EXPLORING THE PERSONAL AND SOCIAL VALUE OF TAGGING SYSTEMS THROUGH SOCIAL CAPITAL THEORY

by

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A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

in

THE FACULTY OF GRADUATE STUDIES

(Interdisciplinary Studies)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

April 2009

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ABSTRACT

The purpose of this study was to explore social media usage and to investigate the personal and collective value of social media. Using a case study methodology and a social capital theoretical framework, I examined the personal and social strategies that emerged from three students using del.icio.us and CiteULike over a five-month period. I used a questionnaire, in-depth semi-structured interviews, and digital archival data logs to gather a holistic perspective of how these newcomers used tagging systems as tools that facilitate the creation and maintenance of relationships. This project represented the first time a social capital theoretical framework was used to understand tagging systems behaviour. My findings suggest that people develop personal and social strategies as tagging systems members in order to maintain and build relationships with their real world social ties. According to social capital theory, these actions represent social strategies that are designed to build bridging social capital, which brings people together through social networks that were not similar to each other (e.g. school), or bonding social capital, which reinforce close ties of people with similarities in key aspects (e.g. close friends). As social media continues to emerge as a space for building connections between other members, it is recommended that designers of social media develop future systems that support the creation and maintenance of online and offline relationships.

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ACKNOWLEDGEMENTS

Thanks to my supervisor Dr. Samia Khan for her assistance, feedback, and advice with my thesis. Her knowledge in case study methodology was very helpful and the vast improvements to my writing abilities are a result of her exceptional feedback. Thanks to Dr. Cyprien Lomas for agreeing to serve as my reader during the final stages of my thesis. He has been a great friend through my time at UBC and I have always enjoyed chatting with him about social media.

Thanks to my parents who provided financial, emotional, and spiritual support as needed through these years. I haven't seen them nearly as much as I would have liked while at UBC and this thesis would not have been completed without their assistance. Special thanks to one of my best friends Eme who continued to check up on me as I would go invisible during various stages of my thesis. His support was very much appreciated. Thanks to Janice Matautia, Administrative Assistant, Interdisciplinary Studies Graduate Program and John Beatty, Director of the Interdisciplinary Studies Graduate Program for their amazing support and motivation especially over this last year as I completed my thesis.

DEDICATION

To my parents.

CHAPTER 1 INTRODUCTION

1.1 Introduction

This thesis explored through a case study methodology and a social capital theoretical framework, the motivations and strategies that emerged from students using del.icio.us and CiteULike over the course of a term. Prior to my research, there was very little scholarly literature about tagging systems, although emerging academic and applied studies offered promise for the future (e.g. Golder & Huberman, 2005; Lund, Hammond, Flack, & Hannay, 2005; Hammond, Hannay, Lund, & Scott, 2005). The main questions addressed in this thesis were:

Research Question 1: W hat personal, individual strategies emerge from newcomers using tagging systems?

Research Question 2: What social, collective strategies emerge from newcomers using tagging systems?

The structure for this chapter is as follows: Purpose and research questions, Significance of the study, and Overview of the thesis.

1.2 Purpose and research questions

Tagging refers to the process of classifying data as 'information about information' or metadata into categories (Steinacker, Ghavam, & Steinmetz, 2001; Duval, Hodgins, Sutton, & Weibel, 2002; NISO, 2004). A user (also called a *tagger*) created a keyword, which was attached to digital content in order that the tagged information (e.g. webpage, picture, video) might be more easily retrieved or to enable sharing with others (Smith, 2008). Tagging systems literature had historically focused on Personal Information Management (PIM), the study and practice of developing ways for people to manage their information using archival, search, and retrieval devices (Jones, 2007). This thesis differed from PIM research (e.g. Jones, 2007), which focused on the role of the individual, by exploring the social component of tagging systems rather than only their personal value and visibility. Indeed, the idea of tagging as social bookmarking came from the concept of one's personal Internet browser bookmarks becoming accessible in a shared environment.

The purpose of this study was to explore how social media, specifically del.icio.us and CiteULike as tagging systems were used, and to investigate what their personal and collective value might be to their members. The aim was to provide a holistic perspective of behaviour in order to share a novel understanding of how these newcomers used tagging systems as tools that facilitate the creation and maintenance of relationships. These tools as social media are being investigated by academics and researchers studying the Internet, in order to better understand how they fit into people's lives and to learn

how these systems might be improved to enhance usability through design changes (Lampe, Ellison, & Steinfield, 2007). With social capital being used as a framework to study other social media such as Facebook (Ellison, Steinfield, and Lampe, 2007; Steinfield, Ellison, & Lampe, 2008), MySpace (Gibert, Karahalios, & Snadvig, 2008), blogs (da Cunha Recuero, 2008), and massively-multiplayer games (Williams, 2006a; Williams et al., 2006), I would expect that in the future tagging systems will also be studied using a social capital approach adding to the existing social media literature. The core elements of trust, social networks, and norms of reciprocity that make up Putnam's (2000) definition of social capital theory may influence how people use these tagging systems.

To explore my research questions, I conducted a case study at the University of British Columbia (UBC), a four-year undergraduate institution in the lower mainland of British Columbia. The study was carried out from January 2006 to May 2006 and the data sources were a questionnaire, archival digital content, and semi-structured interviews. The participants were three students in two graduate level classes without prior exposure to CiteULike and del.icio.us, which were introduced early in the course curriculum by each professor. This project was restricted to these two graduate-level classes with small class sizes at UBC that included tagging systems in their curriculum during that time period.

1.3 Significance of the study

Joshua Schachter, the creator of del.icio.us, designed a tagging system that was only for his personal use (Livingstone, 2007), and became aware of the collaborative benefit of posting URLs in a shared space after the fact. Similarly, Richard Cameron, the founder of CiteULike, created it for his own benefit and discovered the shared value of his online bibliographic library when others signed up for it without his knowledge (Chang, 2005). It begs the question whether newcomers to these environments would perceive these design spaces as personal first and then social afterwards or perhaps because of past shared experiences online (e.g. Facebook or MySpace) perceive them to be social initially.

Although there are studies of tagging systems, this was the only study with a social capital theoretical framework that also contributed to social media literature. This was significant as tagging systems may evoke different behaviours from other forms of social media. My perspective and research questions explored gave fresh insight to new areas of research through the theoretical framework employed. It is hoped that this insight will provide designers of social media with tools and recommendations for future systems that support the creation and maintenance of relationships both on and offline.

1.4 Overview of the thesis

This thesis is organised into five chapters. In Chapter One I began by sharing what the primary focus of my thesis was. In the Purpose and research questions section I provided key definitions of terms, outlined why I was interested in this research, and discussed where I conducted my study. The Significance of my study section stated why this research was relevant today and explored possible implications for the future.

In Chapter Two I provided literature reviews of social media, and describde the theoretical framework I used to provide context to, and support for my research. I outlined the relevant published works and described the features of del.icio.us. In Chapter Three I described the case study research methodology, why it was appropriate for this research, described the participants, implementation, the data sources, the data collection, and the data analysis tools. In Chapter Four I discussed my research study and findings from Chapter Three based on the research questions described in Chapter One and outlined how their behaviour was explained by social capital theory. In Chapter Four I discussed the findings and in Chapter Five I presented the central conclusions of my study, what the implications were in terms of social capital theory, and concluded with possible avenues for future research.

CHAPTER 2 THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Introduction

In this section, I gave context to my research project in order to: provide a foundation through literature and theory to my methodology, case study findings, and provide a framework for my later discussion. I began by addressing significant tagging literature and focused on relevant studies regarding user behaviour. This was followed by a discussion on the functionality of del.icio.us, due to its prominence within social media and popularity as a tool for sharing webpages, and CiteULike, an online reference management tool. To end this section, I provided a historical background of the social capital theoretical framework used to explain my findings.

2.2 An analysis of tagging systems: Del.icio.us and CiteULike

Recent tagging studies came from the areas of Computer Science (e.g. Paolillo & Penumarthy, 2007; Heymann, Koutrika, & Garcia-Molina, 2008), library and information systems (e.g. Tonkin et al., 2008), museums (e.g. Bearman & Trant, 2005; Trant, Bearman, & Chun, 2007), and Computer Supported Cooperative Work (e.g. Storey, Cheng, Bull, & Rigby, 2006; Sen, et. al, 2006; Lee, 2006), with very little academic research in other domains such as education (see Hedberg & Brudvik, 2008), performance art, or social media (see Agichtein, Castillo, Donato, Gionis, & Mishne, 2008). However people in these areas were sharing knowledge about tagging using other means such as books (Weinberger, 2007; Smith, 2008) workshops (Meibergen, 2006; Rhinesmith, 2007a; Rhinesmith, 2007b), and reports (e.g. technology based learning as discussed in The New Media Consortium, 2006 and The New Media Consortium, 2007). Researchers have explored tagging in enterprises (Farrell & Lau, 2006; John & Seligmann, 2006; Thom-Santelli, Muller, & Millen, 2008) and knowledge management as a framework for meeting organisational challenges in information storage and retrieval (Wu, Zubair, & Maly, 2006; Wu, Zubair, & Maly, 2007; Tonkin et al., 2008).

2.2.1 Tagging classification systems

In 2008, the first book that focused exclusively on tagging systems entitled *Tagging: People-Powered Metadata for the Social Web* (Smith, 2008) was published. It built on themes found in *Everything is Miscellaneous* (Weinberger, 2007), which described how people were moving away from hierarchical classification of information (e.g. Dewey Decimal System; CDs organised in one's living room) to systems that were individual and group-generated (e.g. *fun, BobMarley, beach, Jamaica* could be tags on the Jamaican Ministry of Tourism website).

The non-hierarchical and inclusive process of people cooperating ad hoc to classify and share information using user-created metadata within tagging systems is called a folksonomy. Folksonomy, a combination of the terms *folk* and *taxonomy* (Mathes, 2004), is a bottom-up process originally coined in 2004 by Thomas Vander Wal during a discussion on an Information Architecture mailing list (Smith, 2004). A folksonomy

consisted of a tag (e.g. *ubc*), the resource tagged (e.g. University of British Columbia digital image), and the identity (e.g. real or username) of the person that did the tagging (Vander Wal, 2007). Kroski (2005) provided a comprehensive listing of the advantages and disadvantages from using folksonomies. Some of these are shared in Appendix A The advantages of tagging and Appendix B The disadvantages of tagging. Folksonomies provide a bottom-up, user-generated approach to sharing, finding, and retrieving content via labelled keywords for tagging systems.

One of the most relevant studies of tagging systems came from Golder and Huberman's (2006) research of collaborative tagging systems, specifically del.icio.us. The authors described how members used tags over a period of time and they believed that almost all tag use was for personal benefit rather than the public good. They noted that within a tagging system, personal tags (e.g. *toread, myhouse, formom*), could lead members to discover content they may also desire to read. This may be especially useful if the tagging system allowed users to create groups, such as CiteULike, or maintain an awareness of digital images shared by a member's contacts, such as flickr.

The concept of tagging is defined by its core elements as a tripartite graph (Lambiotte & Ausloss, 2005; Halpin, Robu, & Shepherd, 2007), which consists of a user, tag, and resource (see Figure 1). The person utilised the tagging system, created tags or keywords for the resource (e.g. *toread, tagging, del.icio.us*) with a larger objective in mind such as sharing an authored paper online. The resource was the digital content that the user tagged. Sometimes there were common attributes that defined the tagging system, in

43Things (2009) it was personal goals, in last.fm (n.d.) it was music, and in The Free Sound Project (n.d.), it was sounds.



Figure 1 Tagging tripartite graph

The BBC (BBC, n.d.) (see Figure 2), which uses addthis.com (see Figure 3) provided an example of digital media that gave readers the ability to tag content and share links to stories viewed on sites that facilitated sharing or tagging such as del.icio.us.

Figure 2 BBC website, July 9, 2008





A number of institutions and learning centres explored how tagging may help create and enhance community while benefiting the members of their existing knowledge networks. The University of Pennsylvania library created a tagging system called PennTags (PennTags, 2005) using the del.icio.us api which enabled students to tag URLs and library catalogue records. Insight (n.d.) which is an observatory, explored through projects and reports how technology might benefit school education. A 2007 report (Vuorikari, 2007) shared examples of tagging systems such as Flickr and del.icio.us and described possible their potential value for education. The Cleveland Museum of Art, The Smithsonian Institution, the Powerhouse Museum all have prototyped tagging applications on their websites, and the Metropolitan Museum of Art conducted a tagging project in 2005 (O'Connell, 2007). Through a partnership with Flickr, the US Library of Congress organised a pilot project called *The Commons* that enabled Flickr members to tag and comment on digitalised photographs popular with library visitors (Library of Congress Photos on Flickr, 2008; The Commons, 2008).

The Ministry of Reshelving project (McGonigal, 2005a; McGonigal, 2005b) involved participants re-classifying or re-tagging books (e.g. *1984* by Orson Wells) within a bookstore from an existing taxonomy (e.g. fiction) to a new location chosen by them (e.g. current affairs or politics). Jane McGonigal (Terdiman, 2005) referred to this people-driven activity as 'folksonomy mobs'. The Physical Metadata project by Mediamatic (Peek, 2006) introduced tagging within a physical rather than digital environment. The project involved fifty-five words printed on cards as tags that were attached to physical objects in the real world (Peek, 2005). These various projects emphasised how tagging is not just an online phenomenon.

2.2.2 Social media: Del.icio.us

In 2003, Joshua Schachter launched del.icio.us, an application for saving and sharing bookmarks. Del.icio.us has the largest collection of bookmarks and is the oldest, most prominent example of a social tagging system (Mathes, 2004; Golder & Huberman, 2006; Smith, 2008). With its critical mass of members continually supplying content for discovery and navigation, del.icio.us became one of the two tagging systems studied in

my project. It should be noted that the descriptions and related screenshots in my study were only applicable for del.icio.us and are not valid for the current version called Delicious 2.0 (delicious.com rather than del.icio.us) as a complete re-design occurred on July 31st, 2008 (Hood, 2008).

Del.icio.us emerged out of a system Schachter designed for himself in order to organise his personal collection (Livingstone, 2007). He created a text file to better manage his set of links for re-finding and added a brief keyword (e.g. #wifi, #math) following each URL to enable him to search tagged URLs by keyword (Smith, 2008). As Schachter's collection grew to 20 000 bookmarks, he created Muxway in 2001, as a personal predel.icio.us space, put it up on a public server and shared this information through wordof-mouth (Livingstone, 2007). As Schachter described it (Livingstone, 2007), it was a single-user system for himself with a bookmarklet, allowing URLs to be described as a note, tagged via keywords, and saved online. In December 2003, Schachter designed del.icio.us, which allowed users to generate their own tags for URLs they saved. A year later there were 30 000 del.icio.us members and through their collective tagging, a trend emerged of social and personal utility described as the foundation of social media (Livingstone, 2007; Solis, 2007b).

Posting (see Figure 4) at its most basic level is described as the saving of a URL to del.icio.us. This action consists of five parts – a URL, a description/title, notes, tags, and check box, which indicates the post is private. Each post must have a description/title and URL in order to be saved. Whenever a URL is posted, the date and time is stored

by del.icio.us. A URL can be posted from the website, using a del.icio.us browser extension, integrated into an Internet browser, or from a bookmarklet.

delic	IOUS Save a Bookmark	Signed in as ty
URL	http://www.blogworldexpo.com/	🗌 do not share
TITLE	Biog Warld Expo	
NOTES		255 chars
TAGS		0
	Separate Tags with spaces. E.g., hotels bargains newyork (not new york)	
	Recommended Tags: click to add from your existing tags	
	2007 blog blogging blogs blogworld conference convention digital	
	Popular Tags: click to add from popular tags on Delicious	

Figure 4 Del.icio.us pop-up interface, July 21, 2008

Figure 4 displays the del.icio.us interface when activating the JavaScript pop-up window. The URL and title are generated automatically, and can be edited by the creator of the post. The notes field can be a maximum of 255 characters and is optional. Tags, which are also optional, must have combined words because spaces serve as delimiters. For example, if the URL is about the blogworld conference then adding the tag *blogworld* may be more useful than *blog world*, which creates 2 tags without conveying the same meaning.

