The Like Button: A Way to Explore Social Interaction in Threaded Discourse

by

Alexandra Makos

A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy
Curriculum, Teaching and Learning, Ontario Institute for Studies in Education
University of Toronto

© Copyright by Alexandra Makos 2017
The Like Button: A Way to Explore Social Interaction in Threaded Discourse
Alexandra Makos
Doctor of Philosophy
Curriculum, Teaching and Learning, Ontario Institute for Studies in Education
University of Toronto
2017

Abstract

Recent studies have begun to explore alternative ways to support social interaction in threaded discourse. This dissertation extends this research by exploring how a Like button, much like Facebook’s, can provide students with a low-cost mechanism to interact with each other’s discussion posts. I explore how this ubiquitous social media tool was integrated into an experimental academic online learning environment, Pepper, to support student discussion from multiple perspectives. The research suggests that the Like button was adopted in threaded discourse as an indirect speech act, the meaning of which varies because of how it is used by students. There are four studies that explore how the Like button was used by students enrolled in graduate-level online discussion-based courses at a leading Canadian institute of education. Both quantitative and qualitative data were used to explore student interactivity to better understand the role of the Like button as a social scaffold in threaded discourse. Social constructivism and speech act theory were used as frameworks for the project. Collectively, the findings suggest that the Like button in threaded discourse was an effective social interaction tool used by students to engage in a shared learning experience. Recommendations to expand the Like button into additional low-cost social and learning scaffolds and to provide environment users with integrated support on the availability and function of these tools is provided. The findings of my research act as a starting point for integrating more low-cost mechanisms into
threaded discourse by providing thought-provoking ways of integrating and adapting ubiquitous social media tools in academic environments.
Dedication

Arianna, may you always be curious and find wonder in the conspicuous.

Mom, you inspire me to be the best woman I can be. This would not have been possible without you. Thank you for everything.
Acknowledgements

I am so grateful to have thought-provoking individuals in my life—you fuel my curiosity and motivate me to be more creative and more inquisitive.

To my supervisor, Jim Hewitt: Jim, you are a wonderful supervisor, mentor and friend. You encourage me in so many ways to strive for greatness that I cannot begin to thank you enough. Your questions, feedback, and finesse have taught me to continue to ask questions about the seemingly obvious.

To my mentor and committee member, Clare Brett: Clare, you have been with me on this journey in so many ways that words cannot describe. Your unconditional support and the countless hours I spent with you discussing life allows me to be a grounded academic, wife, mother, and role model. For this I am grateful.

To my committee member, Earl Woodruff: Earl, your early adoption of the latest technologies keeps me considering their potential in education and research. You always make me believe that if we look deep enough we can solve any technology-related issue.

Along my journey I have had the privilege of making some amazing friendships that I know will make our futures brighter and last a lifetime. Daniel Zingaro, Murat Oztok, and Kyungmee Lee, you were my first lab-mates and welcomed me with open arms. Each of you allowed me to see educational technology through different lenses. Our nights and weekends in that lab sharing ideas and writing conference papers and articles reminds me that we must always ask questions, however obvious the answer. Zhenhua Xu, I truly appreciate our friendship—it has made my academic journey more meaningful in countless ways. I cannot wait to see what adventures we encounter in the future.

I saved the best for last, my family—I love you all so much. To my husband, Raymond, you are always calm and remind me that no task is too big if you think big. To my mother and father, Susan and Emmanuel, you are the source of my strength and my confidence. You taught me to be curious and shoot for the moon. To my sister and brother, Eleni and Nicholas, we are always pushing each other to be more fabulous versions of ourselves—it’s definitely working ;).
# Table of Contents

Dedication .......................................................................................................................... iv
Acknowledgements ............................................................................................................ v
Table of Contents ................................................................................................................ vi
List of Tables .................................................................................................................... vi
List of Figures .................................................................................................................... ix
List of Appendices ............................................................................................................. xi
Key Terms .......................................................................................................................... xiii

Chapter 1 Introduction ....................................................................................................... 1
  1.1 Rationale ....................................................................................................................... 4
  1.1.1 Research Questions ................................................................................................. 5
  1.2 Background of the Researcher .................................................................................... 6
  1.3 Thesis Outline .............................................................................................................. 7

Chapter 2 Literature Review ............................................................................................... 9
  2.1 Conceptual Frameworks .............................................................................................. 9
  2.1.1 Social Constructivist Theory .................................................................................. 9
  2.1.2 Speech Act Theory .............................................................................................. 11
  2.1.3 Synergy between theories .................................................................................... 13
  2.2 Threaded Discourse in Online Learning ..................................................................... 14
  2.3 Stimulating Interaction through Design: The Facebook Case ................................. 16
  2.3.1 Facebook as a Social Tool ..................................................................................... 16
  2.3.2 Facebook as an Educational Tool ......................................................................... 19
  2.4 Social Interactions in Online Learning Environments ............................................. 23
  2.5 Collaborative Learning in Online Environments ..................................................... 25
  2.5.1 Community of Inquiry Model .............................................................................. 26
  2.5.2 Cooperative Learning Theory ............................................................................. 26
  2.5.3 Community-Building ......................................................................................... 27

Chapter 3 Project Overview ............................................................................................... 32
  3.1 Research Design .......................................................................................................... 32
  3.2 Pepper ........................................................................................................................ 33
  3.3 Rationale for Using Pepper as the Online Learning Environment ........................... 34
  3.4 Data Source and Collection Brief ............................................................................. 35
  3.5 Reliability and Validity .............................................................................................. 38
7.3.1 Differences between non-Liked notes and Liked notes in the courses surveyed

7.3.2 The relationship between student sense of community score and the use of the Like button

7.3.3 The effect of students’ perception of the Like button supporting social interaction on their sense of community score

7.3.4 The effect of students’ perception of the Like button supporting their learning experience on their sense of community score

7.3.5 The positive effect of students’ use of the Like button on their sense of community score

7.3.6 The effect of students’ use of social media on their sense of community score

7.3.7 The effect of students’ contributions to social media on their sense of community score

7.3.8 The effect of students’ use of social media tools on their sense of community score

7.4 Discussion

7.5 Limitations

Chapter 8 Like the Like

8.1 Implications

8.2 Recommendations

8.2.1 Redesigning the Like button

8.2.2 Navigating the Online Environment

8.3 Conclusions

8.4 Future Research

References

Appendix A: The Recruitment E-mail to Students

Appendix B: Survey

Appendix C: Informed Consent

Appendix D: Interview Protocol
List of Tables

Table 3.1 .......................................................... 37
  Summary of research questions, data types, sources, participants and analyses
Table 4.1 .......................................................... 43
  Student Use of the Like Button in Discussion-Based Pepper Courses by Course
Table 4.2 .......................................................... 44
  Student Use of the Like Button in Discussion-Based Pepper
Table 4.3 .......................................................... 46
  Student Frequency of Use of the Like Button in Pepper
Table 4.4 .......................................................... 47
  Frequency of Responses: Description of How Students Use the Like Button
Table 4.5 .......................................................... 49
  Student opinion on the Like button's ability to support their learning experience
Table 4.6 .......................................................... 50
  Student opinion on the Like button's ability to support social interaction
Table 4.7 .......................................................... 51
  Student opinion on how they feel when they give Likes to their peers
Table 5.1 .......................................................... 65
  Data Output for Like Button use as a Reply Acknowledgement Tool in Pepper Courses
Table 5.2 .......................................................... 67
  Averages for Like button use as a Reply Acknowledgement Tool in Pepper courses by field
Table 6.1 .......................................................... 76
  Aggregate Means: Non-Liked Notes, Liked Notes and Means Difference (non-Liked – Liked)
Table 6.2 .......................................................... 77
  Paired samples t-test for aggregate data (non-Liked – Liked notes)
Table 6.3 .......................................................... 79
  CTL Means: Non-Liked Notes, Liked Notes and Means Difference (non-Liked – Liked)
Table 6.4 .......................................................... 80
  Paired samples t-test for CTL data (non-Liked - Liked notes)
Table 6.5 .......................................................... 82
  APHD Means: Non-Liked Notes, Liked Notes and Means Difference (non-Liked – Liked)
Table 6.6 .......................................................... 83
  Paired samples t-test for APHD data (non-Liked – Liked notes)
Table 7.1 .......................................................... 91
  Degree Type
Table 7.2 .......................................................... 91
  Enrolment Type
Table 7.3 .......................................................... 91
  Number of online courses completed
Table 7.4 .......................................................... 92
  Descriptive statistics for student reported sense of connectedness, learning and community by number of online courses completed
List of Figures

Figure 1.1 The Like button icon ........................................................................................................ 4

Figure 1.2 Screen shot of a graduate level Pepper community [emphasis added to identify likes, red oval]. Left: example of a threaded discussion with Liked notes. Right: example of a note that has been Liked .................................................................................................................. 4

Figure 3.1 Screen shot of a graduate level Pepper community [emphasis added to identify likes, red oval]. Left: example of a threaded discussion with Liked notes. Right: example of a note that has been Liked .................................................................................................................. 34

Figure 8.1 Facebook Reactions icons (Krug, 2016) ........................................................................... 117

Figure 8.2 Possible new icons to represent an extension of the Like button in Pepper ............... 118

Figure 8.3 LinkedIn navigation assistance for new messaging system organization .................. 120

Figure 8.4 Example of the navigation helper for the Like button..................................................... 121
List of Appendices

Appendix A: The Recruitment Email to Students ................................................................. 144
Appendix B: Survey .................................................................................................................. 145
Appendix C: Informed Consent ............................................................................................... 151
Appendix D: Interview Protocol .............................................................................................. 154
# Key Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Vocabulary Ratio</td>
<td>The academic vocabulary ratio is the percentage of academic words found in a note. Higher values indicate the use of more academic vocabulary. This analysis uses the Academic Word List (AWL) (Coxhead, 2000), a collection of the most frequently occurring words in academic texts. Ten to fifteen percent of the words in a typical academic journal article belong to the Academic Word List.</td>
</tr>
<tr>
<td>Computer Supported Collaborative Learning (CSCL)</td>
<td>Computer supported collaborative learning refers to supporting learning through social interaction with use of a computer and the Internet. For this study, students engaged in CSCL are involved in knowledge construction through discourse that occurs in an online learning environment.</td>
</tr>
<tr>
<td>Discussion-Based Course</td>
<td>Discussion-based course refers to a course that engages students in discussion as the main learning activity. Students engage in discussion by replying to each other’s notes and making meaning from the content. This may occur through discussion facilitation where individual(s) act as moderators of the discussion to keep the process of knowledge construction through discussion progressing. In learning communities where facilitation is not used, discussion is developed through introductory questions and the evolution of student ideas through processes of questioning and critiquing.</td>
</tr>
<tr>
<td>Emotional Intensity</td>
<td>A metric that is calculated by using the sentiment score (ranging from 0 to 10, where 0 is very negative, and 10 is very positive) (Pang &amp; Lee, 2008) and subtracting 5. If the result is a negative score, then the language is more negative in nature. If the result is a positive score, then the language is more positive in nature.</td>
</tr>
</tbody>
</table>
Indirect Speech Act

Indirect speech acts occur when a speaker communicates to a hearer more than they actually say by relying on the interlocutor’s mutual shared background information and the gathering of contextual cues (Searle, 1969). Indirect speech acts result in a subsequent action or performance. Examples of indirect speech acts are someone advising, prohibiting, inviting, and expressing gratitude to another. Indirect speech acts are considered illocutionary acts (Austin, 1962/1975). There are different categories of indirect speech acts used by linguists to code speech events. See Section 2.1.1 for a detailed description.

Informal Vocabulary Ratio

The informal vocabulary ratio is the percentage of informal words used in a note. This calculation uses a wordlist that was developed internally based on the content of public Internet discussion boards. It contains words that are used in less formal speech (e.g., “yup”, “lol”, “ok”) (Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007).

Liked Note

A Liked note refers to a note that has received a Like from at least one student.

Likes Given

Likes given are the number of Likes a student has given to others’ notes.

Like Rate

A construct developed to indicate how many Likes students are giving to notes. This is calculated by dividing the number of Likes given to notes in a course by the number of notes in the course. The Like rate can be greater than 100% in a course because a note can be Liked more than once (although it can only be Liked once by any given user).

Likes Received

Likes received are the number of Likes a student has received from others.

Links

Links refer to an internal link in Pepper between notes. This allows students to write notes that connect other students’ ideas by embedding a link to particular note(s) in their note.
<table>
<thead>
<tr>
<th><strong>Links Created</strong></th>
<th>Links created refers to the number of links created by a note author to others’ notes.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Links To</strong></td>
<td>Links to refers to the number of links in others’ notes that link to a particular students’ content.</td>
</tr>
<tr>
<td><strong>Non-Liked Note</strong></td>
<td>Non-Liked notes refers to a note that does not receive a Like.</td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>A note is the main element of a threaded discussion in Pepper. Students create a note and others reply to these notes. Notes can be edited, deleted, or marked as private (no one other than the author of the note can see a private note). Every note has a Like button associated with it.</td>
</tr>
<tr>
<td><strong>Note Author</strong></td>
<td>The note author is the individual who writes a particular note.</td>
</tr>
<tr>
<td><strong>Note Grade Level</strong></td>
<td>Note grade level refers to the Flesch-Kincaid Grade Level algorithm (Flesch, 1951) used to calculate the grade level at which notes are written. The higher the note grade level, the more complex the content.</td>
</tr>
<tr>
<td><strong>Note Length</strong></td>
<td>Note length is the total number of words in a note. Mean note is calculated for each student where the total number of words across all notes is divided by the total notes written.</td>
</tr>
<tr>
<td><strong>Online Learning Environment (OLE)</strong></td>
<td>An online learning environment refers to the online space or platform where students engage in CSCL. For this study, the OLE used is Pepper.</td>
</tr>
<tr>
<td><strong>Pepper</strong></td>
<td>Pepper is an experimental online learning environment. It has been selected for use in this study. Knowledge construction through collaborative discussion is the focus of many courses that use this environment.</td>
</tr>
<tr>
<td><strong>Pronoun Vocabulary Ratio</strong></td>
<td>The pronoun vocabulary ratio is the percentage of pronouns found in a note. Higher values indicate the use of more pronouns. The pronoun word list used is from the LIWC software (Pennebaker, Chung, Ireland, Gonzales, &amp; Booth, 2007).</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Read</strong></td>
<td>Read refers to the act of reading a note in Pepper.</td>
</tr>
<tr>
<td><strong>Reads</strong></td>
<td>Reads refers to the number of times a note has been read.</td>
</tr>
<tr>
<td><strong>Reading Ease Score</strong></td>
<td>The reading ease score refers to the degree of readability of note. Score is calculated using the Flesch Reading Ease algorithm (Flesch, 1951). Higher values indicate text that is more readable.</td>
</tr>
<tr>
<td><strong>Replies</strong></td>
<td>Replies refer to the number of replies that a note has received.</td>
</tr>
<tr>
<td><strong>Reply Acknowledgement Pattern</strong></td>
<td>The reply acknowledgement pattern identified in Pepper data reveal a particular sequence of online events represented by the following interaction: Student A writes a note, Student B responds to it, and then Student A Likes the reply note.</td>
</tr>
<tr>
<td><strong>Revised Note</strong></td>
<td>A revised note is a note that has been edited by its author. Pepper logs the number of revisions made to a note.</td>
</tr>
<tr>
<td><strong>Sentence Length</strong></td>
<td>Sentence length is the number of words in a sentence.</td>
</tr>
<tr>
<td><strong>Sentiment</strong></td>
<td>Sentiment refers to the degree of positivity of the language that is used, ranging from 0–10 (Pang &amp; Lee, 2008) in a note. A score of 5 is neutral.</td>
</tr>
<tr>
<td><strong>Social Vocabulary Ratio</strong></td>
<td>The social vocabulary ratio is the percentage of social words found in a note. Higher values indicate the use of more social vocabulary. The social word list used is from the LIWC software (Pennebaker, Chung, Ireland, Gonzales, &amp; Booth, 2007).</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Speech Act</td>
<td>In the fields of linguistics and philosophy, speech acts are a unit of language used to express meaning where the utterance is considered as an action, particularly regarding its intention, purpose, or effect (Austin, 1962/1975; Searle, 1969). Examples of speech acts are someone giving promise, declaring, advising, asking, inviting, and ordering to another. See Section 2.1.1 for a detailed description.</td>
</tr>
<tr>
<td>SPSS</td>
<td>SPSS is the statistical software used for quantitative data analysis in this study. SPSS stands for “Statistical Package for the Social Sciences.”</td>
</tr>
<tr>
<td>String</td>
<td>A string is the primary element, multiple of which, make up a thread in a discussion. In Pepper, strings are known as “notes”.</td>
</tr>
<tr>
<td>Thread</td>
<td>Threads are typically used in online learning environments to represent a topic or conversation. Students engage in discussions about course content using threads (Hewitt, 2005). Refer to Figure 1.3 for the arrangement of a thread in Pepper. The notes/strings in a thread are arranged hierarchically and chronologically.</td>
</tr>
<tr>
<td>Threaded Discourse</td>
<td>The visible manifestation of an online discussion. Threaded discussions in online learning environments resemble online forum discussions where replies to posts are grouped together in threads and indented to form a step pattern. The arrangement of posts within a forum is hierarchical and chronological. Within a particular thread, the posts are also chronological and are comprised of strings.</td>
</tr>
</tbody>
</table>
Chapter 1
Introduction

Threaded discussions are a way to organize conversations in online environments by topic. A new thread is generated when a post is made by an author and strings of replies are generated within that thread because of conversation surrounding that original post. Threads are organized hierarchically, with each “reply” displayed immediately beneath the note it is replying to, and indented to the right (see Figure 1.2). They are most commonly used in forums, e-mail, and online learning environments (OLEs) so that users of these systems can easily navigate content in the text-rich space.

Threads are arguably the most visible manifestation of an online discussion. Because a thread is fundamentally a mechanistic construct (Herring, 1999), it is technically possible for consecutive online notes to have little or no bearing on one another. Nevertheless, threads are well-defined, easily identifiable artifacts; and the reply protocol roughly aligns with the notion of conversational turntaking. (Hewitt, 2005, p. 568)

These predominately text-based environments offer many benefits for learning: (1) asynchronous communication any time of day (Oztok et al., 2014), (2) simultaneous engagement in discussions between remotely distributed individuals on a variety of topics (Hammond, 1999; Walther, Loh, & Granka, 2005), and (3) allowing learners to reflect on the content posted in the discussions before creating a new post or response of their own (Hewitt, 2005). However, some argue that the text-rich environment can be difficult for students to engage in discussions with peers, not because of the threaded structure of the discussion, but due to the lack of aural and visual cues needed for individuals to generate the social dynamic most commonly experienced in face-to-face discussions (e.g., Fussell, 2002; Walther, Loh, & Granka, 2005).

An understanding of the ways verbal and nonverbal cues are integrated [in online environments] has become especially relevant today, now that new technologies allow for communication via text-based chat, e-mail, and other media in which verbal communication is the primary channel of communication… A better understanding of how people integrate verbal and non-verbal cues in face-to-face settings would enable system designers to develop technologies to support emotional communication among remotely distributed parties. (Fussell, 2002, p. 11)
In addition to the organization of online discussions as threads, it is thought that environments can be designed to expand interactivity beyond posting text-based responses to posts by providing students with different ways to interact with content, their peers, their instructor, and the environment itself.

Technology has the potential “to create communities of learners…and can facilitate the interactions and activities necessary” for learning to occur (Jonassen, Davidson, Collins, Campbell, & Bannan Haag, 1995, p. 7). However, research examining student interaction in OLEs reports a discrepancy between an environment’s ability to cultivate student interaction and how well those interactions support learning goals (Kreijns, Kirschner, & Jochems, 2003). Kreijns, Kirschner, and Jochems identified two factors contributing to this discord: (1) instructors taking social interaction for granted by relying on the environment to support social interaction, and (2) social interaction in online courses being restricted to cognitive processes that only support educational outcomes. Relying on the environment to support social interaction when social interaction is not intentionally designed and integrated into an online course perpetuates this issue. Richardson and Swan (2003) suggest that students’ learning is negatively affected when instructors do not integrate social interaction and relationship building into their courses. The greater goal of the online learning community, although not explicit, can be considered to foster social interactions that provide students with opportunities to construct and advance knowledge in a supportive environment. In focusing on the design of OLEs in terms of tools designed to work synergistically with threads to generate some social exchange, it may be possible to overcome the lack of interpersonal interaction experienced in traditional distance learning (e.g., Jung, Choi, Lim, & Leem, 2002; Kreijns, Kirschner, & Jochems, 2003).

In an OLE, students typically spend most of their time reading, composing their thoughts, and producing discussion posts. Discussion is central to making progress on difficult concepts and students need to be prepared to ask questions, acknowledge when they have difficulties, and occasionally offer perspectives knowing that others might disagree with them (Jung et al., 2002). If there is limited social interaction between students, then difficult discussions may result in students failing to participate in threads (Hewitt, 2005). Some researchers argue that a sense of community and user engagement needs to be established for fruitful discussions to evolve (Swan, 2005). A sense of community is important because it engenders trust among students, which can facilitate the collaborative processes of knowledge construction (Garrison, Anderson, & Archer,
If students are not able to develop a sense of a trust within their online learning community, then learning can be hindered (Rovai, 2002a). Schellens and Valcke (2005) found that increased discussion activity reflects an increase in the appearance of higher levels of knowledge construction. Their research suggests that increasing trust and the establishment of social interactions that support discussion activity are important for learning. These behaviours are not exclusive to learning; they are fundamental for human interaction (Sproull & Faraj, 1997).

Before social network sites dominated our daily routines, research on computer-mediated communications suggested that systems designed for text-rich interactions were not only devoid of mechanisms for social exchange, but the task of emotional exchange was seemingly out of reach. Walther, Loh, and Granka (2005) best capture the spirit of the time before social media changed the how we interact socially online:

> A central issue in the research about computer-mediated communication (CMC) is whether and how the social meaning of interactions is affected by the absence of nonverbal cues when communicators substitute text-based electronic messaging for face-to-face (FTF) encounters. Two prevailing positions have arisen with respect to this issue: One, that the absence of nonverbal vocal and physical cues denies users important information about partners’ characteristics, emotions, and attitudes, resulting in less sociable, relational, understandable, and/or effective communication. The other, that people adapt to the medium by imbuing verbal messages with, and/or by interpreting from contextual and stylistic cues, information about participants’ characteristics, attitudes, and emotions, allowing for normal or enhanced relational communication to accrue. (p. 36)

We are at a unique point in time where the use of social media platforms, like Facebook, can provide us with examples of how people socially interact online using social scaffolding tools that are designed to allow people to give positive feedback and connect with things they care about amongst a network of remotely distributed friends. It reminds us that “[p]eople on the net are not only solitary information processors but also social beings. They are not only looking for information; they are also looking for affiliation, support and affirmation…Behaviors appropriate [for social interaction] … include chatting, discussing, arguing, and confiding” (Sproull & Faraj, 1997, p. 38). An examination of social media tools and their affordances in scaffolding social interaction provides research in online learning with possible mechanisms for supporting students in threaded discourse. Considering this, the issue of how to scaffold social
interaction in online education can be reframed: How can social media tools scaffold the interactions students have in threaded discourse?

1.1 Rationale

In recent years, our research team, The Pepper Project, has become interested in exploring how new social media tools might be used in online learning environments. As part of this research, in 2012 we introduced a Like button to our experimental learning environment, Pepper. Similar to the Like button in Facebook, students could “Like” each other’s notes (Figure 1.1 and 1.2).

![Figure 1.1. The Like button icon.](image)

![Figure 1.2. Screen shot of a graduate level Pepper community [emphasis added to identify likes, red oval]. Left: example of a threaded discussion with Liked notes. Right: example of a note that has been Liked.](image)

They were notified upon logging into their Pepper course each time one of their notes was Liked by a classmate, they could easily see which notes in a discussion thread had been Liked, and by whom. The new Like button was surprisingly successful. Across all Pepper courses in the calendar year 2012, the Like button was pressed approximately 32,000 times (approximately...
100,000 notes were generated over that period). Clearly students were making regular use of the Like button, but we did not understand why.

Use of the Like button as a low-cost tool in social media platforms allows users to informally share and exchange ideas, thoughts, and feelings with their friends with a simple click of the button. So, the integration of a Like button in threaded discussions may provide a simple mechanism for developing a more nuanced mode of social interaction.

The purpose of this project was to develop a series of studies through which I can understand the affordance of the Like button (popularized by Facebook) in a formal, academic online learning environment that employed discussion threads. This contributes to the body of research concerned with the structural, experiential, and motivational factors that appear to promote social and cognitive aspects of learning through threaded discourse (Gunawardena, 1995; Vrasidas & McIsaac, 1999; Garrison, Anderson, & Archer, 2001 Swan, 2005). The current study examines how the Like button served as a social mechanism to work in conjunction with threaded discourse and how it was adopted by students. Methodologically, this research analyzes both qualitative and quantitative data to explore various aspects of how students adopt the use of the Like button in their threaded discussions. A detailed description of the button’s functionality in Pepper is described in Key Terms (p. xii–xiv). The results of the studies are interpreted within the framework of social constructivist theory and speech act theory to capture the development of social interaction conventions in online learning environments. The insights and recommendations gleaned from this exploratory series of studies can inform future designs of online learning environments, online learning community participants (instructors and students), and online learning researchers.

1.1.1 Research Questions

The overarching research question is: How is the Like button used by students in online discussion-based courses to interact with each other? The following sub-questions inform the research program:

1. How do students experience the Like button in threaded discourse?
a. How often do students use the Like button?

b. How do students describe their use of the Like button?

2. How pervasive is the use of the Like button as a form of acknowledgement in online discussions?

3. How do Liked notes differ from non-Liked notes in quantifiable features including number of words, revisions, reads, replies, and other quantifiable features?

4. How does student perception of the role of the Like button relate to sense of community?

1.2 Background of the Researcher

Years ago, a graduate professor of mine spoke of the masters of the Renaissance. She described how these masters transformed their creations by defying the properties of the materials they were working with. Her words proved to summarize the academic journey that I have embarked on. As an undergraduate, my venture into the University of Toronto allowed me to tackle the seemingly dissimilar fields of Human Biology and Art History. Five years of study resulted in an Honours Bachelors of Science. Most of my time during those years was spent exploring my passion for the Italian Renaissance, specifically sculpture and architecture. My curiosity was piqued by the design and execution of these massive art forms, which lead me to pursue a Masters of Art History. Working on this degree was pivotal to my journey. Although I was passionate about the subject matter, I kept asking myself why Art History is taught the way it is—rather than a transformative experience, rote memorization was encouraged, which was quite like my experience studying the sciences. After completing the Art History program, I decided to transform my experiences into the study of curriculum development and instructional design.

I worked on my Masters of Education and shaped my own journey in the program. I focused on science, mathematics, and technology courses, where I eventually met Professor Jim Hewitt. It was CTL 1602- Introduction to Computers in Education that would bring meaning to my past studies, my present frustrations with curriculum design and instruction, and my future endeavours. I found purpose in discussing technology’s role in education, more specifically, understanding how technology can increase student learning if it is purposefully integrated into both curriculum development and teaching practices. I began to shape spaces where I, as a
student, could maximize my learning opportunities and make as many connections as possible to the everyday world. As a researcher, I knew there was an opportunity to explore the potential of designed tools and environments where, given a developed curriculum and pedagogical approaches, learning experiences could be transformed. Pepper provided me with the opportunity to allow my art and educational technology experience to collide. There was something about the system being local and experimental that attracted me to online learning environment design. The ability to quickly design, create, implement, and then evaluate the effectiveness of elements in this online environment is what transformed my art and science experiences into valuable lenses with which I could study the pedagogical value of design choices.

Entering the doctoral program and conducting research on social interactions that take place within online learning environments became an obvious path for me. I wanted to incorporate my interest in design with my need to connect and interact with my peers in the online courses I was enrolled in. I am always compelled to socialize with my peers in both face-to-face and online courses because I feel that it brings more meaning and increases my level of engagement. I learn material that is of interest to me when I am comfortable sharing with my peers. This project captures my essence. The intersection of art and technology on my life-long learning journey allows me to explore the myriad of learning possibilities with one click of a button—the Like button.

1.3 Thesis Outline

Chapter One positions my research. This is followed by my research questions and my background. Chapter Two is a review of the literature. Social constructivist and speech act theory are described as the conceptual frameworks for the investigation. There are several bodies of literature that contribute to this inquiry; I focus on the ways that learners experience threaded discourse, the nature of social interactions in social networks and within threaded computer-supported collaborative learning (CSCL) environments, and collaborative learning in online learning environments (OLEs). Chapter Three provides an overview of the project. The research questions are provided. A rationale is provided for the use of Pepper in this study followed by a description of the data sources and collection processes. A description of the methodological rationale is provided. Chapters Four through Seven deal with each of the research questions as discrete studies. Each of these chapters contains detailed descriptions of methods used, the
results, and conclude with discussions. Chapter Eight provides a summary of the Like button as a tool for social interaction, suggests recommendations based on the findings of this exploratory project, and offers conclusions and describes future research. References follow this chapter, and appendices, including full versions of the invitation to participate, the survey, the interview protocol, and the letter of consent used in the project, are provided.
Chapter 2
Literature Review

A description of Social Constructivism and Speech Act Theory are provided as the conceptual frameworks for this study. This is followed by a literature review of threaded discourse in online learning, stimulating user interaction in Facebook, social interaction in online learning environments, and collaborative learning in online environments.

2.1 Conceptual Frameworks

2.1.1 Social Constructivist Theory

Researchers of CSCL have employed social constructivism to examine learner interactions with their peers, with their course content, and with their instructors to understand how learning is shaped. Social constructivism suggests that learning is fundamentally social in nature and is shaped by context, conversation, and collaboration (Brown, Collins, & Duguid, 1989; Dewey, 1938; Vygotsky, 1978). Particular to online communities, there has been much focus on how the learning environment functions to support student interaction. “Online interaction supports learning by exposing students to other people’s ideas, and by providing them with an opportunity to articulate their own ideas and receive peer feedback” (Hewitt, 2005, p. 568). Hiltz (1994) discusses how successful online interactions can result in more effective learning and that “the social process of developing shared understanding through interaction is the ‘natural’ way for people to learn” (p. 22). Swan (2005) summarizes social constructivism’s importance for online learning practices: “learning is essentially a social activity, [and] that meaning is constructed through communication, collaborative activity, and interactions with others. It highlights the role of social interactions in meaning making ... [and] knowledge construction” (p. 5). Students develop new understandings and can advance their knowledge and form deeper connections with their peers and course content through social interaction and collaboration. Collectively, the development of user-generated content is a result of common understanding and the negotiation and advancement of ideas by the learners. Students are active knowledge constructors in this case, rather than passive knowledge receivers (Jonassen, 1991).

When social constructivism is employed as a theoretical framework, the interactions students engage in to develop discourse-based content becomes central; discussions connect individuals
in an online learning environment and motivate them to take an active role in knowledge construction and the meaning-making processes (Oztok, 2013). While researchers agree that social interaction is a necessity for collaboration, CSCL research framed by social constructivist theory continues to focus on how the functionality of online learning environments “support and guide social interaction towards critical thinking, argumentation, or socially constructing meaning” (Kreijns, Kirschner, & Jochems, 2003).

For this thesis, social constructivism is used to recognize that social interaction between students is a necessary component of engagement (Brown, Collins, & Duguid, 1989; Dewey, 1938; Vygotsky, 1978) in online learning communities. Emphasis is placed on developing a sense of trust, affirmation, and sense of community that may enhance student activity and collaboration in online discussions (Kreijns, Kirschner, & Vermeulen, 2013). Studies on social presence suggest that a difference in online social interaction exists when CSCL members have had prior interaction with each other, whether it is in previous courses or in face-to-face meetings with each other (e.g., Tu, 2002). Within the online learning environment, there are many opportunities for learners to scaffold and promote knowledge construction using the tools integrated into the system (e.g., Vrasidas, 2000), but the focus of the studies in this thesis are on how students are adapting these tools, in this case the Like button, to engage their peers in ways other than text-based responses. Social constructivist perspectives underscore the importance of social interaction for cultivating socioemotional ties, like trust (Kreijns, Kirschner, & Vermeulen, 2013), between learners within CSCL environments, which may then lead to a better foundation for the social interaction necessary for successful collaboration and engagement in online discussions. Consequently, both instructors and learners should be cognizant of the importance of social interactions; yet this has rarely been the focus of course design and online teaching and learning practices.