Figure 5 shows a public del.icio.us post. The title is a hyperlink that when clicked will take the user to that particular URL, in this case the Come Out & Play Festival website that was first posted on May 7, 2006. To the right of the URL, the user can click "save this" to post the bookmarklet to their home del.icio.us library. The third line displays the user created tags. Clicking on a tag will display other posts (if any) associated with that tag. Highlighted in pink is the number of other users that have also saved that post (31). As shown, the more intense the shade of pink, the more people that have saved it in their home library.

Figure 5 Public del.icio.us post, July 21, 2008

Come Out & Play Festival :: September 22-24 save this The Come Out & Play Festival is a street games festival dedicated to exploring new styles of games and play. to games nyc play urban ... saved by 31 other people ... on may 07, 2006

Tag clouds (see Figure 6) are a way to visually represent a set of keywords known as tags

(Smith, 2008) using identifiers such as size or colour to connote information.

Figure 6 43 things tag cloud, August 14, 2008

Today's Tags:

2007 resolution 43things adventure **art** beauty book **books career** computers cooking creativity dance education exercise family

fitness food freedom friends **fun** happiness health home language learn learning life lifestyle love misspelled goal money music people personal photography programming read reading relationships school self-improvement sex social speling sports **travel** work write writing Sites such as CiteULike and del.icio.us also provide personal tag clouds to allow each member to easily view, which tags they most frequently used. In del.icio.us, tags within a tag cloud that a member has in common with other members are shown as blue (Explore tags on delicious, n.d.). In 43 things (43 Things, 2009) tag cloud tags are highlighted so that larger tags appear a more intense yellow to represent quality of use.

Del.icio.us, as is common with social media, continued to modify its design and functionality since its origins in 2004. During the time of my data collection, the following occurred: Yahoo bought del.icio.us, private posting was added (see *Appendix J Del.icio.us privacy feature*), and Firefox Internet browser del.icio.us extensions emerged. At the end of the term (April 27th, 2006), a subscription system called "my network" (Orchard, 2006) appeared. This service allowed members to add others to their network to keep up-to-date on posts that had been publicly added by other members. When a member saved a post, clicking on a username in the network, made it easy to share it with that other person. During the summer of 2008, the founder Joshua Schachter resigned. Shortly after, a new version of del.icio.us called Del.icio.us 2.0, was released (see Arrington, 2008a; Arrington, 2008b). A perspective of the del.icio.us User Interface (UI) and its history was provided here that was relevant to the January – May 2006 time period of my study.

2.2.3 Social media: CiteULike

CiteULike is described as a free online service to assist academics in saving, sharing, and organising academic papers deemed of interest. It is a Web-based tagging system

combined with a bibliographical management service (Emamy & Cameron, 2007). The idea for CiteULike across through a need in 2004 by Richard Cameron, the project's creator, to find an easier way to organise his academic papers after returning to school from the workforce (Chang, 2005; Cameron, 2008). He decided to create a system for personal use that synchronised with a central server and categorised his articles so that he could either access them at home or his workplace (Chang, 2005; Cameron, 2008). As Richard Cameron also learned about del.icio.us around that time, he decided to create a web interface to access the server and gave the URL to a few trusted friends with instructions not to share it. The next morning 20 people had registered without Richard having any idea how they found out about this service (Chang, 2005).

Richard Cameron wanted to design a system that was online because people read and discovered articles on the Internet, so it could potentially be a useful platform for collaborative work with joint paper authoring (Cameron, 2008). If, for example, a system could share which articles group project members were reading, it would enhance the collaborative knowledge of the group and reduce unnecessary communication (Cameron, 2008). By placing the service online, it enabled members to have access to anyone's personal CiteULike library and could potentially result in opportunities for sharing, contributing, discovering, and learning between CiteULike members.

With CiteULike, each paper that is posted by a member appears on the main page (see Figure 7) displaying recent papers added by everyone as well as in a member's personal home library. The following information is displayed with each paper: title, author name

with initials, author-generated tags, username that uploaded the paper, anticipated reading status as stars (1-5, 1 meaning "I do not really want to read it" to 5 meaning "Top priority!"), a hotlink displaying, if any, the number of users that also have the paper in their library, and the date and time that each paper has been uploaded. Articles can be exported to one's BibTex or Endnote.

Figure 7 CiteULike home page, July 23, 2008



The CiteULike Home page (see Figure 7) displays recent papers posted by members. At the top are 5 drop down menus: the CiteULike tab, Post Articles, My CiteULike, Journals, and Groups. On the right column are the most active tags used by the members ordered alphabetically. Tags used more frequently have a larger font and a filter box will narrow down the list to match only letters placed there. Figure 8 shows the page when an article is posted by a recognised journal.

Bibliographical information is extracted such as title, abstract, and authors. Users can add keywords as tags for personal benefit that they would like to associate with the article. The article may be posted to a user's library, just sent to the main CiteULike page, or kept private by the member. Notes can be added that are visible to anyone accessing CiteULike. The CiteULike classification system is based on tags as a usergenerated organisational model using keywords that are meaningful to a user. With each article it is possible to see the other users that have also posted the article and their respective tags to a CiteULike library. Users are able to navigate through tags and members can discover new literature serendipitously that ordinarily might not have been found.

Figure 8 Posting to CiteULike, July 23, 2008

Title:	Identifying the influential bloggers in a community
Abstract:	none
Authors:	Agarwal N, Liu H, Tang L, Yu PS
lags:	blogging socialmedia commulty intern
	Note: This is just a list of keywords which you'd like to associate with the article.
Suggestions	: internet Press tab key to autocomplete
	186 tags in your library
Post to:	Vour library
Priority:	I might read itl
Prîvacy:	Don't let other people see that I've posted this article
Notes:	
PDF:	Browse
BibTeX Key:	

Figure 9 displays the library of user tyfn. The middle screen displays the articles in chronological order from the most recent. Each entry consists of the title (clicking will display the article page of tyfn), year and page number, author and the tags associated (e.g. *tagging, social, hypertext, folksonomies*). The entry shows: the posting date by tyfn of the article; priority to read (2 stars = I might read it); and the number of other users and groups as a hyperlink that also contain the article.

Figure 9 Library of tyfn, July 23, 2008



Since the time of data collection between January – May 2006, there were design changes to CiteULike: there is no longer a menu sidebar, instead there is a drop-down menu; advertising and Google ads are supported; blog entries can be created on a personal page allowing other members to comment; members can create a profile page (e.g. photo, date joined, graph of recent activity); and members can view who else has the most articles in common with them (called neighbours). CiteULike continues to remain a stable tool for organising and sharing academic articles; it is expected that modification will occur in the future.

2.3 Defining social media

Although, there is not a clear definition of what social media is (Solis, 2007a; Solis, 2007b), it can be interpreted as involving an understanding of the sociology behind how many-to-many conversations are occurring on the web and how these various spaces form a culture for listening, observing and cultivating relationships among people in digital and physical environments. Social media is described as an evolving environment, where the underlying foundation is about relationship building (Solis, 2008b).

Although one might be tempted to describe interactions within these online environments the product of new media (Gitelman & Pingree, 2003; Wardrip-Gruin & Montfort, 2003), instead we should view the digital experiences simply as just another form of communication – albeit social - within a novel environment. These engaging tools (e.g. Flickr, CiteULike, and del.icio.us) are described as social media, which Brian Solis, a social media specialist (see Figure 10) perceived as being more meaningful when one had a grounded understanding of anthropology and sociology, rather than only social technologies experiences (Solis, 2007c; Solis, 2008b).



Figure 10 Brian Solis online social map, July 15 from http://bit.ly/27KpW6

According to an e-book by iCrossing, social media is defined as "media that users can easily participate in, share and create content for, including blogs, social networks, wikis, forums and virtual worlds" (Mayfield, 2008, p. 28). Brian Solis, in a blog post seeking conversation on the subject stated that:

social media describes the online tools that people use to share content, profiles, opinions, insights, experiences, perspectives and media itself, thus facilitating00 conversations and interaction online between groups of people. These tools include blogs, message boards, podcasts, micro blogs, lifestreams, bookmarks, networks, communities, wikis, and vlogs. (Solis, 2007b).

For Brian Solis, social media is about conversations that connected people through content that they created, shared, and discovered (Solis, 2008a). Darren Barefoot (see Figure 11) defined social media in terms of communication channels visualised in his social media circle of seven social media communication channels; the centre circle represented his blog (Barefoot & Szabo, 2007, p13; Solis, 2008b).





Applications of social media include: alternate reality games such as The Lost Ring (The Lost Ring, 2008) in which YouTube (YouTube, n.d.) was integrated into gameplay (YouTube, 2008); using Scribd (Scribd, n.d.) to share educational articles in a group called Web 2.0 in Education (Scribd, 2009); and developing corporate strategies for social media in business that were distributed to an organization group on Slideshare (Owyang, 2007). All social media has user-created keywords called tags to associate or describe content with the objective of enriching the process of sharing, discovering, and communicating within an information space.

Social media involves applications that people used to share content, knowledge and experiences in which conversations and collaboration may be facilitated online between a set of people. Tagging systems connect users through keywords and may facilitate opportunities for users to connect via their content and ideas. Under the backdrop of social media, tagging within a shared, community space offered enriched opportunity for group benefit through social media even beyond the particular tagging system being used.

2.4 Social capital theory

Social capital is the theory that was most appropriate for explaining the behaviour in this case study through my research questions, as its theoretical roots in Sociology provided a solid foundation for exploring social behaviour in tagging systems. My research questions were:

- What personal, individual strategies emerge from newcomers using tagging systems?
- What social, collective strategies emerge from newcomers using tagging systems?

According to Solis (2008a), the future of communication was less about emphasizing technology and more about understanding Sociology. It was about discovering how tagging systems could be a resource centre to assist others that were seeking and sharing information.

Social capital is a framework for understanding issues of trust, social norms, and reciprocal relationships in social media and Internet Studies (e.g. Daniel, Schwier, & McCalla, 2003; Preece, 2004; Quan-Haase & Wellman, 2004). For example, it was used as a theoretical framework: to study information technology behaviour (Huysman & Wulf, 2004); to explore the relationship between Facebook student usage and the maintenance and formation of social capital (Ellison et al., 2007); to examine how social capital and trust could be extended into virtual learning environments (Daniel et al., 2003); to investigate the development of social capital in guilds, described as teams of players, in World of Warcraft (WoW) (Williams et al., 2006); to study how social media in rural communities supported the formation and maintenance of social capital (Gilbert, et al., 2008); and to understand what function (bridging or bonding social capital) online groups could serve within society (Norris, 2004). While there were research efforts to investigate, understand, and apply social capital in social media, this understanding was

not extended to tagging systems. Exploring social capital in social media studies showed promising support for it potential value as a theoretical framework for tagging systems.

Sociology is not only associated with social capital, it also underlies case study methodology, the origins of which came out of the University of Chicago Department of Sociology. The social capital theoretical framework is interrelated with my case study methodology and should be considered appropriate for the situating of my interdisciplinary research into the scholarly field of social media literature. One objective of this thesis was to provide a deeper understanding of social capital while offering potential directions for research beyond tagging systems into areas such as video technology, photography, or music.

2.4.1 A conceptual history of social capital theory

The concept of social capital today is fairly common. It is extensively addressed in academic literature such as Sociology, Political Science, and Economics (Portes, 1998; Woolcock, 1998; Adler & Kwon, 2002). A number of researchers have noted that social capital is not defined as a single concept (Daniel et al. 2003; Ellison et al. 2007) instead it is linked to multiple definitions within different fields of study (Adler & Kwon, 2002). It is even characterised as "fashionable" or "trendy" (Adam & Roncevic, 2003, p. 156), due in part to the widespread popularity of Putnam who discussed American community life in the context of social capital (Putnam, 1995a; Putnam, 2000). Social capital (Putnam, 2000) is divided into *social* – involving social interactions, and *capital* – like human capital

(education) or physical capital (car) as it had value. By value, this means that the effects could have persistence (Putnam, 2000).

2.4.1.1 The evolution of social capital

As Varheim (2007) noted, social capital writings increased significantly from 1992, when up to that time, he found little published material related to social capital. An *ISI Web of Science* literature search conducted on January 3, 2006 for "social capital" between the periods 1992-2005 revealed 1 999 documents (82.6% were articles) with *social capital* as the title, abstract, or keyword (Varheim, 2007). I conducted an *ISI Web of Science* literature search for *social capital* during the periods 1992-2008 on September 17, 2008, which revealed 3 290 documents (84.01% were articles) in diverse fields such as information science, urban studies, and economics. My literature search showed that social capital articles continue to be written, so it is surprising that my study is the first to use this theoretical framework with tagging systems.

According to Putnam (2000), the term social capital was independently created at least 6 times over the 20th century to draw attention to how social relationships influenced productivity in society. His *Bowling Alone* book placed social capital within popular culture, extending it beyond academic literature to media spaces such as *Cooking Light* (Farr, 2004). Putnam (2000) is the theorist most relevant to my study because he focused on the value of associations and networks. His social capital concepts were used as a framework in social media literature to attribute behaviour, and the related writers and

theorists that represented his conceptual timeline that are elaborated within this chapter helped provide a foundation to place my findings within this social capital framework.

In order to understand how social capital theory can interpret social media, a conceptual history traced the path of social capital from Putnam, a contemporary author of the 20th century back to theorists from the 18th and 19th century, before returning to its use in present-day Internet Studies within our 21st century. The objective was to provide a foundation that showed how Putnam's social capital theory emerged during the 20th century and better outline why researchers and authors used it to understand social behaviour online today.

2.4.1.2 Trends in civic participation and social capital

Farr (2004) described Robert Putnam, a political scientist, as the most recognised social capital author of the 20th century also known as the contemporary period. Putnam's 1993 book entitled *Making Democracy Work: Civic Traditions in Modern Italy*, (Putnam, Leonardi, & Nanetti, 1993) provided a sociocentric perspective to his meso (group) and macro (societal) level analysis about how the type of regional government differed between the north and south of Italy (Paldam, 2000; Adam & Roncevic, 2003; Bjornskov, 2006). A sociocentric perspective (see also Fukuyama, 1999) saw the focal actor as a collective, such as an organization, association, or a society (e.g. a church). One of the benefits of Putnam et al.'s (1993) study of Italian regional institutions is its application towards understanding governance in areas of rural and urban development, such as in conjunction with the World Bank (Adam & Roncevic, 2003).

Social capital is defined as:

features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions (Putnam et al., 1993, p. 167).

Voluntary participation within these networks enabled a sense of community. This was necessary for a civil society to function and enhance efficiency as members were bound together due to norms of generalized reciprocity and feelings of trust that developed through the coordinated activities in which strangers become known to one another (Paldam, 2000; Adler (2000); Farr, 2004; Bjornskov, 2006). According to Putnam et al. (1993), generalized reciprocity is described as "I'll do this for you now, knowing that somewhere down the road you'll do something for me" (p. 183). Adler and Kwon (2002) perceived these shared norms, defined as common rules for behaviour within society, as enabling individuals to focus on collective interests rather than individual goals. Putnam (2000) defined social capital in term of two parts: bonding and bridging. Bonding social capital provided the glue between members of a community typical to those relationships that are emotionally tight such as family and close friends; and bridging social capital enabled communities to connect with each other as needed for the sharing of artefacts between one another (Putnam, 2000).
The Putnam Instrument (Putnam et al., 1993) was recognised as the best-known measure for extracting social capital data from voluntary organisations (Paldum, 2000; Adam & Roncevic, 2003; Bjornskov, 2006). The instrument is used to collect data in the World Value Survey, an international research project that gathered cross-country data from 80+ countries since 1981 (see Inglehart, Bassanez, Diez-Medrano, Halman, & Luijkx 2004; see Bjornskov, 2006 p37-38 for a list of the countries from Albania to Zimbabwe). In order to measure social capital, Bjornskov's (2006) gathered data from the World Values Survey in which he divided this content into three groups coinciding with Putnam et al.'s (1993) definition of social capital. The groups were: trust (viewed as generalized social trust in people), social norms (viewed as justifiable actions), and networks (activity in volunteer organisations) (Adam & Roncevic, 2003).

Bjornskov (2006) analysed the cross-country data according to Putnam et al.'s (1993) three components of social capital (trust, norms, networks) and his results showed that they were the manifestations of three distinct phenomena rather than one. Bjornskov (2006) believed that Putnam et al.'s (1993) single (parsimonious) measure of social capital should be re-examined to see if trust, norms, or networks underlie the results. For example, Bjornskov found, after re-examining the data from two well-known social capital cross-country studies (see Keefer & Knack, 2000 and Knack, 2002) based on Putnam et al.'s (1993) measure of social capital, that the effects of governance, defined as the impact of social capital on economic growth and investment, and life satisfaction were solely due to the trust component of Putnam's concept.

In 2000, with his *Bowling Alone* book, Putnam (2000) framed the concept of social capital in the context of American society. He perceived social capital to be declining in America as measured by the quantity of trust and 'norms of reciprocity' within communities or between people and stated that:

the core idea of social capital theory is that social networks have value. Just as a screwdriver (physical capital) or a college education (human capital) can increase productivity (both individual and collective) so too social contact affect the productivity of individuals and groups [...] social capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them (Putnam, 2000, p. 18-19).

This productivity, could be experienced as a private benefit through participation within the group (e.g. working together to raise money for a charity through a high school fashion show) as well as a public one providing positive advantages to the civic society as a whole (e.g. money is used by the charity to buy computers for the local community centre) (Putnam, 2000). The intellectual roots of social capital will now be traced from Putnam of the 20th century to the 18th and 19th century theorists of Durkheim, Weber, and Tocqueville (Paxton, 1999; Adam & Roncevic, 2003; Farr, 2004).

2.4.1.3 Durkheim's division of labour in society

Durkheim is one of the founders of Sociology, in addition to Weber and Marx. Durkheim's (1933) social solidarity concept, referred to the bonds within a society as a source of social capital. It consists of two parts: mechanical solidarity, in which the focus was one's community of interest; and organic solidarity, where the focus was one's society (Portes, 2000; Wilson, 2006). A key component of this concept, which Portes (2004) referred to as enforceable trust, is that repayment was not necessarily reciprocal, but may in fact be societal. For example, a student that was provided a scholarship by their government to attend a prestigious foreign university could be expected to return home afterwards so that their country might reap benefits from their newly acquired skills. The idea of group participation having positive outcomes for people and communities was a staple belief from Durkheim's *The Rules of Sociological Method* (1895) in which he focused on how group life and social relationships combated feelings of selfdestruction and played an important role in the maintenance of health and societal wellbeing (Durkheim, 1938; Portes, 1998; Kawachi & Berkman, 2000).

2.4.1.4 Hanifan and the rural movement for civic education

Putnam (2000) referenced the first known use of the term social capital in the 20th century by L. J. Hanifan, (Hanifan, 1916; Hanifan, 1920) a young progressive educator, who published in the *Annals of the American Academy of Political and Social Science* in 1916 to urge the importance of community participation within a West Virginia region. Hanifan cited the benefit of social capital in maintaining democracy and providing for social,

economic, and political renewal (Farr, 2004; Putnam & Goss, 2002). He described his use of this terminology in this way:

In the use of the phrase social capital I make no reference to the usual acceptation of the term capital, except in a figurative sense. I do not refer to real estate, or to personal property or to cold cash, but rather to that in life which tends to make these tangible substances count for most in the daily lives of people: namely good will, fellowship, sympathy, and social intercourse among the individuals and families who make up a social unit. ... The individual is helpless socially, if left to himself. ... If he comes into contact with his neighbor, and they with other neighbors, there will be an accumulation of social capital, which may immediately satisfy his social needs and which may bear a social potentiality sufficient to the substantial improvement of living conditions in the whole community (Hanifan, 1916, p.130).

In their analysis of Hanifan's social capital account, Putnam and Goss (2004) concluded that: "Hanifan's account of social capital anticipated virtually all of the crucial elements of later interpretations of this concept..." (p.5).

Social capital as described by Hanifan (1916) is both a private benefit and a public good (see also Putnam & Goss, 2004) as he stated:

The community as a whole will benefit by the coöperation of all its parts, while the individual will find in his associations the advantages of the help, the sympathy, and the fellowship of his neighbors. [...] When the people of a given community have become acquainted with one another and have formed a habit of coming together occasionally for entertainment, social intercourse, and personal enjoyment, then by skilful leadership this social capital may easily be directed towards the general improvement of the community well-being. (Hanifan, 1916, p. 130-131).

Hanifan was believed to have embraced this concept because the community activities allowed him as an educator to create a movement. This movement placed education at the forefront of public life, as a symbol of social involvement through its definition as a community centre (Farr, 2004).

2.4.1.5 Dewey's philosophy for social capital through education

According to Farr (2004), the social philosopher and educator John Dewey from the early 20th century (Dewey 1934; Dewey 1976; Dewey 2004) may have provided the most respected philosophy for the civic education movement and social capital. As Dewey described it:

society means association; coming together in joint intercourse and action for the better realization of any form of experience which is augmented and confirmed by being shared (Dewey, 2004 p. 118).

Dewey's use of the term social capital occurred in four of his publications 1900, 1909, 1915, 1934, to emphasise schools as community centres for learning and to push for equal rights in society for all Americans (Farr, 2004). Farr (2004) suggested that Dewey might have been recognised as the first or most well-known user of social capital in the 20th century, had it appeared prominently in a title or been elaborated upon in a definition. As three of Dewey's publications with the social capital term occurred prior to Hanifan, Farr (2004) found it inconclusive whether Hanifan took the term from Dewey as Hanifan had "closeness in time, vocation, and philosophy" (p. 19) to Dewey. He instead suggested that these uses might represent independent inventions of the term consistent with a pattern established by Putnam (2000) that early users of the social capital term had been unknown to each other (Farr, 2004).

2.4.1.6 Marx and the production of labour within society

Karl Marx, as a political economist, used the term social capital or gesellschaftliche Kapital, in his Capital Volume 2 book written in German 1863-1878 to discuss his concept of aggregate social capital (Wilson, 2006). He defined social capital as the sum of individual capital that is pooled together in a socialised manner in order to advance production (Farr, 2004; Wilson, 2006). Marx suggested that through a shared circumstance, these workers developed a common identity and stood up for each other's ideas (Portes, 1998). When the individual capitalists realised that together they had social wealth, they produced power through this collective identity. Capital comes in this form to a realisation of the social nature of its power, in which every capitalist participates in proportion to his share in the total social capital (Marx, 1906, Part II, Chapter 10, p. 229).

The concept of bounded solidarity, in which altruistic actions, (e.g. UBC math club members donating time to tutor inner-city kids), emerged out of Marx's principle of class consciousness (Portes, 1998). It was the way that people with shared interests came to view themselves as a class that would work together for the common interests of the group (Portes, 1998; Wilson, 2006). Group members were not forced to engage in these actions, but rather these individuals felt an obligation to adhere to certain norms and conventions to stay committed to the group in order to obtain benefits accrued by their membership (Lang, 2004). Lang (2004) defined the strength of this collective good determined by the pervasiveness of these conventions of shared support, as bounded solidarity. Wilson (2006) interpreted bounded solidarity to mean that the limits of one's community provide boundaries. For example, these solidarities might be bounded by a common location (e.g. UBC Irving K Barber Learning Centre), shared skill (e.g. amateur photographer), or collective artefact (e.g. Apple MacBook Pro).

According to Farr (2004), Marx's perspective of social capital, like other political economists of the 19th century (e.g. Edward Bellamy and Alfred Marshall), focused on *capital* from a social perspective. This differed from the social capital writers of the 20th

century (e.g. Hanifan and Putnam), which focused on *the social* from a capital's perspective. The value or *capital* of these networks as social capital became more commonly explored in the 20th century with the writings of Putnam (1995; 2000). According to Farr (2004), these concepts were previously defined by the theorists of the 19th and 20th century using the social capital term. Farr (2004) clarified this saying:

Then [19th century], "social capital" expressed an explicit antithesis to a non-capitalist perspective upon capital, now [21st century], an implicit antithesis to a non-capitalist perspective on society. (Farr, 2004, p. 25)

What Marx may have meant then was that during the 19th century, individualism – an individual bread-winner, capitalist or *person*, was emphasised. The idea of many persons becoming a collective *people* with defined objectives of mutual benefit was the idea behind social capital (e.g. a march in the town square to raise awareness about worker's rights).

2.4.1.7 - Tocqueville and democracy through participation in associations

Prior to the 1980s, the concept of social capital existed, but without a term, which Farr (2004) attributed partly to a new word being used within American academic circles to define an old concept. For example, Tocqueville, an early 19th century French social scientist and author of *Democracy in America* (Tocqueville, 1838), perceived a connection between America's high rate of participation in voluntary associations and democracy (Paxton, 1999). Tocqueville, referred to by Putnam who built on Tocqueville's ideas, as

"the patron saint of contemporary social capital" (Putnam, 2000, p. 292), postulated that the private and public benefit of participation in associations promoted shared, collective identities beyond self-interest in his exploration and study of America (Tocqueville, 1838; Paxton, 1999; Putnam, 2000; Farr, 2004). Tocqueville's 19th century social capital insights on volunteer groups in America remained influential throughout the 20th century (Putnam 2000).

2.4.1.8 Social capital and social media in the 20th and 21st century

Today there is widespread use of internet tools that enable sharing of content through tagging, suggesting a need to introduce general frameworks such as social capital to explore personal and collective issues regarding behaviour within these environments. Social media researchers in recent years have extensively studied social capital (e.g. Ellison et al., 2007; Lampe et al., 2007) and attributed it to a number of factors such as trust, reciprocity, shared norms, shared understanding, and cooperation within the context of the Internet. Tagging systems are increasing used by the general public to organise information, share knowledge, and build relationships. These tagging environments have become platforms for the maintenance and sharing of knowledge suggesting a need to explore social capital as a framework for understanding behaviour in tagging systems. By extending the utility of social capital into tagging systems, it could be an initial step in developing a more precise model of social capital through identification and manipulation of core variables such as trust, shared norms, and reciprocity.

Putnam's (1995a; 1995b; 1996; 2000) theory of social capital explored the relationship

between citizen engagement in one's community and government performance as well as other social institutions in order to understand the functions within society that led to greater community involvement. Putnam focused on factors of social capital that were related to civic engagement. Putnam (1995) viewed civic engagement as "people's connections with the life of their community" (p. 665). According to Putnam et al. (1993) and Putnam (1995b) there was a positive, strong relationship between a) performance of the government and other social institutions and b) civic engagement.

Putnam's (2000) theory described how social capital in the United States, which he attributed to low levels of community participation through face-to-face activities, was decreasing. According to Putnam (1995a), this resulted in reduced levels of social connections and civil engagement. Putnam (1995a; 1995b) attributed these decreases to technology, specifically television and its ability to privatise leisure time, rather than allow people to build social capital through face-to-face interactions in clubs, neighbourhood gatherings, and other environments that facilitate citizen engagement. Social researchers offered continual debate, without any common conclusion being drawn, on whether the widespread use of personal technologies increased time spent interacting online to the determent of face-to-face interactions within the neighbourhood or local community with family, friends, and acquaintances (e.g. Kraut, et al., 1998; Putnam, 2000; Geser, 2006). Other researchers viewed these environments as enhancing real-world connections (e.g. McKay, Thurlow, & Toomey Zimmerman, 2005; Williams, 2006b; Ellison, et al. 2007), by augmenting the means of communication, socialisation, and information sharing between people separated by time or distance.

Putnam's theory of social capital (1995a) stated that norms, networks, and trust were interconnected in society and made up the core components of social capital. The more cooperation people had with other members of their community, the more trust that occurred, and the more that it was felt that these members would reciprocate trust, and result in a higher likelihood of co-operation occurring (Putnam, 1995a). Social trust (Putnam, 1995a) emerged out of 2 related areas: norms of reciprocity and networks of civic engagement. Norms of reciprocity is defined as a belief that positive social behaviour will be reciprocated in the future (Putnam, 1995b). Networks of civic engagement, is described as one's connection with community life that could be used to gather information about a person's trustworthiness in the social network, and was used to maintain robust norms of reciprocity (Putnam, 1995b). Two other factors of relevance in networks were: horizontal networks (e.g. 2 secretaries in a law firm), which increased social capital and vertical networks (e.g. a law firm partner and her secretary), which decreased social capital (Putnam, 1995b). Weak ties (e.g. acquaintances or work colleagues) according to Putnam (1995b) contributed more to social capital than social ties (e.g. family or close friends).

Putnam (1995a; 1995b) attributed television and its effect on privatising leisure time as the main cause for the decline in society's participation within their community. Since people were not engaged in social activities such as bowling or clubs outside of the home, their weak social ties (e.g. acquaintances) did not develop, which negatively affected norms of reciprocity and trust (Putnam, 1995a; 1995b; 2000). If social capital

was decreasing due to increased time engaged in private activities, would increased participation in online environments counteract this and what would Putnam then say about social media?

I believe that Putnam's (2000) concerns with television decreasing social capital were based on its ability to remove the individual from real world social activities such as playing hockey in the neighbourhood or joining a campus organisation. Therefore, I viewed his arguments as being based on the physical presence of others and the removal of that presence would result in decreased levels of social capital because the opportunity for conversation and socialisation was removed. Television is a one-way media, a private, information space rather than a place for conversations to flow. The World Wide Web of the late 90s had similarities to television in that these online tools were used mostly for reading and sharing information (e.g. websites, mailing lists through email), with less emphasis on building or maintaining relationships through the technology.

Therefore, Putnam in the early 21st century would perceive computer technology and television as decreasing social capital because it took one away from time that could be spent in real-world community engagement. However, as noted by Wellman, Haase, Witte, and Hampton (2001) in a discussion of social networks and social capital, television was not equivalent to the Internet, which they perceived as "socially interactive" (p. 439). What does Putnam's interpretation of computer technology mean for social media, and how would Putnam view social media with respect to social capital? Although social media researchers found that the use of social media increased social

capital (e.g. Williams, 2006a; Williams et al., 2006), I believe that Putnam perceived social media similar to his impression of television and Internet technology of late 20th century. Based on his writings (Putnam 1993; Putnam 2000), Putnam would perceive social media interaction as absent of face-to-face communication and would therefore take time away from participation in activities in physical environments, resulting in decreased social capital.

As noted previously by the social capital theorists of the 18th, 19th, and 20th century, social capital is important for helping create a productive society through civic engagement that provided benefit for all. The value of social media was to provide a platform for building online and offline relationships. One sees an example of this through social media; photos may be posted on Flickr of a Vancouver photowalk that had been advertised as a Facebook event, and draw comments from Flickr members. In this situation, the use of social media by members should: provide a counterbalance to decreased social capital in their community, outline the importance of social capital in society, and show the benefits of social media engagement for relationships. The Vancouver photowalk example provided an opportunity for friends to come together and participate in an activity that enhanced their relationships and increased social capital. The creation of the Facebook event provided a common platform for these friends to become aware of the upcoming activity and by sharing the event on Facebook, the friendship circle of people that RSVP would also become aware of the photowalk. This could possibly lead to new people attending the photowalk, with an opportunity to build relationships that ordinarily might not have happened had there not been a

Facebook event created. In addition, in the time that followed the event, the different participants could post their photos to Flickr, add photowalk participants as friends, and then connect with these new contacts through the organisation of subsequent Vancouver photowalks using social media.

Therefore social media should not be thought of as a separate entity from real world activities, but rather as an integrated platform, which could enhance and build real world relationships through the sharing of knowledge and information online. The larger objective of my research was to show how social media, specifically tagging systems were being used to enhance real world relationships while increasing social capital within society based on Putnam's (2000) definition. My research would benefit social media designers (e.g. Flickr, del.icio.us, CiteULike), because I am able to reveal insights into how these tools were used by members to support real world relationships. For example, a going away party could be shared on Flickr and Facebook as a keepsake for those in attendance through social media.

Blanchard and Horan (1998) argued that interactions within physically based online environments (which they refer to as virtual communities of interest) could increase social capital and counteract societal decreases in social capital. Physically based virtual communities of interest are online, shared environments such as a mailing list or newsgroup that emerged out of an actual, physical form (e.g. a neighbourhood community garden association). Blanchard and Horan (1998) explored literature on networks, norms, and trust that made up Putnam's (2000) definition of social capital.