This framework will be useful in conceptualizing the interactions taking place amongst learners in various situations within the CSCL environment as a fundamental aspect of learning. In exploring the interactions of learners in conjunction with speech act theory, it allows me to better understand how social interactions can influence the nature of student learning in online discussion-based courses.
2.1.2 Speech Act Theory

Speech act theory helps us describe what happens during an exchange of words between individuals because it allows them to operate within and interact with the world around them. It assumes that “language forms and intentions are relatively formulaic and that there is a direct correspondence between sentence forms (for example, in terms of structure and lexicon) and the function or meaning of an utterance” (Kaburise, 2012). As explored by Austin (1962/1975, 2005) and Searle (1969, 1975), breaking language down into speech acts allows us to contemplate the words philosophically and classify them systematically in attempt to explain their meaning. In linguistics, the empirical classification of speech acts predominates the research in this area due to the development of classification systems by Austin (1962/1975) and Searle (1975).

Austin (1962/1975) defined a speech act as an utterance that has a performative function. Austin proposed that speech acts be analyzed in three categories: (1) as a locutionary act—what is said, (2) as an illocutionary act—what is meant, and (3) as a perlocutionary act—what happens as a result (1962/1975). To bring clarity to Austin’s theory, Searle defined a speech act as: “language that both describes and is the action” (Carr, Schrock, & Dauterman, 2012, p. 2) because of the number of actions involved in a speech act. Searle distinguished between his and Austin’s definition by stating that “the illocutionary act is the minimal unit of linguistic communication” (1969, p. 2). Searle (1975) developed a classification for illocutionary acts in an attempt to emphasize that language and its meaning are used in five general ways that do not always correlate to the form and meaning of utterances: (1) assertives—“we tell people how things are”, (2) directives—“we try to get them to do things”, (3) commissives—“we commit ourselves to doing things”, (4) expressives—“we express our feelings and attitudes”, and (5) declarations—“we bring about changes in the world through our utterances” (p. viii).

For both Austin and Searle, meaning is achieved by those engaged in conversation when the form and meaning in a speech act correlate, also known as a direct speech act; however, when form and meaning of the words used do not correlate, this can result in a misunderstanding, also known as an indirect speech act (Searle, 1969). Both theorists acknowledged that miscommunication between individuals was a result of a lack of correlation between the form and meaning. Austin’s 2005 edition of his seminal work on indirect speech acts offers that misunderstandings between participants of a speech act can be reduced with clues from the
context or the conditions within which the exchange is taking place. So, the shared background knowledge between the speaker(s) and listener(s) in a speech act contributes to their ability to make meaning, as the background clues allow those engaged to determine with greater accuracy what they expect the speech act to achieve.

Speech act theory seeks “to understand how individuals construct messages to communicate and create meaning through language, and specifically the construction and purposes of messages” (Carr et al., 2012, p. 2). Meaning is created when those engaged in speech acts correctly interpret what is communicated by those individuals engaged in the act. The meaning of a speech act is social in nature, as clues about the context are related to the space within which the act is unfolding, or an understanding of that space. Thus, in both verbal and non-verbal forms, the construction of language can influence the interpretation of the speech act.

In text-based environments such as social network sites or online learning environments, the application of speech act theory has been limited to the classification of text-based communications between individuals using Searle’s categories of illocutionary acts or similar types of classification systems used by linguists (McNair & Paretti, 2010; Carr et al., 2012; Maíz-Arévalo, 2013; Carretero, Maíz-Arévalo, & Martínez, 2015). When broken down in terms of online posts, a speech act is a post or a series of posts through which meaning is made between individuals. That is, an individual constructed a post, and the reader accurately interpreting it and responding to it in various ways (for example, Liking a Facebook post). In some online learning environments there are limited tools for students to respond to posts, so the exchange of posts in a thread results. Text-rich posts are constructed by individuals knowing that they must attempt to convey their thoughts the best way they can to avoid miscommunication with the readers. But, this is not always the case, and some research has focused on how emoticons are used in conjunction with text to more accurately convey meaning (see Dresner & Herring, 2010). As a response to environments lacking aural and visual cues, tools are being integrated to assist in generating content that better allows individuals to convey meaning and thus interpret speech acts, for example, audio record features and video message tools.

Additionally, social networking sites, like Facebook and Twitter, have created ways for users to interact with each other’s content by Liking or Favouriting them. It is the latter type of interactions that this thesis is concerned with, and, more specifically, understanding how Liking can be considered an indirect speech act.
When speech act theory is mapped onto aspects of an online learning environment, the following interpretation is used: tools like the Like button will be considered a language developed for online spaces that scaffold the language used in text-based posts, both of which inform each other and can be analyzed using speech act theory. The context and conditions of the speech acts can be described by the purpose of having individuals in the course engaging in course-related content. The correlation between the language and context help to determine the type of illocutionary acts taking place.

The use of tools (for example, the Like button) in online environments to quickly convey meaning to recipients is becoming ubiquitous, particularly in social network sites. The use of these tools in online learning environments is relatively new and limited, as researchers are only now beginning to understand the value of integrating such tools as the Like, Favourite, and Share buttons on student learning, little of which has been documented empirically. Each of these buttons can communicate to the recipient various things, the first being the literal interpretation of a button as described by its name; however, more work needs to be done in this area. Throughout the four studies in this thesis, it will become evident that the interpretation of the Like button as a speech action is pertinent in online environments because it is a way for individuals to quickly engage in a positive exchange with the individual who contributed to the online discussion. Speech act theory will not be used in its traditional sense, as linguists and pragmatists use it to code the utterances exchanged between interlocutors, but rather as an overarching framework that deals with the ambiguity of language in discussions. To better understand the role of the Like button in supporting the social nature and impact of its use in discussion-based online environments, speech act theory to informs social constructivist theory by describing how interactions and language can be interpreted in several ways.

2.1.3 Synergy between theories

In using speech act theory to inform social constructivism as the framework for this thesis, I acknowledge that the language used in online learning environments both describes and is (Searle, 1969) what the users intend to convey to the readers. As described in speech act theory, discussions include two participants, the speaker and listener (Searle, 1969; Searle, 1979). Mapping speech act theory to online, text-rich environments, students would assume two roles, the author—when they are posting notes—and the reader—when they are reading notes.
In discussion-based courses, understanding the true meaning of posts within threaded discussions is difficult because of a lack of aural and visual cues, and a lack of context and intention of what is being said by participants. To encourage students to engage with each other and act as both author and reader, a sense of trust must be cultivated; this is considered by some researchers to be a necessary feature of online discussions (Swan, 2005; Garrison et al., 2001) for students to learn. Social constructivism speaks to the context within which the users can appropriate tools to provide them with cues to better understand one another. The synergy between these two theories acknowledges the connection between the text and its reception in the online environment through social dynamics to stimulate continued engagement.

2.2 Threaded Discourse in Online Learning

Asynchronous threaded discussions are typically used in online learning environments to engage students in discussions about course content (Hewitt, 2005). Threaded computer-mediated communication (CMC) discussion is thought to increase dialogic reasoning, critical thinking, and mutual understanding by explicitly positioning one utterance next to another in a way that connects, articulates, and reflects the meaning of the social interaction (Jeong, 2003). The complexities of social interactions that take place in text-based CSCL environments often highlight the need for inquiry into ways in which positive collaborative experiences can be cultivated. Since all users within a CSCL environment can compose content simultaneously, the assumption of this uninterrupted “talk…theoretically permits higher levels of peer discourse than in traditional face-to-face courses” (Hiltz, 1986). However, this body of literature does little to understand the negative effects of the volumes of text produced by students on their ability to critically read and interact with ideas to advance the community’s collective knowledge and understanding. An investigation of student reading behaviours suggests that a possible metric to understand how students read online is “Scan Rate” (Hewitt, Brett, & Peters, 2007). However, it is not clear to what extent scanning text is problematic from this study. In fact, the examples of scanning to find specific information and scanning acting as a coping mechanism for students to keep up with course demands are potentially useful strategies to deal with information overload. The study describes the way that information overload is dealt with in text-based environments and offers the scan rate metric as a possible research tool to investigate whether scanning text
interferes with effective learning (p. 228). However, the possibility of measuring scanning text demonstrates that students adopt various strategies to interact with the material.

The nature of online discussions for student learning should also be considered from the perspective of the time students invest in participating in these discussions. This is important because one of the limiting aspects of learning through face-to-face discussions is time—there is only a set period that students meet each week. The environment and asynchronous nature of online discussions is a space where students can develop meaning through multiple exchanges over an extended period. Hewitt writes: “extended online dialogue should ideally be the norm” (2005, p. 569). During this time, discourse surrounding course content is shared, interrogated, and common understandings generated through a deeply engaged discussion. Students take the time to read others’ contributions, compose their thoughts about what has been said and what has been offered in the course readings, and then construct meaning to be shared with their peers online. As such, there is more time for students to invest in the social and cognitive aspects of learning in these online spaces.

One of the most commonly cited problems in research about online discussions is that students have difficulties engaging with each other because of a lack of verbal and visual cues in text-based environments (Kreijns, Kirschner, & Vermeulen, 2013). Student participation within CMC discussions typically involves the posting of messages (“notes”) in a communal space, reading notes posted by others, and then replying to them. Interaction in these environments tends to be slower and more effortful than face-to-face interaction. During face-to-face interaction, people rely on a wide range of verbal and non-verbal feedback cues (e.g., head nodding) that help them monitor whether their utterances are understood. This phenomenon of looking for other people’s acknowledgement is referred to as “grounding” a conversation (Clark & Brennan, 1991; Clark & Schaefer, 1989). Unfortunately, online environments lack these aural and visual cues, making it much more difficult to “ground” online discussions (Clouder et al., 2006; Çelik, 2013). Some people feel like they are “talking into a vacuum” when they post their ideas online. The lack of feedback produces a sense of uncertainty and insecurity, a problem that is compounded by the slow pace of conversational turns. Some students have reported that they regularly worry about how their classmates and instructor perceive them. If no one responds to their notes, they worry that others disapprove of what they’ve written (Rovai, 2002a). Thus, the “grounding” problem in online environments should be understood to be more than just an impediment to
communication. It also has important consequences for social cohesion, a person’s sense of self-efficacy, and their willingness to engage in open discourse with others, which directly affects collaboration (Clark & Brennan, 1991). A review of how interaction is studied in Facebook informs my understanding of the ways online environments are designed to preserve user-generated data. Given the structure of online discourse, I turn to the literature on social interactions in CSCL environments to inform my understanding of the value of interaction.

2.3 Stimulating Interaction through Design: The Facebook Case

Online environments ranging from social media sites (e.g., Facebook) to online learning environments (e.g., Pepper) are designed to support interaction. These environments provide users with ways to connect, express themselves, and share content with others in their networks and online communities. Specifically, interaction patterns and use of Facebook are consistent across various demographic groups internationally (Viswanath, Mislove, Cha, & Gummadi, 2009). Interactions between individuals are triggered by environment mechanisms (e.g., use of the Like button) and guided by the common goals shared by members of the online community (Viswanath, Mislove, Cha, & Gummadi, 2009; Selwyn, 2009). Of all the online environments accessible, Facebook is the most widely used and will serve as the exemplar for this study. A literature review on the use of Facebook provides us with an understanding of how social interaction is affected by the design of the environment because instances of user interaction are preserved in various types of artifacts (e.g., as pictures, status updates, wall posts, and news feed items).

2.3.1 Facebook as a Social Tool

Facebook provides researchers with a unique opportunity to observe how people relate to each other because of the data mining of preserved content shared by users. A review of the research conducted on Facebook reveals the diverse nature of the research involving the social network (Wilson, Gosling, & Graham, 2012). Facebook’s newsroom website (updated daily) reports that the site has over 890 million daily active users as of December 2014, 82.4% of which live outside of Canada and the United States. Pew Research reports that Facebook use among adults is the most pervasive of the available social media sites (Facebook, Twitter, Instagram, Pinterest, and LinkedIn). A 2014 survey found 70% of adults that have Facebook accounts used the site on
a daily basis and “more than half of Internet users (52%) use two or more of the social media sites [listed above]” (Duggan, Ellison, Lampe, Lenhart & Madden, 2015, p. 2). Social interaction stimulated by the site is based on three core user abilities: (1) having a personalized profile page that allows the user to post content that is relevant to them, (2) connect with “friends” by linking to their profiles (the average number of friends a user has is 155), and (3) interacting with members of Facebook through a variety of mechanisms (Buffardi & Campbell, 2008; Tufekci, 2008) that makes it simple for users to share content that is found on the Internet.

Facebook’s history is important for understanding why people use the social network. At its conception in 2004, Facebook was a way for college students to interact with each other in an online fashion (Selwyn, 2009; Wilson, Gosling, & Graham, 2012). Continuously evolving by opening to new user demographics, Facebook’s audience broadened to include anyone over the age of 13 with an e-mail address (late 2006). Globally, 58% of the world’s adult population uses the site and usage among seniors continues to rise. The rapid expansion of the network demographic resulted in an evolution of the site’s design, including the integration of a news feed in 2006, multiple language support in 2008, the introduction of the Like button in 2009, and the launch of timeline profiles in 2011. Facebook’s design decisions support the interactions that users have with each other and in how users construct their identity (e.g., profile pictures, wall posts, groups, news feed, the Like button). When users register for the site they are presented with blank profile pages that then require personalization by entering information in a variety of fields (Wilson, Gosling, & Graham, 2012). Although users can contribute content to others’ profiles, users typically maintain control of their profiles through curating pictures, liking web content, posting status updates, sharing content with friends, and maintaining privacy settings. It is with this particular aspect of the Facebook phenomenon that this study is concerned.

When Facebook use was exclusive to students in higher education, the environment was used as a way for students to maintain and build their offline relationships in an online setting (Barkhuus & Tashiro, 2010). In 2011, a study found that students predominately used the site for instant communication and connections with their friends when they were not face-to-face with one another (Cheung, Chiu, & Lee, 2011). A study from 2009 of university students in the UK describes student use of Facebook to negotiate their knowledge of what is going on in school by capturing the types of face-to-face discussions students would have in Facebook wall posts and status updates (Selwyn, 2009). The content analysis of student Facebook posts and status updates
revealed five themes: “1) recounting and reflecting on the university experience; 2) exchange of practical information; 3) exchange of academic information; 4) displays of supplication and/or disengagement; and 5) ‘banter’ (i.e., exchanges of humour and nonsense)” (p. 161). Discussion of the findings as a back-channel for students shaping their identity through conflict between the academic and social realms of student life demonstrates how Facebook “has become an important site for the informal, cultural learning of ‘being’ a student, with online interactions and experiences allowing roles to be learnt, values understood and identities shaped” (Selwyn, 2009, p. 171). Similar findings were found in Barkhuus and Tashiro’s study (2010) that examines the integration of Facebook into student social practices (ad-hoc encounters, meeting for coffee, meeting to study, and special events with advanced notice). Facebook is described in the study as a tool that “influences and facilitates real-life behaviour,” allowing students whose goal is to be successful in their studies to also be social amongst their peers, which contributes to a more holistic university experience (p. 140). Findings of a study looking at intensity of Facebook use and college students’ life satisfaction, social trust, civic engagement, and political participation suggest a positive relationship exists. This finding is inconsistent with other studies that suggest that frequent Facebook use contributes to isolation and feelings of being less connected (Valenzuela, Park, & Kee, 2009). Valenzuela, Park, and Kee attribute this to student personality types; for example, if a student is outgoing then they are more likely to be actively engaged in various groups on Facebook that relate to their face-to-face interactions and experiences (2009, p. 893). Cumulatively these studies suggest that Facebook be considered a tool that allows students to engage and negotiate online interactions, and as a social tool that scaffolds learning experiences that take place face-to-face.

Previous studies of the Like button have examined it primarily from an economic perspective. In 2013, a study found the development of a “Like economy” by “tracing the buttons and the data flows they enable” (Gerlitz & Helmond, 2013, p. 1349). The social web, a set of relationships that link people together over the Internet, is the infrastructure that the Like economy operates within (Gerlitz & Helmond, 2011). A result of users Liking content linked to sites outside the social network fuels the Like economy: “the social is of particular economic value, as user interactions are instantly transformed into comparable forms of data and presented to other users in a way that generates more traffic and engagement” (Gerlitz & Helmond, 2013, p. 1349). Facebook capitalized on the social button infrastructure and its ability to generate user data
which has provided opportunities for social network marketing to target consumers. Little research has been conducted on the success of social network marketing, but a case study by Trattner and Kappe (2013) sought to examine the Like economy through an ad driven social stream marketing campaign. The results of the study indicate that the best indicator of social stream marketing is the number of friends a user has (p. 98). The results suggest that the Like button is an indicator of the potential value of the user, where “the more Likes a user gets for the post on her pin wall, the higher the probability that she is a valuable user” (p. 99). A study by Chin, Lu and Wu (2015) explored Facebook users’ motivation for clicking the Like button with a university student population. The study found that users were motivated to click Like based on who the individual was that posted the content, and how many Likes had been received on the post (p. 590). These studies reinforce the findings of a Pew Internet study (Hampton, Goulet, Marlow, & Rainie, 2012) that found “power users” (i.e., those that contribute much more than the typical Facebook user) receive more Likes from the friends in their network because of the volume of content they post and the frequency of their posting. The study of Facebook’s social button infrastructure is limited but they provide insight into the social phenomenon of Liking and how the act of Liking is a social measure of user engagement.

2.3.2 Facebook as an Educational Tool

Research examining the educational use of Facebook is limited, and studies have only begun to explore how the social media site supports educational interactions; this is in part due to the widespread impression of Facebook as being a social tool (Wilson, Gosling, Graham, 2012). Echoing the sentiments of Bosch (2009), Facebook cannot be ignored as a potential educational tool “if one considers the large number of students on Facebook often actively participating in discussions and groups” (p. 190). The following explores how Facebook has been used as a tool to support online educational experiences.

Two years after Facebook was created, a study on identity management and student–faculty relationships was conducted and found that student–faculty contact on Facebook had no impact (positive or negative) on students’ ratings of professors; concerns were expressed by students about how faculty perceived them considering the social nature of their exchanges with their friends (Hewitt & Forte, 2006). A study on the perceived role of Facebook as an educational technology by Roblyer, McDaniel, Wedd, Herman, and Witty (2010) for faculty to manage
communication with students using the social network strengthens this sentiment. The researchers administered a questionnaire to both faculty and students regarding the use and perception of the social network as a classroom communication support tool. Considering that 95% of students surveyed have a Facebook account compared to 73% of faculty respondents indicates that adaptation of the social network tool for educational purposes requires widespread adoption amongst faculty. Frequency of use of Facebook and e-mail were reported and results show that students are more likely to check both communications compared to faculty, who are more likely to check e-mail (Roblyer, McDaniel, Wedd, Herman, & Witty, 2010, p. 137). The questionnaire asked students and faculty what their primary use of Facebook was, and overwhelmingly both groups reported their primary use was to keep in touch with friends and to connect with individuals with whom they have lost touch. The least common use of Facebook was reported as being for instructional purposes (p. 138). Despite student respondents being more willing to use Facebook for education-related communications compared to faculty who preferred e-mail, little emphasis is placed on the use of Facebook as an educational tool in current research.

The text-based artifacts produced in Facebook allow researchers to explore the site’s potential to support language learning. A study by Kabilan, Ahmad, and Abidin (2010) examines the potential through student surveys in a Malaysian university. Students were to consider the value of Facebook as a useful and meaningful learning environment to support, enhance, and/or strengthen their use of English. Students reported interest in attaining these specific learning goals, but displayed little evidence in accomplishing these goals (p. 184). Their discussion emphasizes the need for active engagement in activities targeted toward learning rather than socializing on Facebook; additionally, this requires support and facilitation to allow students to make meaning from the learning experiences (p. 185). Activities that are designed to support the learning outcomes of strengthening skills in another language using Facebook as a platform dramatically shifts users’ interaction with the environment from a social use exploring others’ profiles and news feed, to an educational tool that leverages the various types of media students can engage with to achieve their language learning goals.

A study by Kirschner and Karpinski (2010) acknowledges that students use Facebook as a social tool simultaneously with other education-related activities. They sought to understand how this affects academic performance. Students completed surveys that addressed their use of Facebook,
reported study habits and engagement in university-related activities, and general Internet use. Additionally, students were asked to report their GPA and answer a question about the impact that their use of Facebook had on their academic success. Although limited in generalizability, the findings suggest a significant negative relationship between Facebook use and academic performance. Kirschner and Karpinski describe that the relationship found “might be an indication of a deleterious effect of trying to implement these two processes [using Facebook as a social tool, and engaging in education-related activities (i.e., studying)] at the same time” (2010, p. 26), although some education tasks, like inquiry-based learning, require engaging in both socially and educationally oriented tasks.

The development of education-related communities on Facebook is being explored by researchers to understand Facebook’s value in supporting teaching and learning online. Baran (2010) conducted a case study exploring how students felt about using Facebook to support an online educative interaction. A Facebook group containing resources (e.g., videos, links, pictures) relevant to the course content shared by the students became the online branch of a face-to-face undergraduate course. Student activity in the Facebook group was assessed. A questionnaire was administered to capture what students thought about incorporating Facebook in their coursework, and interviews were conducted to gain additional insight around the students’ thoughts. Findings from this case study suggest that the interaction on Facebook enhanced student–student relationships by allowing students to learn more about their peers, but one of the limitations of integrating the tool was the lack of instructional design that resulted in very informal use of the Facebook group (p. E148). Although the findings cannot be generalized, Baran’s study makes explicit the need for course learning outcomes and course design to inform how Facebook can be formally integrated as an educational tool. Similarly, a study by DiVall and Kirwin (2012) explored how a Facebook page could be used to facilitate online resources for a course on Comprehensive Disease Management. Students in the course were directed to participate via Facebook (although participation was voluntary) and engage with the page by posting and viewing study tips, links that were relevant to course content, or questions about content. A course discussion board made available to students via Blackboard was also a part of the course. Students were surveyed at the end of the course about their use of the Facebook page and their perception of added value to the course. The study revealed that students found the addition of Facebook useful in the learning experience as it “increased their self-perceived
likelihood of being exposed to course announcements, online discussions, and external links” (p. 5). Although course work was not formally integrated into the use of Facebook in both Baran (2010) and DiVall and Kirwin’s (2012) studies, it is interesting to note that positive student experiences with the platform are reported in terms of acquiring information about the course content.

A comparative study on the use of Facebook and Moodle to support discussions in an online course was conducted to examine if the social nature of Facebook enhanced students’ perceived social presence and student interaction (DeSchryver, Mishra, Koehler, & Francis, 2009). Researchers compared student perceptions through an online survey in addition to measuring the frequency and length of discussion interactions in each of the environments. Two offerings of the same course (run by the same instructor and teaching assistants) were run concurrently, and for the online discussion portion of the course, students were randomly assigned to use the course Facebook page or the Moodle forum. Compared to the Moodle forum, students in the Facebook discussion did not perceive a higher level of social presence, nor did they write longer posts or engage in more frequent posting (p. 333). These findings are discussed by researchers as being limited by: (1) running a portion of the course (online discussion) on Facebook rather than the whole course due to a lack of availability of course management tools like grading and calendars, which led to students dividing their online attention to different environments; and (2) there was no requirement for students to become friends with each other for fear of affecting the outcome of the study. These limitations drew attention away from the social affordances of Facebook to focus on the educational role it would play in the course. This is an important point to note, because the literature casts the social affordances of Facebook in a positive way that can be leveraged for educational purposes.

A review of the literature on Facebook and its role as a social tool with education potential suggests there are many avenues to be explored. The studies described capture the value that Facebook offers in studying user interaction: (1) the preservation of artifacts that are authored by users, and (2) the sharing of these artifacts with others in the users’ networks. The widespread adoption of Facebook is an indication that the design of the online environment scaffolds and stimulates user interaction. Facebook’s Like button serves as the model for developing social interaction in threaded discourse in this study.
2.4 Social Interactions in Online Learning Environments

Scholars describe social interaction in CSCL environments in terms of the social and cognitive dimensions; much of the literature on social interactions and the design of CSCL environments have focused on the cognitive “processes necessary for learning, whereas the informal, social-emotional processes are not typically the focus” (Kreijns, Kirschner, & Vermeulen, 2013). The literature continues to place an emphasis on interaction and achievement to understand how collaborative and highly interactive situations are tied to student success (e.g., Rovai, 2001; Lave & Wenger, 1991); however, there has been sporadic interest in understanding the effectiveness of information exchange as affected by the relationships amongst learners within a community (e.g., Warkentin, Sayeed & Hightower, 1997). Vrasidas and McIsaac (1999) found that class size, instructor feedback, online course structure, and prior experiences in online courses influenced interaction in an online course. Much attention is paid to social interaction and students’ knowledge acquisition and cognitive processes with respect to academic achievement, rather than creating a more meaningful learning experience that promotes deep learning. There must be a shift in focus in the literature to fully understand the value of social interaction for positive learning experiences.

In an effort to bring attention to the importance of group development that “results in a social space where trust, sense of community, and strong interpersonal relationships exist” Kreijns, Kirschner, and Vermeulen cite Bales (1999) to capture how social interaction should be understood: “social interaction should be directed not only toward cognitive processes but also toward socioemotional processes that underlie these cognitive processes; hence, social interaction has both a cognitive dimension and a socioemotional dimension” (as cited in Kreijns, Kirschner & Vermeulen, 2013, p. 2). These studies highlight that to understand the importance of socioemotional interactions within CSCL environments on learning, more focus is required when designing CSCL environments and conducting research. Particular to the socioemotional contexts of a CSCL environment, learners can begin to understand each other’s social cues and gather information about one another to “develop a fluid and subtle cultural vocabulary” (p. 3) that can then contribute to the productivity of online discussions as it can aid in grounding conversations (Clark & Brennan, 1991). Hence, research should shift its focus toward understanding sociable CSCL environments that create the conditions to facilitate online
communities where social cues and information are easily conveyed, particularly in text-rich discussion-based communities.

Amongst a community of learners in a CSCL environment, social interactions provide members with a mechanism to communicate their motivation and participate in activities to help them each achieve their learning goals (Rovai, 2002b). Classroom community as defined by Rovai consists of two components:

[Fe]elings of connectedness among community members and commonality of learning expectations and goals…Connectedness denotes recognition of membership in a community and the feelings of friendship, cohesion, and satisfaction that develop among learners. Once individuals are accepted as part of a nourishing learning community, they develop feelings of safety and trust. With safety and trust comes the willingness of community members to speak openly. This candor is important to a classroom community because with trust comes the likelihood that members will expose gaps in their learning and feel that other members of the community will respond in supportive ways…Learning, the second component of classroom community, is the feeling that knowledge and meaning are actively constructed within the community, that the community enhances the acquisition of knowledge and understanding, and that the learning needs of its members are being satisfied. For a classroom community to flourish, members must not only identify with the group but must also internalize at least partial acceptance of the group’s values and goals. Learning is the goal and consequently represents an indispensable component of classroom community. (p. 322)

This passage effectively captures the importance of socioemotional ties cultivated through learner interactions and the way that they directly operationalize the scaffolds for productive online discussions in CSCL environments. Scaffolding the social and cognitive interactions learners engage in is recognized as being supported by all of its members, which Kreijns, Kirschner, and Jochems describe as a way to avoid the pitfalls of social interaction in CSCL environments (2003, p. 349).

Finally, social interaction in online environments has been studied through the construct of social presence, which emphasizes the value of perceived human interaction through CMC. The concept was first defined as the “degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships” (Short, Williams, & Christie, 1976, p. 65). Gunawardena (1995) describes social presence as not being the characteristics of the media that determine the perceived degree of social presence, but rather that participants in online
environments are creating social presence by projecting their identities through carefully constructed communications to the community. Social presence continues to be studied as a stand-alone aspect of online education. However, Garrison, Anderson, and Archer (2010) point out that the work on social presence is “a one dimensional construct associated with an emotional sense of belonging” (p. 7), which does not account for the influence it has on several aspects of the educational experience in online learning contexts. Social presence in terms of the community of inquiry (CoI) model—that Garrison, Anderson, and Archer (1999) developed—would not be to isolate it as a feeling of the individual, but rather would be the feeling that members in the group have a shared social identity.

As it relates to the technology, environments have begun to support user interaction in more complex ways that also includes the use of multi-media, diverging from the overwhelming text-based environments. As such, social presence can be considered a relational quality, where aspects of communication are dependent on the participants in a community, rather than the interface through which interaction is taking place. Garrison (2010) defines the measure of social presence as “participants identifying with the community, communicating purposefully in a trusting environment, and developing interpersonal relationships” (in Garrison, Anderson, & Archer, 2010, p. 7). Considering the role of social presence in collaborative learning, we can understand successful collaboration in online learning environments as the willingness of learners to be socially present and willing to engage in processes where members of a learning community construct meaning through sustained discourse (Garrison, Anderson, & Archer, 2001). With this understanding of social interaction and its role in generating a sense of community for learners, it is necessary to turn to the literature on collaborative learning in CSCL environments to inform how learning stems from community building.

2.5 Collaborative Learning in Online Environments

This section considers three collaborative learning theories that have been applied to online learning environments: Community of Inquiry Model, Cooperative Learning Theory and Community-Building. Each of these theories contributes by providing insight on the conditions necessary to stimulate student discussion.
2.5.1 Community of Inquiry Model

The Community of Inquiry (CoI) model, within the context of online learning, views learners engaged in online discussion as a type of community of inquiry. There are three elements of the CoI model that support educational transactions in online learning environments: social presence, cognitive presence, and teaching presence. Social presence, which was described in the previous section, is conceptualized as the feeling that members in the group have a shared social identity. Teaching presence has a large role in the CoI model, as it can be considered a determinant of students’ perceived learning, satisfaction, and sense of community (Garrison & Arbaugh, 2007). The three components of teaching presence – course design and organization; facilitation of discourse; and direct instruction – are necessary for the success of the CoI framework. To sustain an online learning community, the interactions taking place “need to have clearly defined parameters and be focused in a specific direction, hence the need for teaching presence” (Garrison & Arbaugh, 2007, p. 163). Cognitive presence is the ability of members of a learning community to construct meaning through sustained discourse (Garrison, Anderson, & Archer, 2001). Learners construct meaning by moving through the following stages: the triggering event, exploration, integration and resolution of ideas. Research suggests that the design and the facilitation of an online course helps to support learners through these stages of construction (Duphorne & Gunawardena, 2005; Moore & Marra, 2005; Oriogun, Ravenscroft, & Cook, 2005; Schrire, 2004).

The elements of the CoI model act in concert to foster a community that is seeking to advance their collective understanding and knowledge. Learners are the dominant active participants but instructors can engage in this process in a directive way to ensure that course goals are achieved.

2.5.2 Cooperative Learning Theory

Cooperative learning theory describes learning as being greater than the sum of the knowledge of the learners involved when all learners work together to accomplish a shared goal (Johnson, Johnson, & Holubec, 1998). Rather than learning independently and relying on one’s own knowledge, understanding, and skills, cooperative learning capitalizes on providing a group of students with access to the knowledge, understanding, and skills that other learners in the group possess. Cooperative learning requires five essential elements: (1) positive interdependence, (2) individual and group accountability, (3) face-to-face promotive interaction, (4) social skills, and
(5) group processing (Johnson, Johnson, & Holubec, 1998). These elements prompt the teacher, who used to be the sole bearer of knowledge, to shift to a facilitative role as the learners become accountable for the creation of knowledge that allows them to reach their learning goal. It is important to note that the shift of the teacher to facilitator requires more preparation because “seating people together and calling them a cooperative group does not make them one” (Johnson & Johnson, 1999, p. 68).

Johnson, Johnson, and Holubec (1998) define the criteria for formal cooperative learning to include: (1) making preinstructional decisions, (2) explaining the task and the role that each member of the group will play, (3) monitoring students and intervening to develop interpersonal relations with group members when necessary, and (4) assessing student learning and helping students reflect on how well their groups worked together at executing and completing specific tasks. They describe informal cooperative learning as students working together in small groups for a short period of time to achieve a shared learning goal.