Regarding networks, Blanchard and Horan (1998) believed that online environments had a positive influence on social capital when they were able to increase network density and ease information sharing. This increase in network density had a greater likelihood of occurring within physically based, rather than geographically dispersed online environments. This was because a physically based online environment (e.g. Vancouver photo club Flickr group in which an online component exists for members' use) created a new type of shared, public space (online + physical) and increased the opportunity for social interaction between members as neighbours, even when people were using computer technology from a private space such as home (Blanchard & Horan, 1998).

Physically based online environments differ from a geographically dispersed online environment (e.g. the '365 Days' Flickr group in which members take a daily selfportrait). Regarding norms, Blanchard and Horan (1998) believed there was a direct relationship with the norm of reciprocity such that simply viewing a helpful act online (e.g. sharing of information) might be enough to increase trust among the membership. With respect to trust, the likelihood of deceptive behaviour occurring was perceived to be lower in physically based online environments. The norms and objectives of an online environment could also influence the ability of members to be trustworthy. Therefore, Blanchard and Horan (1998) believed that a physically based online environment with tools to facilitate communication between members would over a period of time strengthen networks, norms, and trust resulting in increased social capital.

In his book Bowling Alone, Putnam (2000) analysed the collapse of the American

community and the decline of social capital, building on his previous work (Putnam, 1995a; 1995b; 1996). His argument was such: a screwdriver is a piece of physical capital that had value because it could be used to assist in the building of a house, which increased one's individual productivity as well as the collective productivity of the community. Social connections (e.g. friends at the campus gym or members of a sewing club) increased one's personal productivity as well as group productivity because social capital had individual and collective benefit. Therefore, my interpretation of his work is that because Putnam only viewed online environments as private spaces, without an awareness of their value as a shared, public arena, today Putnam would not perceive social media as able to address his concerns about decreased social capital within society.

During the late 90s – in the early days of the Internet, Putnam found that it was too new to make a definitive statement with a degree of confidence about the links between social capital and the Internet (Putnam, 2000). Putnam's (2000) impressions of Internet technology was similar to his analysis of television as an environment for diverting people attention from community relationships, which he viewed as not being reproducible online. This is why in a 2000 personal conversation via email with Barry Wellman (Wellman et al., 2001, p. 439) Putnam stated, "I think you're a wild-eyed optimist to think that person-to-person networks are just as good as, if not better than old-fashioned door-to-door (or rather faces-to-faces) networks". Putnam (2000) was concerned that the absence of non-verbal cues on the Internet that accompanied face-toface interaction resulted in online connections that lacked robustness and led to decreases in reciprocity, trust, and solidarity.

The literature of Putnam (1995a; 1995b; 2002) is built on the concepts of sociological theorists such as Durkheim, Marx, and Weber that wrote about the decrease in face-to-face interactions within community life. In order to better understand the social capital phenomenon, Putnam addressed the bonding-bridging dichotomy (Putnam 2000; Putnam & Goss, 2002). Bridging social capital brought people together through social networks that were not similar to each other (e.g. a sports club) while bonding social capital referred to social networks that reinforced close ties of people with similarities in key aspects (e.g. race, age, gender) (Putnam, 2000; Putnam & Goss, 2002).

Norris (2004) studied the role of online groups examining whether their function in society was bridging or bonding based on Putnam's definition of bridging social capital and bonding social capital. They used survey data from the PEW Institute on Communities and the Internet, which asked about people's experiences, behaviour, and attitudes towards online and local communities (Norris, 2004). Norris (2004) examined whether active Americans online felt the Internet widened their experiences of community (defined as being able to connect with other people having different beliefs or backgrounds) or whether they believed it deepened their experience (defined as strengthening and maintaining existing social networks). Their results suggested that the Internet served both functions, however the strength of the effect varied dependent on the type of online group (Norris, 2004).

Over the last 10 years, a number of studies emerged (e.g. Blanchard & Horan, 2000;

Wellman et al., 2001; Shah, Kwak, & Holbert, 2001; Ginsburg & Weisband, 2002; Daniel, et al., 2003; Hampton & Wellman, 2003; Norris, 2004; Preece, 2004; Quan-Haase & Wellman, 2004; Wasko & Faraj, 2005; Williams, 2006a; Williams, 2006b; Lampe et al., 2007; Ellison et al., 2007; Steinfeld, Ellison et al., 2008; Williams et al., 2006, da Cunha Recuero, 2008 Gilbert, et al., 2008) that explored social capital, specifically its components such as trust, reciprocal relationships, and norms, as a framework for understanding social relationships and Internet use. The studies most relevant to this thesis were expanded below as the first to use a social capital framework within social media literature.

Daniel et al. (2003) explored how social capital and trust could be extended to online environments that focused specifically on learning while offering suggestions on how a social capital model might serve to understand its development in online environment. They provided an extensive review of social capital literature in the social science and humanities in order to: talk about the lack of a single definition; discuss why a standard method of measuring social capital did not yet exist; provide examples of possible benefits of social capital (e.g. extends trust through a community); share studies of possible negative influences of social capital (e.g. encourage internal trust among organised crime units); discuss Putnam's dimensions of social capital (bridging and bonding); focus on trust as a source for social capital and how it might be measured; and discuss the value of online environments as a social tool for developing social capital through shared goals, norms, and collaborative activities. The objective of their paper was to review social capital literature in order to develop a future social capital

computational model for studying online learning environments, which Daniel et al. (2003) believed was lacking in this research area.

In order to develop a computational model of social capital for social media, it would be valuable to understand the key elements (such as trust, shared norms, and shared understanding) that made up the social capital model and how they might be manipulated using computational tools (Daniel et al., 2003). In a more recent paper Daniel, McCalla, and Schwier (2007) presented a Bayesian belief network approach using social capital theory to examine issues relevant to intercultural collaboration in virtual environments. Bayesian Belief Network (BBN) techniques are used for simulations and understanding computational models such as social capital (Daniel et al., 2007). Daniel et al. (2007) perceived social capital as involving a variety of variables for virtual environments and potential states such as trust (high/low), awareness (presence/absence), and shared understanding (high/low). They developed a number of evidence-based scenarios to query the model and watched what changes in the different types of variables would be likely to impact intercultural issues key to collaboration in two different communities (Daniel et al., 2007). Although manipulating social capital is beyond the prevue of this paper, there would be value in developing a social capital computational model or Bayesian Belief Network to understand social media. This is because some of the weighing used for the variables of virtual environments may be the same and therefore assist understanding of the individuals and groups that use social media.

Gilbert et al. (2008) used social capital theory to explore behavioural differences between rural and urban social media users focusing on MySpace. They noted that there was little research studying how people in rural communities used digital technology (Gilbert et al., 2008). As people within rural communities might have unique needs, this particular knowledge could help in designing richer social experiences for them online, because social capital may develop differently in rural environments than urban spaces (Falk & Kilpatrick, 2000). Gilbert et al. (2008) addressed this gap by examining behavioural differences between more than 3 000 rural and urban social media users using social capital with a focus on rural life. They found differences in how rural and urban people used social media (Gilbert et al., 2008). Rural people had smaller networks of friends with those connections being closer to home, and had higher rates of profiles set to private. Gilbert et al. (2008) suggested that designers of social media may want to build incremental trust into a system to address this issue of rural users having problems establishing trust with people beyond their local area. In turn, that would provide these rural people with access to a greater diversity of online connections.

Williams et al. (2006) interviewed players of World of Warcraft (WoW), a popular massively multiplayer online game, in order to understand player behaviour, attitudes, and opinions surrounding the social dynamics of guilds. Recall that guilds are teams of players that band together to solve quests (Williams et al., 2006). They cited Putnam's (2000) work on civic engagement and the destructive quality of media, specifically television, which created privatised leisure and took time away from face to face interactions in one's neighbourhood, communities, or social relationships. Television

(Putnam, 2000) is blamed for the decreases in social capital over the last 50 years in the United States. Williams et al. (2006) wondered how WoW as an engaging form of social media might affect this trend using an exploratory study to focus on 3 areas: the types of social organisation, specifically addressing guilds as player associations created in WoW; the type of social relationships developed within guilds between players and what social consequences may emerge; and the degree to which the WoW social interface influenced social interactions. Therefore they studied group behaviour, individual behaviour, and the impact of the design interface with the research questions of Williams et al. (2006) concentrating in the areas of organisational communication, civic engagement, and online communication.

Williams et al. (2006) also found that WoW was a social environment in which players interacted through team strategies, goals, and activities (e.g. raiding parties) that resulted in socialisation, connections, and organisation usually unrelated to actual gameplay. Williams et al. (2006) viewed WoW as a play space where social capital emerged, stating that player behaviour indicated they were not *bowling alone* (Putnam, 2000). Regarding players that held a social relationship prior to the game, WoW became a relevant place for maintaining and enriching this connection. For the other players, it was viewed as a place for developing bridging social capital (see Norris, 2004) over a period of time online. Williams et al. (2006) suggested that players were engaged with WoW and other online environments in order to develop a sense of community as a counterbalance to Putnam's (2000) argument that social capital was in decline in the United States. These findings suggested that WoW as a social media provided value as an enriched

environment for developing social capital through the maintenance of relationships that occurred prior to gameplay as well as those that emerged through gameplay.

Ellison et al. (2007) stated there was a strong connection between certain uses of Facebook among university undergraduates, and the maintenance and creation of three dimensions of social capital (bridging, bonding and maintained) in a study that was part of a larger project exploring social capital as a framework for understanding relationships among Facebook users (Lampe et al., 2007; Steinfield et al., 2008). Ellison et al. (2007) discussed Putnam's (2000) concerns about declining social capital in American society and provided examples of Internet studies that showed how online interactions had positive influences on social capital and community interaction rather than detract from time spent on face-to-face activities (e.g. Wellman et al., 2001). Ellison et al. (2007) provided an overview of bridging social capital and bonding social capital and explored the potential effects of the Internet regarding social connections between people. They introduced the 'maintained social capital' dimension, which added to Putnam's (2000) definitions for bridging and bonding social capital to serve as a measure for the maintenance of relationships with high school acquaintances after students went away to attend university (Ellison et al., 2007). Their findings using data from April 2006 showed that students predominately used Facebook to maintain relationships with their old acquaintances or to strengthen social capital with those whom they had an existing, real world relationships at their university (e.g. person in the same club or their residence) (Ellison et al., 2007).

Ellison et al. (2007) findings showed that the most commonly included profile information (e.g. stating high school or college attended) was of relevance for existing acquaintances that might be trying to locate these students. A Facebook intensity scale, created to measure Facebook usage, looked at the degree to which members would count on high school acquaintances to do small favours, and became a predictor of higher levels of maintained social capital (Ellison et al., 2007). Ellison et al. (2007) stated that as many college students moved away from home, being able to remain in touch with high school acquaintances was in line with what Granovetter (1973) referred to as the strength of weak ties. Weak ties were defined as loose networks between people with informal relations that may be relied on for beneficial information (Granovetter, 1973). Weak ties were linked to Putnam's (2000) definition of bridging social capital. According to Ellison et al. (2007), the advantage of these connections within Facebook could become a useful resource for social and career opportunities in the future. They may also minimise feelings of "friendsickness" because old, close friends were not physically nearby (Ellison et al., 2007, p. 1143).

da Cunha Reuero (2008) explored the relationship between social capital and the motivation of Brazilian bloggers to publish information based on the perception of social capital they believed they would acquire. They studied how information flows among Brazilian bloggers and its relationship to social capital, and investigated how social capital might influence how information spread throughout this blogger community (da Cunha Reuero, 2008). Da Cunha Reuero (2008) conducted a qualitative study in 2007 and 2008 with interviews and ethnographic research to build on the three forms of social capital

(bridging, bonding, maintained) from Ellison et al.'s (2006) and Putnam's (2000) definitions.

The findings showed that these Brazilian bloggers viewed information they published in two parts: personal information (about themselves) and useful information (general information from other sources) (da Cunha Reuero, 2008). Da Cunha Reuro (2008) found five core motivations for blogging: creating a personal space (e.g. share personal experiences); sharing social interaction; sharing knowledge (e.g. share tips to fellow teachers to improve classes); creating authority (e.g. to be recognised as an expert and credible); and creating popularity (based on comments and being associated with popular blogs), which they connected to Putnam's (2000) theory of social capital, under bridging, bonding, and maintained social capital classifications. They concluded that these bloggers were aware that information published through their blog had different values within their blogger community and their choice of what to publish was dependent on their motivations for blogging, which in turn influenced bonding, bridging or maintained social capital.

2.4.1.9 Relevance of social capital for society

Social capital literature has value in sharing examples of how it is being used as a framework for social media. In each study (specifically Williams et al., 2006; Ellison et al., 2007; da Cunha Reuero, 2008; Gilbert et al. 2008), it is the first time a social capital framework had been used in that particular social media. This relates to my research of tagging systems because my study was the first to apply a social capital framework to my

findings, which connected my research to other social capital literature that involved social media. The diversity of these studies showed that social capital was of value beyond academia. If social capital was declining within society due to media exposure taking away time from face-to-face interactions as my interpretation of Putnam (1995; 2000) suggested or as Putnam (2000, p. 18-20) stated, social media may be able to counter this decline by developing and enriching relationships through interactions within this shared space.

By understanding how people used tagging systems and the way behaviours increased social capital, this may lead to insight in developing social capital models that enhanced knowledge and built relationships in social media. Further, the influence would not be limited only to the online space – students could increase social capital among their fellow students, a teacher could increase social capital among their colleagues, an entrepreneur could build connections beyond their immediate geographical region. The concept of social capital was affiliated with social and civic engagement and with networks of trust, cooperation, and norms of reciprocity (see Putnam, 1995; Putnam 2000). From a perspective of public policy within society, social capital was used to better understand a variety of fields that helped create a more productive civic society and community life through the various functions (e.g. schools and education, democracy and governance, families and youth) (Franke, 2005). So then, the benefits of this research could enrich everyday life within society and counteract Putnam's (2000) perceptions of declining social capital. As social media emerged over the last five years as a space for building relationships and sharing conversations between other members,

it is important to explore how social capital might be influenced, so that if social capital was declining within society, we can determine if social media is able to effectively counteract this decline.

Therefore, as people continue to interact with social media, it is important to explore whether these tools are being used to better one's society (e.g. creating a Facebook group to raise money for malaria in Africa) within social media as well as offline. What contributions are being made to the larger membership that post videos to YouTube, add comments on Flickr photos, or share a URL on del.icio.us? How may those contributions affect real world relationships? The value of social media for increasing social capital may be experienced through membership (e.g. simply signing up as a Flickr member) or it may be that active membership (e.g. writing a comment on another member's Flickr photo; writing a birthday message on a friend's Facebook wall) is necessary for social capital to be enhanced. One wonders then whether the acquisition of social capital in our society differs within social media than in the real world.

CHAPTER 3 METHODOLOGY

3.1 Introduction

My methodology within this project was case study and the design was single-case. As a methodology, case studies are recommended when the research questions posed were "how" and "why" (Yin, 1984, p. 17) and when an in-depth analysis is required for understanding social research (Sjoberg, Williams, Vaughan, & Sjoberg, 1991). The purpose of this study was to explore through the research questions how social media, specifically del.icio.us and CiteULike were used and to study their personal and collective value by participants. The aim was to share a novel understanding of how newcomers use tagging systems for the development and maintenance of their relationships. The data sources for the study were: an initial questionnaire, semi-structured interviews, and digital archival data logs.

3.2 The case study as methodology

Case study can be defined as:

an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used (Yin, 1984, p. 23).

According to Cresswell (2002):

A case study is a problem to be studied, which will reveal an in-depth understanding of a "case" or bounded system, which involved understanding an event, activity, process, or one or more individuals. (p. 61).

This definition can also be compared with VanWynsberghe and Khan (2007) who proposed a definition after using Flyvbjerg (2001) to refute known myths about case study research. They defined case study as:

A transparadigmatic and transdisciplinary heuristic that involves the careful delineation of the phenomena for which evidence is being collected (event, concept, program, process etc.) (VanWynsberghe & Khan, 2007, p. 6).

Cresswell (2002) is the definition that most resonated with my research. I chose case study methodology because it allowed me to gather an "in-depth understanding" (Cresswell, 2002, p. 61) about the tagging systems behaviour of each unit of analysis through multiple data sources. I chose case study to explore my research questions rather than use surveys to collect data because my abilities to investigate the phenomenon of tagging systems would be limited as it would be difficult to obtain rich

in-depth analysis. In this exploration of social media through case study methodology, the case study was social media, specifically del.icio.us and CiteULike as tagging systems.