A study by Johnson and Johnson (1989) shows that cooperative learning results in increased higher level reasoning, increased sharing and production of new ideas and solutions to problems, and increased transferability of concepts and skills to different contexts. Brown and Ciuffetelli (2009) confirmed these findings, and added that the methods are effective for learners with different abilities, which enhances a learner’s self-perception and perception of others. Sharan (2010) describes these benefits in terms of the intercultural classroom and how students recognize the value that different interests and backgrounds have for enriching and expanding the boundaries of knowledge. Despite the body of research supporting the benefits of learning through cooperative methods, the implementation of formal cooperative learning can be rather complex because the set of conditions that must be met requires tailoring that is dependent on the group composition and the expertise of the instructor in implementing these conditions. In online learning environments where there is a lack of face-to-face interaction, instructors may find it difficult to implement cooperative learning as a framework to develop the conditions in which student discussions can flourish (Kreijns, Kirschner, & Jochems, 2003).

2.5.3 Community-Building

Wegerif (1998) writes that: “forming a sense of community, where people feel they will be treated sympathetically by their fellows, seems to be a necessary first step for collaborative
learning. Without a feeling of community people are on their own, likely to be anxious, defensive and unwilling to take the risks involved in learning” (p. 48). Research on CSCL environments continues to focus on the development of functional systems that “support and guide social interaction towards critical thinking, argumentation, or socially constructing meaning” (Kreijns, Kirschner, & Jochems, 2003, p. 349). Studies have found that collaborative learning within CSCL environments positively affects deep learning, the development of critical thinking for arriving at a shared understanding of the current state of knowledge in a particular domain, and the retention of this knowledge (e.g., Garrison, Anderson, & Archer, 2001). Peer to peer interaction is paramount as ideas are taken up and challenged by asking how and why. As knowledge is brought into the discourse, the organic process of the creation of new knowledge is based on the collective understanding of the group (Scardamalia & Bereiter, 2003). The variation in type and amount of knowledge that individuals within the group possess does not negatively affect the process, rather it enhances it as the focus is placed on the viability of the new knowledge produced in new contexts. The goal is to create new knowledge through a deeply engaged process of collaboration with no predetermined end in mind.

Occurring simultaneously is learner development of social and communication skills, which allow participants to engage with each other in positive and constructive ways that foster a sense of trust, affirmation, and group cohesion (Johnson & Johnson, 1999). “Social interaction appears to be the key to collaboration. If there is collaboration then social interaction can be found in it, and vice versa, if there is no social interaction then there is also no real collaboration (Garrison, 1993; Johnson, Johnson, & Stanne, 1985; Soller, Lesgold, Linton, & Goodman, 1999)” (as cited in Kreijns, Kirschner, & Jochems, 2003, p. 338).

In CSCL environments, the emphasis on peer-to-peer collaboration is critical, as the instructor is no longer the sole source of knowledge. Focus is on the collaborative process, and by deeply engaging students in collaborative work, collective knowledge becomes the currency that fuels deep learning for the individuals in the community. However, the literature demonstrates that even though students are placed in groups for collaboration, this does not guarantee that the collaborative process will take place (Johnson & Johnson, 1999). This is where Vygotsky’s theory of the zone of proximal development (ZPD) can provide insight on the process. Vygotsky (1978) defines the zone of proximal development as “the distance between the actual developmental level as determined by independent problem solving and the level of potential
development as determined through problem solving under adult guidance or in collaboration with more capable peers” (p. 86). The existence of ZPD is meant to suggest that some processes of learning are at initial stages and are not yet fully developed, but are in the process of being achieved. Tasks that are within the ZPD of a learner at a particular point in time will be appropriated as independent developmental achievements (Vygotsky, 1978). In the context of online discussions, when interacting with more capable peers, learners are able to act in ways that are beyond their competence level, ways which would be impossible if they were acting alone. The ZPD “presupposes an interaction on a task between a more competent person and a less competent person, such that the less competent person becomes independently proficient at what was initially a jointly accomplished task” (Kozulin, 2003, p. 41). Cooperation and collaboration are essential processes for development within ZPD where all learners play a role in knowledge construction.

Learners work together in online discussions with the aim of acquiring a deeper understanding of particular content. Vygotsky’s theory does not consider learners as individuals; rather, they are individuals that are socially and emotionally connected to others within their particular environment and culture (Levykh, 2008). Learners can perform at levels that go beyond their current competency as they use words and artifacts that have meaning for them, but which they would be unable to use unless in the context of interacting with others who have already achieved developmental competency with those words and artifacts (Cole & Wertsch, 1996). Bruner (1985) understands that “the tutor or the aiding peer serves the learner as a vicarious form of consciousness until such a time as the learner is able to master his own action through his own consciousness and control” (p. 24). Conscious control acquisition means that learners now have at their disposal, the newly developed function or concept, which they can independently use as a tool. A more capable peer scaffolds learning tasks to make it possible for the learner to move from needing assistance to use the tool, to independent tool use (Bruner, 1985). According to Zaretskii (2009), ZPD interactions can facilitate the development of many types of developmental tools within a learning community, including “self-definition, reflection, planning, goal-formation, control, norms of interaction (collaboration), self-regulation (conceptual, reflective, emotional), the ability to overcome difficulty, to use mistakes as food for reflection, to establish relationships between an action’s means and its end” (p. 83). Goos, Galbraith, and Renshaw (2002) describe how the ZPD functions in the context of tutor–student
relationships, unbalanced peer relationships, and in peer groups where competency may be relatively comparable among the group members. In this last case, peer group members learn from the unique knowledge and skill contribution that each member has to offer. This emphasizes that the ZPD is not a one-way interaction, but rather, consists of multi-directional interactions as learners pool their resources and coordinate each of their unique perspectives in order to solve a problem (Forman, 1989). Related to Scardamalia’s (2002) concept of collective cognitive responsibility, collaboration must be stimulated, incentivized, and nurtured. Most importantly, it is the factor of recognition and acknowledgement amongst members of the community that is important in the collaborative process, because this drives the awareness of the creation of a space where deep learning and meaning-making can occur.

Historically, studies on student learning in CSCL environments have tended to focus on cognitive constructs (e.g., Picciano, 2002; Garrison, Anderson, & Archer, 1999), rather than addressing the issue from a social interaction perspective. These constructs have been consistently described as supporting knowledge creation through processes that rely heavily on sharing and exploring the knowledge of the learners, which then may or may not advance the state of current knowledge that is agreed upon. A study by Gunawardena, Lowe, and Anderson (1997) looked specifically at the types of interactions that took place during the social construction of knowledge in online discussions, and developed a model for interaction analysis. The study classifies knowledge construction as a series of phases—Phase I: Sharing/Comparing Information, Phase II: Discovery of dissonance and inconsistency, Phase III: Negotiation of Meaning/Co-construction of knowledge, Phase IV: Testing and modification of proposed synthesis, and Phase V: Agreement/Application of newly constructed meaning (p. 413). This model considers knowledge construction an incremental process wherein the learners are heavily invested in knowledge sharing and the examination of shared knowledge that can be challenged before moving into the later phases of interaction. It is important to note that the study found that the content of online postings was predominantly classified in first and second phases (p. 427). Kanuka and Anderson (1998) describe this as being a characteristic of the democratic nature of computer-mediated communications. This finding is also consistent with what Garrison, Anderson, and Archer (2001) found in student interactions in online discussions using the practical inquiry model—whereby most of the student interaction focused on knowledge sharing during the exploration phase (p. 18). Both studies reported evidence of student learning, even
though online discussions were dominated by knowledge sharing/exploration. What this indicates is that learners are very much interested in knowing what their peers know and want to share their own knowledge. Cook-Sather (2002) describes the importance of students sharing knowledge as critical to learning in the 21st century because “the call to authorize student perspectives is a call to count students among those who have the knowledge and the position to shape what counts as education” (p. 3). This is the foundation for creating a culture that motivates learners to engage with each other through the social construction of knowledge, because students need to be authors of their own understanding. This begs the question: how do we make a transition from focusing on the social construction of knowledge to focusing on creating an online learning environment where threaded discourse more effectively supports social interaction?
Chapter 3
Project Overview

The review of literature in online learning has been concerned with the structural, experiential, and motivational factors that appear to promote social and cognitive aspects of learning through threaded discourse (Gunawardena, 1995; Vrasidas & McIsaac, 1999; Garrison, Anderson & Archer, 2001; Swan, 2005). This project is concerned with student interaction in threaded discourse but it takes a different perspective than prior studies. A Like button was integrated into threaded discourse and this project explores how it was adopted by students. The tool was added to Pepper as a low-cost mechanism that students could use to interact with each other in a text-rich environment. Various aspects of the tool’s use are examined to understand how the Like button is integrated into students’ practices in online discussion-based courses. Four studies were conducted to capture why the Like button has become a widely-adopted tool in threaded discourse in Pepper across several courses.

The project uses a mixed-methods approach, and each question is addressed by a separate study that will form individual chapters in my dissertation. A description of why Pepper is used for this study precedes a general description of the data sources and methods used. More detailed information about data sources and methods as they pertain to each research question can be found in the individual chapters.

3.1 Research Design

This study employed a mixed-methods research design involving multiple data sources (Collins, Joseph & Bielaczyc, 2004; Creswell & Plano Clark, 2011; Creswell, 2009). A convergent parallel design was used. The combination of quantitative and qualitative sources allowed me to triangulate and validate the data.

Quantitative data were collected to explore student engagement and emergent patterns of student use of the Like button within threaded discussions across 41 courses. Data from log files associated with student interactions and the creation of discussion posts were mined for behavioural information. This informed the overall usage of the Like button. It was important to model and analyze the quantitative data using various statistical methods, including t-tests, ANOVA, and correlation analysis to provide a well-developed understanding of the effects of the
Like button on student interactions in online discussions as informed by each of the research questions. One of the drawbacks to solely using quantitative data in any investigation is the data itself, since it only logs what the architect of the learning environment considers useful data (Buckingham Shum & Ferguson, 2012). Quantitative data can only provide a partial view of student use of the Like button.

Qualitative investigation provided detailed descriptions of student experiences associated with use of the Like button in their courses. Surveys and interviews were used to develop a deeper understanding of the elements of a CSCL environment that contribute to its social ability and the impact this has on student learning with a sample of graduate students. Through these two qualitative data collection methods, the meaning-making experiences of students revealed the nature, value and impact (Seidman, 2012) of the Like button to scaffold social interaction in their online learning communities. The research design was interested “in understanding the lived experience of [students] and the meaning they make of that experience” (Seidman, 2012, p. 9) because this informed what value the Like button had on students’ sense of community.

3.2 Pepper

Pepper is an experimental online learning environment. Knowledge construction through collaborative, threaded discourse is the focus of many courses that use this environment. Much like online forums, the body of the environment is structured in folders, within which threaded discussions take place. Student participation within these discussions typically involves the posting of “notes” in a folder associated with course content, reading notes posted by others, and then replying to them. Interaction in the environment tends to be slower and more effortful than face-to-face interaction, but the platform includes several social features to facilitate user interaction, including private messaging, a Like button associated with student notes, student profiles, a community wall, and a lounge area. Text-based compositions, multi-media integration (video, images, and audio), private messaging, and resource uploading (via note attachments and/or uploading to a central resource area) allow learning community members to share content in a meaningful way.

Pepper allows students to focus on the advancement of knowledge and development of unique learning experiences by increasing the ease of workflow in a text-rich environment. The Like button reinforces this ease of workflow by minimizing the effort needed on the part of the user to
trigger an interaction with another community member. The Like button retains the same functionality in Pepper as it does in Facebook—i.e., there is a “thumbs up” icon (Figure 1.1) associated with every note in a threaded discussion in Pepper, which can be clicked by community members (Figure 3.1).

Pepper collects click-stream tracking information about users’ interactions and their creation of content in their learning community. Various tools allow students to seek support from their peers, convey affirmation of ideas brought into discussion, and foster the development of a shared sense of community in the hopes of cultivating open and constructive spaces for discussion to unfold.

![Figure 3.1. Screen shot of a graduate level Pepper community. Left: example of a threaded discussion with Liked notes. Right: example of a note that has been Liked.](image)

### 3.3 Rationale for Using Pepper as the Online Learning Environment

Pepper has been selected for this study for four reasons: (1) the environment incorporates very simple, user-friendly tools that allow students to participate in impromptu encounters within their course community; (2) there are over a dozen graduate courses that use this platform during any given academic term whose major component is collaborative online discussions seeking knowledge construction; (3) the platform logs all user actions, which provides access to
extensive data sets; and (4) the tools being studied can be modified in multiple ways (renamed and/or removal of functionality) and then compared to normal functionality.

### 3.4 Data Source and Collection Brief

This study involved the collection of data from multiple sources, including both quantitative and qualitative data sets. Ethics approval was granted by the Research and Ethics Board at the University of Toronto. Data were collected from the log files of multiple discussion-based courses using Pepper and through surveys and interviews from students who had taken these courses. Courses were taught at the graduate level at the Ontario Institute for Studies in Education. Courses selected for the studies satisfied two criteria: (1) the discussion-based course was offered fully online with minimal face-to-face interaction (less than one hour a week of face-to-face time), and (2) the course required students to regularly participate in weekly, asynchronous discussions via Pepper. Data spans the period of 2011 Fall course offerings to 2015 Fall course offerings. Courses included are from two fields within the faculty of education: Curriculum, Teaching and Learning (CTL), and Applied Psychology and Human Development (APHD). The instructors for these 41 courses were contacted to request use of their courses for the study. Upon approval, data were extracted. Data produced by all instructor accounts were removed.

All data were organized and cleaned to focus specifically on student interactions. A total of 1,166 students across 41 courses were included in the study. All data were stored in encrypted files on my computer and stored in accordance with the ethics granted in protocol #30845 by the University of Toronto Research and Ethics Board. The request to participate, the survey, the letter of consent, and the interview protocol are included in the appendices (Appendices A–D).

The following chapters address the methods and findings of each research question as a discrete chapter. This will allow the reader to easily connect the methods used to the presentation of the results, and to the subsequent discussions. Each research question uses different sub-sections of this population, which is described in Table 3.1. The table depicts a summary of the types of data and sources, methods, number of participants, and analysis type for each study. A more detailed description of the data sources is described in the next four chapters, as they pertain to each of the research questions. The combination of data sources allows me to explore student use of the Like button in online discussion-based courses from various perspectives. Chapter 4 explores
students’ experience of the Like button in Pepper to understand how and why they use the tool. Chapter 5 explores the adoption of the Like button as form of acknowledgement in online discussions. Chapter 6 seeks to understand how Liked notes differ from non-Liked notes in their quantifiable features. Chapter 7 explores how students’ sense of community is influenced by their perceived role of the Like button in threaded discourse. Chapter 8 offers conclusions, recommendations, and future research programs.
Table 3.1
Summary of research questions, data types, sources, participants and analyzes

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Research Question</th>
<th>Data Type and Source</th>
<th>Number of Participants</th>
<th>Analysis Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>How do students experience the Like button in threaded discourse?</td>
<td>Quantitative, Pepper log files</td>
<td>1166</td>
<td>SPSS descriptive analysis and correlations</td>
</tr>
<tr>
<td></td>
<td>How often do students use the Like button?</td>
<td>Mixed, Anonymous surveys</td>
<td>80</td>
<td>SPSS descriptive analysis and textual analysis</td>
</tr>
<tr>
<td></td>
<td>How do students describe their use of the Like button?</td>
<td>Qualitative, Interviews</td>
<td>8</td>
<td>Textual analysis</td>
</tr>
<tr>
<td>5</td>
<td>How pervasive is the use of the Like button as a form of acknowledgement in online discussions?</td>
<td>Quantitative, Pepper log files</td>
<td>1067</td>
<td>SPSS descriptive analysis</td>
</tr>
<tr>
<td>6</td>
<td>How do Liked notes differ from non-Liked notes in quantifiable features including number of words, revisions, reads, replies, and other quantifiable features?</td>
<td>Quantitative, Pepper log files</td>
<td>1166</td>
<td>SPSS descriptive analysis, t-tests</td>
</tr>
<tr>
<td>7</td>
<td>How does student perception of the role of the Like button relate to sense of community?</td>
<td>Quantitative, Anonymous survey</td>
<td>218</td>
<td>SPSS descriptive analysis, t-tests</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Appendix B, Section 4)</td>
<td>80</td>
<td>ANOVA</td>
</tr>
</tbody>
</table>
3.5 Reliability and Validity

The reliability of quantitative data was calculated for the student survey responses to the Sense of Community scale developed by Rovai (2002a). Cronbach’s coefficient a for the full scale administered in the survey was .91. The scale had a high level of internal consistency. In the reliability analysis conducted by Rovai for the development of the instrument, Cronbach’s coefficient a for the full classroom community scale was .93 (2002a, p. 206).

For the interview portion of the data collection, I developed and used the same interview protocol for each participant (see Appendix D). The questions were grouped into categories to provide participants with the opportunity to focus on their overall experiences in their online courses. To ensure data validity, I employed member-checking with each of the participants after the transcript of the interview was generated (Creswell & Plano Clark, 2011). Since there were only eight interview participants, member-checking was completed with each of them.

The large data sets included in this study required that I engage an external auditor in my data analysis to ensure the validity of the findings. Each of the data sets and results in this study were reviewed by a doctoral candidate from the Applied Psychology and Human Development Department at OISE, University of Toronto. This individual has a strong background in advanced statistics.
Chapter 4
Student Experience of the Like Button

When the Like button was incorporated into Pepper, it was done so because a Recommend button that was in place at the time was not being used by students. The intention of the Recommend button was to allow students to highlight promising ideas generated in their online discussions. Due to the lack of interactivity with the button, it was renamed Like. In renaming the button Like, the learning implication of the term Recommend shifted toward being more social in nature. A case study in 2013 by Makos, Oztok, Zingaro, and Hewitt explored how this seemingly new facility was used through an anonymous online survey completed by 31 of 117 students. The goal of the survey was to understand the ways that the Like button was used when course instructors do not prescribe its function. The results suggested that there are three situations where students use the button: (1) when someone has similar thoughts or feelings students identify with, (2) when someone offers a new or interesting perspective, or (3) when someone provides a deep analysis of the subject matter. This suggests that the Like button acts as a way to convey students’ socioemotional reactions to their peers’ content in threaded discourse. Respondent #31 captures this: “I guess the very idea of liking a post means I may have learned something from it” (Makos et al., 2013, p. 4).

To begin to understand how the Like button promotes social interaction in threaded discourse it is necessary to explore how and why it is used by students. This chapter addresses the first research question:

1. How do students experience the Like button in threaded discourse?
   a. How often do students use the Like button?
   b. How do students describe their use of the Like button?

The following sections present the data source, methods, and findings used to explore students’ experience of the Like button in threaded discourse.
4.1 Data Source and Methods

4.1.1 Archival Data

Data from Pepper log files were extracted using the “Summary” extraction script to address the question: how often do students use the Like button? Data were extracted for all 41 courses. The following metrics for each student across these courses were included in the dataset for descriptive statistical analysis:

- Total active students in the course
- Total active students in the course that used the Like button
- Total number of student notes
- Total Likes given to student notes

A total of 1,166 students were included in the dataset. Data were cleaned and descriptive statistical analysis were run in SPSS. The Like rate of student notes was calculated as a relative indicator of how often the Like button is used in different courses. The Like rate is calculated by dividing total Likes by total Notes. Since a note can receive a Like from multiple students in a course, the Like rate can be over 100%. Considering that these metrics only provide us with the actual Liking that is taking place rather than the reason for giving a Like, additional data were requested to understand how students experienced the Like button.

4.1.2 Survey Data

Late in the Winter 2015 academic term (January through April), I contacted graduate course instructors requesting permissions to contact students in their course to complete an anonymous online survey. The instructors contacted used Pepper as their primary online learning environment for fully-online course offerings and had students engaging in weekly discussions about course content. Permissions in the form of an e-mail were received from all nine course instructors contacted by early April 2015. To maximize recruitment, the recruitment messages were sent out a week after the students had completed their courses. It was made clear to students that this recruitment message was research related and not tied to their assessments in the course in any way. Within the first three days of the recruitment message being sent, 65 responses were collected. To increase the number of responses, a second message was sent to students two
weeks after the original recruitment e-mail was sent. Since there was no way to determine who had completed the survey (as it was anonymized), everyone in these courses received the e-mail a second time with an addition made to the content noting that they may have already received and completed this survey, and if so, to disregard the e-mail. Ultimately, the request to complete the anonymous online survey using the Survey Monkey data collection tool was sent to 236 students across nine courses. A total of 89 students completed the survey, nine surveys were incomplete—80 respondents completed the survey in its entirety, resulting in a 33.9% response rate. The portion of the survey results regarding students experiences of the Like button in Pepper is described below. A large part of the survey (Appendix B, Section 4) was the series of questions made up of Rovai’s (2002a) Sense of Classroom Community Scale—these responses were not used in this part of the study as they apply to the study described in Chapter 7. See Appendix A and B, Sections 1 through 3, for the full version of the recruitment message and survey.

The online survey collector was closed one month after the first recruitment e-mail was sent out. Data were exported from Survey Monkey into a Microsoft Excel file. Reported student responses was sorted and cleaned to include only responses pertinent to this section of the study (Appendix B, Sections 1–3). Data analysis included running descriptive statistical analysis in SPSS and content analysis for the open-ended survey questions.

4.1.3 Interview Data

A follow-up interview was included in this study to gain additional insight about how students describe their experiences. The final question of the survey (see Appendix A) asked students of their willingness to participate in a follow-up interview. Of the 80 survey respondents, 33 indicated that they would like to be contacted for an interview. All 33 students were contacted via e-mail using the e-mail address they provided in the online survey. A total of eight students responded to the e-mail and scheduled a time to be interviewed. A 24% response rate was achieved. See Appendix D for the interview questions.

Interviews were conducted by phone or face-to-face, depending on the preference of the interviewee. The interviewees were e-mailed copies of the letter of consent and interview questions (see Appendix C and D) in advance. Interviewees requesting Skype or phone interviews sent signed copies of their letter of consent back to me before beginning the interview.
The interviewees that participated face-to-face brought a signed copy of the consent form with them, which was later scanned and filed with the others. Upon commencing the interview, interviewees were asked if they would like to have their computers open to their Pepper course to recall information, and they were also reminded about the content in the letter of consent and that their identity would remain anonymous when the findings were reported. All eight interviews were conducted, recorded, and transcribed. The interviews were recorded using an iPhone and then voice files were named using pseudonyms for the interviewees—Student 1, 2, etc. The letters of consent were also saved using the same naming conventions to maintain continuity. I transcribed the interviews individually in Microsoft Word and then created a master file including all interviews. I then reorganized all responses by the question so that responses from students 1–8 were listed with the respective question. The interview results were analyzed through textual analysis and trends were drawn from review of these.

4.2 Results

4.2.1 How often do students use the Like button?

Log file data provides us with actual student use of the Like button in Pepper. Table 4.1 provides total student use of the button across the 41 courses included in the study. Table 4.2 provides total student use of the Like button between the two fields. Correlation analysis was run to determine if a correlation exists between notes produced and notes Liked.

Of the 1,166 students across 41 courses, 1,067 (91.9%) used the Like button at least once in the course. On average, the student note Like rate is 62.5%. A positive correlation was found between the total number of notes produced and total number of notes Liked across all 41 courses, \( r = .77 \) at a 95% confidence level. A positive correlation was found between notes produced and notes Liked in the CTL field, \( r = .71 \) at a 95% confidence level. A positive correlation was found between notes produced and notes Liked in the APHD field, \( r = .92 \) at a 95% confidence level.
<table>
<thead>
<tr>
<th>DB</th>
<th>Field</th>
<th>Number of Students in Course</th>
<th>Students in Course that used Like Button</th>
<th>% Students that used the Like Button</th>
<th>Total Student Notes produced (Public)</th>
<th>Total Likes Given to Student Notes</th>
<th>Student Note Like Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>APHD</td>
<td>32</td>
<td>29</td>
<td>90.63</td>
<td>2520</td>
<td>1416</td>
<td>56.19</td>
</tr>
<tr>
<td>2</td>
<td>APHD</td>
<td>24</td>
<td>23</td>
<td>95.83</td>
<td>1789</td>
<td>829</td>
<td>46.34</td>
</tr>
<tr>
<td>3</td>
<td>APHD</td>
<td>14</td>
<td>14</td>
<td>100.00</td>
<td>936</td>
<td>612</td>
<td>65.38</td>
</tr>
<tr>
<td>4</td>
<td>APHD</td>
<td>60</td>
<td>57</td>
<td>95.00</td>
<td>2610</td>
<td>1317</td>
<td>50.46</td>
</tr>
<tr>
<td>5</td>
<td>APHD</td>
<td>31</td>
<td>28</td>
<td>90.32</td>
<td>2691</td>
<td>1145</td>
<td>42.55</td>
</tr>
<tr>
<td>6</td>
<td>APHD</td>
<td>16</td>
<td>14</td>
<td>87.50</td>
<td>1144</td>
<td>749</td>
<td>65.47</td>
</tr>
<tr>
<td>7</td>
<td>APHD</td>
<td>48</td>
<td>48</td>
<td>100.00</td>
<td>4451</td>
<td>2057</td>
<td>46.21</td>
</tr>
<tr>
<td>8</td>
<td>APHD</td>
<td>20</td>
<td>20</td>
<td>100.00</td>
<td>1399</td>
<td>571</td>
<td>40.81</td>
</tr>
<tr>
<td>9</td>
<td>APHD</td>
<td>73</td>
<td>69</td>
<td>94.52</td>
<td>5631</td>
<td>2212</td>
<td>39.28</td>
</tr>
<tr>
<td>10</td>
<td>APHD</td>
<td>46</td>
<td>46</td>
<td>100.00</td>
<td>7753</td>
<td>2710</td>
<td>34.95</td>
</tr>
<tr>
<td>11</td>
<td>APHD</td>
<td>29</td>
<td>29</td>
<td>100.00</td>
<td>2196</td>
<td>1839</td>
<td>83.74</td>
</tr>
<tr>
<td>12</td>
<td>APHD</td>
<td>24</td>
<td>16</td>
<td>66.67</td>
<td>762</td>
<td>226</td>
<td>29.66</td>
</tr>
<tr>
<td>13</td>
<td>APHD</td>
<td>69</td>
<td>67</td>
<td>97.10</td>
<td>6914</td>
<td>3389</td>
<td>49.02</td>
</tr>
<tr>
<td>14</td>
<td>APHD</td>
<td>16</td>
<td>16</td>
<td>100.00</td>
<td>1914</td>
<td>1566</td>
<td>81.82</td>
</tr>
<tr>
<td>15</td>
<td>APHD</td>
<td>32</td>
<td>32</td>
<td>100.00</td>
<td>3853</td>
<td>1653</td>
<td>42.90</td>
</tr>
<tr>
<td>16</td>
<td>APHD</td>
<td>23</td>
<td>21</td>
<td>91.30</td>
<td>1848</td>
<td>866</td>
<td>46.86</td>
</tr>
<tr>
<td>17</td>
<td>APHD</td>
<td>22</td>
<td>18</td>
<td>81.82</td>
<td>1167</td>
<td>483</td>
<td>41.39</td>
</tr>
<tr>
<td>18</td>
<td>APHD</td>
<td>69</td>
<td>60</td>
<td>86.96</td>
<td>6184</td>
<td>2980</td>
<td>48.19</td>
</tr>
<tr>
<td>19</td>
<td>APHD</td>
<td>16</td>
<td>16</td>
<td>100.00</td>
<td>743</td>
<td>799</td>
<td>107.54</td>
</tr>
<tr>
<td>20</td>
<td>APHD</td>
<td>25</td>
<td>25</td>
<td>100.00</td>
<td>2217</td>
<td>1366</td>
<td>61.61</td>
</tr>
<tr>
<td>21</td>
<td>APHD</td>
<td>29</td>
<td>16</td>
<td>55.17</td>
<td>1933</td>
<td>390</td>
<td>20.18</td>
</tr>
<tr>
<td>22</td>
<td>APHD</td>
<td>25</td>
<td>19</td>
<td>76.00</td>
<td>1645</td>
<td>589</td>
<td>35.81</td>
</tr>
<tr>
<td>23</td>
<td>CTL</td>
<td>14</td>
<td>12</td>
<td>85.71</td>
<td>1508</td>
<td>177</td>
<td>11.74</td>
</tr>
<tr>
<td>24</td>
<td>CTL</td>
<td>19</td>
<td>18</td>
<td>94.74</td>
<td>1576</td>
<td>442</td>
<td>28.05</td>
</tr>
<tr>
<td>25</td>
<td>CTL</td>
<td>17</td>
<td>17</td>
<td>100.00</td>
<td>1343</td>
<td>470</td>
<td>35.00</td>
</tr>
<tr>
<td>26</td>
<td>CTL</td>
<td>22</td>
<td>21</td>
<td>95.45</td>
<td>1925</td>
<td>1601</td>
<td>83.17</td>
</tr>
<tr>
<td>27</td>
<td>CTL</td>
<td>19</td>
<td>18</td>
<td>94.74</td>
<td>1270</td>
<td>1619</td>
<td>127.48</td>
</tr>
<tr>
<td>28</td>
<td>CTL</td>
<td>15</td>
<td>15</td>
<td>100.00</td>
<td>1112</td>
<td>803</td>
<td>72.21</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>CTL</td>
<td>23</td>
<td>22</td>
<td>95.65</td>
<td>1615</td>
<td>1101</td>
<td>68.17</td>
</tr>
<tr>
<td>30</td>
<td>CTL</td>
<td>17</td>
<td>16</td>
<td>94.12</td>
<td>1002</td>
<td>806</td>
<td>80.44</td>
</tr>
<tr>
<td>31</td>
<td>CTL</td>
<td>27</td>
<td>26</td>
<td>96.30</td>
<td>2246</td>
<td>2986</td>
<td>132.95</td>
</tr>
<tr>
<td>32</td>
<td>CTL</td>
<td>36</td>
<td>30</td>
<td>83.33</td>
<td>1535</td>
<td>814</td>
<td>53.03</td>
</tr>
<tr>
<td>33</td>
<td>CTL</td>
<td>47</td>
<td>33</td>
<td>70.21</td>
<td>1710</td>
<td>984</td>
<td>57.54</td>
</tr>
<tr>
<td>34</td>
<td>CTL</td>
<td>28</td>
<td>26</td>
<td>92.86</td>
<td>2978</td>
<td>2545</td>
<td>85.46</td>
</tr>
<tr>
<td>35</td>
<td>CTL</td>
<td>17</td>
<td>15</td>
<td>88.24</td>
<td>1485</td>
<td>787</td>
<td>53.00</td>
</tr>
<tr>
<td>36</td>
<td>CTL</td>
<td>16</td>
<td>15</td>
<td>93.75</td>
<td>2002</td>
<td>1912</td>
<td>95.50</td>
</tr>
<tr>
<td>37</td>
<td>CTL</td>
<td>23</td>
<td>21</td>
<td>91.30</td>
<td>1658</td>
<td>986</td>
<td>59.47</td>
</tr>
<tr>
<td>38</td>
<td>CTL</td>
<td>21</td>
<td>20</td>
<td>95.24</td>
<td>1672</td>
<td>1690</td>
<td>101.08</td>
</tr>
<tr>
<td>39</td>
<td>CTL</td>
<td>24</td>
<td>23</td>
<td>95.83</td>
<td>2069</td>
<td>1562</td>
<td>75.50</td>
</tr>
<tr>
<td>40</td>
<td>CTL</td>
<td>19</td>
<td>18</td>
<td>94.74</td>
<td>1796</td>
<td>1644</td>
<td>91.54</td>
</tr>
<tr>
<td>41</td>
<td>CTL</td>
<td>19</td>
<td>18</td>
<td>94.74</td>
<td>1337</td>
<td>1525</td>
<td>134.12</td>
</tr>
<tr>
<td>Total/Average</td>
<td>1166</td>
<td>1067</td>
<td>91.85%</td>
<td>94139</td>
<td>54218</td>
<td>62.48%</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2
Student Use of the Like Button in Discussion-Based Pepper

<table>
<thead>
<tr>
<th>DB</th>
<th>Field</th>
<th>Number of Students</th>
<th>Total Students that used Like Button</th>
<th>% Students that used the Like Button</th>
<th>Total Student Notes Produced (Public)</th>
<th>Total Likes Given to Student Notes</th>
<th>% Student Notes Liked</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>APHD</td>
<td>743</td>
<td>683</td>
<td>91.92</td>
<td>62300</td>
<td>29764</td>
<td>47.78</td>
</tr>
<tr>
<td>19</td>
<td>CTL</td>
<td>423</td>
<td>384</td>
<td>90.78</td>
<td>31839</td>
<td>24454</td>
<td>76.81</td>
</tr>
<tr>
<td>Total/Average</td>
<td>1166</td>
<td>1067</td>
<td>91.85%</td>
<td>94139</td>
<td>54218</td>
<td>62.48%</td>
<td></td>
</tr>
</tbody>
</table>

44
4.2.2 How do students experience the Like button in threaded discourse?

The following results described are a combination of data reported by students in the online survey and in the interviews. This question is approached from multiple perspectives to gain a deeper understanding of how students integrate their use of the Like button into their practices in online, discussion-based courses. Each sub-section presents the various results of the survey and interviews.

4.2.2.1 How do students describe their use of the Like button?

The following survey results report how students describe their frequency of use of the Like button. Of the 80 respondents, nine students reported that they did not use the Like button, nine students reported rare use (once a month), 28 students reported infrequent use (once or twice a week), 19 students reported frequent use (several times a week/once a session), and 15 students reported persistent use (multiple times a session). Table 4.3 presents students’ reported frequency of use of the Like button.

A series of 13 instances of why students used the Like button in Pepper were described. Each instance began with “I may Like a note…”. Students were asked to select all the instances that applied to their use of the button. The frequency of each of the instances is presented in Table 4.4.

The survey indicates that 76.3% of students report their use of the Like button to communicate approval or agreement quickly. Other instances where students are more likely to use the Like button are when valuable contributions are made to the discussion (58.8%), when new ideas are presented (65.0%), when a resource is shared (58.8%), and to offer encouragement to a classmate (57.5%). Students report that they are least likely to use the Like button as a way of expressing puzzlement toward a post (18.8%), and when an author discloses something personal about themselves (32.5%).

The use of the Like button to communicate agreement quickly was also reported by students in the interview. They overwhelmingly felt that the Like button was a simplified way to say “I agree” (S2, S3, S4, S5, S6, S7, S8) or that the student has a shared perspective regarding the content. The interviews also revealed that students used the Like button for various reasons,
including social, learning, and emotional support. Student 3 describes their varied use of the Like button here:

It’s a nice addition because socially it shows that I am supporting the people in my group and helping the community. When people Liked one of mine, then it meant something especially if they don’t Like everything all of the time. Knowing that you put work into it and then it is recognized with people Liking it boosts your confidence and makes you want to keep trying hard. Socially it also connects to the learning by making you want to continue to want to push in similar ways. If you create a note where you’re contributing a resource and you receive a ton of Likes then you realize this is what the community likes seeing and that they’re learning from, then you want to keep doing that.

It appears that students predominately report their use of the Like button as a way to quickly communicate approval or agreement without having to write a reply to someone’s note. The survey findings were confirmed by the interviews.

Table 4.3
Student Frequency of Use of the Like Button in Pepper

<table>
<thead>
<tr>
<th>Frequency of Use</th>
<th>Frequency (n=80)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does not</td>
<td>9</td>
<td>11.3%</td>
</tr>
<tr>
<td>Rare</td>
<td>9</td>
<td>11.3%</td>
</tr>
<tr>
<td>Infrequent</td>
<td>28</td>
<td>35.0%</td>
</tr>
<tr>
<td>Frequent</td>
<td>19</td>
<td>23.8%</td>
</tr>
<tr>
<td>Persistent</td>
<td>15</td>
<td>18.8%</td>
</tr>
<tr>
<td>Description</td>
<td>Frequency (n=80)</td>
<td>Percent</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
<td>------------------</td>
<td>---------</td>
</tr>
<tr>
<td>...as a way to quickly communicate approval or agreement without having to write a reply to someone’s note.</td>
<td>61</td>
<td>76.3%</td>
</tr>
<tr>
<td>...because it presents new ideas.</td>
<td>52</td>
<td>65.0%</td>
</tr>
<tr>
<td>...because I feel it makes a valuable contribution to the discussion.</td>
<td>47</td>
<td>58.8%</td>
</tr>
<tr>
<td>...because the author shares a resource.</td>
<td>47</td>
<td>58.8%</td>
</tr>
<tr>
<td>...as a way to offer encouragement or emotional support to a classmate.</td>
<td>46</td>
<td>57.5%</td>
</tr>
<tr>
<td>...because of the clarity of thought in the note.</td>
<td>41</td>
<td>51.3%</td>
</tr>
<tr>
<td>...because of its humour.</td>
<td>39</td>
<td>48.8%</td>
</tr>
<tr>
<td>...that offers a possible solution to a problem/issue that has come up in discussion.</td>
<td>38</td>
<td>47.5%</td>
</tr>
<tr>
<td>...that discusses, or refers to, ideas in one of my earlier notes.</td>
<td>38</td>
<td>47.5%</td>
</tr>
<tr>
<td>...to indicate that I have had a shared or similar experience.</td>
<td>37</td>
<td>46.3%</td>
</tr>
<tr>
<td>...because the author tries to make connections to ideas in other notes</td>
<td>32</td>
<td>40.0%</td>
</tr>
<tr>
<td>...in which the author discloses something personal about themselves.</td>
<td>26</td>
<td>32.5%</td>
</tr>
<tr>
<td>...because the author expresses a sense of puzzlement.</td>
<td>15</td>
<td>18.8%</td>
</tr>
</tbody>
</table>

### 4.2.2.2 Student routines and interaction in Pepper

Students were asked to describe their routines in Pepper and their use of the various tools in the system. All students described that when they logged into Pepper, they would usually see what is going on during the particular week’s discussions. They described reading content posted to either acquire content knowledge or to engage in conversation with each other. Student 5 describes why looking at what was going on was of value:

> I would typically read comments first then write because if there were comments that I had about the readings and someone else had already said them, then I would go in and reply and add what I thought was also important. I made an effort to make sure I knew what was said before posting. (S5)
All students described that this routine of reading and contributing would change when they were notified of private messages or personal tasks when logging in—“The only change I would normally make is if I had a [notification] for a private message, then I would address that first before anything else” (S7).

Students reported high use of tools that increased interaction amongst peers in their courses—these include replying, Liking, and linking to peers notes or external content. Students reported low use of tools that were more personal in nature—these include favouriting notes for quick identification, engaging in private messaging with the instructor or peers, and creating private notes.

4.2.2.3 Student’s attitudes toward use of the Like button

Students were asked a series of questions regarding their feelings toward the Like button as a tool for learning and social interaction, followed by questions about how they felt when they received Likes and when they gave Likes. Last, the students were asked to describe how their instructors used the button. The results for each of these are described below.

4.2.2.3.1 Like button as scaffold for learning

Students were asked in the survey about their opinion of the Like button’s ability to support their learning experience. Of the 80 respondents, 38 (47.5%) students felt that the Like button interferes with their learning experience, no one reported no impact, 32 (40%) found it useful for their learning experience, nine (11.3%) found it very useful for their learning experience, and one student did not respond. Table 4.5 displays the results from the survey. Student opinion was rather divided—47.5% negative, 51.3% positive—on the Like button’s ability to support their learning experience.

When interviewed, six of the eight students did not consider the Like button a tool that was able to support their learning in a substantive way. Students described the Like button as being useful when accompanied by a reply to a note that they agreed with (S1, S2, S6). Student 6 said “I would usually click it, then reply to their comment to add more to what was said.” Student 1 describes the value of this type of combination in more detail:

I found myself using the button when I read a note that I agreed with. So for example if someone asked a question in the question board and I also had the
same question, I would like their post so that I didn’t have to respond or post the same question in a separate spot. So it was useful for that. And it was also useful when I was reading responses and having a discussion; I found that it was easier and cleaner to like it rather than saying “I agree with that.” If there was something else to add then I would start a new post. But if it was a good idea and I liked that idea then I would just use the Like button than just bulking up the message board. (S1)

Students added that they did not pay much attention to which student did the Liking, rather the focus was placed on the content of the note that was Liked: “I used it only when I found the post meaningful to our discussion” (S4). Student 7 describes how she found the Like button valuable to the learning experience:

I would use it when I noticed in past weeks when more people had liked a certain post of mine I would go back and review that one to assess what I did differently in that post compared to other posts and try to replicate that [style] or format or whatever I did.

It appears that students have mixed perceptions of how the Like button can be used as a scaffold for their learning experience in Pepper.

Table 4.5
Student opinion on the Like button's ability to support their learning experience

<table>
<thead>
<tr>
<th>Role of Like button in your learning experience</th>
<th>Frequency (n=80)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interferes</td>
<td>38</td>
<td>47.5%</td>
</tr>
<tr>
<td>Does not impact</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Somewhat useful</td>
<td>32</td>
<td>40.0%</td>
</tr>
<tr>
<td>Very useful</td>
<td>9</td>
<td>11.3%</td>
</tr>
<tr>
<td>No response (null)</td>
<td>1</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

4.2.2.3.2 Like button as scaffold for social interaction

Students were asked in the survey about their opinion of the Like button’s ability to support social interaction. Of the 80 respondents, 20 (25%) students felt that the Like button does not support social interaction, 59 (73.8%) students felt that the Like button does support social interaction, and one student did not respond to this question. Table 4.6 displays the results from the survey.
These findings are consistent with the comments described by students in the interview regarding the Like button’s ability to support social interaction. Students described the Like button as adding value to their social interactions because it was a low-cost mechanism to say “I agree” (S2, S3, S4, S5, S6, S7, S8) or that a student has a shared perspective regarding the content. “Socially, I wanted to express that I really liked their note and the person’s values that they conveyed. I notice that sometimes people are not confident in what they are saying in their notes so I show them encouragement by using Like” (S8). Students also used the button to provide positive feedback to their peers, which they felt resulted in increased confidence, encouragement, and support for the varied perspectives that came up in weekly discussions:

> It’s a nice addition because socially it shows that I am supporting the people in my group and helping the community. When people Liked one of mine, then it meant something especially if they don’t Like everything all of the time. Knowing that you put work into it and then it is recognized with people Liking it boosts your confidence and makes you want to keep trying hard. (S3)

One student expressed that their use of the Like button for social interaction did not extend past the “I agree” (S1) appropriation.

Table 4.6
Student opinion on the Like button's ability to support social interaction

<table>
<thead>
<tr>
<th>Frequency of Use</th>
<th>Frequency (n=80)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does not support</td>
<td>20</td>
<td>25%</td>
</tr>
<tr>
<td>Does support</td>
<td>59</td>
<td>73.8%</td>
</tr>
<tr>
<td>No response (null)</td>
<td>1</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

4.2.2.3.3 Receiving Likes

Students reported that the Like button was a form of positive feedback that, when received, indicated they were contributing something of value to their course discussion. “It wasn’t used much, but it made me feel like there was someone out there. It was powerful because it appeared that what I had said actually made sense to someone. It seemed that only a few people were using it so it was valued” (S6). Additionally, they expressed that it increased their confidence and their personal value in the community. Student 3 describes the feeling: “It’s a confidence booster; not that I’m only relying on that to boost my confidence, but I can also tell by the way
they are replying to me. The way they reply is even more helpful for learning. In general, it makes you feel good inside” (S3). It also acted as an indicator that other people were reading their notes.

4.2.2.3.4 Giving Likes

When surveyed, 55 students (68.8%) reported that they felt good when they gave their peers Likes. Table 4.7 displays the results from the survey when students were asked how they felt when they gave Likes to their peers. When students reflected on giving Likes to others during the interview, they were more positive, as they described their intentions to express that they agreed or had a shared perspective with their peers and thus clicked Like. “I hoped that they would think that I either agreed with what they were saying or that I liked what they were saying or had similar ideas” (S1). Additionally, they used it to indicate that they thought a note was valuable to their discussion, which in turn could have resulted in increased respect for their peers that gave them recognition:

I recognize how I feel when someone recognizes me, so giving others Likes I hope they feel that they are being recognized and that their writing means something and isn’t just going to get lost in cyber space. I would hope that it encourages them to continue to feel good about their contributions. (S3)

Table 4.7
Student opinion on how they feel when they give Likes to their peers

<table>
<thead>
<tr>
<th>Emotional response to Giving Likes</th>
<th>Frequency (n=80)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>23</td>
<td>28.8%</td>
</tr>
<tr>
<td>Positive response</td>
<td>55</td>
<td>68.8%</td>
</tr>
<tr>
<td>No response (null)</td>
<td>2</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

4.2.2.3.5 Instructor use of the Like button

Students overwhelmingly described their instructors as not using the Like button in any way for their courses. Additionally, they stated that the instructors didn’t draw attention to it. “I don’t remember the professor saying anything about the Like button. I also don’t remember them using it either. They might have pressed it on a resource or video here or there but I’m not sure. I never noticed it” (S3).
4.2.2.4 Impact on online discourse

Students described the impact of Liking on their contributions to their online discussion. One student described Liking as a way to pay more attention to the notes: “Well when the other people in the course like things then it can draw your attention to whatever they are liking so you can focus on what they are focusing on and see what they find relevant and interesting” (S1). When examined in conjunction with the value of the Like in learning, student 4 describes the following: “I guess I would hope they get more attention to their post so that whoever is grading thinks it's valuable. I personally just like it if I find it useful, I don’t think about the other person who wrote it” (S4). Another student describes using the Like button as a model for the development of note content:

I would use it when I noticed in past weeks when more people had liked a certain post of mine I would go back and review that one to assess what I did differently in that post compared to other posts and try to replicate that [style] or format or whatever I did. (S7)

Student 8 describes Liking as a motivating factor: “It makes me continue to work hard at what I am doing. It depends, mostly it makes me want to write and contribute more to the community. Sometimes when I have a lot of likes I think I shouldn’t add more to the discussion and just leave it there” (S8).

Some students expressed concern for the use and over-use of the Like button in Pepper discussions as affecting the value of the button in the discussion. One student stated: “It doesn’t impact me. I guess I don’t really care if people Like it or not, I find it valuable when they actually reply to me” (S4). Another student states: “I sometimes didn’t even notice a like. It wasn’t a motivating factor for me at all. I would read a lot and had an idea in my head about what I wanted to contribute so the button didn’t influence me” (S5).

4.2.2.5 Online discussion-based course experiences

Students were asked to describe their overall learning and social experiences in Pepper as it related to student interaction. Some participants chose not to go into detail with their responses, and offered that their expectations for both learning and social aspects of the course were met or were not met. A detailed description of the two learning experiences is described below.
4.2.2.5.1 Overall online learning experience

Students were asked to describe their overall learning experience in Pepper. All participants described their expectations in terms of interaction in the course. Some participants chose not to go into detail with their responses, and offered that their expectations for learning in the course were met or were not met. Textual analysis of interview transcripts revealed that students’ online learning experiences could be categorized in three ways: not being met, being met, or being exceeded.

4.2.2.5.1.1 Not meeting students’ expectations

One student reported that their expectations of the online learning experience were not met due to a lack of interaction:

> It was redundant content and I wanted to have an external mediator to get the conversation going rather than having it just between the students. It wasn’t very challenging. Because I work full time, there were times when I couldn’t get online and would have to wait to post; so the flow was frustrating at times and also I had to wait on other students to post so that took a lot of time too. (S4)

4.2.2.5.1.2 Meeting students’ expectations

Five students reported their learning experiences as having met their expectations. Four of these students chose not elaborate on this. One student describes this as being built into the structure of the course: “…it was mandatory to post, that really made everyone go online and get people contributing to the course” (S6).

4.2.2.5.1.3 Exceeding students’ expectations

Two students reported that their expectations for learning in the course were exceeded. Student 3 describes this as being a result of the effort made to engage with peers: “I didn’t know what to expect, but it was better than I expected because I didn’t think I would get so invested in it. So it surpassed it” (S3). Student 8 shared a similar sentiment and described that more peers were willing to make deeper connections than previously perceived. They said:

> I had stereotypes about online courses and viewed them negatively. I really enjoy online courses because there is more time for reflection. I can participate more because it is asynchronous. Because it is not face-to-face, students are more
willing to make deeper connections. It was positive and exceeded my expectations. I’m really happy I tried the online course. (S8)

4.2.2.5.2 Overall online social experience

Students were asked to describe how their overall social experience in Pepper as it related to student interaction met their expectations. Textual analysis of interview transcripts revealed that students’ online social experiences could be categorized in three ways: not being met, being met, or being exceeded.

4.2.2.5.2.1 Not meeting students’ expectations

Three students described not having placed value on their online social experience because they considered their online courses as not having a predominantly academic focus. Student 7 describes why they do not place value on the social experience:

… it depends on the people in your course. There are some people that are cold so they don’t necessarily reveal that much about themselves and then sometimes you get people who tell you more, tell you all of their secrets and it has much more of a personal feel to it. (S7)

Student 5 emphasizes the need for an academic focus:

I didn’t really have any social expectations because I look at it as more academic. People in the beginning post their biography notes and I see that people identify with the similarities there but I don’t really care about that… maybe because I’m older, but I don’t look at courses as a social experience. I’m interested in what they have to say academically and their ideas. The social aspect of the collaborative part of courses was when I had to engage socially, but there was always an academic focus. (S5)

Student 4 states:

I knew that everything had to be online and I’m not necessarily comfortable with being online to have discussions. Overall I had low expectations. It’s really hard when you’re online trying to expand your discussions. When there are arguments it’s much more difficult to hash them out online. (S4)
4.2.2.5.2.2 Meeting students’ expectations

Four students described their social experience as having met their expectations. Two of these students described the value of having an introduction/biographic note that allowed them to get to know their peers as a positive social aspect of their courses that “everyone got to read through” (S1). “There was substantive conversation and it was a nice warm social environment where a group of us decided to stay in touch after the course so we added each other to Facebook to do that” (S2). Student 6 noted how useful it was to know that there were others in the course: “It was interesting because it was a larger course and you got to know people more with the names that kept popping up. It allowed me to know that there are not just 3 people in my class and have to maintain a professional demeanour in the discussion” (S6). Others describe the social aspect of their course as being better than previous courses “because people were really supportive of each other. Is it the exact social experience that I would get from a face-to-face, I would say no, but definitely was a good experience” (S3).

4.2.2.5.2.3 Exceeding students’ expectations

One student described the social experience as exceeding their expectations: “I didn’t think I could have such deep communication with people. There are people that I actually miss from the course because we really connected” (S8).

4.2.2.5.3 Suggested modifications to the Like button that affect student interaction

The Pepper environment is constantly being improved based on feedback from course instructors and students. This question was an opportunity for participants to provide feedback for future modifications to a popular system tool.

When asked if students would change anything about the Like button, they overwhelmingly reported that they would make the button more noticeable. Student 1 offers,

I would make it bigger and maybe put it at the top of the message where you may click reply so that it would be a little more obvious. I think that people in this day and age know what the Like button is on Facebook and its functionality is very similar in Pepper. (S1)

Student 4 was unable to recall the details of the Like button’s appearance and states: “I would make it more obvious, I don’t think it even think people notice it. Is there a number count on it?
That number should be a little more obvious that people have Liked notes” (S4). Student 6 shares similar sentiments about the button: “The button could be bigger/bolder to draw attention to it. If I’m not mistaken it is not that obvious so that would be helpful” (S6).

In making the button more noticeable, one student offered a different reason for making the button larger:

I would make it darker or bigger depending on the number of Likes. I think that would be useful. I didn’t necessarily curate posts based on their likes so if this could be implemented, then I would use it to help me read through the content. If there was a way that the notes had more attention brought to them because of Liking that would definitely help but it might change the whole dynamic. (S2)

Two students indicated that they would add a function to allow students to describe why they Liked a note. Student 3 describes the tool as being useful, but would add

…that whenever you click Like it prompts you to write a quick comment about what you Liked specifically [about the note]. Our peers were really good at providing the comments, but some might not be. I think it’s like getting a mark for an assignment back with no feedback so you want to know the reason for it. (S3)

Student 3 goes on to say, “I think that particular to community, some should have systems that should help them use it if they don’t use it or if they over use it to understand the value [of the Like button]” (S3). Student 7 suggests that a limit to the number of Likes students give be added because “I have seen it used where somebody just goes in and Likes everything and it’s kind of like you can’t agree with everyone’s posts or arguments. Sometimes they use it as a scapegoat for showing participation” (S7).

One student described that the Like button may function in a more descriptive way if the button was split into two different buttons: “I think it’s handy to have a quick thing to give positive affirmation. I use it for I agree or interesting/great comment. So maybe split it into 2 different buttons” (S5).

Overall, it appears that students would like to see the Like button be made more obvious in the environment, in addition to having various suggestions that relate to more specific use of the button.
4.3 Summary of Results

Log files were mined for student use of the Like button and descriptive statistical analysis was completed using SPSS. To provide more insight to the quantitative data, an anonymous online survey and follow-up interviews were conducted. All data sources when considered together provide a deeper understanding of how students experience the Like button in threaded discourse. The data reveals that on average 91.9% of students in the 41 courses used the Like button. When students were surveyed about why they use the Like button, they most frequently reported that it was a way to communicate approval or agreement quickly. Students also reported that they were more inclined to use the Like button when valuable contributions were made to the discussion, when new ideas were presented, when a resource was shared, and to offer encouragement to a classmate. Students report that they were least likely to use the Like button as a way of expressing puzzlement toward a post, and when an author discloses something personal about themselves. This was consistent with the opinions expressed by students when interviewed. Students’ feelings toward the role of the Like button as a social scaffold was more positive than it was toward using the Like button to scaffold their learning experiences. Reviewing the data, it appears that students’ experiences of the Like button were described positively, and that their use of the social media tool in an educational application was beneficial to their course experiences.

4.4 Discussion

I consider this study the cornerstone of the project, as it explores how students experience the Like button in threaded discourse using both quantitative and qualitative methods. This gave me a general idea of how often students used the button, in addition to describing the various reasons the Like button was used. It provided me with a way of conceptualizing the subsequent studies in the project. The Like button is clicked for multiple reasons. The actual intent for sending a Like is only known to the sender and the recipient interprets it in various ways. Most often, the recipient interprets the Like positively, even though the author’s intent of the online speech act is not fully knowable.

The idea that the Like button serves to say “I agree” without having to type a note in reply to another peer is echoed by most of the students interviewed. Students described their use of the Like button as playing more of a social function within their courses, where it made them feel
good to give and receive Likes, causing them to feel more connected to their peers and want to engage more in the course discussions. This is consistent with research findings in understanding threaded discourse in OLEs where social interaction is considered part of the foundation for positive, collaborative, and engaging discussions (e.g., Hiltz, 1994; Gunawardena, 1995; Brown, Collins, & Duguid, 1989; Dewey, 1938; Vygotsky, 1978). The results of this study suggest that engagement in discussion may involve more than just posting notes in response to one another. When a Like button is added to the online environment, a “Like” becomes an indirect speech act that changes the vernacular of online discussions.

Despite the overwhelming appropriation of the Like button as a tool to say “I agree,” there were subtler nuances that accompanied the use of the Like button—positive feelings toward the work that students put into their discussions. In the term “like,” there is not one prescribed meaning. Students are clearly using it to mean and elicit feelings associated with social interactions that are more common in face-to-face interactions, like a head nod or a smile. With respect to creating a positive space where students engage in discussions surrounding a myriad of topics, the Like button may act as a just-in-time feedback mechanism. The image of a student sitting on their computer staring at the amassed notes over the course of a week and creating their own posts in a discussion-based course comes to mind. It would not be difficult to imagine them feeling overwhelmed and longing to just see someone else in that space nod their head or smile at them. Unfortunately, the medium typically does not allow this. Systems like Blackboard and Moodle do not even allow you to see if there are other students online in the environment at the same time as you—the online environment becomes a dark abyss. In Pepper, you can see who is online, but this is reinforced by allowing students to quickly acknowledge others’ presence in the various discussions with a low-cost mechanism like the Like button. Receiving a Like lets you know that someone else is out there and is interested in what you are contributing to the course discussion. In this sense, students not only recognize that others are reading their posts, they are experiencing what tends to be a lonely encounter in a more positive way. Perhaps the appropriation of the Like button by students to say “I agree” provides students with just enough positive feedback from their peers to manage the volumes of text produced in discussion-based courses.

The addition of a new tool to help students interact socially is quite nuanced, and some students reported little or no added value to their learning experience. However, perhaps this is how the
button should be perceived in threaded discourse. One would not want it to dominate or detract from the time and effort students invest in generating and engaging in discussions. “Like” should be a subtle gesture and a reminder that students’ time and effort are not wasted. As students engage in discussion, they should feel an intrinsic sense of satisfaction as they engage in the constructive exchange of ideas. Part of that satisfaction is grounded in the underlying social acknowledgement that the ideas one has presented have been deemed interesting by another.

One of the more curious findings that arose during the interviews concerned the instructor’s relationship with the Like button. Students did not recall their instructors using the Like button or mentioning and prescribing its use in their courses. This is interesting because if the Like button is perceived as a social scaffold, instructors may be interested in mentioning the tool at the very least, if not prescribing the use of the button as a tool that will allow students to develop a sense of connectedness to each other in a low-cost way. It is a possibility that some instructors did not know the button existed or chose not to describe it because the focus for them was to be on course discussions and the production of notes, not the use of additional tools that did not explicitly provide insight regarding student learning. As a social scaffold, the Like button may have the potential to operate as the tool that grounds the conversation taking place, thus allowing for greater interaction and meaning-making through discussion (Swan, 2005)—the issue of grounding will be discussed in detail in the next chapter. Considering that instructor use of the Like button was negligible compared to that of students across all the courses included in the study, it may be necessary for instructors to be made aware of the student-perceived benefits of use of the Like button within text-rich environments. Another possibility is that use of the button can be interpreted in many ways, and instructors do not feel comfortable with this. Additional research into instructor use of the Like button is recommended.

The relationship between the Like button and student learning outcomes is challenging to determine. In this study, I chose not to look at correlations between student grades and use of the Like button. The University’s grading scheme for graduate courses ranges from B- to A+, and in the courses I examined, most students were typically awarded grades within a small, four grade level range (B+, A-, A, and A+), which severely limits the power of statistical analysis. Moreover, all of the courses employ a marking scheme that awards marks for “online participation,” which confounds any effort to study the relationship between online Liking and
Given these limitations, combined with my concerns about students’ privacy, I decided not to incorporate student grades into the study.

The literature suggests that successful online interactions may result in more effective learning (e.g., Hiltz, 1994; Swan 2005), although the precise relationship between interaction and learning is not entirely clear. In discussion-based courses, the term “learning” itself is subjective, as students are required to make personal meaning of the content. At this institution and in these courses, students are highly encouraged to draw on their own experiences when engaging in discussions to better understand how to mobilize educational theory into practice (Dewey, 1938). Rather than turning to student performance, I asked students in the survey and interviews various questions about the relationship between their use of the Like button and their learning experience. It was evident that students found the Like button to be a more explicit social scaffold, yet when describing its relationship to their learning experience, very few reported that there was any connection between their use and their learning. One student did say that when they received many Likes to a note, she would review it to identify possible features of the note that caused others to give it more Likes compared to the author’s other notes, and then attempt posting a new note containing these features (S7). In the survey, students were split on their feelings toward the Like button supporting their learning (47.5% reported that the Like button interfered with their learning and 51.3% reported that it was somewhat, if not very useful, to their learning). The ambiguity of the Like button’s perceived role in supporting student learning may be a result of the Like button being widely known as a social media tool rather than one that was developed for academic purposes. Perhaps such a low-cost mechanism when appropriated to an academic environment and when used by students, is considered time off-task since it does not involve the creation of unique or text-based content. Given that these courses are discussion-based, on-task interactions are most likely considered to be reading and creating posts. Any additional interactions may not be considered as valuable to their learning.

In spite of student perceptions, models like Garrison, Anderson, and Archer’s (1999) Community of Inquiry and research describing meaningful learning experiences as being cultivated through social and cognitive interactions (e.g., Hiltz, 1994). Some students reported using a combination of a Like and a reply simultaneously to engage both the social and cognitive dimensions. The Like button plays an affective role, and the accompanying follow-up reply provides content and deepens the interaction. This arrangement arguably helps better ground the discourse, by
simultaneously providing affirmation and acknowledgement of the original author’s work, while at the same time presenting new thoughts and extensions of those ideas.

Looking specifically at the results of the interview, when students were asked what they would change about the Like button, a majority suggested the Like button should be made more visible in the system (e.g., larger). Others suggested that the button should split into additional buttons to more precisely communicate the intent (similar to Facebook). It is a possibility that the term Like itself is more of a catch-all positive term that results in the ambiguity of its meaning when applied to notes in a thread. Each of the reasons students use the Like button, and how it is being received by their peers, indicates that the Like button is an indirect speech act that requires additional information to correctly interpret its role in threaded discourse. Recently, Facebook changed their Like button to provide more detailed reactions to users’ posts. They included both positive and negative reactions that would allow users to quickly express a more descriptive, yet low-cost reaction to posts (Facebook, 2016). Turning to this ubiquitous social media tool for recommendations, future iterations of the Like button facility could be explored to bring clarity to the use of the button in the knowledge construction process—i.e., renaming the button, encouraging course instructors to define the functionality of the button, or adding additional buttons as scaffolds to describe different types of reactions. This idea is expanded in Section 8.2.

Considered collectively, the preceding study suggests that students use Like for multiple purposes. First, and perhaps most importantly, it appears that Like serves a social scaffold, as its role as an indirect speech act communicates positive intent. The strongest and most consistent finding was that students appreciate receiving Likes from their classmates and that it makes them feel like they are engaging in online discussions where others are actively reading what they are posting. It causes them to feel more positively toward those classmates and it reassures them that other people appreciate their ideas. This is important: one of the frequently cited problems in the computer conferencing literature is that students often feel insecure about how others perceive their work (Peters & Hewitt, 2010) and that they are talking into a vacuum (Rovai, 2002a). By starting to address these problems, Like may offer benefits in terms of community-building and strengthening bonds between students. The social value of Like is well supported in the results of this study. The academic value of Liked notes is less clear. Some students (but not all) felt that it could be used to help identify notes that were of value to their learning, but this was not widespread. More research is needed in this area and will be discussed further in Chapter 8.
4.5 Limitations

The data triangulation in this study allowed for a more descriptive exploration of how students experience the Like button. One of the major limitations of this study is that users in the log files, survey, and interviews were anonymous insofar as I cannot map their log file data to their responses and look for convergence between data sources. There are similarities found across all three data sources, but reliability between the qualitative data and log files cannot be reported. Despite not achieving convergence, the results do provide an in-depth look at how students experience the button, and provides avenues for additional development of the tool that log file data alone would have not provided. The exploratory nature of the study reveals that future work focusing on the nuanced role of the Like button on student learning in threaded discourse is worthwhile; this is discussed in greater detail in Chapter 8.
Chapter 5
The Like Button as a Form of Acknowledgement

A previous study found that students reported using the Like button to acknowledge others’ contributions in online discussions (Makos, Oztok, Zingaro, & Hewitt, 2013). One particularly distinctive pattern takes the following form: Student A writes a note, Student B responds to it, and then Student A “Likes” the reply note; in effect the student acknowledges the reply from their peer. This pattern is referred to as a Reply Acknowledgement. An analysis of 20 graduate courses for the reply acknowledgement pattern found that 94% of students used the Like button, and over 90% of these students engaged in this type of reply acknowledgement behaviour, and there was a 25% chance that when a note was Liked that it was a Reply Acknowledgement (Makos & Hewitt, 2014). As noted in Chapter 4, the Like button was described by students as being used to say “I agree” with what another student is saying in online discussion, acting as a tool that provides a simplistic form of grounding conversation. This follows the same reply acknowledgement pattern researchers found in the study by Makos and Hewitt (2014). For this project, the pattern of reply acknowledgement is used and examined on a larger scale across multiple discussion-based courses.

To begin to understand how the Like button promotes social interaction in threaded discourse, it is necessary to explore how and why it is used by students. This chapter addresses the second research question:

2. How pervasive is the use of the Like button as a form of acknowledgement in online discussions?

The following sections present the data source, methods, and findings used to determine how pervasive the appropriation of the Like button as an acknowledgement tool is in threaded discourse.

5.1 Data Source and Methods

This study was conducted on a larger scale to include online discussion-based courses that have used Pepper since 2011 to look at the pervasiveness of use of the Like button as an acknowledgement tool. To answer the research question, a data extraction tool that isolates
which user Likes which user’s replies from the archival data was created by the system administrator of Pepper.

Data were extracted from the log files of 41 courses across two fields: Curriculum, Teaching and Learning (CTL) and Adult Psychology and Human Development (APHD). The data were extracted using two tools: (1) the Who Likes Who’s Reply tool, which provides a breakdown of which students wrote the notes that were Liked and which students did the Liking; and (2) the Summary extraction tool that provides a breakdown of student activity across various categories (including the number of: notes created, notes read, words written, sentences, replies made to others’ notes, replies received to their notes, Likes given to others’ notes, Likes received, etc.).