I wanted to develop an in-depth understanding of how people tag, specifically their decision-making and tagging behaviour motivations using case study research. An example of case study research being used to understand human behaviour on the Internet (PEW/Internet, 2008) is the field of ethnography (e.g. Miller & Slater, 2000). Like my research, the study of Miller and Slater (2000) was consistent with Cresswell's (2002) definition of case study. Miller and Slater (2000) used participant-observation, semi-structured interviews, and surveys to develop an in-depth understanding of how the Internet, as a contemporary phenomenon shaped the lives of citizens within Trinidad. They examined the integration of the Internet in real-life social environments such as businesses, government, households, and Internet cafes within Trinidadian society (Miller & Slater, 2000).

3.3 A prototypical case study

In VanWynsberghe and Khan (2007), they outlined seven features for a prototypical case study. A prototypical case study outlined the characteristics that are necessary (but insufficient by themselves) for the research to be defined as case study (VanWynsberghe & Khan, 2007). These seven features were: small-N, contextual detail, natural settings, boundedness, multiple data sources, extendibility, and working hypothesis and lessons

learned. As the first six features of a prototypical case study matched the characteristics of my research, they were further elaborated below.

3.3.1 Small-N & contextual detail

In case study research, the purpose was not mainly to understand how other cases might be related, but to have an in-depth, intense understanding of the case under investigation so that what was learned could be maximised (Stake, 1994). Case study was referred to by Gerring (2007) as single-unit, N=1, or small-N. For example, in my case study I had three units of analysis (Shoshanna, Lorenz, Christoph) in which data was gathered via digital archives, an initial questionnaire, and semi-structured interviews. One of the key benefits of a small-N was that it provided an opportunity for detailed, rich analysis about the single unit under investigation, which Gerring (2007) believed allowed the investigator to more likely arrive at a more comprehensive understanding of the issue being investigated.

Having a small-N provided for a comprehensive view of the events and contributed to a holistic view of the different parts of the story which in turn provided a wider perspective of the phenomenon under investigation (Addington-Hall, Bruera, Higginson, & Payne, 2007). For example, in my case study, the holistic perspective for analysis occurred over five months (January-May). A third rationale for a small-N, considered common in clinical psychology (Yin, 1984), involved a rare or unique case such as an unusual injury or disorder in which it was warranted to document and investigate a single

case. For example, Curtis (2008) in her dissertation used a mixed-method case study design to investigate a cancer patient navigator program, which involved interviews from seven cases in which each case was a patient.

Case studies offered the possibilities for rich, detailed, accounts (Miles 1979; Platt 1992; Miles & Huberman 1994) of a particular action in order to communicate to the reader a "sense of being there" (Prosser & Schwartz, 2003, p. 116). In this case study, the two courses were the context. Participants were recruited from two graduate courses: ETEC 533 Technology in the Mathematics and Sciences Classroom, a distance education course out of the Faculty of Education and EECE 519: Computer-Supported Collaborative Work, a course out of the Faculty of Engineering.

In the EECE 519: Computer-Supported Collaborative Work course, there were not any course assignments (optional or mandatory) that specifically required del.icio.us or CiteULike usage through the term. Students within the course were simply asked by the professor during the first classes to experiment with these particular tagging systems. Whether use of the tagging systems were mandatory or optional had no influence on my data collection strategies. I accepted anyone for the study that agreed to participate and had no way of knowing whether they would actually be active members of the tagging systems throughout the term. The interviews were scheduled monthly independent of the lecture material. The participants of my study from EECE 519 did not mention at any time having their use of del.icio.us or CiteULike influenced by course material during the term.

In the ETEC 533 Technology in the Mathematics and Sciences classroom distance education course, there were two optional sections of course material on del.icio.us (section 4.6) and CiteULike (section 4.9) for the course. The del.icio.us section entitled: 4.6 An Introduction to our Tagged Information Space site, provided a brief description regarding the history of del.icio.us and how sites such as CiteULike and del.icio.us were online management systems for organising information. In the CiteULike section entitled: 4.9 An Introduction to Resource Folders at CiteULike, students were provided with a brief introduction about what CiteULike was, why it was being used in the course and a description of its advantages as a tool for shared organisation of bibliographic material. Although it was recommended that the del.icio.us and CiteULike sections be completed, they were not mandatory and no assigned work was submitted to the professor, to ensure the section was completed. In addition, neither section was taught during the first month of class.

In the del.icio.us section entitled: 4.6 An Introduction to our Tagged Information Space site, students were required to explore a del.icio.us page that the professor had created for the course containing links, simulations, and multimedia. Students were also provided with a common tag (e.g. UBCETEC533) to use when adding material to del.icio.us that would be unique to the course. An exploratory exercise for the del.icio.us section could be completed at any time and it was recommended that it be completed in the del.icio.us section to assist with familiarity. It would also allow students to gain knowledge with their class page on del.icio.us by interacting with the different content there. Students were provided with step-by-step instructions on how to create a del.icio.us account, add URLs to their particular personal page, and how to add the common tag to a classrelevant URL.

In the CiteULike section, step-by-step instructions were provided on creating an account, how to add bibliographic information about an article to one's personal library, and how to make a contribution to the ETEC533 group. As the course assignments were optional, there was no way to know whether any participant from this course completed the assignments. The course assignments had no influence on the design of my interview questions, nor the frequency in which they occurred. There was not any mention during the interviews about the course assignments.

3.3.2 Natural settings and boundedness of event being studied

Case studies are investigated within natural settings using multiple ways of data collection in order to make sense of the phenomenon being studied and provide a holistic picture (Benbasat, Goldstein, & Mead, 1987; Denzin & Lincoln, 2003). In case studies, the researcher does not control or manipulate behaviour in order to gather data (Benbasat et al., 1987). Instead a natural setting is used as the context or environment where the phenomenon appeared, and might require the researcher to gain access to particular material to record or observe behaviour over a set period of time. In my case study, the natural setting was the specific tagging systems investigated (del.icio.us and CiteULike) that each participant used. The archival data logs from each unit of analysis were

examined in order to explore patterns of behaviour as these tools were used over the course of the study in a natural manner.

There was a reason for the natural setting not being the physical location where the ETEC 533 course material was accessed, as it was a distance education course. As the researcher, I did not have knowledge regarding the physical dimensions of each particular location used to access course material. For the participants from the EECE 519 course, I did not observe their behaviour within the class, nor was I able to research the physical environment where they accessed the tagging systems. Although, not key to answering any particular research question, these observations as an additional methodology might have provided immediate feedback from a participant regarding their tagging behaviour at the moment it occurred. As I was unable to observe the context in which interactions with del.icio.us and CiteULike took place, I chose to define the natural setting for my study as the Internet.

Case studies must always have boundaries within a real-time context of a particular time and space. (Yin, 1984; Stake, 1994) My case was bounded in time by the school term period in which it occurred from January – May, a five month period. It was further bounded in space by the two tagging systems, delicio.us and CiteULike studied, it was bounded by geography as it only involves University of British Columbia graduate students.

3.3.3 Multiple sources for data collection

The use of multiple data sources in case study research to validate collected content is defined as triangulation by Denzin (1989) or a "triangulated research strategy" (Snow & Anderson, 1991, p.157). It refers to the use of "multiple data sources, methods, investigators, and theoretical perspectives in the study of some phenomenon" (Snow & Anderson, 1991, p. 158). Using more than one research strategy enabled one to combine the benefits and flaws of each, as all methodology have limits and disadvantages (Snow & Anderson, 1991; Denzen, 1989). Within this study, the following data sources were used: a questionnaire, archival tagging systems data, and semi-structured interviews.

3.3.4 Extendability of research within larger context

Case study research had value as it enhanced knowledge by providing new ideas and theories about a phenomenon (Orum & Feagin, 1991; Orum, Feagin, & Sjoberg, 1991). This may allow the phenomenon to be studied within a larger context beyond the particular case being investigated as an "integrated whole" by giving an understanding of the relationships and interactions that occurred over time within the case study (Anderson, Crabtree, Steele, & McDaniel, 2005, p. 681). Within a larger context, my study explored how social capital manifested itself through the use of social media, specifically its influence on relationships. The findings of my research on social capital was extendable to other social media because these tools continue to be studied and explored for their potential value in enriching social capital through relationship-building. A possible future area of exploration involves a study into youth behaviour as

broadcasters of live-streaming video sites (referred to as lifecasters) such as Ustream.tv (http://ustream.tv) Qik (http://qik.com) or Justin.tv (http://justin.tv) to share their everyday lives online. My potential research questions would be: How does lifecasting affect one's existing real-world relationships? What types of games or outdoor activities are being built on these live social media platforms? What effect does this form of social media have on social capital?

3.4 Unit of analysis within case study methodology framework

In this case study, the unit of analysis was discussed within the framework of case study methodology. According to Sjoberg et al. (1991), "a case study involves characteristics or configurations of a particular unit of analysis - be this an individual, a community, an organization..." (p. 36). Quite simply, the unit of analysis was what I chose to look at in my study; the individual behaviour of newcomers to tagging systems over a five-month period (January – May). Each individual I studied was a unit of analysis, so there were three units of analysis in my study. The rational for my unit of analysis being each individual participant rather than their group behaviour as a whole was because the research questions:

- What personal, individual strategies emerge from newcomers using tagging systems?
- What social, collective strategies emerge from newcomers using tagging systems?
could be adequately responded to without comparison, therefore a comparative analysis between these units of analysis was not pursued.

3.5 Generalisation of findings in qualitative research

To generalize meant to state that what was the case at one time or place, would also occur in another place or time. A criticism of case study research was that it was impossible to generalise findings beyond a single case study (see VanWynsberghe & Khan, 2007 for other examples). Yin (1984) believed that case study researchers should generalise findings to a larger theory in order to address these concerns about external validity in the context of qualitative research.

Qualitative research is defined as "naturalistic to the extent that the research takes place in real-world settings and the researcher does not attempt to manipulate the phenomenon of interest" (Patton, 2002, p. 39). According to Hoepfl (1997, p. 48) "where quantitative researchers seek causal determination, prediction, and generalization of findings, qualitative researchers seek instead illumination, understanding, and extrapolation to similar situations." Hoepfl (1997, p. 49) summarised the most prominent features of qualitative research that a number of authors (e.g. Bogdan & Biklen, 1982; Lincoln & Guba, 1985; Patton, 1990; Eisner, 1991) identified. Some of the synthesised points from the list were:

- 1. The researcher acted as the human instrument of data collection.
- 2. Qualitative research is judged using special criteria for trustworthiness.

3. Qualitative researchers paid attention to the idiosyncratic as well as the pervasive, seeking the uniqueness of each case.

In the judging of qualitative research, Lincoln and Guba (1985, p. 300) in Hoepfl (1997, p. 58) provided a comparison of key criteria for the quality of quantitative (conventional) versus qualitative (naturalistic) research (see Table 1).

Table 1 Quantitative and qualitative terms

Conventional terms (quantitative)	Naturalistic terms (qualitative)
Internal Validity	Credibility
External Validity	Transferability
Reliability	Dependability

The corresponding terms dependability, transferability, credibility are expanded in the reliability and validity sections below.

3.5.1 Reliability of the data gathered in this study

Some writers were critical of qualitative research for failing to emphasise reliability and validity issues clearly (Le Compe & Goetz, 1982; Brink, 1989 in Appleton, 1995). According to Orum et al. (1991), within case study literature, there was a debate regarding validity and reliability of the data and how it could be measured using case study research. Reliability related to the internal stability of data over a period of time and the use of different observers and coders of the same information (Lincoln & Guba 1985 in Orum et al., 1991; Orum et al., 1991). According to Yin (1984) and Stake (1995), there were six places from which case study information could come from: documents (e.g. journal notes); archives (e.g. one's personal page on CiteULike); interviews; direct observation; participant-observation; and physical artefacts.

In exploring the reliability (quantitative) versus dependability (qualitative) inquires from Hoepfl (1997), I discovered this relevant statement by Lincoln and Guba (1985, p. 316) "Since there can be no validity without reliability (and thus no credibility without dependability), a demonstration of the former is sufficient to establish the latter" (p. 316). Patton (2002) in regard to a researcher's capacity and talent to do qualitative research viewed reliability as a consequence of the validity within the study. Lincoln and Guba (1985) specific to the issue of reliability in quantitative research, instead used the term "dependability" to refer to qualitative research. According to Seale (1999), trustworthiness "is always negotiable and open-ended, not being a matter of final proof whereby readers are compelled to accept an account" (p. 468). Therefore, when reliability was desired trustworthiness was a key component to examine in qualitative research (Lincoln & Guba, 1985; Seale, 1999).

My project involved gathering interview data, which was preceded by a brief questionnaire in January about each participant's demographics and prior Internet experience; therefore it was relevant to discuss the reliability or dependability of selfreports (both questionnaires and interviews). Interviews are a form of self-report; as the interviewer I had to assume that the information provided by the respondents was accurate (Burns & Grove, 1987 in Appleton, 1995). Studies that investigated self-reports

have primarily been in areas of public health or sexual behaviour. For example, Sonenstein, Stewart, Lindberg, Pernas, and Williams (1997) discussed the lessons learned gathering self-reports, specifically interviews, questionnaires, and surveys from conducting the National Survey of Adolescent Males (NSAM), which measured their sexual behaviour.

Sonenstein et al. (1997) stated that because of privacy norms and expectations regarding socially desirable behaviour, answers provided by teens could be biased. Therefore, through the informed consent procedures, to enhance the likelihood of answers being truthful, it is important to ensure the participants that their responses would be kept confidential (Sonenstein et al., 1997). Sonenstein et al. (1997) addressed a common concern about the credibility of interview or questionnaire-based survey data, and showed very high reliability (e.g. 96%) of their findings through consistent reporting by respondents when comparing their interview answers with their answers from a self-administered questionnaire.

Appleton (1995) focused on issues of reliability and validity in an analysis of qualitative interview data from nurses that interviewed families one-on-one in relation to child protection issues in order to explore the concept of vulnerability. Interviews were used in order to explore this concept in-depth as the data-collection instrument (Appleton, 1995). The reliability of the data that was brought to light from these interviews was then based upon how the level of ability and competence of the interviewer as well as any possible interviewer bias (Guba & Lincoln, 1981 in Appleton, 1995; Field & Morse

in Appleton, 1995). Therefore, as the study advanced and the researcher's interview skills improved as expected, the quality of the data collected would also improve (Appleton, 1995). Appleton (1995) used a standardised interview schedule to increase the stability or reliability of the data being gathered (Brink, 1989 in Appleton, 1995). To address the reliability of the equipment used for data-collection, Appleton (1995) used a tape recorder to elicit information during the interviews to increase reliability.

As self-reports offer the possibility of socially-desirable answers, there may be questions regarding the reliability of the data I elicited through interviews. However, as my study investigated social media, specifically tagging systems, no apparent or documented societal stigmas associated with this behaviour were found and it was not expected that participants would respond untruthfully either consciously or sub-consciously. As I had the quantitative tagging systems archival data logs from each unit of analysis for comparison, I did not observe any inconsistency with their interview responses. To increase reliability in my study, a digital tape recorder was used for the face-to-face interviews and the interviews over Skype were recorded on my computer. As well, an interview schedule guide was used for my interviews to provide some consistency in questions asked. As the study progressed, I gained confidence in the interview process and further developed my interview skills. Therefore, I am confident in the reliability of the data gathered within this study.

3.5.2 Validity of the data gathered in this study

Qualitative researchers used a variety of terms to address issues of validity in their research work such as 'credibility', 'transferability', and 'truth value' (Guba & Lincoln, 1981 in Appleton, 1995; Patton, 2002; Hoepfl, 1997, Sandelowski, 1986 in Appleton, 1995). In quantitative research, validity is defined as the extent to which there was confidence that the findings accurately measured what they were suppose to measure (Sandelowski, 1986 in Appleton, 1995).

According to Lincoln and Guba (2002), transferability is the degree to which two contexts are similar or fit together (fittingness). For someone interested in making a judgement about transferability between two contexts, it was necessary to have a rich description of information regarding both contexts to allow for a reasonable judgement to be carried out (Lincoln & Guba, 2002).