Using the Summary tool as the primary data source, data were sorted by course and cleaned to not include instructors. Additionally, data were cleaned for those students that had minimal participation in the course (only participated minimally for first two or three weeks, and then had no participation afterward). After cleaning, a total of 1,166 students were included in this study. The same students and instructors that were removed from the Summary data were removed from the Who Likes Who’s Reply data sets across all 41 courses. It is important to note that students can appear across multiple courses as data spans five years of course offerings; however, all data is tagged by course to maintain which instance of the student data I was looking at. All data sets were merged to create a master data file in Microsoft Excel and descriptive statistical analysis was run in SPSS to output frequencies and paired t-tests comparing student activity. The SPSS outputs were exported and included in the results below.

5.2 Results

5.2.1 How pervasive is the use of the Like button as an acknowledgement in online discussions?

The study examined 19 courses from the CTL field, and 22 courses from the APHD field. Table 5.1 displays the course averages for Like button use as a reply acknowledgement tool. Table 5.2 displays the averages for Like Button use as a reply acknowledgement tool by field and the overall totals.

Like button use was tallied for each student. Of the 1,166 students across the 41 courses, 1,067 (91.9%) used the Like button at least once. Of the 1,067 students that used the Like button, 953
(88.8%) engaged in the reply acknowledgement pattern of use. A paired t-test comparing student usage was conducted to determine if students taking courses in the two fields differed in their use of the Like button and its use as a reply acknowledgement. There was no statistical significance. A t-test was conducted to determine if student activity in each of the two fields differed in the number of notes being Liked by students. Statistical significance was found, p <.01. More notes were Liked in the CTL field (75%) compared to those students in courses in the APHD field (51.2%).

Table 5.1
Data Output for Like Button use as a Reply Acknowledgement Tool in Pepper Courses

<table>
<thead>
<tr>
<th>DB</th>
<th>Field</th>
<th>Students in Course</th>
<th>Students in Course that used Like Button</th>
<th>% Students used the Like Button</th>
<th>Total Student Notes in DB (Public)</th>
<th>Total Student Notes with at least one Like</th>
<th>% Student Notes with at least one Like</th>
<th>Total Student Replies that Receive Likes</th>
<th>Total Reply Ack. Likes</th>
<th>% Reply Ack.</th>
<th>Students that engage in Reply Ack. liking</th>
<th>% Students engaged in Reply Ack.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>APHD</td>
<td>32</td>
<td>29</td>
<td>90.63</td>
<td>2520</td>
<td>870</td>
<td>34.52</td>
<td>1171</td>
<td>281</td>
<td>24.00</td>
<td>27</td>
<td>93.10</td>
</tr>
<tr>
<td>2</td>
<td>APHD</td>
<td>24</td>
<td>23</td>
<td>95.83</td>
<td>1789</td>
<td>538</td>
<td>30.07</td>
<td>748</td>
<td>153</td>
<td>20.45</td>
<td>20</td>
<td>86.96</td>
</tr>
<tr>
<td>3</td>
<td>APHD</td>
<td>14</td>
<td>14</td>
<td>100.00</td>
<td>936</td>
<td>338</td>
<td>36.11</td>
<td>497</td>
<td>105</td>
<td>21.13</td>
<td>14</td>
<td>100.00</td>
</tr>
<tr>
<td>4</td>
<td>APHD</td>
<td>60</td>
<td>57</td>
<td>95.00</td>
<td>2610</td>
<td>858</td>
<td>32.87</td>
<td>949</td>
<td>279</td>
<td>29.40</td>
<td>50</td>
<td>87.72</td>
</tr>
<tr>
<td>5</td>
<td>APHD</td>
<td>31</td>
<td>28</td>
<td>90.32</td>
<td>2691</td>
<td>774</td>
<td>28.76</td>
<td>1069</td>
<td>267</td>
<td>24.98</td>
<td>24</td>
<td>85.71</td>
</tr>
<tr>
<td>6</td>
<td>APHD</td>
<td>16</td>
<td>14</td>
<td>87.50</td>
<td>1144</td>
<td>482</td>
<td>42.13</td>
<td>658</td>
<td>177</td>
<td>26.90</td>
<td>13</td>
<td>92.86</td>
</tr>
<tr>
<td>7</td>
<td>APHD</td>
<td>48</td>
<td>48</td>
<td>100.00</td>
<td>4451</td>
<td>1560</td>
<td>35.05</td>
<td>2049</td>
<td>698</td>
<td>34.07</td>
<td>44</td>
<td>91.67</td>
</tr>
<tr>
<td>8</td>
<td>APHD</td>
<td>20</td>
<td>20</td>
<td>100.00</td>
<td>1399</td>
<td>344</td>
<td>24.59</td>
<td>473</td>
<td>66</td>
<td>13.95</td>
<td>17</td>
<td>85.00</td>
</tr>
<tr>
<td>9</td>
<td>APHD</td>
<td>73</td>
<td>69</td>
<td>94.52</td>
<td>5631</td>
<td>1444</td>
<td>25.64</td>
<td>1964</td>
<td>677</td>
<td>34.47</td>
<td>66</td>
<td>95.65</td>
</tr>
<tr>
<td>10</td>
<td>APHD</td>
<td>46</td>
<td>46</td>
<td>100.00</td>
<td>7753</td>
<td>1033</td>
<td>13.32</td>
<td>1473</td>
<td>539</td>
<td>36.59</td>
<td>44</td>
<td>95.65</td>
</tr>
<tr>
<td>11</td>
<td>APHD</td>
<td>29</td>
<td>29</td>
<td>100.00</td>
<td>2196</td>
<td>1104</td>
<td>50.27</td>
<td>1704</td>
<td>488</td>
<td>28.64</td>
<td>28</td>
<td>96.55</td>
</tr>
<tr>
<td>12</td>
<td>APHD</td>
<td>24</td>
<td>16</td>
<td>66.67</td>
<td>762</td>
<td>175</td>
<td>22.97</td>
<td>166</td>
<td>73</td>
<td>43.98</td>
<td>11</td>
<td>68.75</td>
</tr>
<tr>
<td>13</td>
<td>APHD</td>
<td>69</td>
<td>67</td>
<td>97.10</td>
<td>6914</td>
<td>1331</td>
<td>19.25</td>
<td>2927</td>
<td>1010</td>
<td>34.51</td>
<td>62</td>
<td>92.54</td>
</tr>
<tr>
<td>14</td>
<td>APHD</td>
<td>16</td>
<td>16</td>
<td>100.00</td>
<td>1914</td>
<td>1020</td>
<td>53.29</td>
<td>1506</td>
<td>527</td>
<td>34.99</td>
<td>14</td>
<td>87.50</td>
</tr>
<tr>
<td>15</td>
<td>APHD</td>
<td>32</td>
<td>32</td>
<td>100.00</td>
<td>3853</td>
<td>870</td>
<td>22.58</td>
<td>942</td>
<td>311</td>
<td>33.01</td>
<td>29</td>
<td>90.63</td>
</tr>
<tr>
<td>16</td>
<td>APHD</td>
<td>23</td>
<td>21</td>
<td>91.30</td>
<td>1848</td>
<td>608</td>
<td>32.90</td>
<td>829</td>
<td>318</td>
<td>38.36</td>
<td>21</td>
<td>100.00</td>
</tr>
<tr>
<td>17</td>
<td>APHD</td>
<td>22</td>
<td>18</td>
<td>81.82</td>
<td>1167</td>
<td>336</td>
<td>28.79</td>
<td>471</td>
<td>119</td>
<td>25.27</td>
<td>16</td>
<td>88.89</td>
</tr>
<tr>
<td>18</td>
<td>APHD</td>
<td>69</td>
<td>60</td>
<td>86.96</td>
<td>6184</td>
<td>1694</td>
<td>27.39</td>
<td>2665</td>
<td>955</td>
<td>35.83</td>
<td>52</td>
<td>86.67</td>
</tr>
<tr>
<td></td>
<td>APHD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>16</td>
<td>16</td>
<td>100.00</td>
<td>743</td>
<td>454</td>
<td>61.10</td>
<td>620</td>
<td>144</td>
<td>23.23</td>
<td>14</td>
<td>87.50</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>25</td>
<td>25</td>
<td>100.00</td>
<td>2217</td>
<td>754</td>
<td>34.01</td>
<td>778</td>
<td>282</td>
<td>36.25</td>
<td>19</td>
<td>76.00</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>29</td>
<td>16</td>
<td>55.17</td>
<td>1933</td>
<td>324</td>
<td>16.76</td>
<td>262</td>
<td>109</td>
<td>41.60</td>
<td>14</td>
<td>87.50</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>25</td>
<td>19</td>
<td>76.00</td>
<td>1645</td>
<td>474</td>
<td>28.81</td>
<td>564</td>
<td>243</td>
<td>43.09</td>
<td>18</td>
<td>94.74</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>14</td>
<td>12</td>
<td>85.71</td>
<td>1508</td>
<td>141</td>
<td>9.35</td>
<td>154</td>
<td>39</td>
<td>25.32</td>
<td>9</td>
<td>75.00</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>19</td>
<td>18</td>
<td>94.74</td>
<td>1576</td>
<td>298</td>
<td>18.91</td>
<td>404</td>
<td>66</td>
<td>16.34</td>
<td>15</td>
<td>83.33</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>17</td>
<td>17</td>
<td>100.00</td>
<td>1343</td>
<td>302</td>
<td>22.49</td>
<td>423</td>
<td>105</td>
<td>24.82</td>
<td>16</td>
<td>94.12</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>22</td>
<td>21</td>
<td>95.45</td>
<td>1925</td>
<td>854</td>
<td>44.36</td>
<td>1490</td>
<td>344</td>
<td>23.09</td>
<td>20</td>
<td>95.24</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>19</td>
<td>18</td>
<td>94.74</td>
<td>1270</td>
<td>823</td>
<td>64.80</td>
<td>1262</td>
<td>382</td>
<td>30.27</td>
<td>15</td>
<td>83.33</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>15</td>
<td>15</td>
<td>100.00</td>
<td>1112</td>
<td>442</td>
<td>39.75</td>
<td>697</td>
<td>206</td>
<td>29.56</td>
<td>13</td>
<td>86.67</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>23</td>
<td>22</td>
<td>95.65</td>
<td>1615</td>
<td>660</td>
<td>40.87</td>
<td>1002</td>
<td>215</td>
<td>21.46</td>
<td>18</td>
<td>81.82</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>17</td>
<td>16</td>
<td>94.12</td>
<td>1002</td>
<td>509</td>
<td>50.80</td>
<td>556</td>
<td>212</td>
<td>38.13</td>
<td>12</td>
<td>75.00</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>27</td>
<td>26</td>
<td>96.30</td>
<td>2246</td>
<td>1266</td>
<td>56.37</td>
<td>2657</td>
<td>588</td>
<td>22.13</td>
<td>26</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>36</td>
<td>30</td>
<td>83.33</td>
<td>1535</td>
<td>576</td>
<td>37.52</td>
<td>360</td>
<td>157</td>
<td>43.61</td>
<td>21</td>
<td>70.00</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>47</td>
<td>33</td>
<td>70.21</td>
<td>1710</td>
<td>980</td>
<td>57.31</td>
<td>489</td>
<td>213</td>
<td>43.56</td>
<td>25</td>
<td>75.76</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>28</td>
<td>26</td>
<td>92.86</td>
<td>2978</td>
<td>1295</td>
<td>43.49</td>
<td>2366</td>
<td>567</td>
<td>23.96</td>
<td>26</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>17</td>
<td>15</td>
<td>88.24</td>
<td>1485</td>
<td>540</td>
<td>36.36</td>
<td>681</td>
<td>192</td>
<td>28.19</td>
<td>15</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>16</td>
<td>15</td>
<td>93.75</td>
<td>2002</td>
<td>1035</td>
<td>51.70</td>
<td>1666</td>
<td>425</td>
<td>25.51</td>
<td>15</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>23</td>
<td>21</td>
<td>91.30</td>
<td>1658</td>
<td>634</td>
<td>38.24</td>
<td>908</td>
<td>202</td>
<td>22.25</td>
<td>18</td>
<td>85.71</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>21</td>
<td>20</td>
<td>95.24</td>
<td>1672</td>
<td>834</td>
<td>49.88</td>
<td>1662</td>
<td>292</td>
<td>17.57</td>
<td>19</td>
<td>95.00</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>24</td>
<td>23</td>
<td>95.83</td>
<td>2069</td>
<td>904</td>
<td>43.69</td>
<td>1330</td>
<td>360</td>
<td>27.07</td>
<td>22</td>
<td>95.65</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>19</td>
<td>18</td>
<td>94.74</td>
<td>1796</td>
<td>892</td>
<td>49.67</td>
<td>1460</td>
<td>345</td>
<td>23.63</td>
<td>16</td>
<td>88.89</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>19</td>
<td>18</td>
<td>94.74</td>
<td>1337</td>
<td>818</td>
<td>61.18</td>
<td>1330</td>
<td>355</td>
<td>26.69</td>
<td>15</td>
<td>83.33</td>
<td></td>
</tr>
<tr>
<td><strong>Total/Average</strong></td>
<td>1166</td>
<td>1067</td>
<td>91.85%</td>
<td>94139</td>
<td>31188</td>
<td>37.02%</td>
<td>45382</td>
<td>13086</td>
<td>29.22%</td>
<td>953</td>
<td>88.79%</td>
<td></td>
</tr>
</tbody>
</table>


Table 5.2
Averages for Like button use as a Reply Acknowledgement Tool in Pepper courses by field

<table>
<thead>
<tr>
<th></th>
<th>Field</th>
<th>Students in Course</th>
<th>Students in Course that used Like Button</th>
<th>% Students used the Like Button</th>
<th>Total Student Notes in DB (Public)</th>
<th>Total Student Notes with at least one Like</th>
<th>% Student Notes with at least one Like</th>
<th>Total Student Replies that Receive Likes</th>
<th>Total Reply Ack.</th>
<th>% Reply Ack.</th>
<th>Students that engage in Reply Ack.</th>
<th>% Students engaged in Reply Ack.</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>APHD</td>
<td>743</td>
<td>683</td>
<td>91.92</td>
<td>62300</td>
<td>17385</td>
<td>28.63%</td>
<td>24485</td>
<td>7821</td>
<td>31.94</td>
<td>617</td>
<td>90.34</td>
</tr>
<tr>
<td>19</td>
<td>CTL</td>
<td>423</td>
<td>384</td>
<td>90.78</td>
<td>31839</td>
<td>13803</td>
<td>43.35%</td>
<td>20897</td>
<td>5265</td>
<td>25.20</td>
<td>336</td>
<td>87.50</td>
</tr>
</tbody>
</table>

Total/Average 1166 1067 91.85% 94139 31188 37.02% 45382 13086 29.22% 953 88.79%

5.3 Data Summary

Data mining Pepper log file data over a total of 41 online, discussion-based courses with an extraction tool called *Who Likes Who’s Reply* allowed me to identify when students engaged in reply acknowledging behaviour, i.e., when Student A writes a note, Student B responds to it, and then Student A “Likes” the reply note. This study illustrates that student use of the Like button as a crude form of an acknowledgement is pervasive—of the 91.9% of students engaging in Liking, 88.8% of them engage in reply acknowledging.

5.4 Discussion

There is no simple equivalent to body language (e.g., head nods) in online learning environments. However, tools like the Like button can provide some compensation for the absence of visual and aural cues. When text-rich threads are accompanied by Likes or other types of social scaffolds, readers are provided with more clues about how to interpret online exchanges.

When two people have a face-to-face discussion, the grounding taking place is exceptionally more complex and dynamic as both participants watch each other to gather visual and aural cues that influence their choice of words and the way they engage in the discussion. For example, if I was explaining an idea to you, I would also be watching your reaction to see if you understood what I was saying. I may even alter what I am saying mid-speech, depending on the expressions I am receiving from you. When you’re responding to my ideas, you are also gauging my reaction
and watching my expressions. You may alter your words, phrases, and even your expressions based on my cues—maybe I am nodding my head in agreement, or maybe I look confused. These subtle yet telling cues are not available to participants in an online discussion, so the resulting discourse is a crude version of that experience. Tools, like the Like button, may provide some affordance in grounding the conversation, however simplistic. If you and I were having a discussion online, I may post my idea as I have worked it out in my mind. I may or may not be cognizant that when you read it, you may not elicit a response that I was anticipating. Not only will you be reading the post asynchronously, my words may not read the same way I “spoke” them while typing. You may agree or disagree with what is there. Maybe you feel like you understand what I am saying, but you don’t yet know what you’d like to say to engage in this discussion. It is within this context that the Like button can play a modest role in reducing some of the uncertainty that people feel. The complexity of face-to-face grounding is so intricate that it may be impossible to develop text-based interactions that can fully replicate it. Nevertheless, the Like button serves as a crude form of acknowledgement that makes grounding somewhat more feasible than it would be otherwise.

Thinking about the Like button as a form of acknowledgement in online discussion suggests that the button replicates a head nod in face-to-face conversations. It is a low-cost mechanism to say that those engaging in discussion understand each other’s perspectives. Based on Clark and Brennan (1991) and Clark and Shaefer’s (1989) work on grounding conversations, where verbal and non-verbal cues are used by those engaging in a discussion, a tool was required by students to support them with the issue of grounding in an environment where there is a lack of aural and visual cues (Clouder et al., 2006; Çelik, 2013). Their appropriation of the Like button appears to be the tool they selected to act in this way, although rather simple. In Pepper, there are no additional actions that can be publically made to posts that would allow students to know you have read it other than replying to the note with a text-based response. Privately, students can favourite the note for their own review later. In Blackboard, for example, there are no interaction buttons associated with a post other than reply. So, the question of the degree to which students can ground conversations in a text-rich environment is not yet well understood.

Knowing that grounding conversation has traditionally been difficult in asynchronous online discussions, students naturally become uncertain about how their contributions to the online discussion are perceived by others. This uncertainty can inhibit collaborative interaction. If
people are anxious about how their ideas are interpreted, they may be less likely to share a perspective, ask difficult questions, or participate in a discussion of a controversial topic. While the Like button does not necessarily solve the problem of “grounding,” results indicate that it may relieve some of the uncertainty that people feel, and prompt a deeper sense of trust in one’s classmates. Students’ appropriation of the Like button as a form of acknowledgement is their way of developing another set of social and communication skills. Perhaps this is what allows them to engage with each other in positive and constructive ways that foster a sense of trust and affirmation (Johnson & Johnson, 1999). The findings from the study in Chapter 4 confirm the increased sense of positivity directed toward other students and shared ideas and sentiment toward the content of their notes. However, due to the various appropriations of the Like button by different students (see Chapter 4, Section 4.2.2.1 for all the ways students describe their use of the button) this problem of grounding conversation is still far from resolved.

This current study focuses a specific pattern of use, which was repeatedly observed in online exchanges: the Reply Acknowledgement pattern. In this pattern, Person A initiates the conversation, Person B responds, and then Person A “Likes” Person B’s response. What does “Like” indicate in this context? Does it indicate that Person A agrees with Person B, or could it mean something else?

Understanding the adoption of the Like button in the Reply Acknowledgement pattern as one type of indirect speech act is a useful step in understanding how to support the social aspect of threaded discourse that can cultivate more supportive CSCL environments. The number of Reply Acknowledgements is quite substantial in online discourse, with almost 30% of the notes in courses receiving reply acknowledgements and almost 90% of students engaging in this action. Why is the Reply Acknowledgement so pervasive? It is not clear, but we can speculate that the Like as an indirect speech act is nuanced, and may have multiple meanings as described in Table 4.4 in the previous chapter. Here are some additional possible interpretations that are specific to a Reply Acknowledgement:

- **Agreement**: When I Like your reply to my note, I may simply be telling you that I agree with you.
• Gratitude: Another possibility is that I am grateful to you for replying to my post. Perhaps I simply appreciate feedback. In this case, Like does not necessarily mean that I agree with what you have written, but rather serves as a “thank you” for your reply.

• Sign Off: Liking your reply may be a way for me to signal that I have nothing more to say in this thread. I may Like your note to end our exchange on a positive note, so that you and I are on good terms for future interactions in our online course.

• Personal Support / Empathy: If you sound uncertain in your note, express a vulnerability, or share a personal struggle, I may use Like to show empathy and personal support.

• “We agree to disagree”: Like may also be used in cases where two people are in disagreement and have had a back-and-forth exchange. Ending the interaction with a “Like” would not necessarily signal that the disagreement has been resolved, but might instead send the message that, “I appreciate your response and acknowledge your position. Although we disagree, there is no offense taken.”

One can thus imagine many different possible meanings of a “Like” in a “Reply Acknowledgement” scenario. Perhaps that is why there are so many Reply Acknowledgements in the courses studied.

Considering the appropriation of the Like button as a simple form of acknowledgement of peers’ perspectives in discussion, this study provides baseline data for understanding how the Like button may be used to scaffold the social interaction in threaded discourse. This aspect of the study is important because other online learning management systems (like Blackboard and Moodle) and social media platforms (like Facebook) do not provide external researchers with data on student use of their systems. To develop online learning environments that scaffold user interactions, this data is necessary for creating a foundation upon which we can understand how users are choosing to engage with their peers in non-text-based, nuanced ways that are not traditionally considered meaningful interactions in threaded discourse.
5.5 Limitations

This study is limited to online, discussion-based courses at a large Canadian institute for education. The courses explored a range of topics and they provided students with opportunities to discuss issues in detail. The applicability of the findings to other types of courses is uncertain.
Chapter 6
Liked versus Non-Liked Notes

A previous case study by Makos, Zingaro, Ozток, and Hewitt (2014) examined the differences in the quantifiable features of notes across ten metrics between non-Liked and Liked student authored notes. The metrics included:

- Mean number of revisions made to notes
- Mean note length (in words)
- Mean sentence length (in words)
- Academic Word List use percentage
- Informal World List use percentage
- Mean Flesch Reading Ease score (higher values indicate text that is more readable)
- Mean Flesch-Kincaid Grade Level (Flesch, 1951) of the notes
- Sentiment
- Total number of links made by the student to other student’s notes
- Total number of links made to the student’s notes by other students

The case was run using three courses. Statistically significant differences were associated with note length, average sentence length, reading ease, and less informal vocabulary. These metrics indicate that Liked notes were, on average, longer, contain lengthier sentences, were slightly more difficult to read, and had fewer informal words than non-Liked notes.

The intention for this study is to replicate this study with a larger number of courses to better identify aggregate trends in the differences between non-Liked and Liked notes. These attributes were chosen to highlight any content-based differences between Liked and non-Liked notes because they potentially reflect the complexity and cognitive level of student discourse (Bradley, Thom, Hayes & Hay, 2008). For example, a note that has been revised repeatedly by its authors may be written at a higher grade level or possess more reasoned arguments than single-pass notes. Similarly, a note containing many academic words may offer more sophisticated ideas.
For each of the wordlist-based measures, the total number of words used for each student's Liked and non-Liked notes was calculated, and divided by the number of notes in the category.

The following study investigates the differences on a larger scale to address the third research question:

3. How do Liked notes differ from non-Liked notes in quantifiable features including number of words, revisions, reads, replies and other quantifiable features?

The following sections present the data source, methods and findings used understand the differences between the quantifiable features of non-Liked notes and Liked notes.

6.1 Hypothesis

Based on the prior study (Makos, Zingaro, Oztok & Hewitt, 2014), I expect that the findings from my previous study would hold true and that Liked notes will differ from non-Liked notes in terms of their quantifiable features in similar ways.

6.2 Data Source and Methods

An examination of the quantifiable features comparing notes that did not received Likes to notes that received Likes was conducted. Data classified by these two conditions (notes that received no Likes and notes that received Likes) was extracted using an extraction tool that was developed by the Pepper administrator to calculate the following metrics for each student:

- Total notes in the category
- Mean number of revisions made to notes
- Mean note length (in words)
- Mean sentence length (in words)
- Academic Word List use percentage
- Informal World List use percentage
- Pronoun “I” Vocabulary percentage
- Pronoun “You” Vocabulary percentage
- Pronoun “He/She” Vocabulary percentage
• Pronoun “We” Vocabulary percentage
• Pronoun “They” Vocabulary percentage
• Mean Flesch Reading Ease score (higher values indicate text that is more readable)
• Mean Flesch-Kincaid Grade Level (Flesch, 1951) of the notes
• Emotional Intensity
• Total number of links made by the student to other students’ notes
• Total number of links made to the student’s notes by other students

These attributes were chosen to highlight any quantifiable differences between non-Liked and Liked notes because they potentially reflect the complexity of student discourse (Bradley, Thom, Hayes & Hay, 2008). The extraction tools following the conditions of notes that received Likes and notes that received no Likes were run on 41 courses containing a total of 1,166 students after the data were cleaned for students that had minimal participation over the 13 weeks (i.e., students that dropped the course in the first few weeks of class). The data consisted of 19 courses from the CTL field, and 22 courses from the APHD field.

Data were cleaned and multiple paired samples t-tests were run in SPSS. A paired samples t-test that compared students’ features of their non-Liked notes to their Liked notes was run across all students in each of the 41 courses. Additionally, a paired samples t-test was run comparing non-Liked notes to Liked notes in students in CTL courses, and then a paired samples t-test comparing non-Liked notes to Liked notes in students in APHD courses was run.

6.3 Results

6.3.1 How do Liked notes differ from non-Liked notes in their quantifiable features across all courses?

Of the 1,166 students in the dataset, 1,162 (99.7%) of the students received at least one Like to their notes. A paired samples t-test with a 95% confidence level was run on the aggregate data across all 41 courses to determine if students’ notes that received no Likes differ in their associated note metrics from notes that received Likes. Table 6.1 displays the means across each
of the metrics for non-Liked notes and Liked notes along with the means difference. Table 6.2 displays the results of the statistical analysis.

The aggregate statistical analysis of archival course data reveals that there are more non-Liked notes within a course discussion than Liked notes. Looking specifically at how the quantifiable features of Liked notes differ from non-Liked notes, the following was found—Liked notes, on average:

- are revised less,
- are longer,
- contain shorter sentences,
- contain more informal words,
- contain lower use of the pronouns “I” and “You,”
- contain higher use of the pronouns “He/She” and “They,”
- are more difficult to read,
- are written at a higher grade level,
- and contain more links made to a student’s note than non-Liked notes.

A discussion of these results can be found in Section 6.5.
Table 6.1
Aggregate Means: Non-Liked Notes, Liked Notes, and Means Difference (non-Liked – Liked)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Mean Non-Liked Notes</th>
<th>Mean Liked Notes</th>
<th>Means Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notes</td>
<td>52.07</td>
<td>28.64</td>
<td>23.43</td>
</tr>
<tr>
<td>Revisions</td>
<td>71.08</td>
<td>42.26</td>
<td>28.82</td>
</tr>
<tr>
<td>Note Length</td>
<td>130.69</td>
<td>161.66</td>
<td>-30.96</td>
</tr>
<tr>
<td>Sentence Length</td>
<td>16.10</td>
<td>9.57</td>
<td>6.53</td>
</tr>
<tr>
<td>AWL Percentage</td>
<td>7.42</td>
<td>7.44</td>
<td>-0.02</td>
</tr>
<tr>
<td>IWL Percentage</td>
<td>0.31</td>
<td>0.27</td>
<td>0.04</td>
</tr>
<tr>
<td>“I” Percentage</td>
<td>0.45</td>
<td>0.44</td>
<td>0.01</td>
</tr>
<tr>
<td>“You” Percentage</td>
<td>0.15</td>
<td>0.12</td>
<td>0.03</td>
</tr>
<tr>
<td>“He/She” Percentage</td>
<td>0.05</td>
<td>0.06</td>
<td>-0.01</td>
</tr>
<tr>
<td>“We” Percentage</td>
<td>0.15</td>
<td>0.15</td>
<td>0.00</td>
</tr>
<tr>
<td>“They” Percentage</td>
<td>0.20</td>
<td>0.23</td>
<td>-0.03</td>
</tr>
<tr>
<td>Flesch Reading Ease Score</td>
<td>58.31</td>
<td>56.52</td>
<td>1.74</td>
</tr>
<tr>
<td>Flesch-Kincaid Grade Level</td>
<td>9.54</td>
<td>9.92</td>
<td>-0.38</td>
</tr>
<tr>
<td>Emotional Intensity</td>
<td>1.35</td>
<td>1.33</td>
<td>0.02</td>
</tr>
<tr>
<td>Links made to others</td>
<td>3.36</td>
<td>3.40</td>
<td>-0.04</td>
</tr>
<tr>
<td>Links made to student</td>
<td>2.45</td>
<td>4.93</td>
<td>-2.48</td>
</tr>
</tbody>
</table>
Table 6.2
Paired samples t-test for aggregate data (non-Liked – Liked notes)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Means Difference (non-Liked – Liked)</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>95% Confidence Interval of the Difference</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notes</td>
<td>23.43</td>
<td>34.00</td>
<td>1.00</td>
<td>21.47 – 25.38</td>
<td>23.53</td>
<td>1165</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>Revisions</td>
<td>28.82</td>
<td>52.94</td>
<td>1.55</td>
<td>25.78 – 31.86</td>
<td>18.59</td>
<td>1165</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>Note Length</td>
<td>-30.96</td>
<td>64.29</td>
<td>1.88</td>
<td>-34.66 – -27.27</td>
<td>16.44</td>
<td>1165</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>Sentence Length</td>
<td>6.53</td>
<td>5.82</td>
<td>0.17</td>
<td>6.20 – 6.87</td>
<td>38.34</td>
<td>1165</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>AWL Percentage</td>
<td>-0.02</td>
<td>1.58</td>
<td>0.05</td>
<td>-0.11 – 0.07</td>
<td>4.58</td>
<td>1165</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>IWL Percentage</td>
<td>0.04</td>
<td>0.31</td>
<td>0.01</td>
<td>0.02 – 0.06</td>
<td>4.36</td>
<td>1165</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>“I” Percentage</td>
<td>0.01</td>
<td>0.12</td>
<td>0.00</td>
<td>0.02 – 0.06</td>
<td>4.36</td>
<td>1165</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>“You” Percentage</td>
<td>0.03</td>
<td>0.07</td>
<td>0.00</td>
<td>0.02 – 0.03</td>
<td>12.04</td>
<td>1165</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>“He/She” Percentage</td>
<td>-0.01</td>
<td>0.06</td>
<td>0.00</td>
<td>-0.01 – 0.00</td>
<td>-4.07</td>
<td>1165</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>“We” Percentage</td>
<td>0.00</td>
<td>0.08</td>
<td>0.00</td>
<td>-0.01 – 0.00</td>
<td>-1.44</td>
<td>1165</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>“They” Percentage</td>
<td>-0.03</td>
<td>0.09</td>
<td>0.00</td>
<td>-0.04 – -0.03</td>
<td>-11.63</td>
<td>1165</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>Flesch Reading Ease Score</td>
<td>1.74</td>
<td>7.16</td>
<td>0.21</td>
<td>1.33 – 2.15</td>
<td>8.31</td>
<td>1165</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>Flesch-Kincaid Grade Level</td>
<td>-0.38</td>
<td>1.41</td>
<td>0.04</td>
<td>-0.46 – -0.30</td>
<td>-9.23</td>
<td>1165</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>Emotional Intensity</td>
<td>0.02</td>
<td>0.67</td>
<td>0.02</td>
<td>-0.02 – 0.06</td>
<td>1.11</td>
<td>1165</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>Links made to others</td>
<td>-0.04</td>
<td>11.12</td>
<td>0.33</td>
<td>-0.67 – 0.60</td>
<td>-0.11</td>
<td>1165</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>Links made to student</td>
<td>-2.48</td>
<td>7.96</td>
<td>0.23</td>
<td>-2.94 – -2.03</td>
<td>-10.65</td>
<td>1165</td>
<td>p &lt; .001*</td>
</tr>
</tbody>
</table>

*Denotes significant statistical difference
6.3.2 Course Field Focus Results

Paired samples t-tests were conducted to determine if the two fields of courses revealed differences between non-Liked and Liked notes. A paired samples t-test analysis of the difference between non-Liked notes and Liked notes across students in CTL and APHD fields is described below.

6.3.2.1 CTL Field

A paired samples t-test with a 95% confidence level was run using the 19 CTL courses to determine if student notes that received no Likes differ in their associated note metrics from notes that received Likes. Table 6.3 displays the means across each of the metrics for non-Liked notes and Liked notes along with the means difference. Table 6.4 displays the results of the statistical analysis.