I developed specific strategies to support transferability in my study as well as reduce the likelihood of holistic fallacy (Miles & Huberman, 1994), described as the perception of a researcher/interviewer to view all aspects of a certain situation as being congruent, when in actuality only the individuals interviewed may have held that particular perspective (Duffy, 1987). As my findings studied tagging systems within the context of social media, they may be transferable to other social media platforms such as Facebook and Flickr, in which people enhanced their real-world relationships with friends and

acquaintances through the sharing of digital content. These findings may also be transferable across other educational settings such as colleges or high schools in which the participants have multiple roles (e.g. student, part-time employee, friend) that might influence their tagging behaviour. In addition, these findings should be transferable across time, for example, if a similar study was conducted at this moment within the same institutional setting.

Guba and Lincoln, 1981 in Appleton, 1995 believed that the 'truth value' in a qualitative study involved evaluation of its credibility rather than internal validity as measured in quantitative research. According to Sandelowski, 1986 in Appleton, 1995, qualitative research was considered credible if it showed accurate descriptions of participants' experiences, and where the individuals that had those experiences would immediately view it from that description as their own behaviour. Credibility referred to internal validity (Hoepfl, 1997). It was dependent on three unique but related elements (Patton, 2002): rigorous techniques for conducting fieldwork that resulted in high-quality data collected; the credibility of the interviewer/researcher such as status, skills, track record, and knowledge; philosophical belief in the value of qualitative inquiry, which meant expressing an appreciation for naturalistic methods, purposeful sampling, and inductive approaches. Therefore, credibility was based more on the richness of the information collected and on the analytical skills of the researcher than the size of the sample (Hoepfl, 1997; Patton, 2002).

To address the issue of rigor in my data collection, I will discuss possible predispositions

and make biases explicit in order to absolve any barriers to credible qualitative findings. As an early adopter of del.icio.us and CiteULike, it was possible that my expectations regarding how newcomers should use these tagging systems would influence how I viewed the data gathered. To establish researcher credibility of my study, as an early member of del.icio.us and CiteULike, I had extensive experience in the use of tagging systems. This prior knowledge helped in the formation of interview questions and in understanding the meaning behind my data analysis and the case study findings. By understanding the archival tagging systems data, I confirmed the interview information where possible.

As a fellow student, I identified with potential student issues that may have influenced behaviour with respect to their tagging systems use. During data analysis, I continued to refer back to the interview transcripts and tagging systems data as I developed categories for the findings. Using data from two sources for my study, interviews and the tagging systems archival data logs, validity was increased by reducing the risk of the holistic fallacy (Miles & Huberman, 1994). For these reasons, I am confident in the validity of my case study data.

3.6 Research methods

My research methods were interviews, digital archival data logs, and a brief pre-interview questionnaire at the beginning of the study (Strauss & Corbin, 1998; Miller & Slater, 2000; Yin, 2003; Marshall & Rossman, 2006). The digital archival data were gathered in

order to compare each participant's tagging systems content with their interview responses as well as generate discussion during the interview process. The questionnaire was provided to gather demographic information and determine what prior Internet experience a participant acquired, such as previous del.icio.us or CiteULike exposure. Two questions were:

- Do you use the bookmark feature on your Internet browser?
- Do you have any experience with del.icio.us?

Interviews yield qualitative data that upon analysis helped the researcher make better sense of the experiences of people by focusing on a depth of understanding as an end in itself (Patton, 2002). Interviews involve "asking questions, listening, expressing interest, and recording behaviour" (Neuman, 1994, pg. 358-59). There were three interviews with a natural progression of questions from the first to the last interview. The questions from the first interview were designed to develop an initial baseline of each participant's experiences. The questions from the second interview were created to elicit responses regarding their behaviour since the first interview. The last interview continued to explore changes in behaviour since the first and second interview and was designed to explore each participant's tagging usage over the whole study period.

Examples of questions from the first interview included:

- How do you tag information found online?
- Could you explain why you created these tags?

Questions from the second interview included:

- How has your organisation of bookmarks changed from your use of del.icio.us?
- Has your behaviour changed since January, have you learned anything new?

From the third interview, examples of questions included:

- Can you talk/show me the process of how you tag?
- What features do you wish existed in tagging systems you use?

3.7 Recruitment and sampling

The recruitment occurred on the University of British Columbia campus. The opportunity to study the human behaviour of students using social media within an academic setting was of importance as these tools could have educational value for productivity, learning, information gathering, and group collaboration for students as well as educators (see HigherEdBlogCon, 2006; see The New Media Consortium, 2006; The New Media Consortium, 2007; PEW/Internet, 2008). The rapid pace with which new technologies continue to emerge and the ability of students to adapt and evolve provided a unique opportunity to explore how online environments that support tags influenced student academic and social life and also allowed for an examination of what student responses might emerge (Brown, 2005; Friedman, 2005; Rundle and Conley, 2006; Pence, 2007; Prensky, 2008).

The courses took place between January 2006-April 2006. Invitations to professors were sent via email to those that included del.icio.us and CiteULike in their course curriculum. After these professors agreed to participate in the study, individual students were contacted that fit the criteria of being registered in the course and having personally, without pressure or consequences, decided to create del.icio.us and CiteULike accounts. Participants were recruited from two graduate courses: ETEC 533 Technology in the Mathematics and Sciences Classroom, a distance education course out of the Faculty of Education and EECE 519: Computer-Supported Collaborative Work, a course out of the Faculty of Engineering.

The three graduate students, Christoph, Lorenz, and Shoshanna that participated in this study, had pseudonyms. Christoph was a BC high school math teacher, between 30-34 years of age with prior experience using his Firefox Internet browser bookmarks, and was first exposed to del.icio.us and CiteULike through his UBC course. He was responsible for maintaining a shared resource of bookmark links for teachers at school. Lorenz was an engineering graduate student between 30-34 years of age and used the bookmark feature on his Internet browser. He was introduced to del.icio.us and CiteULike in his UBC course. Lorenz only accessed the Internet at home using dial-up technology. Shoshanna was a Library and Information Sciences graduate student between 20-24 years of age, with a part-time job, who bookmarked URLs on her Firefox Internet browser. She was a Flickr user and did not have any experience with del.icio.us or CiteULike prior to this study.

The professors played no part in the recruitment of students. For the EECE 519 course, I collected each student's email address in order to send them information about the study and a request to participate. For the ETEC 533 distance education course, each student was emailed with an offer to participate and a description about what would be involved. It is possible that a power relationship might be perceived between students and a teacher, similar to a faculty supervisor and graduate student (McCroskey & Richmond, 1983; Aguinis, Nesler, Quigley, Suk-Jae, & Tedeschi, 2007). Therefore, during the period of the study, neither professor was aware of the number or names of participating students, to remove any perception that student involvement was influenced by perceived repercussions for non-participation.

Purposeful sampling involved choosing information-rich cases for in-depth inquiry and insight or for in-depth understanding (Patton, 2002). This research project used purposeful sampling to provide answers to my research questions. Purposeful sampling illuminated the strategies that emerged over the course of a term in which the three units of analysis used the del.icio.us and CiteULike tagging systems. My sampling was purposeful as it was necessary to use a certain type of student – those without prior tagging systems experience that were also registered in a class in which the professor introduced tagging systems.

3.8 Data collection procedures

Two 10-minute open-ended interviews were conducted face-to-face or using VoIP (voice over internet protocol that acted like a telephone on a computer for audio conversation), specifically Skype (http://www.skype.com) during Feb and March with two different interview guides. The initial questionnaire is displayed in Appendix D Initial questionnaire, the first 10-minute interview questionnaire is placed Appendix E Interview 1 (10 minutes), and the second is in Appendix F Interview 2 (10 minutes). The one-hour interview questionnaire is displayed in Appendix G Interview 3 (1 hour). The total amount of interviewing for each participant was 80 minutes. An interview guide was used in all interviews and was referenced during each interview by myself to ensure the necessary questions were asked.

Sample questions included:

- Can you tell me a personal story about how you began tagging?
- What will it take for tagging to be adopted by the masses?
- How has your tagging behaviour changed over time?

The interviews were recorded using a digital recorder during the face-to-face interviews and using Skype to enable later transcription and analysis. During each face-to-face interview, the personal tagging space of the participant was displayed on the interviewer's laptop to assist with recall and better facilitate responses. During the remote interview, the participant sat in front of a computer with their del.icio.us and CiteULike home libraries displayed. The participant's archival data logs were studied to assist with questions and to better clarify answers afterwards. I transcribed all interviews conducted with the study participants and coded them using content analysis of the case study research (Krippendorff, 1980; Yin, 1984; Eisenhardt, 1989; see Graneheim & Lundman, 2004; Anfara & Mertz, 2006) to provide meaningful data and answers to the research questions.

In addition, this project used in-depth semi-structured interviews, which had the added value of gathering specific information about the behaviour and motivations of these participants that could not be gleaned from the data alone. In semi-structured interviews, the person is interviewed for a short time period (e.g. an hour), in a conversational format usually using a script of questions (Yin, 1984). In case study research, interviews are a key source for gathering evidence because they tapped into the insight that participants provided of the situation being investigated (Yin, 1984). Put simply, interviews are about storytelling (Seidman, 2006). The participants could reflect and make sense of their experience and through that process, in-depth information was shared (Seidman, 2006). The interview questions were standardized and open-ended using an interview guide to maintain consistency across all interviewees.

The rational for using interviews was to gather a broader spectrum of information from each participant, in which the responses dealt less with quantitative measures but more on "interpretation, summary, and integration" through "quotations and case descriptions" rather than statistics (Weiss, 1995, p. 3). The objective was to elicit specific

examples of tagging system usage by probing responses. The questions further explored behaviour: tagging system usage since last interview; any changes noticed in behaviour; changes noticed (if any) in tagging systems interface; changes (if any) in organisation of bookmarks or digital articles since last interview.

The content of del.icio.us and CiteULike could be separated according to user, URL, and tag. As quantitative studies of these environments have concentrated on the URL or tag (e.g. Golder and Huberman, 2005; Kipp, 2007), my focus was on understanding tagging from the perspective of the user so the scope and tenor of my interviews examined the motivation and behaviour of the individual users I studied rather than their quantitative data alone. Del.icio.us and CiteULike were the two sites researched due to their influences as the primary sites in their respectable areas of URLs and bibliographic information. These sites were part of the self-organising structure of interconnections through users, links, and tags in a shared system to a broader "loosely joined" dynamic Web (Weinberger, 2002; Weinberger, 2007). Today, they are still the best-known sites for their particular purpose.

The procedures used to gather data were as followed. Each participant's data was analysed by searching for common patterns of use and individual characteristics among the users. They were also used during the preparation of the interviews as a guide for follow-up questions. An initial questionnaire containing closed and open-ended questions was sent via email to each participant. The purpose was to obtain information about specific demographics (age and gender) and level of Internet experience (whether

browser bookmarks used; organisational tools used; experience with del.icious;

experience with CiteULike) (see Table 2). Each question (Q1 = Question 1) is described in *Appendix D Initial questionnaire*. The content within Table 2 is defined as M = Male, F =Female, Y = Yes, N= No, N/A = not-applicable, Outlook = Microsoft Outlook, and iCal = Apple iCal calendar.

Name	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Christoph	Μ	30-34	Y	Y	Outlook	Y	86	N	N/A
Lorenz	Μ	30-34	Y	Y	ICal	N	N/A	N	N/A
Shoshanna	F	20-24	Y	Y	real	N	N/A	Y	5
					calendar				
					shared Trac				

Table 2 Initial questionnaire demographics and experience

3.9 Triangulation of data

Triangulation was necessary from an ethical perspective to validate the data collection process (Tellis, 1997) and refers to the use of "multiple data sources, methods, investigators, and theoretical perspectives in the study of some phenomenon" (Snow & Anderson, 1991, p. 158). Methods triangulation meant combining multiple methods such as interviews and observations for data collection to study the same phenomenon in order to enable consistency checks between the data (Patton, 2002). As all methodology had limits and disadvantages, using more than one research strategy combined the benefits and flaws of each (Denzen, 1989; Snow & Anderson, 1991). According to Denzin (1989), there were three sources for data collection in triangulation: people, the situation and context, and the time period. In my project, information was collected about the participants over a five-month period between January and May. In order to understand the case in-depth, I collected data using a questionnaire, semi-structured interviews and digital archival data from the tagging systems to create an integrated whole and enhance the credibility of my data through a focus on technical rigor. Information about these data collected included the features provided for members and how users tagged within these environments. The digital archival data were compared with each participant's corresponding interview responses to ensure consistency during data analysis. In addition, the questionnaire responses were compared with the participant's interviews to ensure that they were not inconsistent. For example, if a participant stated having no previous del.icio.us experience on their questionnaire, but noted during an interview having two years experience as a del.icio.us member, then these data sources would collectively not support each other.

3.9.1 Content analysis of triangulated data

According to Krippendorff (1980) and Hsieh and Shannon (2005), content analysis referred to a research approach for interpreting text data in a subjective manner in order to identify and code patterns, keywords, topics, and phrases as instances of the phenomenon (e.g. discussions of tagging behaviour) through a systematic, organised process. Directed content analysis, as used in this project, validated an existing theoretical framework or extended prior research (Hsieh & Shannon, 2005). As my qualitative data was the personal interviews from my cases, and I used a social capital

theoretical framework to structure my initial coding scheme, directed content analysis was most appropriate for my project.

According to Holsti (1969), content analysis had three characteristics: objectivity, systematic, and generality. He defined *objectivity* as determining that each stage of research must involve explicitly generated rules and procedures (e.g. how categories were constructed for analysis) (Holsti, 1969). In this section, I described my definitions for the codes used in analysis of the interview text data. *Systematic* stipulated that whether categories or content were included or excluded occurred based on objectively applied rules (Holsti, 1969). In my study, the categories used were finalised after a preliminary analysis of my data and a significant literature review of relevant tagging systems, social media, and social capital material. *Generality* meant that the findings must have theoretical value, as content analysis was concerned with data comparisons based on the theory used (Holsti, 1969). This project was a case study of tagging systems with the focus on del.icio.us and CiteULike using three units of analysis. I explored the tagging behaviour of the three students as newcomers with the objective of validating social capital theory and extending related tagging systems literature.

In order to develop an enriched understanding of this case through directed content analysis, the interviews were recorded, transcribed, and coded using qualitative software. Recording took place with a digital recorder for the face-to-face conversations or a computer-based recorder when Skype was used. I then listened and transcribed the recordings into Microsoft Word. The files were then transferred into text format to be

analysed. My analysis of the interviews was carried out using the Mac OS X downloaded free limited edition of HyperRESEARCH 2.8

(http://www.researchware.com). HyperRESEARCH 2.8 is a qualitative analysis software tool for coding of data. The limits of the free version allowed a maximum of 75 codes for the master code list, each study was limited to seven cases, and each case was limited to 50 code instances (e.g. if the same paragraph of interview text has codes A,B,C for its case, only 47 instances are left). Use of the free version did not affect the validity of my data.

The preliminary findings of the interview text coding were designed to extract general topics for the theoretical framework and to explore how the data might better inform the structure of my project. Qualitative software was used to search and manually code strings of interview text, based on the research questions. This sometimes resulted in the same line having multiple codes. Texts that were not categorised by the initial coding phase were given a new code. In the preliminary analysis there were six codes, in the final analysis there were seven codes, the difference being the addition of the code – impression management. In the quote by Shoshanna below, in which the interview asked the question, *"Do you find that those personal and shared uses conflict?"* the entire text was given this new code:

Yes, a little bit. I do not think I could really use that single del.icio.us account to do both because a lot of my personal interests aren't of interest to my friends, right. Not to mention, I might potentially bookmark things that I might find a little bit embarrassing. Or at least I wouldn't necessarily want my friends to form an impression of me based on it. So I am not recommending my friends to visit my site anymore so that I can use it for my own personal, professional use.

According to Goffman (1959), impression management is described as methods individuals used to provide a good impression, or control the impression formed by others. This definition applied to the above quotation because Shoshanna indicated a concern that content she saved on del.icio.us might influence how her friends perceived her actions. The master code list resulted in seven codes: browser bookmarks, CiteULike, del.icio.us, impression management, personal, social general, social relationships. As data can have multiple meanings (Krippendorff, 1980), my codes did overlap as they were not mutually exclusive.

Table 3 provides two examples of a piece of text that had been coded. Each code was used at least once to represent an interview response.

Table 3 Example of interview data

Meaning unit	Topic
Del.icio.us is purely about publishing	Social Relationships
notes about my favourite websites to	
share with friends	
So I am not recommending my friends	Personal
visit my [del.icio.us] site anymore so that	
I can use it for my own	
personal/professional use	

The operational definitions of the seven codes are:

- browser bookmarks content discussed the use and Internet browser bookmark
 behaviour of the participant. For example, if the participant stated a preference
 for using their Internet browser bookmarks rather than del.icio.us.
- del.icio.us content discussed the use of del.icio.us by the participant. For example, the participant explained the process of how they posted a URL and tagged it.

- *CiteULike* content discussed the use of CiteULike by the participant. For example, the participant explained a tag they used when posting an academic article.
- *impression management* participant discussed concern for how tagging system behaviour might be perceived by others. For example, did not post a URL because it might be viewed offensive by friends, co-workers, or unknown members on del.icio.us.
- personal participant described use of tagging systems (personal-tagging) or other computer-based personal information management systems (personal-non-tagging) to organise own information for archival or personal retrieval in future (e.g. URLs or links to papers). For example, participant described the process of transferring their Internet browser bookmarks to their del.icio.us account.
- social general content discussed behaviour of participant using del.icio.us or CiteULike in a social manner and indicated an awareness of other members within the space. For example, by clicking on a *physics* tag in CiteULike, they discovered a valuable reference for a term paper project in another member's library.
- *social relationships* content discussed behaviour of participant using del.icio.us or CiteULike in a social manner and indicated an awareness or benefit for real-world

friends or colleagues that may also use the space. For example, used del.icio.us to save reviews of popular movies before sharing the URL from one's library via Instant Messaging to fellow co-workers.

Each unit of analysis was treated as an individual unit and each interview was separated and coded sequentially. A report was generated that organised the source text into sections based on its corresponding code in alphabetical order. The digital and paper reports of each interview were used to guide the discussion of the following chapter, in which I attempted to discuss social capital theory in terms of social media through directed content analysis of the identified categories.

3.10 Strengths of the study

My discovery of del.icio.us came after using Internet browser bookmarks and I found CiteULike after previous experiences with personal bibliographic tools. As a newcomer to these tagging systems in 2004, my rational for using them was first to fulfill a personal, organisational need and then I realised their social value. I am one of the early members of CiteULike and del.icio.us and an active user of multiple tagging systems. These experiences provided an advantage for me to be better prepared to construct questions, follow the flow of conversation, and offer follow-up questions that might further elicit responses when necessary to delve deeper into an answer. As a member of the social media community, I drew on these experiences for the data analysis.

The present study took place over the five-month period, in which three interviews, spread out over the five month, were obtained with each participant in order to better understand tagging systems strategies. An advantage of this longitudinal method is the ability to explore changes over time and to develop a richer level of understanding regarding *how* and *why* change occurred (Malloy, Woodfield, & Bacon, 2002). Of relevance to this research project were the individual changes as each unit of analysis interacted with del.icio.us and CiteULike and possible implications for their behaviour. An additional strength of this study was employing multiple methods for the collection of each participant's data. The use of an initial questionnaire, interviews, and archival data from del.icio.us and CiteULike, provided a triangulated approach to gathering information. By gathering information using an interview guide that could be collaborated when possible with the tagging systems data logs and questionnaire, a more holistic picture could be drawn of behaviour.

3.11 Limitations of the study

This project was limited to two graduate-level classes with small class sizes as those were the only ones I encountered at the University of British Columbia (UBC) that included tagging systems in their curriculum. Although the length of the study was five months, a longer study (e.g. one year or two years) would have provided additional, continuous information about how their tagging systems behaviour affected their university and non-university activities. As the only researcher, there were limits on the time available to interview each participant, which meant that more extensive interviews with co-

workers, friends, or family that may have been mentioned within an interview could not be followed up.

CHAPTER 4 RESULTS AND DISCUSSION

4.1 Introduction

The goal of this research was to investigate whether novice users utilized tagging systems as personal organisational tools and whether over the time, users exhibited greater social behaviour than their initial use. To that end, I explored how these tagging systems were used in personal ways and how they were used in social or collective ways. The findings were broken down into each unit of analysis to provide a snapshot of an individual user's tagging experience over the course of a term. The organisation of this section consists of individual archival data, initial questionnaire and corresponding discussion from three interviews for each unit of analysis.

For each unit of analysis, the number of items within their del.icio.us and CiteULike library is stated in Table 4. To specifically address the research questions, social behaviour, personal behaviour, individual tagging strategies, collective tagging strategies were discussed. Within the context of social capital theory, the quantity of items each participant posted was not necessarily of relevance, but rather how these items may have fit into their relationship with others. Each unit of analysis section ended with a discussion of the findings within the context of social capital theory.

	Shoshanna		Christoph		Lorenz	
	del.icio.us	CiteULike	del.icio.us	CiteULike	del.icio.us	CiteULike
Interview 1	13	6	60	6	2	3
Interview 2	20	6	61	6	2	6
Interview 3	39	6	135	6	2	6

Table 4 Number of del.icio.us URLs/CiteULike articles at time of interview

4.2 Shoshanna: Recommender of websites for close friends

Shoshanna was a Library and Information Sciences graduate student with a part-time job. The initial questionnaire in February revealed that Shoshanna had no prior experience using either del.icio.us or CiteULike. After the initial questionnaire, and during the first interview in February, Shoshanna described herself as having become a "regular" user of del.icio.us. During the first interview (see Table 4 in *4.1 Introduction*) Shoshanna had thirteen items in her del.icio.us library and six items in her CiteULike library. She reported using some of the extended del.icio.us features such as the plug-in function on her Firefox Internet browser. In response to the question, *How do you tag information found online?*, Shoshanna stated that it was "really easy to tag a page" and that the pop-up window for adding URL information assisted her tagging choices by providing a list of popular suggestions:

Well, basically I will be browsing on the web or on a webpage that I like and I will be like 'oh I should tag this and add it to del.icio.us' by clicking

the tag icon up there [points to 'tag this' icon] and every so often if I want to see the page that I tagged, then I will click that [points to del.icio.us personal home page button] there.

During this first interview, the interviewer's laptop displayed Shoshanna's CiteULike and del.icio.us home page to facilitate responses to questions about her tagging behaviour. Shoshanna stated that she used del.icious to share URLs with her friends (non-classmates) via email, as they were not members themselves. In a continuation of her response to the question, *How do you tag information found online?*, she stated:

Because sometimes people ask me "Hey [Shoshanna], can you recommend some good websites", and I thought it would be useful if I could have links and little annotations all kept in one spot"

Shoshanna shared information of value to her friends. For example, for the Rotten Library link (<u>http://www.rotten.com/library/</u>), she wrote in a del.icio.us post Notes field:

One of my favorite sites of all time, ever. The Rotten Library is a collection of brilliant encyclopedia-style articles written by a hiliarious, brilliant underachiever. Check out the "what's new" section to get a sampling. I have spent hours readin[g].

The del.icio.us post Notes field for her Film-Philosophy link (<u>http://www.film-</u>philosophy.com/) read:

The layout for this site is a bit of a mess, but it has some great reading. They link to lots of essays of interest all over the net, and they have a discussion list that's great to read. Here's the archives for the discussion list; it might take you...

These descriptions provided what Shoshanna described in this first interview as a "minipersonal review of the site" in response to the question, *Why did you [add notes comments in your del.icio.us post]?* In an analysis of her interview responses, Shoshanna noted below, that her Internet browser bookmarks use remained the same. In her response to the interviewer's question, *Do you have anything to add interesting about how you use [tagging systems] at all?*, she stated:

I'm not using del.icio.us as a substitute for my regular bookmarks. My browser behaviour with my regular bookmarks has remained unchanged. Del.icio.us is purely about publishing notes about my favourite websites to share with friends.

In terms of CiteULike, she described her behaviour through her response to my interview question, "Do you find that you are using CiteULike different than del.icio.us?" as minimal, "I only ever used CiteULike on one occasion". As shown in Table 4 above, there were six articles in her CiteULike library. What should be noted is her use of the

course tag "lib500" [pseudonym] in the first five articles – all posted within an hour of each other. When questioned about why this particular tag was used, she stated that she tracked potential research papers she wanted to use in the future. Her lack of CiteULike experience was explained by her admitting that it was "completely out of [her] brainspace". In response to the question, *Do you find that you are using CiteULike different than del.icio.us?*, she said:

...I found that I would find sites that are interesting and then I would register them with CiteULike and then I would never actually go back to read them. I found that when I was doing research, when I was exploring these sites, I found it was just a lot easier to just use the regular browser. I did not see it worthwhile to create tags and records for papers that I had not read yet.

In discussing Shoshanna's behaviour from her responses in this first interview, her Internet browser use remained unchanged between January and February when the interview was conducted. Her solitary use of CiteULike appeared to be because she did not understand how it functioned, nor did she see it beneficial to create a CiteULike entry before reading the article she would describe. In del.icio.us, she first uploaded URLs to her home page, then when she wanted to share a particular URLs such as a movie website with her friends, she would send them an email message containing her home page URL (e.g. <u>http://del.icio.us/member/shoshanna</u>). When Shoshanna referred to her friends she did not appear to mean contacts on del.icio.us, as she had not made any connections with other members there, but rather her real world friends using the del.icio.us description feature to send information to them about a URL she deemed of interest to them. Therefore, Shoshanna's del.icio.us use could be considered social as its only function for her at this stage of the study was for recommending her favourite websites to her friendship circle.

4.3 Shoshanna's del.icio.us links added from Internet browser bookmarks

The second interview one month later in March, was designed to elicit further information about Shoshanna's behaviour and rational for using del.icio.us. At the time of this interview, she had twenty del.icio.us items in her library and six items in her CiteULike library (see Table 4 in 4.1 Introduction). In response to the question, Do you have any time when you have come across something that you wanted to share? she stated:

Whenever I've encountered a site, I want to bookmark, I just use traditional [Internet browser] bookmarks. The sites that I have bookmarked in del.icio.us are sites that I already knew about that I wanted to publish. Any new sites that I haven't explored yet are not part of del.icio.us. ...I usually forget to put these on del.icio.us because I haven't got in the habit of putting something into del.icio.us whenever I come across a new webpage that I would like to bookmark and I haven't got in the habit of regularly visiting my del.icio.us webpage.

Usually if I think to myself, I need to look at a website of mine, my first thought or instinct is to go to my traditional [Internet browser] bookmarks at the top of the menu, which is sort of subconscious, it is difficult to change that decision.

Shoshanna's rational for using del.icio.us was to "[track] school and professional development related websites" and then send them to her friends as she stated they were not "websavvy" enough to become del.icio.us members themselves. She continued to write mini-reviews in the description field of a URL post, although she admitted during this second interview to recently forgetting to use del.icio.us. This was reflected in the fact that only six del.ico.us links (see Table 4 in 4.1 Introduction) were posted between February (the first interview) and March (this second interview). According to the interview data, in response to the question, *Do you have any time when you have come across something that you wanted to share?*, Shoshanna stated that:

The sites that I have bookmarked in del.icio.us are sites that I already knew about that I wanted to publish. Any new sites that I haven't explored yet are not part of del.icio.us. For Shoshanna, as observed in the above response, del.icio.us was not a site for storing newly found URLs, but rather it was for adding links that she previously bookmarked using her Internet browser. In this second interview, in response to the question, *Have you explored del.icio.us at all?*, she stated, "No. I haven't explored [the del.icio.us] features. I am so busy. I do not have time." Based on my review of Shoshanna's interview statements, such as "I am not going to use del.icio.us to track my schoolwork, I'm going to use it as an inventory of my favourite websites", her use of del.icio.us differed from how she used her Internet browser bookmarks - a space for "work and career related" information. As she discovered interesting websites, she placed them into her Internet browser bookmark directory.

Therefore, there were distinct contrasts between how Shoshanna used her Internet browser bookmarks and del.icio.us between the first (February) and second interview (March). Recall that Shoshanna had a part-time job in addition to her responsibilities as a graduate student. Having to balance her work/school responsibilities may have contributed to the amount of time she could devote to explore and understand the functionality of del.icio.us. Therefore, her use of the Internet browser was for new URLs she discovered that were of interest to her, which she might later upload to del.icio.us, as she did not use del.icio.us to store these newly found URLs at this point in the study. Shoshanna's del.icio.us page was only for uploading URLs familiar to her as they were retrieved from her Internet browser bookmarks, rather than directly from the Internet.

4.4 Del.icio.us became tool for Shoshanna's personal use

In mid-April, a final one-hour interview took place to delve deeper into her use of del.icio.us and CiteULike and to explore larger questions about her tagging behaviour. At this time, Shoshanna had 39 items in her del.icio.us library and six items in her CiteULike library (see Table 4 in 4.1 Introduction). Recall that in the first interview in January and the second interview in February, Shoshanna used her Internet browser bookmarks to store all the links she found online and then she transferred links of relevance from her del.icio.us space to her friends using email. During this third interview Shoshanna revealed that she no longer used her del.icio.us library to share her URLs with friends. In this interview, questions such as "Can you provide examples on when you determined to tag something vs. ignoring it vs. putting it in to a browser?" and "What features do you wish existed within del.icio.us?" were asked of her. From this third interview three themes emerged that delved deeper into her usage of del.icio.us and CiteULike as well as explored larger questions regarding her tagging behaviour. These themes were: social to personal use of del.icio.us, del.icio.us as a private space vs. a public space, individual tagging strategies vs. collective tagging strategies.

4.4.1 Shoshanna's social to personal use of del.icio.us

Between the second interview in March and this final interview in mid-April, Shoshanna's use of del.icio.us changed compared with responses provided in the first interview in February and the second interview. In response to the question, *How has your tagging behaviour changed over time?*, she stated:

...after I added my first 15 bookmarks I started to transition and to begin using it for personal use.

I am using [del.icio.us now] to save bookmarks to websites that I haven't read yet or maybe I wouldn't necessary recommend or endorse to anyone. I am simply using it to save websites that I know I would like to visit again at some point. So now I am *starting to use it as a substitute for my conventional browser bookmarks*.

Whenever I come across [school-related] pages I automatically say, "Ok, I'm going to use the [Internet] browser bookmark for this, and bookmark the site within my folder for this course. Like in my browser bookmarks I have a folder for each of the courses I am taking at any given time.

If it's a site that my interest is only temporary, I do not use del.icio.us for it, I use del.icio.us for websites that I think have a bit more ongoing value to them. Because I haven't tried removing anything from my del.icio.us site so far, I haven't really thought about deleting anything from del.icio.us.

Whereas with my browser bookmarks, I often delete things or archive them, or kinda reorganize them when they are no longer important to me. So, it is only when I think something will have ongoing importance to me that I think of using it in del.icio.us. *Otherwise, I just use browser bookmarks*.

Shoshanna recalled her comments from the first and second interview when she stated that she enjoyed being able to share URLs with her friends because it helped them and she felt it enhanced her image among them. To assist her friends, she provided notes "that could inspire or encourage them" to show that a particular page was interesting that would "pique their curiosity so that they would be interested enough to click the link". In reference to her use of del.icio.us between January and March when she was asked the question, *What is the value for information sharing with your friends?*, Shoshanna said:

When I used to share my [del.icio.us] bookmarks with my friends, which I do not anymore, the value was being able to recommend websites to my friends that they would enjoy for recreational reading, and it was me addressing an expressed need from my friends that they couldn't find many websites that they enjoyed visiting on the Web and they couldn't find many websites that interested them, so it was me trying to meet that need.
The advantage for me trying to impart things to other people that validate my own case and through the sharing, hopefully my friends will say "oh yes, Wendy, you found some good websites". I hope to expand my own image among my friends by sharing things that are of value with them.

In discussing the changes from the second to the third interview, a one month period, her del.icio.us usage appeared to have changed from a social platform to a purely personal space exclusively for her own use. As Shoshanna stated previously in the first two interviews, she originally used del.icio.us as a place to store URLs that were shared with friends, while her Internet browser bookmarks was exclusively a place to store URLs of interest to her.