The statistical analysis of archival course data in the CTL field reveals that there are more non-Liked notes within a course discussion than Liked notes. Looking specifically at how the quantifiable features of Liked notes differ from non-Liked notes within CTL courses, the following was found—Liked notes, on average:

- are revised less,
- are longer,
- contain shorter sentences,
- contain more academic and informal words,
- contain lower use of the pronoun “You,”
- contain higher use of the pronouns “He/She” and “They,”
- are more difficult to read,
- are written at a higher grade level,
- are more positive in their emotional intensity,
- and contain more links made to a student’s note than non-Liked notes.
This follows a similar pattern to the aggregate data analysis in Section 6.3.1 except for academic word use, and use of the pronoun “I.” A discussion of these results can be found in Section 6.5.

Table 6.3
CTL Means: Non-Liked Notes, Liked Notes, and Means Difference (non-Liked – Liked)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Mean Non-Liked Notes</th>
<th>Mean Liked Notes</th>
<th>Means Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notes</td>
<td>42.75</td>
<td>32.12</td>
<td>10.23</td>
</tr>
<tr>
<td>Revisions</td>
<td>64.62</td>
<td>52.36</td>
<td>12.26</td>
</tr>
<tr>
<td>Note Length</td>
<td>151.87</td>
<td>186.17</td>
<td>-34.30</td>
</tr>
<tr>
<td>Sentence Length</td>
<td>17.15</td>
<td>10.23</td>
<td>6.92</td>
</tr>
<tr>
<td>AWL Percentage</td>
<td>7.74</td>
<td>7.96</td>
<td>-0.22</td>
</tr>
<tr>
<td>IWL Percentage</td>
<td>0.28</td>
<td>0.21</td>
<td>0.07</td>
</tr>
<tr>
<td>“I” Percentage</td>
<td>0.51</td>
<td>0.50</td>
<td>0.01</td>
</tr>
<tr>
<td>“You” Percentage</td>
<td>0.15</td>
<td>0.12</td>
<td>0.03</td>
</tr>
<tr>
<td>“He/She” Percentage</td>
<td>0.03</td>
<td>0.04</td>
<td>-0.01</td>
</tr>
<tr>
<td>“We” Percentage</td>
<td>0.15</td>
<td>0.15</td>
<td>0.00</td>
</tr>
<tr>
<td>“They” Percentage</td>
<td>0.15</td>
<td>0.19</td>
<td>-0.04</td>
</tr>
<tr>
<td>Flesch Reading Ease Score</td>
<td>57.85</td>
<td>55.59</td>
<td>2.26</td>
</tr>
<tr>
<td>Flesch-Kincaid Grade Level</td>
<td>9.88</td>
<td>10.40</td>
<td>-0.52</td>
</tr>
<tr>
<td>Emotional Intensity</td>
<td>1.35</td>
<td>1.42</td>
<td>-0.07</td>
</tr>
<tr>
<td>Links made to others</td>
<td>6.53</td>
<td>7.51</td>
<td>-0.98</td>
</tr>
<tr>
<td>Links made to student</td>
<td>4.21</td>
<td>9.70</td>
<td>-5.49</td>
</tr>
</tbody>
</table>
Table 6.4
Paired samples t-test for CTL data (non-Liked - Liked notes)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Paired Differences</th>
<th>95% Confidence Interval of the Difference</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Means Difference (non-Liked - Liked)</td>
<td>Std. Deviation</td>
<td>Std. Error Mean</td>
</tr>
<tr>
<td>Notes</td>
<td>10.23</td>
<td>29.77</td>
<td>1.45</td>
</tr>
<tr>
<td>Revisions</td>
<td>12.26</td>
<td>55.32</td>
<td>2.69</td>
</tr>
<tr>
<td>Note Length</td>
<td>-34.30</td>
<td>91.80</td>
<td>4.46</td>
</tr>
<tr>
<td>Sentence Length</td>
<td>6.92</td>
<td>6.10</td>
<td>0.30</td>
</tr>
<tr>
<td>AWL Percentage</td>
<td>-0.22</td>
<td>2.02</td>
<td>0.10</td>
</tr>
<tr>
<td>IWL Percentage</td>
<td>0.07</td>
<td>0.24</td>
<td>0.01</td>
</tr>
<tr>
<td>“I” Percentage</td>
<td>0.01</td>
<td>0.13</td>
<td>0.01</td>
</tr>
<tr>
<td>“You” Percentage</td>
<td>0.03</td>
<td>0.07</td>
<td>0.00</td>
</tr>
<tr>
<td>“He/She” Percentage</td>
<td>-0.01</td>
<td>0.04</td>
<td>0.00</td>
</tr>
<tr>
<td>“We” Percentage</td>
<td>0.00</td>
<td>0.08</td>
<td>0.00</td>
</tr>
<tr>
<td>“They” Percentage</td>
<td>-0.04</td>
<td>0.08</td>
<td>0.00</td>
</tr>
<tr>
<td>Flesch Reading Ease Score</td>
<td>2.26</td>
<td>7.89</td>
<td>0.38</td>
</tr>
<tr>
<td>Flesch-Kincaid Grade Level</td>
<td>-0.52</td>
<td>1.69</td>
<td>0.08</td>
</tr>
<tr>
<td>Emotional Intensity</td>
<td>-0.07</td>
<td>0.73</td>
<td>0.04</td>
</tr>
<tr>
<td>Links made to others</td>
<td>-0.98</td>
<td>17.11</td>
<td>0.83</td>
</tr>
<tr>
<td>Links made to student</td>
<td>-5.49</td>
<td>10.92</td>
<td>0.53</td>
</tr>
</tbody>
</table>

*Denotes significant statistical difference
6.3.2.2 APHD Field

A paired samples t-test with a 95% confidence level was run using the 22 APHD courses to determine if student notes that received no Likes differ in their associated note metrics from notes that received Likes. Table 6.5 displays the means across each of the metrics for non-Liked notes and Liked notes along with the means difference. Table 6.6 displays the results of the statistical analysis.

The statistical analysis of archival course data in the APHD field reveals that there are more non-Liked notes within a course discussion than Liked notes. Looking specifically at how the quantifiable features of Liked notes differ from non-Liked notes within the APHD field, the following was found—Liked notes, on average:

- are revised less,
- are longer,
- contain shorter sentences,
- contain fewer academic and informal words,
- contain lower use of the pronouns “I” and “You”,
- contain higher use of the pronouns “He/She” and “They”,
- are more difficult to read,
- are written at a higher grade level,
- are less positive in their degree of emotional intensity,
- contain fewer links to made to other student’s notes,
- and contain more links made to a student’s note than non-Liked notes.

This follows a similar pattern to the aggregate data analysis in Section 6.3.1, except for academic and informal word use, and the links made to other students’ notes. A discussion of these results can be found in Section 6.5.
Table 6.5
APHD Means: Non-Liked Notes, Liked Notes, and Means Difference (non-Liked – Liked)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Mean Non-Liked Notes</th>
<th>Mean Liked Notes</th>
<th>Means Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notes</td>
<td>57.36</td>
<td>26.42</td>
<td>30.94</td>
</tr>
<tr>
<td>Revisions</td>
<td>74.76</td>
<td>36.51</td>
<td>38.25</td>
</tr>
<tr>
<td>Note Length</td>
<td>118.64</td>
<td>147.70</td>
<td>-29.06</td>
</tr>
<tr>
<td>Sentence Length</td>
<td>15.49</td>
<td>9.18</td>
<td>6.31</td>
</tr>
<tr>
<td>AWL Percentage</td>
<td>7.24</td>
<td>7.15</td>
<td>0.09</td>
</tr>
<tr>
<td>IWL Percentage</td>
<td>0.33</td>
<td>0.30</td>
<td>0.03</td>
</tr>
<tr>
<td>“I” Percentage</td>
<td>0.42</td>
<td>0.40</td>
<td>0.02</td>
</tr>
<tr>
<td>“You” Percentage</td>
<td>0.14</td>
<td>0.12</td>
<td>0.02</td>
</tr>
<tr>
<td>“He/She” Percentage</td>
<td>0.07</td>
<td>0.08</td>
<td>-0.01</td>
</tr>
<tr>
<td>“We” Percentage</td>
<td>0.14</td>
<td>0.15</td>
<td>-0.01</td>
</tr>
<tr>
<td>“They” Percentage</td>
<td>0.23</td>
<td>0.26</td>
<td>-0.03</td>
</tr>
<tr>
<td>Flesch Reading Ease Score</td>
<td>58.56</td>
<td>57.11</td>
<td>1.45</td>
</tr>
<tr>
<td>Flesch-Kincaid Grade Level</td>
<td>9.35</td>
<td>9.65</td>
<td>-0.30</td>
</tr>
<tr>
<td>Emotional Intensity</td>
<td>1.36</td>
<td>1.28</td>
<td>0.08</td>
</tr>
<tr>
<td>Links made to others</td>
<td>1.55</td>
<td>1.05</td>
<td>0.50</td>
</tr>
<tr>
<td>Links made to student</td>
<td>1.45</td>
<td>2.23</td>
<td>-0.78</td>
</tr>
</tbody>
</table>
Table 6.6
Paired samples t-test for APHD data (non-Liked – Liked notes)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Paired Differences</th>
<th>95% Confidence Interval of the Difference</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Means Difference (non-Liked – Liked)</td>
<td>Std. Deviation</td>
<td>Std. Error Mean</td>
</tr>
<tr>
<td>Notes</td>
<td>30.94</td>
<td>33.98</td>
<td>1.25</td>
</tr>
<tr>
<td>Revisions</td>
<td>38.25</td>
<td>49.14</td>
<td>1.80</td>
</tr>
<tr>
<td>Note Length</td>
<td>-29.06</td>
<td>41.08</td>
<td>1.51</td>
</tr>
<tr>
<td>Sentence Length</td>
<td>6.31</td>
<td>5.64</td>
<td>0.21</td>
</tr>
<tr>
<td>AWL Percentage</td>
<td>0.09</td>
<td>1.25</td>
<td>0.05</td>
</tr>
<tr>
<td>IWL Percentage</td>
<td>0.03</td>
<td>0.35</td>
<td>0.01</td>
</tr>
<tr>
<td>“I” Percentage</td>
<td>0.02</td>
<td>0.11</td>
<td>0.00</td>
</tr>
<tr>
<td>“You” Percentage</td>
<td>0.02</td>
<td>0.07</td>
<td>0.00</td>
</tr>
<tr>
<td>“He/She” Percentage</td>
<td>-0.01</td>
<td>0.07</td>
<td>0.00</td>
</tr>
<tr>
<td>“We” Percentage</td>
<td>-0.01</td>
<td>0.08</td>
<td>0.00</td>
</tr>
<tr>
<td>“They” Percentage</td>
<td>-0.03</td>
<td>0.09</td>
<td>0.00</td>
</tr>
<tr>
<td>Flesch Reading Ease Score</td>
<td>1.45</td>
<td>6.71</td>
<td>0.25</td>
</tr>
<tr>
<td>Flesch-Kincaid Grade Level</td>
<td>-0.30</td>
<td>1.21</td>
<td>0.04</td>
</tr>
<tr>
<td>Emotional Intensity</td>
<td>0.08</td>
<td>0.63</td>
<td>0.02</td>
</tr>
<tr>
<td>Links made to others</td>
<td>0.50</td>
<td>5.17</td>
<td>0.19</td>
</tr>
<tr>
<td>Links made to student</td>
<td>-0.78</td>
<td>4.86</td>
<td>0.18</td>
</tr>
</tbody>
</table>

* Denotes significant statistical difference
6.4 Data Summary

Collectively across the 41 courses, the results from a paired samples t-test indicate that Liked notes, on average, are revised less, are longer, contain shorter sentences, contain more informal words, contain fewer use of “I” and “You” pronouns, contain more use of “He/She” and “They” pronouns, are more difficult to read, are written at a higher grade level, and contain more links made to a student’s note than non-Liked notes. The study finds that there are approximately two times as many non-Liked notes in a course than Liked notes. Analyses of courses in the field of CTL share a similar pattern to the collective results, except for Liked notes having higher academic word use and there being more use of the pronoun “I.” Analyses of courses in the field of APHD share a similar pattern to the collective analysis except for Liked notes containing fewer academic and informal words, and fewer links are made to other student’s notes. As such, we can accept the hypothesis that non-Liked notes differ from Liked notes in their quantifiable features.

6.5 Discussion

This study seeks to understand how Liked notes differ from non-Liked notes in their quantifiable features. The quantitative analysis may provide us with an initial understanding of what appeals to students when they Like a note. The metrics selected for this study (see Section 6.2 for a detailed list) were chosen because they capture basic information like length of note, in addition to more detailed information about the nature of note content including word use, reading ease, grade level of writing, and emotional intensity of the language. With the volumes of text produced by students in online, discussion-based courses, exploring how note metrics differ between what students are Liking and choosing not to Like has only been explored by researchers using the Pepper platform (Makos & Hewitt, 2014; Makos, Lee, & Zingaro, 2014; Makos, Oztok, Zingaro, & Hewitt, 2013; Makos, Zingaro, Oztok, & Hewitt, 2014). More broadly, Pepper researchers are exploring the various ways that note metrics can be used to understand what is going on between students in courses and what this may imply for learning and teaching in online courses. No studies have been conducted using other OLE or CSCL environments looking at how note metrics differ between an action taken on a particular note compared to one that has not undergone that action, (e.g., note metrics have not been compared for notes that receive replies and notes that are not replied to). Previous research on
understanding ways that positive collaborative experiences are cultivated in text-based CSCL environments highlights the need to study how various tools influence threaded discourse (Kreijns, Kirschner, & Vermeulen, 2013).

Review of the data indicates that Liked notes tend to appear more complex than non-Liked notes. Although this study did not examine the content of these notes, surveys and interviews in the first study (see Chapter 4) revealed that students are using Like to agree with the content generated. Informing the results of this study, the findings may reflect favourability toward ideas/topics/concepts written about in the notes, and possibly having value for students’ engagement in the discussion.

The issue of interaction through the act of Liking reveals that there is consistency amongst the quantifiable features of notes students are Liking compared to those notes that do not receive Likes. The convergence of my previous studies’ results with these findings suggest that Liked notes within threaded discourse add value to the discussion, which in turn may be an indicator of where students are concentrating their efforts. With the Like button possibly functioning as a social interaction tool that augments student interaction in threaded discourse, the simplistic yet varied interpretation of its meaning when acted on a note within this study is less clear. As an indirect speech act, Liking can be considered a visual cue in the environment to inform readers that there is content of value or interest to students. If these notes are of value to students, then perhaps the role of the Like button as a tool to augment social interaction in threaded discourse can be used to manage the overwhelming nature of these environments. In concentrating on threads where more notes are Liked, students are not only providing cues for each other to continue to engage in these discussions, but also it reveals that students are actively generating content that is more meaningful to the greater community.

Considering the case of Facebook’s design, interaction patterns across demographic groups are consistent internationally because they are guided by the common goals shared by the members of the community (Viswanath, Mislove, Cha, & Gummadi, 2009; Selwyn, 2009). Consistency across the 41 courses and between fields suggests that use of the Like button may be a result of shared appropriation of the button as a tool to indicate approval of what is discussed in the courses. As found in the first study, students Like notes because they are seeking to encourage and engage in discussions about shared interests amongst students within courses (see Chapter 4,
Section 4.2.2). As indicated in the vocabulary analysis with the use of various word lists, there is increased use of pronouns “He/She” and “You” in Liked notes, which may reflect students’ feelings toward being part of the learning community (Hiltz, 1986). Additionally, the higher-grade levels of writing in Liked notes appear to be more complex (Jeong, 2003); this suggests that the content of the notes may reflect the course content. Perhaps the use of the Like button as an indicator of discussion cohesion and on-task conversation can assist students in navigating the overwhelming number of notes produced in these courses. However, knowing that Liked notes are read more than non-Liked notes signifies that it is either the content of the note or the actual presence of the icon signifying that a note has been Liked that resulted in it being read more often, but it is not clear which of these factors affects this metric.

If an additional set of word lists were generated (based on the readings of courses) and added as a metric, then we could determine to what degree notes include pertinent vocabulary, and extrapolate its relevance to the course content. Since the degree of topic divergence in online discussions is typically high (Hewitt, 2003), it is feasible that a note being Liked could allow students to focus their attention and engage in discussions that are more closely related to the course topics. The challenge then is to develop a complementary tool to the Like button that provides more specificity in ranking the importance of the note to its pertinence to the course discussion. Given that students find value in notes that are Liked, such a tool may enhance student interaction and on-task, on-topic discussion.

The results provide us with one mechanism to understand how a Like button is used to augment student interaction in threaded discourse. The use of these various metrics to explore differences between how various tools are used by students may provide opportunities for the implementation of additional scaffolds in threaded discourse OLEs. The possibility also exists whereby use of the Like button tool may be extended into a quasi-assessment tool for instructors to quickly identify notes that students value.

### 6.6 Limitations

This study assumes that the triangulation of data from previous studies up to this point justified the comparison of note metrics between those notes that receive Likes and those that do not receive Likes to explore how students use the Like button in threaded discourse. The study focused on aggregate patterns of quantifiable note characteristics. It did not examine students’
perceptions of specific notes that were Liked/not Liked, although such a study would be an interesting area of investigation for future analysis.
Chapter 7
The Role of the Like Button and Students’ Sense of Classroom Community

This chapter focuses on how students report their sense of classroom community (Rovai, 2002a) as it relates to their reported use of the Like button and their perceived usefulness of the Like button. Rovai’s Sense of Community instrument was developed to study classroom community in online courses (2002a). Rovai’s instrument has been validated (2002a) and measures students’ perceived sense of community based on the sum of their perceived sense of connectedness and perceived sense of learning. The two factors that can be interpreted from the administration of the survey are sense of connectedness and sense of learning. The instrument in this study was implemented as described in the validation study by Rovai:

For items 1, 2, 3, 6, 7, 11, 13, 15, 16, and 19, the following scoring scale was used: strongly agree = 4, agree = 3, neutral = 2, disagree = 1, strongly disagree = 0; for items 4, 5, 8, 9, 10, 12, 14, 17, 18, and 20: strongly agree = 0, agree = 1, neutral = 2, disagree = 3, strongly disagree = 4. To obtain the overall Classroom Community Scale score, one must add the weights of all 20 items. Total raw scores range from a maximum of 40 to a minimum of 0. Subscale raw scores range from a maximum of 20 to a minimum of 0. To calculate the connectedness subscale score, the scores of odd Classroom Community Scale items, i.e., 1, 3, 5, 7, 9, 11, 13, 15, 17, and 19, are added together. Similarly, to calculate the learning subscale score, the scores of the remaining even Classroom Community Scale items are added together. (2002a, p. 202)

The fourth research question directed this study:

4. How does student perception of the role of the Like button relate to their sense of community?

The question is addressed using Pearson bi-variate correlations, and analysis of variance (ANOVA). Examining these types of relationships serves as baseline data that can be used in future work on understanding how various tools within online learning environments influence students’ reporting of their sense of community, connectedness, and perceived learning. Please see Appendix B for the full survey.
7.1 Data Source

A request to complete an anonymous online survey was sent to 218 students across eight courses. These courses took place during the Winter 2015 term (January through April). A recruitment e-mail was sent to students directly through the Pepper system by the system administrator so that the survey participants remained anonymous (see Appendix A). The survey tool allowed us to generate a unique URL for each course so that although the participant remained anonymous, the course they were enrolled in was available. A total of 80 students completed the survey, resulting in a 36.7% response rate. When notified to complete the survey, students were asked to respond to the questions regarding the most recent course they had completed. The introduction to the survey requested general background information from students including:

- Degree working toward
- Full- or part-time enrollment
- Number of online courses previously completed

Upon completion of the background information, the Sense of Classroom Community instrument followed. This section of the survey was made mandatory for students to complete. Due to the explicit link between Facebook’s Like button and the Like button in Pepper, students were asked to report additional information. Subsequent questions followed and the ones included in this study are listed below:

- Their frequency of use of the Like button
- Whether they felt that the Like button supported their social interaction
- Whether they felt the Like button supported their learning experience
- Whether giving Likes made them feel good
- Their consumption of social media (including Facebook, Twitter, LinkedIn, Instagram, etc.)
- Their contributions (posting and/or sharing content) on social media (including Facebook, Twitter, LinkedIn, Instagram, etc.)
- Their use of tools built into social media platforms (including these buttons: Like, Favourite, Share, etc.)
Additional questions were included in the survey, but they were not used for data analysis as they pertained to participation in the follow-up interview that was used in Chapter 4.

For the responses included in this study, survey results were reviewed, frequencies tabulated, and the data coded for analysis in SPSS. Descriptive statistics were run for the Sense of Community scale and two subscales by the background information provided by respondents and the course they were enrolled in. The demographic information collected in this survey did not follow that included in the Classroom Community Instrument developed by Rovai (2002a) because gender and ethnicity are not relevant to this study, as the focus is on acquiring baseline data on students’ attitudes toward the use of a Like button in Pepper.

Of the 80 respondents included in this study, 71 provided all the requested background information. Tables 7.1, 7.2, and 7.3 present the frequency data. Most of the students that completed the survey are completing their Master of Education degree. The number of students enrolled part-time and full-time is relatively balanced. Most respondents had completed a minimum of two online courses. Table 7.4 shows the descriptive statistics for the Classroom Community Scale and the Sense of Connectedness and Learning subscales disaggregated by the total number of online courses that students have completed, and Table 7.5 shows the descriptive statistics for the scale and subscales disaggregated by the course students were enrolled in. The table indicates that students who have completed three or more online courses report a higher sense of classroom community, sense of connectedness, and sense of learning compared to those that have taken only one or two courses. No test of statistical significance was run because the assumption of independence was violated—students may share some of the same courses, but the anonymity of the survey does not allow us to confirm or deny this. Data from the reply acknowledgement (see Section 5.2) and the quantifiable features of non-Liked compared to Liked notes (see Section 6.2) were included for the courses that were surveyed.
### Table 7.1

**Degree Type**

<table>
<thead>
<tr>
<th>Degree Type</th>
<th>Frequency ($n=80$)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA</td>
<td>8</td>
<td>10.0%</td>
</tr>
<tr>
<td>Med</td>
<td>62</td>
<td>77.5%</td>
</tr>
<tr>
<td>PhD</td>
<td>1</td>
<td>1.3%</td>
</tr>
<tr>
<td>No response (null)</td>
<td>9</td>
<td>11.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

### Table 7.2

**Enrolment Type**

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency ($n=80$)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time</td>
<td>41</td>
<td>51.2%</td>
</tr>
<tr>
<td>Part-time</td>
<td>38</td>
<td>47.5%</td>
</tr>
<tr>
<td>No response (null)</td>
<td>1</td>
<td>1.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

### Table 7.3

**Number of online courses completed**

<table>
<thead>
<tr>
<th>No. of completed online courses</th>
<th>Frequency ($n=80$)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>10.0%</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>31.3%</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>20.0%</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>8.8%</td>
</tr>
<tr>
<td>5+</td>
<td>24</td>
<td>30.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>
Table 7.4
Descriptive statistics for student-reported sense of connectedness, learning, and community by number of online courses completed

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Error</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 Course Completed (n=8)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>8</td>
<td>5</td>
<td>32</td>
<td>19.38</td>
<td>3.168</td>
<td>8.959</td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>8</td>
<td>13</td>
<td>37</td>
<td>24.88</td>
<td>2.825</td>
<td>7.990</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>8</td>
<td>20</td>
<td>69</td>
<td>44.25</td>
<td>5.796</td>
<td>16.395</td>
</tr>
<tr>
<td><strong>2 Courses Completed (n=25)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>25</td>
<td>6</td>
<td>33</td>
<td>22.36</td>
<td>1.385</td>
<td>6.927</td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>25</td>
<td>14</td>
<td>36</td>
<td>27.24</td>
<td>1.244</td>
<td>6.220</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>25</td>
<td>27</td>
<td>69</td>
<td>49.60</td>
<td>2.410</td>
<td>12.052</td>
</tr>
<tr>
<td><strong>3 Courses Completed (n=16)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>16</td>
<td>16</td>
<td>37</td>
<td>23.63</td>
<td>1.366</td>
<td>5.464</td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>16</td>
<td>23</td>
<td>38</td>
<td>29.00</td>
<td>1.125</td>
<td>4.502</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>16</td>
<td>40</td>
<td>75</td>
<td>52.63</td>
<td>2.325</td>
<td>9.301</td>
</tr>
<tr>
<td><strong>4 Courses Completed (n=7)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>7</td>
<td>14</td>
<td>32</td>
<td>24.29</td>
<td>2.625</td>
<td>6.945</td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>7</td>
<td>20</td>
<td>32</td>
<td>27.43</td>
<td>1.445</td>
<td>3.823</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>7</td>
<td>34</td>
<td>62</td>
<td>51.71</td>
<td>3.859</td>
<td>10.210</td>
</tr>
<tr>
<td><strong>5 or more Courses Completed (n=24)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>24</td>
<td>14</td>
<td>35</td>
<td>23.50</td>
<td>1.043</td>
<td>5.108</td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>24</td>
<td>19</td>
<td>38</td>
<td>29.13</td>
<td>1.091</td>
<td>5.343</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>24</td>
<td>35</td>
<td>73</td>
<td>52.63</td>
<td>1.875</td>
<td>9.188</td>
</tr>
<tr>
<td><strong>Total participants (N=80)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>80</td>
<td>5</td>
<td>37</td>
<td>22.82</td>
<td>.710</td>
<td>6.352</td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>80</td>
<td>13</td>
<td>38</td>
<td>27.94</td>
<td>.637</td>
<td>5.698</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>80</td>
<td>20</td>
<td>75</td>
<td>50.76</td>
<td>1.242</td>
<td>11.110</td>
</tr>
</tbody>
</table>
Table 7.5
Descriptive statistics for student reported sense of connectedness, learning, and community by online course surveyed in this study

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Error</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DB 12 (n=16)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>16</td>
<td>11</td>
<td>32</td>
<td>22.94</td>
<td>1.41</td>
<td>5.65</td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>16</td>
<td>22</td>
<td>37</td>
<td>29.50</td>
<td>1.08</td>
<td>4.32</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>16</td>
<td>33</td>
<td>67</td>
<td>52.44</td>
<td>2.20</td>
<td>8.81</td>
</tr>
<tr>
<td><strong>DB 17 (n=6)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>6</td>
<td>5</td>
<td>28</td>
<td>17.83</td>
<td>1.86</td>
<td>4.92</td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>6</td>
<td>15</td>
<td>33</td>
<td>25.33</td>
<td>2.72</td>
<td>6.65</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>6</td>
<td>20</td>
<td>61</td>
<td>43.17</td>
<td>6.17</td>
<td>15.12</td>
</tr>
<tr>
<td><strong>DB 18 (n=21)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>21</td>
<td>10</td>
<td>29</td>
<td>21.33</td>
<td>1.08</td>
<td>4.93</td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>21</td>
<td>13</td>
<td>32</td>
<td>23.81</td>
<td>1.11</td>
<td>5.09</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>21</td>
<td>26</td>
<td>58</td>
<td>45.14</td>
<td>2.04</td>
<td>9.36</td>
</tr>
<tr>
<td><strong>DB 19 (n=4)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>4</td>
<td>19</td>
<td>35</td>
<td>27.75</td>
<td>3.35</td>
<td>6.70</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>4</td>
<td>37</td>
<td>60</td>
<td>47.00</td>
<td>5.67</td>
<td>11.34</td>
</tr>
<tr>
<td><strong>DB 22 (n=8)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>8</td>
<td>6</td>
<td>29</td>
<td>21.37</td>
<td>2.66</td>
<td>7.52</td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>8</td>
<td>24</td>
<td>34</td>
<td>27.88</td>
<td>1.30</td>
<td>3.68</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>8</td>
<td>30</td>
<td>61</td>
<td>49.25</td>
<td>3.63</td>
<td>10.28</td>
</tr>
<tr>
<td><strong>DB 39 (n=7)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>7</td>
<td>21</td>
<td>37</td>
<td>27.29</td>
<td>1.86</td>
<td>4.92</td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>7</td>
<td>29</td>
<td>38</td>
<td>33.14</td>
<td>1.34</td>
<td>3.53</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>7</td>
<td>50</td>
<td>75</td>
<td>60.43</td>
<td>3.09</td>
<td>8.18</td>
</tr>
<tr>
<td><strong>DB 40 (n=9)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>9</td>
<td>17</td>
<td>32</td>
<td>26.11</td>
<td>1.51</td>
<td>4.54</td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>9</td>
<td>21</td>
<td>37</td>
<td>30.00</td>
<td>1.86</td>
<td>5.57</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>9</td>
<td>41</td>
<td>69</td>
<td>56.11</td>
<td>3.19</td>
<td>9.57</td>
</tr>
<tr>
<td><strong>DB 41 (n=9)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of Connectedness</td>
<td>9</td>
<td>14</td>
<td>35</td>
<td>25.56</td>
<td>2.46</td>
<td>7.38</td>
</tr>
<tr>
<td>Sense of Learning</td>
<td>9</td>
<td>21</td>
<td>38</td>
<td>30.56</td>
<td>1.92</td>
<td>5.77</td>
</tr>
<tr>
<td>Sense of Community</td>
<td>9</td>
<td>35</td>
<td>73</td>
<td>56.11</td>
<td>3.97</td>
<td>11.90</td>
</tr>
</tbody>
</table>
7.2 Methods

To examine how students’ sense of community scores varied depending on how often a course community used the Like button, a Pearson bivariate correlation was run in SPSS. To represent how often a Like button was used, the metric used was the percent of student notes that received at least one Like in a course. This metric provides a conservative estimate of the Liking that goes in any given course community. It is not the total number of times the Like was clicked, rather a relative calculation of how many student notes received Likes compared to the total notes amassed by students. It also accounts for instances where the Like button is used to mean different things (e.g., “I agree,” “thank you”). Considering that the course of the surveyed students was known, averages of their sense of community scores were calculated (see Table 7.5) and used to compare to the averages of how often the Like button was used for student notes in these courses.

An examination of the quantifiable features comparing notes that did not receive Likes to notes that received Likes was conducted for the courses surveyed using the same methods described in Section 6.2. Data classified by these two conditions (notes that received no Likes and notes that received Likes) were extracted using an extraction tool that was developed by the Pepper administrator to calculate the following metrics for each student:

- Total notes in the category
- Mean number of revisions made to notes
- Mean note length (in words)
- Mean sentence length (in words)
- Academic Word List use percentage
- Informal Word List use percentage
- Pronoun “I” Vocabulary percentage
- Pronoun “You” Vocabulary percentage
- Pronoun “He/She” Vocabulary percentage
- Pronoun “We” Vocabulary percentage
- Pronoun “They” Vocabulary percentage
- Mean Flesch Reading Ease score (higher values indicate text that is more readable)
- Mean Flesch-Kincaid Grade Level (Flesch, 1951) of the notes
- Emotional Intensity
- Total number of links made by the student to other students’ notes
- Total number of links made to the student’s notes by other students

A paired samples t-test that compared students’ features of their non-Liked notes to their Liked notes was run across all students in each of the eight courses surveyed. Table 7.6 presents the means difference and means for non-Liked and Liked notes by each of the quantifiable features of notes mentioned above. Table 7.7 presents the results of a paired samples t-test comparing the quantifiable features of non-Liked and Liked notes for the courses surveyed. Table 7.8 presents the means for Like button use as a reply acknowledgement across the courses surveyed.

After data mining and assumption tests were run, it was determined that an analysis of variance (ANOVA) should be applied in this study to determine how students’ perceived role of the Like button in threaded discourse effects their sense of community. ANOVA is appropriate for this study because I examine how students’ sense of community is effected by their experience of the Like button supporting social, learning, and emotional interactions, and their use of social media (consumption, contribution, and use of the various tools) within and between groups. The dependent variable in this study is students’ perceived sense of community. The independent variables and their groups include:

- Whether they felt that the Like button supported their social interaction, two groups:
  - if the tool did support their social interaction,
  - or, if the tool did not support their social interaction;
- Whether they felt the Like button supported their learning experience, four groups:
  - the tool interfered with their learning experience,
  - the tool did not impact their learning experience,
  - the tool is useful to their learning experience,
  - or, the tool is very useful to their learning experience;
- Whether giving Likes made them feel good, two groups:
using the tool did not cause them to elicit an emotional response,
or, using the tool made them feel good;

- Their consumption of social media (including Facebook, Twitter, LinkedIn, Instagram, etc.), five groups:
  o never,
  o rare—about once a month,
  o infrequent—once or twice a week,
  o frequent—once a day,
  o or persistent—multiple times a day;

- Their contributions (posting and/or sharing content) on social media (including Facebook, Twitter, LinkedIn, Instagram, etc.), five groups:
  o never,
  o rare—about once a month,
  o infrequent—once or twice a week,
  o frequent—once a day,
  o or persistent—multiple times a day;

- And, their use of tools built into social media platforms (including these buttons: Like, Favourite, Share, etc.), five groups:
  o never,
  o rare—about once a month,
  o infrequent—once or twice a week,
  o frequent—once a day,
  o or persistent—multiple times a day.

Assumption tests were run to ensure no violations. The results are presented as mean ± standard deviation. Following the results of the ANOVA analyses, a summary table of the results are presented in Table 7.9.
7.2.1 Assumption Testing

Before running the series of one-way ANOVAs, I tested the assumptions required for running a valid one-way ANOVA. The dependent variable, sense of community, is continuous. All the independent variables examined contain at least two categorical, independent groups with no student in more than one of these groups. No outliers were present in the data. An assessment of boxplot values greater than 1.5 box-lengths from the edge of the box were reviewed for each of the independent variables. Tests for normality were conducted using the Shapiro-Wilk test of normality for each of the independent variables. SoC score was normally distributed for each of the groups ($p > .05$). Levene’s test for homogeneity were conducted for all cases, and $p > .05$. Tukey’s value, found by conducting a Tukey-Kramer post hoc analysis (Hayter, 1984), was used to describe the significance of the results. Cronbach’s coefficient $a$ for the full sense of community scale administered in the survey was .91. The scale had a high level of internal consistency. No violations of the assumptions were found. The results are presented as mean ± standard deviation.

7.3 Results

7.3.1 Differences between non-Liked notes and Liked notes in the courses surveyed

A paired samples $t$-test with a 95% confidence level was run on the aggregate data across all eight courses surveyed to determine if students’ notes that received no Likes differed in their associated note metrics from notes that received Likes. Table 7.6 displays the means across each of the metrics for non-Liked notes and Liked notes along with the means difference. Table 7.7 displays the results of the statistical analysis.

The statistical analysis of archival course data for the eight courses surveyed reveals that there are 55% more non-Liked notes within a course discussion than Liked notes. Looking specifically at how the quantifiable features of Liked notes differ from non-Liked notes, the following were found to be statistically significant— Liked notes, on average:

- are revised less,
- are longer,
- contain shorter sentences,
• contain fewer academic words,
• contain fewer informal words,
• contain lower use of the pronoun “You,”
• contain higher use of the pronoun “He/She,”
• are more difficult to read,
• contain more links made to another student’s note,
• and contain more links to the student’s content than non-Liked notes.

These findings largely replicate the findings of section 6.3.1 (which examined 41 courses), with only few small differences. Likely these differences are due to the increased statistical power of the large dataset. Further discussion of these results can be found in Section 7.4.

Table 7.6
Aggregate Means for courses surveyed: Non-Liked Notes, Liked Notes, and Means Difference (non-Liked – Liked)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Mean Non-Liked Notes</th>
<th>Mean Liked Notes</th>
<th>Means Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notes</td>
<td>43.90</td>
<td>28.13</td>
<td>15.77</td>
</tr>
<tr>
<td>Revisions</td>
<td>64.34</td>
<td>43.87</td>
<td>20.47</td>
</tr>
<tr>
<td>Note Length</td>
<td>146.25</td>
<td>173.86</td>
<td>-27.61</td>
</tr>
<tr>
<td>Sentence Length</td>
<td>16.41</td>
<td>10.30</td>
<td>6.11</td>
</tr>
<tr>
<td>AWL Percentage</td>
<td>7.73</td>
<td>7.46</td>
<td>0.27</td>
</tr>
<tr>
<td>IWL Percentage</td>
<td>0.24</td>
<td>0.21</td>
<td>0.03</td>
</tr>
<tr>
<td>“I” Percentage</td>
<td>0.42</td>
<td>0.43</td>
<td>-0.01</td>
</tr>
<tr>
<td>“You” Percentage</td>
<td>0.16</td>
<td>0.12</td>
<td>0.04</td>
</tr>
<tr>
<td>“He/She” Percentage</td>
<td>0.05</td>
<td>0.07</td>
<td>-0.02</td>
</tr>
<tr>
<td>“We” Percentage</td>
<td>0.14</td>
<td>0.14</td>
<td>0.00</td>
</tr>
<tr>
<td>“They” Percentage</td>
<td>0.24</td>
<td>0.25</td>
<td>-0.01</td>
</tr>
<tr>
<td>Flesch Reading Ease Score</td>
<td>56.08</td>
<td>55.32</td>
<td>0.76</td>
</tr>
<tr>
<td>Flesch-Kincaid Grade Level</td>
<td>9.91</td>
<td>10.04</td>
<td>-0.13</td>
</tr>
<tr>
<td>Emotional Intensity</td>
<td>1.34</td>
<td>1.28</td>
<td>0.06</td>
</tr>
<tr>
<td>Links made to others</td>
<td>6.27</td>
<td>4.15</td>
<td>2.12</td>
</tr>
<tr>
<td>Links made to student</td>
<td>3.36</td>
<td>6.83</td>
<td>-3.47</td>
</tr>
</tbody>
</table>
### Table 7.7
Paired samples t-test for courses surveyed (non-Liked – Liked notes)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Means Difference (non-Liked – Liked)</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>95% Confidence Interval of the Difference</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notes</td>
<td>15.77</td>
<td>31.82</td>
<td>2.16</td>
<td>11/52</td>
<td>20.01</td>
<td>7.32</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>Revisions</td>
<td>20.47</td>
<td>43.72</td>
<td>2.96</td>
<td>14.63</td>
<td>26.30</td>
<td>6.91</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>Note Length</td>
<td>-27.61</td>
<td>56.14</td>
<td>3.80</td>
<td>-35.11</td>
<td>-20.12</td>
<td>-7.26</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>Sentence Length</td>
<td>6.11</td>
<td>5.12</td>
<td>.35</td>
<td>5.43</td>
<td>6.80</td>
<td>17.62</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>AWL Percentage</td>
<td>0.27</td>
<td>1.19</td>
<td>.08</td>
<td>.11</td>
<td>.43</td>
<td>3.33</td>
<td>p = .001*</td>
</tr>
<tr>
<td>IWL Percentage</td>
<td>0.03</td>
<td>.18</td>
<td>.01</td>
<td>.01</td>
<td>.06</td>
<td>2.78</td>
<td>p &lt; .05*</td>
</tr>
<tr>
<td>“I” Percentage</td>
<td>-0.01</td>
<td>.12</td>
<td>.01</td>
<td>-0.02</td>
<td>.01</td>
<td>-0.85</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>“You” Percentage</td>
<td>0.04</td>
<td>.08</td>
<td>.01</td>
<td>.03</td>
<td>.05</td>
<td>8.19</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>“He/She” Percentage</td>
<td>-0.02</td>
<td>.07</td>
<td>.01</td>
<td>-0.03</td>
<td>.01</td>
<td>-4.28</td>
<td>p &lt; .001*</td>
</tr>
<tr>
<td>“We” Percentage</td>
<td>0.00</td>
<td>.07</td>
<td>.01</td>
<td>-0.01</td>
<td>.01</td>
<td>-1.4</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>“They” Percentage</td>
<td>-0.01</td>
<td>.10</td>
<td>.01</td>
<td>-0.02</td>
<td>.00</td>
<td>-1.57</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>Flesch Reading Ease Score</td>
<td>0.76</td>
<td>5.71</td>
<td>0.39</td>
<td>0.00</td>
<td>1.53</td>
<td>1.98</td>
<td>p &lt; .05*</td>
</tr>
<tr>
<td>Flesch-Kincaid Grade Level</td>
<td>-0.13</td>
<td>1.09</td>
<td>0.07</td>
<td>-0.27</td>
<td>0.02</td>
<td>-1.68</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>Emotional Intensity</td>
<td>0.06</td>
<td>0.52</td>
<td>0.04</td>
<td>-0.01</td>
<td>0.13</td>
<td>1.69</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>Links made to others</td>
<td>2.12</td>
<td>10.59</td>
<td>0.72</td>
<td>0.70</td>
<td>3.53</td>
<td>2.95</td>
<td>p &lt; .05*</td>
</tr>
<tr>
<td>Links made to student</td>
<td>-3.47</td>
<td>9.59</td>
<td>0.65</td>
<td>-4.75</td>
<td>-2.19</td>
<td>-5.35</td>
<td>p &lt; .001*</td>
</tr>
</tbody>
</table>

*Denotes significant statistical difference
7.3.2 The relationship between student sense of community score and the use of the Like button

A Pearson bivariate correlation was run to assess the relationship between students’ average sense of community score in a course and the percent of students’ notes that receive at least one Like in that course (Table 7.8). Preliminary analyses showed the relationship to be linear with both variables normally distributed, as assessed by Shapiro-Wilk’s test ($p > .05$), and there were no outliers. There was a moderate positive correlation between the course average sense of community score and how many student notes received Likes in these courses, $r(8) = .399$.

Table 7.8
Averages for Like button use as a Reply Acknowledgement Tool in Pepper courses that were included in the survey

| DB | Field | Students in Course | Students in Course that used Like Button | % Students used the Like Button | Total Student Notes in DB (Public) | Total Student Notes with at least one Like | Total Student Replies that Receive Likes | Total Reply Ack. Likes % Reply Ack. Students that engage in Reply Ack. liking % Students engaged in Reply Ack. liking |
|----|-------|--------------------|------------------------------------------|--------------------------------|-----------------------------------|-------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------------|
| 12 | APHD  | 24                 | 16                                       | 66.67                          | 762                               | 175                                       | 22.97                                    | 166                                      | 73                                           | 43.98                                      | 11   | 68.75 |
| 17 | APHD  | 22                 | 18                                       | 81.82                          | 1167                              | 336                                       | 28.79                                    | 471                                      | 119                                          | 25.27                                      | 16   | 88.89 |
| 18 | APHD  | 69                 | 60                                       | 86.96                          | 6184                              | 1694                                      | 27.39                                    | 2665                                     | 955                                          | 35.83                                      | 52   | 86.67 |
| 19 | APHD  | 16                 | 16                                       | 100.00                         | 743                               | 454                                       | 61.10                                    | 620                                      | 144                                          | 23.23                                      | 14   | 87.50 |
| 22 | APHD  | 25                 | 19                                       | 76.00                          | 1645                              | 474                                       | 28.81                                    | 564                                      | 243                                          | 43.09                                      | 18   | 94.74 |
| 39 | CTL   | 24                 | 23                                       | 95.83                          | 2069                              | 904                                       | 43.69                                    | 1330                                     | 360                                          | 27.07                                      | 22   | 95.65 |
| 40 | CTL   | 19                 | 18                                       | 94.74                          | 1796                              | 892                                       | 49.67                                    | 1460                                     | 345                                          | 23.63                                      | 16   | 88.89 |
| 41 | CTL   | 19                 | 18                                       | 94.74                          | 1337                              | 818                                       | 61.18                                    | 1330                                     | 355                                          | 26.69                                      | 15   | 83.33 |

100
Table 7.9
One-way ANOVA for Sense of Community by various student grouping variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Like button supporting student social interactions</td>
<td>766.837</td>
<td>1</td>
<td>766.837</td>
<td>6.658</td>
<td>.001*</td>
</tr>
<tr>
<td>Between Groups</td>
<td>8983.650</td>
<td>78</td>
<td>115.175</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9750.488</td>
<td>79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Like button supporting student learning experience</td>
<td>2066.982</td>
<td>2</td>
<td>1033.491</td>
<td>10.357</td>
<td>&lt;.0001*</td>
</tr>
<tr>
<td>Between Groups</td>
<td>7683.506</td>
<td>77</td>
<td>99.786</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9750.488</td>
<td>79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Like button use eliciting a positive emotional response</td>
<td>1401.288</td>
<td>1</td>
<td>1401.288</td>
<td>13.091</td>
<td>.001*</td>
</tr>
<tr>
<td>Between Groups</td>
<td>8349.199</td>
<td>78</td>
<td>107.041</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9750.488</td>
<td>79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student consumption of social media</td>
<td>1295.636</td>
<td>3</td>
<td>431.879</td>
<td>3.882</td>
<td>.012*</td>
</tr>
<tr>
<td>Between Groups</td>
<td>8454.851</td>
<td>76</td>
<td>111.248</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9750.488</td>
<td>79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student contribution to social media</td>
<td>1321.740</td>
<td>4</td>
<td>264.348</td>
<td>2.321</td>
<td>.052</td>
</tr>
<tr>
<td>Between Groups</td>
<td>8428.748</td>
<td>75</td>
<td>113.902</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9750.488</td>
<td>79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student use of social media tools</td>
<td>1222.793</td>
<td>5</td>
<td>244.559</td>
<td>2.122</td>
<td>.072</td>
</tr>
<tr>
<td>Between Groups</td>
<td>8527.695</td>
<td>74</td>
<td>115.239</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9750.488</td>
<td>79</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**. Denotes significance at the <.01 level.
*. Denotes significance at the <.05 level.
7.3.3 The effect of students’ perception of the Like button supporting social interaction on their sense of community score

A one-way ANOVA was conducted to determine if students’ sense of community scores (SoC score) differed for groups that reported whether the Like button in Pepper supported social interaction amongst their peers. Participants reported their use of these social media tools in two groups: the tool does not support social interaction \( (n = 20) \), and the tool supports social interaction \( (n = 60) \). There were no outliers found as assessed by boxplot; the data were normally distributed for each of the two groups when assessed using the Shapiro-Wilk test \( (p > .05) \); and there was homogeneity of variances, as assessed by Levene’s test for equality of variances \( (p = .131) \). Students’ SoC score was lower for those students who felt that the tool does not support social interaction \( (M = 45.40, SD = 12.84) \) compared to those who feel it does support social interaction \( (M = 52.55, SD = 9.96) \). Students’ sense of community score was statistically significantly different between the two groups, \( F(1, 78) = 6.658, p = .012 \).

7.3.4 The effect of students’ perception of the Like button supporting their learning experience on their sense of community score

A one-way ANOVA was conducted to determine if students’ sense of community scores (SoC score) differed for groups that reported whether the Like button in Pepper supported their learning experience in the course. Participants reported the Like button’s support of their learning experience in four groups: interfering with their learning experience \( (n = 38) \), does not impact their learning experience \( (n = 0) \), is useful to their learning experience \( (n = 33) \), and is very useful to their learning experience \( (n = 9) \). There were no outliers found as assessed by boxplot; the data were normally distributed for each group when assessed using the Shapiro-Wilk test \( (p > .05) \); and there was homogeneity of variances, as assessed by Levene’s test for equality of variances \( (p = .932) \). Students’ SoC score increased from reporting interference with their learning experience \( (M = 45.42, SD = 10.00) \), to reporting that it was useful to their learning experience \( (M = 55.48, SD = 9.89) \), to reporting that it was very useful to their learning experience \( (M = 56.00, SD = 10.32) \) groups. Students’ sense of community score was statistically significantly different for the different groups of the Like button’s usefulness in supporting their learning experience, \( F(2, 77) = 10.357, p < .0001 \). Tukey-Kramer post hoc analysis was run and
revealed that the mean increase in SoC score from finding that the Like button interfered with their learning experience to the button being useful to their learning experience (10.064, 95% CI [4.38, 15.74]) was statistically significant ($p < .0001$), as well as the increase in SoC score from finding the Like button was useful to being very useful in their learning experience (10.579, 95% CI [4.38, 19.43], $p = .015$), but no other group differences were statistically significant.

### 7.3.5 The positive effect of students’ use of the Like button on their sense of community score

A one-way ANOVA was conducted to determine if students’ sense of community scores (SoC score) differed for groups that reported whether their use of the Like button in Pepper made them elicit a positive emotional response. Participants reported how using the tool made them feel in two groups: using the tool did not cause them to elicit an emotional response ($n = 23$), and using the tool made them feel good ($n = 57$). There were no outliers found as assessed by boxplot; the data were normally distributed for each of the two groups when assessed using the Shapiro-Wilk test ($p > .05$); and there was homogeneity of variances, as assessed by Levene’s test for equality of variances ($p = .363$). Students’ SoC score was lower for those students who felt that using the tool did not cause them to elicit an emotional response ($M = 44.17, SD = 8.47$) compared to those that reported using the tool made them feel good ($M = 53.42, SD = 10.99$). Students’ sense of community score was statistically significantly different between the two groups, $F(1, 78) = 13.091, p < .0001$.

### 7.3.6 The effect of students’ use of social media on their sense of community score

A one-way ANOVA was conducted to determine if students’ sense of community scores (SoC score) differed for groups with different social media use (consumption) habits. Participants reported their consumption of social media into five groups: never ($n = 0$), rare ($n = 7$), infrequent ($n = 44$), frequent ($n = 26$), and persistent ($n = 0$). Three respondents did not provide answers to this survey question. There were no outliers found as assessed by boxplot; the data were normally distributed for each group when assessed using the Shapiro-Wilk test ($p > .05$); and there was homogeneity of variances, as assessed by Levene’s test for equality of variances ($p = .538$). Students’ SoC score increased with decreased use of social media across groups—rarely using social media ($M = 62.43, SD = 6.35$), infrequent use ($M = 51.11, SD = 10.91$), and frequent...
use ($M = 47.19, SD = 10.38$). Students’ sense of community score was statistically significantly different for the different levels of use (consumption) of social media groups, $F(3, 76) = 3.882, p = .012$. Tukey-Kramer post hoc analysis was run and revealed that the mean decrease from rare to infrequent (-11.32, 95% CI [-22.59, -.04]) was statistically significant ($p = .049$), as well as the decrease from rare to frequent (-15.24, 95% CI [-27.03, -3.44], $p = .006$), but no other group differences were statistically significant.

### 7.3.7 The effect of students’ contributions to social media on their sense of community score

A one-way ANOVA was conducted to determine if students’ sense of community scores (SoC score) differed for groups with different social media contribution habits. Participants reported their contributions to social media into five groups: never ($n = 8$), rare ($n = 22$), infrequent ($n = 26$), frequent ($n = 15$), and persistent ($n = 6$). Three respondents did not provide answers to this survey question. There were no outliers found as assessed by boxplot; the data were normally distributed for each group when assessed using the Shapiro-Wilk test ($p > .05$); and there was homogeneity of variances, as assessed by Levene’s test for equality of variances ($p = .418$).

Students’ SoC scores were highest in the group that reported minimal contributions to social media—not contributing to social media ($M = 62.38, SD = 10.45$)—when compared to all other groups. Between the groups, rarely making contributions ($M = 51.18, SD = 9.70$), to infrequently making contributions ($M = 48.00, SD = 8.32$), to frequently making contributions ($M = 49.73, SD = 13.90$), to persistently making contributions ($M = 49.00, SD = 13.04$), the SoC score was within a 4-point range. Students’ sense of community score was statistically significantly different for the different levels of contribution to social media groups, $F(5, 74) = 2.321, p = .052$. Tukey-Kramer post hoc analysis was run and revealed that the mean decrease from never contributing to infrequent contributions (-14.38, 95% CI [-27.00, -1.75]) was statistically significant ($p = .016$), but no other group differences were statistically significant.

### 7.3.8 The effect of students’ use of social media tools on their sense of community score

A one-way ANOVA was conducted to determine if students’ sense of community scores (SoC score) differed for groups that reported different usage of social media tools, such as the Like, Favourite, or Share buttons on Facebook, Twitter, and other platforms. Participants reported their
use of these social media tools in five groups: never ($n = 7$), rare ($n = 8$), infrequent ($n = 23$), frequent ($n = 21$), and persistent ($n = 18$). Three respondents did not provide answers to this survey question. There were no outliers found as assessed by boxplot; the data were normally distributed for each group when assessed using the Shapiro-Wilk test ($p > .05$); and there was homogeneity of variances, as assessed by Levene’s test for equality of variances ($p = .653$).

Students’ SoC score was highest in the group that reported not using social media tools ($M = 63.00$, $SD = 9.129$), when compared to all other groups. Between the groups, rarely using social media tools ($M = 51.18$, $SD = 9.70$), to infrequently using social media tools ($M = 48.00$, $SD = 8.32$), to frequently social media tools ($M = 49.73$, $SD = 13.90$), to persistently social media tools ($M = 49.00$, $SD = 13.04$), the SoC score was within a 3-point range. Students’ sense of community score was not statistically significantly different for the different levels of contribution to social media groups, $F(5, 74) = 2.122, p = .072$. Tukey-Kramer post hoc analysis was run and revealed that the mean decrease from never using social media tools to frequent use of social media tools (-14.38, 95% CI [-27.56, -.15]) was statistically significant ($p = .046$), as well as the decrease from never using social media tools to persistent use of social media tools (-14.33, 95% CI [-28.32, -.35], $p = .041$), but no other group differences were statistically significant.

### 7.4 Discussion

This final study presents findings on students’ reported sense of classroom community in online, discussion-based courses using Pepper where the Like button is being actively used in the courses. Students in eight courses were recruited to respond to an online survey. Students who reported completing at least three fully online courses reported the highest sense of community, learning, and connectedness. Compared to students who reported completing five fully online courses, the means between completing three courses and five courses were within tenths of each other. Overall, scores for each of the dimensions of classroom community progressively increased as students report to have completed more courses. This is consistent with research that describes student level of comfort and willingness to engage in discussions in online courses increasing as their familiarity with the online learning environment increases (e.g., Rovai, 2001; Vrasidas, 2004; Warkentin, Sayeed, & Hightower, 1997). This may indicate that rather than just having students explore Pepper as they take their first course using the system, that it would be more beneficial to teach them about the environment ahead of time to put them at ease with their
peers. This aligns with work by Clark and Brennan (1991) in which they describe learners beginning to understand each other’s social cues; in OLEs where the systems lack social cues (Kreijns, Kirschner, & Vermeulen, 2013), developing practices that allow students to become familiar with how the OLE can replicate these social cues may be worthwhile to ensure increased sense of connectedness, learning, and community. Perhaps a combination of the familiarity of Pepper and ability of adapting to the lack of cues in online discussions can be used by instructors in the initial days/week of their course to stimulate icebreaker-type activities—frequently used in face-to-face courses—with the hope of increasing the sociability of students prior to delving into content-based course discussions.

To get a sense of the differences between the quantifiable features of non-Liked notes and Liked notes in the courses surveyed, a paired t-test was run. The results suggest that although there are 55% more non-Liked notes than Liked notes in these course communities, the students in the courses are engaging more with each other through the creation of links to and from their notes to others more often than what is seen in the aggregate trends across 41 courses. The creation of links between each other’s content can be interpreted as a sign of more personal connections being made between the students. If they are actively referring to each other and making a point of creating a link to another student’s post, then this can be thought of as building stronger relationships with peers. These results are supported by an analysis of the relationship between students’ reported sense of community and the use of the Like button in these courses. The moderate positive relationship suggests that the sense of community increases as more notes in a course community are Liked.

In the case of these eight courses, the notes that are Liked reflect the investment in both the social and learning aspects of online discourse. If you and I were having a conversation and I was not trying to engage with you or your ideas, or if you were engaging my ideas and I was not reciprocating the effort, then the feeling you have toward the experience would not be as positive as it would if effort was being made on both our parts. If the act of Liking is a simplistic way to ground online discourse, then the moderate relationship between students’ sense of community scores and the use of Like button reflects the way this tool can be adopted by both students and instructors to stimulate engagement that would otherwise go undetected. The possibility exists that the Like button can be interpreted by students as a positive feedback cue whereby students are saying “keep doing what you’re doing because it is helping me stay in this discussion.” When
students report on their sense of community, I am aware this could be the result of multiple factors; however, given the unique integration of the Like button in their online community, it is possible that the rudimentary tool could support their engagement in online discourse (to what extent is unknown).

Although the Sense of Community scale has not been administered to focus on the impact of a specific tool on threaded discourse in an OLE, students were asked to report on their perception of the Like button supporting their social, learning, and emotional experiences in addition to various questions on their use of social media sites (consumption, contribution, and use of tools in the environment). The results indicate that the presence of the Like button in threaded discourse positively influences students’ sense of community from the perspective of it supporting social interaction, learning interaction, and making them feel positively toward giving Likes to others. This is consistent with earlier survey and interview results that described the Like button positively affecting the social aspects of the online course and their overall expectations. On their perception of the Like button supporting their learning experiences, the nature of these experiences is limited to the interview results in Chapter 4. Students described adopting the use of the Like button for their learning in different ways that related to their consumption and creation of note content. Similarly, students described feeling good about giving peers Likes, which is consistent with the interview findings in Chapter 4. Collectively, these results support the integration of a Like button in threaded discourse to scaffold social interactions that positively enhance students learning experiences. This can be considered a form of validation in the online learning environment where the act of Liking not only offers an alternative way to communicate with your peers, but increases their sense of community, which may in turn increase their engagement in course discussions. Unfortunately, I am unable to examine the data at this level because the survey was anonymous and cannot be triangulated with student log file data. Nonetheless, this is a significant contribution to our understanding of how social interaction can be integrated into threaded discussion through a low-cost mechanism.

In examining students’ sense of community scores from the perspective of their use of social media (including consumption, contribution, and tool use behaviours), a very interesting finding must be noted. Students who, reported increased use of social media across these three variables, on average, had lower sense of community scores than those who use social media less frequently. This suggests that it is not necessarily the familiarity with social media conventions
that influences students’ behaviours in online learning environments, but rather the shared goal
of the participants in the community. The nature of the content generated in threaded discourse in
OLEs requires social interaction to stimulate engagement and participation, but seeing that social
interaction is not the goal of the online learning community, then the ties to that community are
regulated by a shared goal to engage in learning experiences.

Collectively, the significant results suggest that for students to generate a sense of classroom
community, tools that allow them to increase their interactivity while working through text-rich
discussions may be valuable to their experience. Additionally, results suggest that designing
online environments where social interaction can be cultivated while engaging in course-related
discussions is necessary. There is a familiarity amongst students with popular social media sites
like Facebook, whose tools can be adapted—as they have been in Pepper—but the conventions
of the use of aspects of social media do not inform the meaning they have in an academic setting.
Speaking to the context and cues of the environment, it is obvious that the act of Liking can take
on several meanings, and the recipient of these Likes can interpret them in various ways. Not
only does this inform our understanding of how students in threaded discourse adapt the way
they navigate the text-rich OLE, it creates a new language for them to engage each other socially.

Studies on using Facebook as a learning environment itself are done so for very specific
purposes such as language learning, or for understanding how students use Facebook as a back-
channel to get to know their peers in their courses better (Kabilan, Ahmad, & Abidin, 2010;
Baran, 2010). These purposes can be likened to face-to-face courses where students learn
conversation skills, or informal meetings at a campus library discussing course material. These
appropriations of the environments do not impact the way students potentially interact in the
formal learning environment, whether it be through a private Facebook group, or a lecture hall.
These experiences provide scaffolds that students mobilize during their learning exchanges to be
able to achieve their learning goals. When considered in this way, it is rather obvious that the
results from the survey on the relationship between students’ sense of community scores and
their use of social media are inverse. The questions asked about their contribution, consumption,
and behavioural pattern of use of various aspects of social media sites were not a result of social
media playing a role in the course they took, rather to gain a general sense of how these
respondents used these sites in their social lives in hopes of exploring a potential effect on their
level of comfort with aspects of online learning. On social media sites, users curate their own
networks, interactions, and goals, whereas in an OLE, they become part of a space in which the network, interactions, and goals are predetermined (each to a varying degree) by the very nature of taking a course—regardless if it is online or not. In an OLE where threaded discourse is the primary way students are to learn course material, the students make individual decisions on how much effort to invest in the social aspects of learning. As seen in the first study, each of the students interviewed established their own social and learning goals, much like they would have if they were taking face-to-face courses. This suggests that turning to social media for cues to mirror user behaviours is not the primary objective for stimulating interaction in OLEs, rather, the purpose of social media is to inform the thoughtful design of simplistic interactions that can scaffold students’ personal learning paths in online courses.

Considering the overall experiences reported by students, it is feasible to interpret the results of this study as the Like button having a positive impact on threaded discourse, which is evidenced by their sense of community scores. The nature of online discussion-based courses can be quite divergent due to many factors, including the asynchronous nature of the system, the structure of the discussions into threads, and the ability of the students to develop communication skills that allow them to engage in discussion in a system void of aural and visual cues. By including a Like button and other interactive features in threaded discourse, we have effectively repurposed a ubiquitous social media tool for learning that recognizes the importance of social interaction for the goal of learning. If these courses were run on another platform, for example, in Blackboard, there is no way for students to engage with their peers in a low-cost way; the only option for interaction is to post a note to the course discussion board. Recognizing that others are online with you and can interact with you without writing a note may have increased the probability of students’ willingness to engage in interactions with each other. In turn, this may have resulted in students being able to make their own meaning from the discussion without feeling like they have missed out on any learning opportunities.

7.5 Limitations

As with the first study, one of the major limitations is that users in the log files, surveys, and interviews were anonymous insofar as I did not know what student responded to the survey. However, knowing which course students provided responses for, using a marker from the unique URL indicating which course community was e-mailed, allowed me to glean some
information on the relationship between the students’ survey responses and the course communities they were a part of. Additionally, due to the design of the survey instrument, I was unable to run a multivariate analysis of variance, as multiple assumptions were not met.

Considering that this study provides baseline results for student-reported sense of classroom community and its subscales, data may not be as generalizable because the instrument was added to a survey that included other questions about the Like button, which could have affected the results. In hindsight, I would have included open-ended questions in the survey about the reasons why students use social media, and specifically, why they use the Like button in Facebook. This would have provided additional information to explore the relationship between how the Like button is used for social and learning purposes by students. The results do provide an indication of an underlying relationship between the design of OLEs, intended use of tools, and the need for increasing student interactivity in online discussion-based courses.
Chapter 8
Like the Like

The current chapter brings the various studies together by exploring implications and recommendations, offering conclusions, and outlining future research. Drawing on all the studies in this project, it is evident that the nuances of learning in threaded discourse are complex, not only due to the physical limitations imposed by the systems, but also a result of the inherently divergent nature of communication when students can engage in multiple discussions with each other at any time in a course. In a system like Pepper, we constructed another layer of interaction that has not yet been implemented in OLEs like Blackboard and Moodle through the integration of a Like button. This tool supplemented the text-based language used by students in threaded discourse to partially compensate for the lack of aural and visual cues in OLEs. An exploration of the Like button yielded many interesting findings. Collectively, the results suggest the importance of a need to develop tools that support users’ social interactions.

Better understanding how to support social interaction in threaded discourse in OLEs is paramount as social media sites dominate our daily interactions and offer many ideas that can be integrated into academic environments. Using social constructivism and speech act theory as the frameworks for this project positions the research in a unique way. Social constructivism recognizes that the interactions students engage in during discourse is central to generating shared understanding in knowledge construction, and meaning-making processes. Speech act theory acknowledges the complexity behind the intent and reception of cues in exchanges between individuals as inherent in language itself. The very development and use of tools like the Like button in online threaded discourse can be thought of as creating a new vernacular where low-cost ways for users to interact can be interpreted in numerous ways. This project contributes baseline data on the intent, reception, and meaning of the Like button to explore its role in threaded discourse. The next step is to understand how student learning is affected by these types of tools so as to design environments that more effectively support student exchange in predominately text-based spaces where intent, reception, and interpretation of these exchanges is the foundation for learning online.
8.1 Implications

Given the growing interest and need for online education, this study offers a first step at understanding how students interact in these spaces in ways that scaffold their interactions through threaded discourse and how that changes their learning experience. From a theoretical perspective, this study explores the complexity and nuance of social interaction in online environments through speech act theory, which is traditionally used to understand verbal communication. Speech act theory allows me to position this research in the online literature on threaded discourse by exploring the myriad of ways that the Like button is used by students through sending and receiving Likes. Speech act theory recognizes that the intent and interpretation of language is deeply embedded in the context of interlocutors’ shared knowledge and understanding, but in online threaded discourse, this has yet to be examined.

Online learning environments use threads to provide the opportunity for exchange of ideas and maintain the possibility for depth of conversation. However, a major flaw of threaded discourse is inherent in its very nature—it is entirely text-focused. Threaded discourse is devoid of the visual and aural cues that play an important role in the (mis)interpretation of face-to-face speech acts. By adding another layer to threaded discourse using a Like button, some of the uncertainty surrounding the reception of ideas by your peers is alleviated, but the myriad of reasons a student may use the button itself is still laden with ambiguity. The Like button is an indirect speech act that requires understanding how context and shared knowledge contribute to its interpretation and purpose in online discussions. It is possible that choosing to integrate the Like button provides a more positive interpretation of ideas and exchanges in threaded discourse due to the inherent affirmative connotation of the word “like” itself. The findings of the study offer that the Like button can be considered a type of speech act that allows for individuals to quickly engage in positive exchange with another individual in online discussions. Speech acts inform the way that tools such as the Like button are designed to more effectively capture the intent in sending and receiving these interactions.

For researchers, the Like button and similar tools offer promising ways of enriching threaded discussions. Research is needed to provide a deeper understanding of how these low-cost tools influence the use of language within these spaces. Additionally, it will provide insight into the intended meanings assigned to these tools. We need to understand how and why students and
instructors are using these buttons to better scaffold their learning experiences. Text is the primary mode of communication, but it is plausible that when we better understand what role the Like button and similar tools play in online discussion, we can advance the way we develop and exchange ideas with each other. Much like the body of literature on speech acts, studies on these low-cost tools would involve linguistic and pragmatic analyses, not only of the note content, but accompanied by the intention of clicking such buttons during threaded discourse. This information can also inform the way instructors design their course discussion activities and evaluations. Not only would the text-based posts provide insight on the students’ ability to engage in learning through threaded discourse, but use of these tools may indicate whether they feel a need for additional social supports to successfully engage in discussion with their peers. It is plausible that students who feel left out may be apprehensive to engage in some discussions, but entering the conversation with a Like may help them build the confidence necessary to jump into the conversation, secure in the knowledge that authors feel positively toward people that give them Likes. For those students who are actively posting in the discussions, the Like button and similar tools can act as a break from the cognitive effort required to compose posts. They find some comfort in knowing that they do not need to compose a post that tells the author of a note that they have “heard” what was “said” as an affirmation of the author’s contribution. Thus, the use of the Like button and similar tools offer promise for better meeting the social needs of threaded online discourse.

From the lens of social constructivism, this study expands on our understanding of the need for social interaction in learning. Learning is shaped by the context, conversation, and interaction of individuals. In online threaded discourse, textual exchange has traditionally been the foundation of this social interaction. Low-cost interaction such as using a Like button may encourage open and constructive dialogue by extending the number of ways that people can connect socially and encouraging positive types of talk. One can imagine that if a Dislike button were integrated into online discussions, conversation might eventually break down because of the negative implication of the term. The Like button is, in effect, a mechanism to amplify a sense of social cooperation and mutual support in an online community. Promoting a sense of trust and affirmation amongst students is a critical first step if the goal is to encourage their sharing of ideas and construction of knowledge.
Within the body of literature on social constructivism, this research informs the need for creating online learning environments that mimic the types of social interactions (e.g., smiling and nodding) that are ubiquitous in face-to-face discussions. Understanding how these types of tools help develop a sense of trust and community amongst a group of students affects course design, the role of the instructor, and the pedagogy of meaning-making through online threaded discourse.

This study provides an initial exploration into the importance of social interactions by way of the Like button and similar tools in threaded discourse. For instructors, it could mean leveraging the use of the Like button by encouraging students in the initial weeks of a course to Like others’ notes that “speak” to them or that they find valuable to their own learning goals. This does not necessarily mean that instructors should prescribe a purpose to the Like button, rather, they can suggest various ways that it may be used by students in the course, while also drawing attention to the tool itself. For students, engaging in Liking during the initial weeks of a course can generate a sense of trust and confidence that may result in a greater sense of community. Although this study does not look at the relationship between students’ personal learning goals and their sense of community, future research may find that deeper engagement resulting from Liking may allow them to attain their goals more effectively because the discourse that they engage in takes place in what they perceive to be a supportive online learning community. Use of the Like button in this way may be critiqued as generating a false sense of security for students, but this study has begun to show that in online environments void of visual and aural cues, students enjoy receiving immediate positive feedback through the Like button because it makes them realize someone else is “there” and “hearing” what they are “saying.” Additionally, there is no notification system in Pepper, like that in Facebook, that tells students when their notes have been Liked. Students discover their notes have been Liked by navigating through the discussion threads. It is possible that the feeling associated with discovering that they have received a Like generates a sense of excitement and motivation. That alone may be what keeps students engaged in their online course, but it is unclear, as this was not studied. What this makes me wonder though is: why do students keep using the Like button?

This study begins to address the question of why students keep using the button from a social interaction perspective—they have adapted the tool to suit their individual needs in online discussions. The pervasiveness and persistence of its use suggests that it is an effective tool for
capturing ideas that the community of learners finds valuable. In the analysis on the differences between non-Liked and Liked notes, it is evident that the content receiving Likes is more complex in its quantifiable features, revealing more ideas pertinent to the course are taking place in the discussion. As discussed, an analysis of the content would provide more insight on the cognitive level and relevance of the material, but even the quantitative information indicates students are making connections to the posts. For instructors looking to navigate the course discussion for assessment purposes, they may initially look at notes that receive Likes. For students logging in to the environment to read their peers’ responses, it may be worthwhile to look at the notes that receive Likes first before composing a post. It is also plausible that the notes signal to the community which ideas are “trending” in weekly discussions. Keeping in mind that the scenarios described for navigating online discussions does not mean that non-Liked notes will not be read, rather it suggests that the hierarchical nature of threaded discourse may not be followed. Depending on the reader, non-Liked notes may or may not be read. Ultimately, students find posts that are thought provoking, and when they wish to respond or post a new idea, they choose to read other notes in the thread that may be related but have not necessarily been Liked. Each of these interpretations of Liked notes provides community members with ways to navigate the text-rich environment, which in turn may reduce stress levels after several weeks of a course when hundreds of notes have been posted. This is valuable to understanding the role of the Like button and similar tools on how members of online discussion-based courses navigate and make meaning of the organizational structure of threaded discourse.

Although this study did not focus on researching students’ Liking behaviours in social media, the relationships that were explored suggest that there are major differences between the interactions in online learning environments and social media sites. Most notable is the goal of the online learning environment. Students are heavily invested in this space to advance their knowledge. I would assume that this is not their goal when they are on social media sites. The findings of this study suggest an inverse relationship between students’ sense of community and their use of social media. This is worth mentioning because although research on student behaviours related to Liking on social media would be valuable to get a sense of what students intend when they Like, in online learning, the goals of using the Like button in each of the environments is presumably different. On Facebook, Like can be used as a way to detect—for marketing purposes—people’s affinities so they can monetize their interactions by strategically offering
adds to users. In the online learning environment, Like can be considered a way to generate potential engagement in discourse. As such, Liking in threaded discourse is both a preemptive and a reactive act that scaffolds discourse between members of the learning community.

In exploring how the Like button has been adopted in threaded discourse from multiple perspectives, it is evident that the findings will generate interest in how they affect researchers, course instructors, and students in designing, teaching, and learning in online spaces. The following section discusses the recommendations made based on this study’s findings.

8.2 Recommendations

Pepper includes several social media-like tools to increase the social presence of students in the computer-mediated environment. These tools include:

- the Like button,
- a lounge where students can see who is online at the same time as them,
- avatars for students to display images of themselves so others can see who they are interacting with,
- a profile where students describe a bit about themselves,
- private messages as a back channel to interact with course instructors and peers,
- notifications that e-mail students updates for activity within their course (which they set for themselves),
- and the ability to link to others’ notes to more easily build on ideas in a discussion.

The lowest cost social media-like feature of these that are integrated into threaded discourse is the Like button. The findings suggest that the Like button acts as a social scaffold in online discussions by students appropriating it as a low-cost tool to say “I agree.” However, some students use it as a way of providing the author with positive feedback, for acknowledging that someone is sharing new content and providing additional insight to the discussion, amongst other reasons (see Chapter 4, Section 4.2.2.1). Thus, the Like button acts as a catch-all social scaffold in online discussions, much like a head nod in face-to-face discussions. Yet the term “Like” itself does not explicitly tell the author of the post why someone is choosing to interact with their note.
in this way. Additionally, some students choose to Like a note and then follow up with a reply, but this is only if they make a conscious effort to do so. Despite the ambiguity of why a student Likes a note, they report positive feelings toward both giving and receiving Likes.

Students actively engage in using the Like button as a rudimentary acknowledgement tool throughout their discussions, and report that Liked notes have value in their discussions, and that it supports both the social and learning aspects of their course experiences. Overall, students positively rate their sense of classroom community, connectedness, and learning in their online discussion-based courses using Pepper when the Like facility is actively used by most of the students. Collectively, the results from the study suggest that although the Like button is regarded as useful, there is still ambiguity in its role within an online academic setting, which may be a result of the term “Like” itself.

There are two major recommendations that follow, which precipitate from the results of these studies. The first recommendation explores the redesign of the Like button to bring clarification to its usage that may help students better streamline their low-cost interactions in online discussion-based courses. The second recommendation explores the value of better navigating the online environment through the development of environmental cues that highlight the various features and their role within threaded discourse.

8.2.1 Redesigning the Like button

In February 2016, Facebook launched “Reactions,” an extension of the Like button, to their News Feed posts to better capture how people are reacting to the various content posted by their friends (Krug, 2016). Reactions still include a Like button, but there are additional reactions that include Love, Haha, Wow, Sad, or Angry, all of which are represented by an accompanying emoji (see Figure 8.1). To toggle between various reactions, users hold down the Like button and the additional reactions can be selected.

![Figure 8.1. Facebook Reaction icons (Krug, 2016)](image-url)
As described in their announcement for Reactions, Facebook acknowledges that the Like button itself did not capture the gamut of emotions that people wanted to express, and they used focus groups and data mining of users’ comments to narrow down which emotions to include in their Reactions. The results of this project revealed the same issue in Pepper—students were appropriating the use of the Like button in various ways to make a low-cost interaction with a note. Although the Like button has been a quick and easy way for students to interact with others’ discussion posts in Pepper, the term itself doesn’t explicitly provide the author with a reason for receiving the Like, unless a student replies to their post as well. If we think of redesigning the Like button in Pepper, we can use Facebook’s Reactions as a model for functionality, but include different types of academic interactions. Based on what students reported in the survey and interviews, Pepper’s interactions could include the following: Like, I agree, Recommend, Insightful, Build On, and Confused. A new set of icons developed to reflect these types of quick reactions might add another dimension to the scaffolding of discussions to reinforce the need for visual cues in the environment (Figure 8.2).

![Possible new icons to represent an extension of the Like button in Pepper](image)

**Figure 8.2.** Possible new icons to represent an extension of the Like button in Pepper

The addition of these other buttons may allow for more substantive grounding of the discussions, which in turn may scaffold students’ learning deeper than the Like button alone. The “I agree,” “Recommend,” and “Insightful” interactions describe the note’s content as having value to the discussion, but each with a different meaning to other students in the course. Clicking “I agree” tells others that you share similar feelings/ideas with the author of the note. Clicking “Recommend” tells others that you think the note content has substantive value in the discussion. Clicking “Insightful” tells others that the note content considers a new and possibly valuable perspective in the discussion. The “Build On” and “Confused” interactions describe that the note content compels the students to engage in bringing clarification to ideas/issues in the discussion. Clicking “Build On” tells others that additional discussion needs to follow a note because the ideas/issues require more attention. Clicking “Confused” would indicate that the reader requires additional information or support from peers to better understand an idea/issue in the discussion. It is conceivable that the last two button suggestions conjure feelings of anxiety and
apprehension on behalf of the students who are clicking the buttons for fear of lack of support offered by their peers, but it is possible to have these particular button interactions remain anonymous in an attempt to reduce this.

Conceptually, including these buttons in threaded discourse can extend the cues and context needed for students to correctly interpret how their peers are interacting with the content they generate. These buttons are a quick and easy way for students to reveal more specific reactions to reading discussion postings. To test this extension, an experimental version of Pepper that includes these buttons can be used and compared to the same course that only provides students with use of the Like button.

8.2.2 Navigating the Online Environment

Researchers argue that proficiency and skill of using the internet does not alone determine a student’s ability to learn effectively in an online environment, rather, it is their ability to adapt to the system being used (Eastin & LaRose, 2000). Discussion can be difficult in online learning environments because of the lack of aural and visual cues (Kreijns, Kirschner, & Vermeulen, 2013). Yet, as this project reveals, environments that include low-cost mechanisms that can augment and scaffold discussion in more adaptive ways allows students to engage in alternative ways. As students become more comfortable with interacting and engaging with each other through computer-mediated technologies, it is conceivable that these skills can be transferred to an academic context. The results of the project show that as students continue to take online discussion-based courses at the institution, they report higher levels of sense of classroom community, connectedness, and learning.

Stepping back from the micro level of discussions and examining the online environment as a whole, it may be useful for students to become acquainted with adapting their communication skills from face-to-face and other computer-mediated experiences (e.g., communicating through social media) to an academic environment in a low-cost way by practicing interacting with each other on off-task activities rather than having students jump into course discussions without providing them with enough time to familiarize themselves with the environment. Typically, instructors in online courses ask students to post a note about themselves, almost like a mini bio, and then retrieve the course syllabus and additional learning materials. Other than this, students are on their own trying to navigate the online space. The current state of technology allows us to
augment students’ initial interactions in a way that quickly allows them to discover all the different features and tools within an online environment regardless of the purpose of the online space. Looking at LinkedIn as an example, they use pop-up windows and alerts to assist users in discovering how the professional social media network operates (Figure 8.3).

**Figure 8.3.** LinkedIn navigation assistance for new messaging system organization

This same idea can be applied to Pepper to better adapt students to a space where they will be spending a lot of their time over the course. Currently, the Pepper Research Team has a series of YouTube videos that take the viewer through step-by-step instructions on how to use the system’s various features. Considering the value in having students explore the environment on their own and actually click through the interactions rather than just watching an instructional video, an augmented navigation cue would be a more promising way of familiarizing students quickly.

The navigation helper can be activated upon students’ initial login to their course site and remain active until they have explored all of the features and tools within Pepper. A gamification element can be added as well to ensure that students have achieved all interaction milestones that may be valuable to their online experience. Not only would this type of augmented experience assist students with familiarizing themselves with the system, it would allow course instructors to focus on scaffolding the social and learning aspects of their online experiences much better, since students are better equipped to focus on on-task interactions, such as weekly discussions of course content. One of the necessary tasks in implementing such a navigation tool is in understanding the function of each of the features from both an instructor and student
perspective. For example, if the Like button is to be used to show the author of a note that you agree with their note, then someone learning the system would see a pop-up window when reading a post that suggests they Like the note to agree with what that individual is saying (Figure 8.4).

Figure 8.4. Example of the navigation helper for the Like button

Conceptually, introducing a tool that augments users’ initial navigation of Pepper can support time on-task and productivity by easing anxiety due to a lack of awareness of the functionality of the learning environment. Users need to gain a sense of cyber-spatial awareness to effectively adapt their ability to interact and converse in this seemingly familiar online space.

8.3 Conclusions

This project explores how a Like button is used by students as a tool to interact with each other in text-rich online discussion-based courses. While the current body of literature emphasizes the need for understanding how students adapt their communication in threaded discourse, this project examined this issue by integrating a ubiquitous social media tool into students’ posts using the Pepper system to understand how students used the Like button to support their interactions. The mixed methods, multi-study approach revealed that an academic appropriation of Facebook’s Like button provided students with a low-cost social scaffold to primarily replace their need to type “I agree” in response to peers’ notes during discussion. The results also suggest that the integration of the Like button into threaded discourse may provide some relief to
one of the most commonly cited issues with threaded discourse in OLEs, the problem of
grounding conversation due to a lack of aural and visual cues, as it allows students to recognize
that others have read and acknowledged their postings. This is reflected in student interviews
where they describe their experiences using the Like button, both giving and receiving Likes, as
making them feel good about the content they are producing and being able to develop a sense of
trust through the low-cost interaction. Students suggested that the Like button be made more
obvious in the environment, because in its current representation, it can be missed by those who
do not know it is there. The survey and interview responses provide more detailed accounts of
how and why students use the Like button. Consequently, I better understand how the Like
button positively scaffolds students’ interactions in text-rich course environments.

Analyses of aggregate data revealed widespread use of the Like button by students, which is an
indicator of its ease of use in the system as a supplementary tool in threads. Examining how the
Like button was appropriated as a reply acknowledgement tool and looking at the frequency of
its use in this way demonstrates that threaded discourse OLEs require a low-cost mechanism as a
way for saying “I agree.” Considering that the project did not explore the content of notes that
received Likes, there is no definitive way of knowing if students continued to use “I agree” in
their notes when giving a Like and following it up with a note. In examining how Liked notes
differ from notes that do not receive Likes using various quantitative metrics, we glean some
insight into the features of notes that students find valuable to their discussion—Liked notes, on
average, are revised less, are longer, contain shorter sentences, contain more informal words,
contain lower use of the pronouns “I” and “You,” contain higher use of the pronouns “He/She”
and “They,” are more difficult to read, are written at a higher grade level, and contain more links
made to another student’s note than non-Liked notes. Although this study did not examine the
content of these notes, surveys and interviews in the first study revealed that students are using
Like to agree with the content generated. This understanding of the role of the Like button
indicates that the tendency for Liked notes to share similar quantifiable features may reflect
favourability toward ideas/topics/concepts written about in the notes, and possibly adds value for
students’ engagement in the discussion. The convergence of these findings may also be an
indicator of where students are concentrating their efforts within discussions. If these notes are of
value to students, then perhaps understanding the role of the Like button as both a social and
learning scaffold provides students with the opportunity to manage the overwhelming volumes of text within threaded discourse in OLEs.

Finally, in asking students to report on their overall sense of classroom community, it was revealed that, generally, students are positively experiencing their courses. Looking at the differences between their reported sense of community across multiple variables, it is obvious that the Like button positively influences their experience in threaded discourse by scaffolding social interaction.

This project provides an initial look at how a ubiquitous social media tool integrated into threaded discourse can provide students with a low-cost mechanism for social interaction in their online courses. This dissertation begins the conversation on the many possibilities for solving the issue of online learning environments lacking the aural and visual cues needed to support social interaction. The recommendations for this project stem directly from the results and reflect the current trends in social media—expanding the low-cost tools available to users and assisting them in navigating the features of the online environment. This study contributes to the literature by extending what we know about how face-to-face conversations unfold and trying to understand what tradeoffs must be made in online learning environments to cultivate rich and meaningful discussions.

8.4 Future Research

The current state of research in online learning environments provides little evidence for understanding the relationship between threaded discourse and how tools can supplement and scaffold social interaction in these environments within which students learn. Researchers are seeking to understand how to design these spaces to stimulate the types of social interaction that are foundational to the process of learning in discussion-based courses (Kreijns, Kirschner, & Vermeulen, 2013). In looking specifically at how the Like button functions as a social scaffold within this type of online learning environment, we are seeking to deepen our knowledge of how social interactions affect threaded discourse. Several questions are raised by this exploratory project regarding the effect of the Like button and other social media tools (i.e., the Share button) on student productivity, on the nature of students’ contributions to online discussions, and on student experiences.
The various studies in the project revealed that the content of student notes may provide a deeper understanding of how the Like button influences discussions and possibly allows exploration of the meaning-making students engage in through these discussions. Additional research in the form of case studies examining how the content of Liked notes differs from that of notes that do not receive Likes would be valuable. To assess the content, Gunawardena’s 1995 model of discussion phases can be used to code notes to reveal how the discussions unfold throughout a course. An extension of this work can look at where Liked notes are situated in the threads to understand if use of the tool assists students in identifying valuable notes and brings cohesion to the discussions. Another perspective can be taken to examine how the appropriation of the Like button as a form of acknowledgement tool affects threaded discourse by focusing on discussion cohesion or increased engagement in particular threads.

To better understand the generalizability of the results of this project, the same studies and analyses can be conducted in a different online learning environment. Pepper is not as popular of a learning platform as Blackboard or Moodle, but running these studies in alternative environments can help to improve the generalizability of the results. Additionally, it would be valuable to run these studies with a different demographic.

To examine the impact of tools integrated into threaded discourse to scaffold interaction, additional research in the form of double-blind experiments can be designed where student participants are in one of two groups: the control group, and the experimental group, where various conditions are applied. Experimental conditions can be applied that seek to replicate various phenomena encountered in social media—for example, discussions where Likes are inflated to replicate behavioural influence, discussions where students that receive Likes to their notes are not notified of this interaction to replicate the culture of social validation, and, having the Like button accompanied by other buttons such as “I agree” or “I disagree” to study how the adoption of the Like button as a catch-all mechanism may not provide students with the type of low-cost reaction to peers’ notes.

Experimental case studies can also be designed to test tools that direct users to explore how features of the system function. One course can be run with half of the students having access to the navigation tool, and the other half without the tool. Students can be surveyed on their sense
of community, connectedness, and learning to determine the effectiveness of this type of augmented navigation system.

In appropriating speech act theory as a framework for the study, the findings suggest that tools such as the Like button can be qualified as indirect speech acts. In turning to the body of research on the classification of indirect speech acts in linguistics and pragmatics, it is possible that a future research program on the Like button in threaded discourse be designed in similar fashions to those fields that code individual speech acts in order to better understand the impact of the tool on exchanges between students. Using Searle’s (1975) classifications for indirect speech acts, I can see how the meaning of the Like button adapts to the nature of the threaded discourse and answer the question: How does this tool affect the language used by students in threaded discourse?

The implications of the current project and future research can offer deeper understandings of tools that may seem inconsequential in the development of socially rich environments as foundations for learning through discussion. Considering the number of courses included in this project, future work in the form of case studies is necessary to examine the effects of social scaffolds such as the Like button at a micro level because of the complexities of learning in threaded discourse. This project has provided a foundation for multiple avenues of future exploration. It is my intention to continue the research in the coming years.
References


Roblyer, M. D., McDaniel, M., Webb, M., Herman, J., & Witty, J. V. (2010). Findings on Facebook in higher education: A comparison of college faculty and student uses and


Hello <Name>,

My name is Alexandra Makos. I am a PhD Candidate in the CTL Department. I am currently conducting research to explore social interactions in discussion-centered online courses that are supported by tools present in the online environment, mainly the Like button.

I am contacting you because you were recently in an online course <Title> taught by <X> that used Pepper. I would appreciate if you could complete a short survey asking questions about social interactions in your online course (centered around your use of the Like button), your learning experiences, and your perceived sense of community in the course. The survey should take about 5 minutes to complete. Here is the link:

https://www.surveymonkey.com/s/likebutton<coarsedatabase>

Please note, that your name would not appear in any reports or published documents as a result of your participation, and your instructor will not be made aware of who is (or is not) participating.

Your input on this topic will be extremely valuable and appreciated.

Best,
Alexandra Makos, Ph.D. Candidate
Dept. of Curriculum, Teaching and Learning
252 Bloor Street West, Room 11-283  Toronto, ON M5S1V6
Tel: 416-978-0138
Cell: 416-278-4609
Email: alexandra.makos@mail.utoronto.ca
Web: http://www.alexandramakos.com
Appendix B: Survey

Section 1: Demographic Information:

Which degree are you working toward completing?

- M.Ed.
- M.T.
- M.A.
- Ph.D.

You are a:

- Full-time student
- Part-time student

How many only courses have you completed prior to this course?

- 1
- 2
- 3
- 4
- 5+
**Section 2: Sense of Community** (scale developed by Rovai, 2002a):

Base your responses for each of the statements below on the most recent online course you have completed. Do not spend too much time on any one statement, but give the response that seems to describe how you feel. There are no correct or incorrect responses. If you neither agree nor disagree with a statement or are uncertain, select neutral. Please respond to all items.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel that students in this course care about each other.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that I am encouraged to ask questions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel connected to others in this course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that it is hard to get help when I have a question.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do not feel a spirit of community.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that I receive timely feedback.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that this course is like a family.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel uneasy exposing gaps in my understanding.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel isolated in this course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel reluctant to speak openly.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I trust others in this course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that this course results in only modest learning.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that I can rely on others in this course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that other students do not help me learn.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that members of this course depend on me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that I am given ample opportunities to learn.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel uncertain about others in this course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that my educational needs are not being met.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel confident that others will support me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel that this course does not promote a desire to learn.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 3: Use of the Like button in Pepper:

How would you describe your use of the Like button in Pepper?

- Rare – about once a month
- Infrequent – once or twice a week
- Frequent – once a session
- Persistent – multiple times per session

Social interaction – the Like button:

- Supports my social interaction with my peers
- Does not support my social interaction with my peers

Learning Experience – the Like button:

- Is very useful to my learning experience
- Is somewhat useful to my learning experience
- Does not impact my learning experience
- Is an interference to my learning experience

Emotional Experience – the Like button:

- Makes me feel good when I like my peer’s notes
- I do not feel anything when I like my peer’s notes
- Makes me feel bad when I like my peer’s notes
Thinking back to times when you Liked notes in Pepper, what was it about these that made you like them? Choose all that apply.

- Helps me navigate through the discussion by emphasizing what to read first
- Allows me to communicate quickly without having to write a reply to someone’s note
- Supports my social interaction with my peers
- Does not support my social interaction with my peers
- Is useful to my learning experience
- Is not useful to my learning experience
- Allows me to highlight what I think is important in the discussion posts
- Makes me feel good when I Like my peer’s notes
- Makes me feel good when I receive Likes from my peers
- Thinking back to times when you “liked” notes in Pepper, what was it about these notes that made you like them? Choose all that apply.
- Person who wrote the note has liked your note
- Person who wrote the note has made a valuable connection to the readings
- The person’s sense of humour
- The person’s use of emoticons
- Clarity of thought in the note
- Presentation of new ideas
- Clear writing
- Sense of puzzlement
- Information exchange
- Connecting ideas in other’s notes
- Possible solution to a problem/issue that has come up in discussion
- Application of new ideas
- Emotional expression
- Sense of commonality
- Encouraging collaboration
- Similar professional/personal experience
Section 4: Use of the Like button in Social Media:

How would you describe your use (consumption) of social media (e.g., Facebook, Twitter, LinkedIn, Instagram)?

- Never – I do not use social media
- Rare – about once a month
- Infrequent – once or twice a week
- Frequent – once a day
- Persistent – multiple times a day

How would you describe your contributions (posting and/or sharing content) on social media (e.g., Facebook, Twitter, LinkedIn, Instagram)?

- Never - I don’t post to social media
- Rare – about once a month
- Infrequent – once or twice a week
- Frequent – once a day
- Persistent – multiple times a day

How would you describe your frequency of use of the Like/Favorite/Share buttons in social media (e.g., Facebook, Twitter, LinkedIn, Instagram)?

- Rare – about once a month
- Infrequent – once or twice a week
- Frequent – once a day
- Persistent – multiple times a day
- I don’t use the Like button
Closing:

Are you interested in participating in a follow-up interview to discuss your use of Pepper's Like button (either online or face-to-face)?

☐ Yes
☐ No

If yes, then please enter your email address below.

Students who indicate their willingness will be invited to participate in a brief interview (approx. 30 minutes) at a mutually agreeable date and time. The interview will involve a discussion about your experiences with the Like button in your online course and your learning experience in Pepper. Your participation in the interview can be via Skype or in person; audio will be recorded for analysis purposes. Please note, that your name would not appear in any reports or published documents as a result of your participation, and your instructor will not be made aware of who is (or is not) participating.
Appendix C: Informed Consent

The following is a letter of consent for your consideration to participate in a research study at OISE, University of Toronto. The purpose of the research is to explore the social nature and impact of student use of the Like button in graduate courses that use Pepper as the primary online learning community.

Scope of the project

The project explores students’ socioemotional experiences and their use of a Like button in online learning environments to understand how they engage in social interactions and how these interactions affect their learning experiences. Study 1 and 2 focus on the analysis of archival data associated with student clicks of the Like button. Study 3 focuses on how students use the Like button to support social interaction, the impact this has on the quality of their learning and sense of community in the online discussion-intensive courses.

Research Team

The principal investigator is Alexandra Makos. She is a PhD Candidate in the Department of Curriculum, Teaching and Learning at OISE. Her supervisor, Professor Jim Hewitt, is the primary developer of Pepper and occasionally supports Alexandra with the integration of tools in Pepper.

Conditions for Participation

By giving your consent you are agreeing to:

- Responding to a short survey asking questions about your use of the Like button in your online course and your learning experience as a student in the course.
- Participate (voluntarily) in a brief interview (approximately 30 minutes) at a mutually agreeable date and time. The interview will involve a discussion about your social experiences in your online course, and the use of the Like button in Pepper. Your participation in the interview can be via Skype or in person. Audio will be recorded for analysis purposes.
- Have your data used (anonymously) for the purpose of research analysis and publication.
Should you decide to participate in the study, you have the option to remove your consent at any time one week prior to the interview date that has been agreed upon.

**Benefits, Risks and Confidentiality**

While there is no formal remuneration for participating in this research, the outcome is intended to increase awareness of best practices and challenges associated with cultivating and sustaining social interactions in online learning environments at the university level where there is an emphasis placed on learning through discussion. Your participation in this study will ultimately lead to an improvement in the social scaffolding tools available in online learning environments used.

There are no anticipated risks associated with your involvement in this research. Your grade in your online course is not contingent on your participation in this research, as the courses discussed have already been completed. Additionally, your previous instructor(s) will not be informed of your decision to participate.

Your input as part of the research will be kept anonymous (replaced with pseudonyms). Your name will not be used in any published documents associated with this study. Any data containing your identifying information will be kept in password-protected files, and will be destroyed one week after the successful completion of the interview.

**Information about this research**

If you have any questions about this research study, you may contact the principal investigator using the information provided below. Any publications resulting from this study will be posted on the following website: [www.pepperproject.ca](http://www.pepperproject.ca).

If you have any questions about your rights as a participant, you can contact the Office of Research Ethics at [ethics.review@utoronto.ca](mailto:ethics.review@utoronto.ca) or 416-946-3273.

*If consent given in person* If you are willing to participate in the study, please indicate this by checking the applicable boxes, and printing your name, signing and dating this form below.

*If consent given online* If you are willing to participate in the study, please indicate this by checking the applicable boxes, and providing your name and university email address. Your
email address will be kept confidential and only used for corresponding with you for things related to your participation in this research study (e.g., sending you a copy of the consent letter and setting up an interview time).

☐ I have read the above information and I agree to participate in this study.

☐ I am willing to participate in an interview.

[In person]

Name (Please PRINT) (Signature) (Date)

[Online]

First Name: Last Name:

Email: (this must be your official university email address)

Sincerely,
Alexandra Makos, Ph.D. Candidate
Dept. of Curriculum, Teaching and Learning
252 Bloor Street West, Room 11-283 Toronto, ON M5S1V6
Tel: 416-978-0138
Cell: 416-278-4609
Email: alexandra.makos@mail.utoronto.ca
Web: http://www.alexandramakos.com
Appendix D: Interview Protocol

Opening:

- What was your usual routine each time you went into your online course, from the time you logged in to the time you logged out?
- What were some of the tools you used most in Pepper, and why did you use them?
- What were some of the tools you used least in Pepper, and why did you not use them?
- Please describe the things you liked most about your online course.
- Please describe the things you found most challenging about your online course.

Like Button:

- Please describe how you used the Like button.
  - Did you find it valuable for social interaction in the course? How? Why?
  - Do you find it valuable for your learning? How? Why?
- When you receive Likes, how does it make you feel?
- When you use the Like button, what do you hope the person on the receiving end will think?
- What are some thoughts about how instructors use the Like button?
  - Do you find they use it?
  - Do they draw attention to the button at the onset of the course or prescribe what it is being used for?
- Do you think the Like button supported your learning in a way that you knew you were “on the right track” or “keeping up with the discussion” in your online course when you received “Likes”?
- Can you describe the impact the Like button has had on your text-based compositions in the online discussions?

Creative:

- If you could change one thing about the Like button’s functionality, what would it be?
- What are some of the other online tools/buttons that you use regularly (e.g., Twitter, Facebook, Instagram)?
  - What do you like about those social media tools?
  - Is there anything about those tools you’d like to see in Pepper?

Closing:

- Please provide any specific comments you have about Pepper’s Like button.
- In general, did your online learning experience in your course meet your expectations?
- In general, did your online social experience in your course meet your expectations?
- Do you have anything else that you’d like to say about your online course, the Like button, or Pepper?