At the end of March, how Shoshanna used del.icio.us changed. For information of a temporary nature such as a school assignment due in a few days, she would put it into one of the course folders in her Internet browser bookmarks as it would be "slightly quicker to add and retrieve" than del.icio.us. Then when it was no longer important to her, she deleted it or uploaded the URLs to del.icio.us for archival value. Her del.icio.us space held important information that she wanted to keep for the long term as it now held ongoing value for her. For Shoshanna, it appeared that del.icio.us could not have a dual purpose, it could either be a resource for her friends or it could be a site for her own use exclusively. Because she longer shared her del.icio.us URLs with her friends, she did not have an opportunity to increase social capital among them through del.icio.us.

4.4.2 del.icio.us as a private space vs. a public space for Shoshanna

In March, a month before the final third interview, del.icio.us implemented a privacy feature in which any post desired could be kept private by the creator (see *Appendix J Del.icio.us privacy feature*). Although she had heard of the feature, she had not yet tried it. She was not aware that the privacy feature was actually included as a checkbox visible on del.icio.us popups for adding URLs. Her prior purpose of using del.icio.us as a sharing tool as stated in the first and second interview, did not necessitate a need for her to have kept her posts private as she only added existing URLs from her Internet browser bookmarks. In response to the question in this final interview, *Have you thought of looking into privacy or any sort of features that allow you to hide your URLs?*, she stated:

I do have some kind of awareness that [the privacy feature] exists and I sorta feel that if I do use del.icio.us more extensively for personal use, I might want to look into that.

What is interesting is her later response to the question about what features she wished existed in del.icio.us. Shoshanna's answer was a privacy feature that mirrored what already was in del.icio.us at that time (see Table 4 in 4.1 Introduction):

I would like simply a box I could check that would say 'public' or 'private'. And those are really the only options I need, public or private bookmarks. Shoshanna expressed concern over how seeing personal content posted on her del.icio.us page would affect her friends' impression of her.

I do not think I could really use that single del.icio.us account to do both because a lot of my personal interest simply aren't of interest to my friends, right. Not to mention, *I might potentially bookmark things that I might find a little bit embarrassing*. Or at least I wouldn't necessarily want my friends to form an impression of me based on it. So I am not recommending my friends to visit my site anymore so that I can use it for my own personal, professional use.

This concern was also extended to the Internet and the possibility of someone finding her home del.icio.us page online by-chance.

...I am still thinking that [someone] might see it because I have used my own name as my username and that has made me more cautious and more careful about what I had used to bookmark and it has probably happened a few times where I have visited a site and thought, oh maybe I should add it to del.icio.us and then I think "oh wait, I do not know if I want that site associated with my name" and then I decide not to use del.icio.us because of that.

In discussing the behavioural changes that occurred between the second interview in March and this final interview in mid-April, Shoshanna stated that she was focused on using del.icio.us as a tool for organising her personal information. Shoshanna became concerned about who might see her information and what impressions they might extrapolate from viewing the saved content in her del.icio.us library. To resolve this potential conflict, Shoshanna chose to stop sharing with her close friends, rather than explore other options (e.g. open a second del.icio.us account, see whether other tagging services existed that might be a better match, or spend time learning about the features in del.icio.us).

4.4.3 Shoshanna's individual tagging strategies vs. collective tagging strategies

In this final, third interview, Shoshanna noted a dilemma that she still had to resolve regarding using a consistent tag for movie-related links. In response to the question, *'Have you developed any strategies on tagging?*, she stated:

...And also, another decision I have been unsure about is whether to use the word "films" or whether to use the word "movies" or "movie-related website", so I know that I am going to have to come for a strategy for that, you know wanting to have a sort of consistent term that I will use, either "movies" or "film", so I guess that strategies that keeps it in mind that there are certain tags that I have used in the past and certain ways of expressing the concept, say using the word "movie" instead of the word "film" and just trying to keep in mind that ok, these are the words that you've used in the past, so you should continue to use these in the future. She elaborated on how she tagged using her Firefox Internet browser del.icio.us extensions (launched by del.icio.us in 2005). Shoshanna stated, in response to the interviewer questions, *Can you talk me through the process of tagging? How do you go and find something? What is the thinking process of how you go about it?*:

Well, I will be at a website and for some reason it will occur in my mind that I should save this using del.icio.us. So I click on the button, the firefox browser button [tag this] and that popup window pops up, and then I will, and then if I think it is appropriate, I will write a comment. So I start by writing a comment, if for some reason I want to write a comment, to describe it using full sentences, *and then I will look at the popular tags and the recommended tags*, if there are any and sometimes there isn't any. If there's a rare site, sometimes there won't be anything down there.

But if there is I will look at those tags and then I will start clicking tags that seem appropriate to me or recommended tags that seem to fit the bill as well as popular tags. And then I might type in an additional tag or two if I know there are tags that I have used in the past that's not been recommended that I would use for this particular website At first, since they were so different, when I was tagging, I did not think of [tags] that much as an alternative to folders. I knew that people had used them [tagging] as an alternative to folders, but I was thinking of it more as a way of classification, then what I kind of realized, is that thinking of this as an alternative to folders as additional databases where you can create relationships.

Then I realized, ok, maybe I should start using tags that have the same names as my commonly accessed folders on my browser bookmarks and I started to use folders names as tags and realizing that *it was nice that I could save the bookmarks using multiple folders rather than only being able to use one folder.*

For me its completely the idea of being able to describe a given bookmarks using many tags, than to describe it using one folder.

Shoshanna described an added benefit of using del.icio.us. In response to the question, Has using tagged information spaces changed how you organise information?, she stated:

Before I was thinking of tagging mainly as a way of describing an item rather than thinking of it as a way to aid easy retrieval later on, I am starting to make the transition of thinking of tagging mainly as a retrieval tool not as a briefer, description tool. The only reason why you would tag something is so that you can help with retrieval of that tag later on. For example, if I tagged something as being "film", that is because I would at some point want to click the "film" tag and see all the websites that come up.

I think of it as a space for information for myself, I'm not really thinking of using it to share with anyone. However, I know that it is nice that my tags are being exploited by del.icio.us, to help other people, but I do not think of that much and it does not inform my behaviour in any way.

In a discussion of the changes that occurred between the second interview in March and this final interview in April, Shoshanna stated using del.icio.us only for her personal use. Shoshanna used the *library2.0* tag, to extend the web2.0 term to libraries as well as web2.0. Although she did not notice the privacy checkbox, she was aware of the recommended and popular tags that appeared in the pop-up interface when a site was tagged. She no longer used her del.icio.us bookmarks for sharing with friends, although Shoshanna was aware of their social value from using del.icio.us to share content with friends as stated in the first and second interview. Instead, her focus was on creating a personal information space for her del.icio.us library.

4.4.4 Shoshanna's future use of del.icio.us as a primary bookmarking tool

In this third, final interview in mid-April, Shoshanna stated that she perceived herself using del.icio.us more in the future and added that she may "transition to using it as [her] primary bookmarking tool". In response to the question, "So why do you prefer del.icio.us to CiteULike?", she said:

With del.icio.us, I mean if it was easier to make bookmarks public or private, and with my del.icio.us bookmarks, it would be really nice if actually, when I want to visit some of my favourite sites, I go up and I will click those little bookmarks, <menu> at the top of my web browser, *it would be kinda nice if I could click [browser] bookmarks and see my del.icio.us bookmarks as part of my web browser* rather than having to wait for a web site to load.

As noted above, Shoshanna envisioned a future where an Internet browser could integrate tagging into the del.icio.us tagging system and where tags would replace the need for folders. In concluding her final interview, Shoshanna spoke about how she enjoyed using emerging technology and liked sharing knowledge about tagging with fellow students in her program who might also benefit from her personal experience. Therefore, Shoshanna appeared to accept del.icio.us as a primary application and wanted an Internet browser that integrated her del.icio.us library and would easily tag content.

4.5 Discussion of Shoshanna's social and personal tagging strategies in the context of social capital theory

Recall that Interview 1 took place in February, Interview 2 occurred in March, and Interview 3 was in April. Shoshanna's responses during the second interview and the final interview showed changes in how she used del.icio.us from her primary use as a social application to a personal tool. In the first two interviews (February and March), Shoshanna stated that she developed social strategies as a newcomer to del.icio.us, using her library to share URLs of value to her friends. In terms of social capital, she increased her bonding social capital (Putnam, 2000) among her friends by sharing her del.icio.us URLs with written comments in their Notes field. By the third and final interview, she stated that her tagging behaviour had changed and del.icio.us was exclusively for her personal use as she was concerned about how the URLs in her library might be perceived by her friends.

Her social behaviour can be explored in terms of relationship-building as it relates to these offline relationships with the friends she shared her del.icio.us library with in the context of social capital theory. Although, social media and Internet studies usually addressed bridging social capital (Putnam, 2000, Steinfield et al., 2008), which was connected to the development and creation of weak ties, in this case, it was bonding social capital that appeared to be of most relevance. Recall that bridging social capital (Granovetter, 1982; Putnam 2000) was linked to the informal, loose connections between people (e.g. fellow employees) who may share useful information with each other. In contrast, bonding social capital (Putnam, 2000) existed between individuals that had an emotionally close-knit relationship, such as close friends or family. Shoshanna's sharing of the del.icio.us URLs with her close friends and her written comments about a particular URL in the del.icio.us Notes field suggests the development of bonding social capital between them in order to maintain their off-line relationships.

As these links with her close friends were not loose and informal connections, but rather strong ties, her sharing behaviour should not be considered bridging social capital.

Recall that Shoshanna's friends were not members of del.icio.us nor were they classmates of hers. An advantage of social capital is being able to gather useful information shared by other members of the network (Paxton, 1999). Her use of del.icio.us to share links to her friends would be expected to increase social capital among them. The sharing of this del.icio.us content with her friends may be consistent with Shoshanna's desire to maintain these networks. Therefore being a member in her social network of close friends could provide an opportunity for information sharing and reputation-building through these types of trustworthy behaviours that could also be reciprocated (Coleman, 1988, Putnam, 2000). As Shoshanna contributed to her social network the social capital generated might be reciprocated by her friends in the future.

The strategies Shoshanna employed for her del.icio.us account evolved over the study from exclusively social (only for her close friends) to exclusively personal (only for herself). It appeared that the use of her del.icio.us account as a place for URLs of personal interest might be attributed to issues regarding privacy within a public space. Recall that within del.icio.us, a privacy feature was introduced in March shortly before the time Shoshanna's use of del.icio.us changed. However, she expressed having a limited awareness of this privacy feature, which may be due to her busy student life. Had she been fully aware of this feature, she might have continued to use del.icio.us in both social and personal way, rather than be concerned about sharing content that could be

potentially embarrassing to her. Therefore, as stated in her first (February) and second (March) interview, Shoshanna used del.icio.us to share URLs with her close friends and enhance her offline relationships with them.

4.6 Lorenz: Tags gained value when represent content he had read

Lorenz was an engineering graduate student who had previously used his Internet browser to bookmark online content. The initial questionnaire in February revealed that Lorenz had not used either del.icio.us or CiteULike prior to this study. The first interview took place in February at which time the interviewer inquired into Lorenz's experiences with del.icio.us and CiteULike. At the time of this interview (see Table 4 in *4.1 Introduction*), Lorenz had two items in his del.icio.us library and three items in his CiteULike library.

When asked, *Have you explored the [del.icio.us] space*?, Lorenz spontaneously grabbed the mouse and interacted with his del.icio.us home page displayed on the interviewer's laptop. He initially clicked on the "4 other people" link that was visible on one of his del.icio.us posts and then he accessed one of the usernames' del.icio.us home page. When the interviewer questioned his actions by asking *Why did you do that*?, Lorenz stated:

Looked like a link. I'm not afraid to click, you can always go back. [To] see what's there. I do not know what value I will get out of it as yet, the best thing to do is to play with it and see what it will do.

These del.icio.us posts that Lorenz added prior to this interview however did not originate from the home page of another del.icio.us member, instead he saved them at an earlier point in time, when he said, "I happened to have them as [Internet browser] bookmarks". This use of del.icio.us may be better understood in the context of Lorenz's explanation regarding the value of tagging and comments in the del.icio.us Notes field from online papers he posted. In response to the question, "*These sort of comments you made* [on del.icio.us – 'good intro' 'info on matrix vectors'], what is useful about making comments here?" Lorenz clarified that the comments were written to himself, adding, "and I think everyone can see the notes, but I am not sure". Lorenz further stated:

Well that is the value of the paper really. There are certain papers that do not go into a lot of depth, but they may lead you to a lot of other ideas and then there are other ones and they may be like 'I just focus on this one idea' and the title may not tell you that but after you read it you know that it focuses on this and this idea which hopefully would allow me later on to quickly say ok, these papers are not going to help me find what I am looking for, this other one that is intro will probably have something that is generic enough and lead me along the right lines.

Lorenz said that he anticipated using CiteULike to save references for a class paper that term. In response to the question, *Will you still continue to use [del.icio.us and CiteULike]?*, he stated: Well, I think we have to do a proposal paper for the class. I will probably use CiteULike...Once I have to find my own papers to read, then CiteULike becomes beneficial because ...you see what other papers might have relevance to the ones you're reading which then I can see some value in going through the extra steps of putting it on CiteULike, adding the tags, adding the keywords.

I'm just not going to do it, use it, unless it entertains me or provides some useful functionality...it is just extra work, it is just extra things to do and if I do not see the value in doing the extra work, I would probably stop using it for a while.

If I am researching and it helps me find other relevant papers, that's value. If it allows me to see what other interesting papers might be out there when I do not know exactly what I am looking for because other people have related these papers together — that's value. And that's one nice thing about this site, that sense of what's related to each other just happens as you go though. You do not have to say 'this one is related to this other paper' you're just seeing ok, these ideas, these tags are all related so they have some of the same topics they might be worth a look at'. It is a learning process. I [got to] read the papers and come up with what I think are the important words. Unfortunately, until you have read a few papers, you do not know really what the important ideas are that you want to group those papers together with. So, you hopefully get lucky and pick some tags that are useful enough. I could definitely see that if you have 300 papers here and you did not do your tags with a little bit of diligence, you are still back where you were, you still have a list of 300 papers and it is still not providing the tool yet to really group those 300 papers so that they make sense.

In response to the question, Do you have any comments to add?, he stated:

...I am not sure what the tags will represent. Will they represent the major ideas like keywords or will they represent something else? I do not know yet.

...tags just seem...you just either use the same tags over and over so that they become useless or just they represent too many articles, or you use so many that now they do not segment enough and they do not help you organise your thoughts, or your papers, or your ideas.

From an examination of the first interview responses from February, it appeared that Lorenz was trying to understanding the identity and representation of a tag to their digital content, whether articles, papers, or links. Recall that he stated being unclear what "the tags will represent" or "what's an appropriate tag" and how they could be used to represent articles they were associated with. Lorenz believed that by reading a paper, he could determine how best to assign tags to it that would be representative of the ideas within the paper. He stated that he would not use CiteULike unless it "provides some useful functionality". His concern was that he did not want to put in the extra work to tag and annotate before reading a paper, in case when he read it, he determined that it was without value. This may be because he had limited time as a student and did not want to waste time adding tags that he found later were not representative of the ideas within the paper.

4.7 Home dial-up technology and Lorenz's tagging behaviour

The second interview with Lorenz took place in March, one month following the first interview in order to ask him about his tagging systems experiences over that time period. For the second interview, Lorenz had two items in his del.icio.us library and six items in his CiteULike library (see Table 4 in 4.1 Introduction). He stated that he had only used del.icio.us once since the first interview in February and when the interviewer asked, Is there a reason why you haven't added new URLs?, he explained:

I am mostly working at home on a dial-up machine and because it is just one machine I am not finding it difficult to keep track of my bookmarks. There are not that many and I am not on multiple machines and *the dial-up* [at home] is just too slow, it is an inconvenience to go to the website to handle bookmarks.

Instead Lorenz used his Internet browser on this home computer to save links of interest. In response to the question, *How do you handle bookmarks now when you are on dial-up?*, he responded:

...So I just bookmark [URLs] in Safari [a type of Internet Browser] and that's it. Unfortunately it does not have the tagging but it is quicker because with the dial-up, it just takes longer and I do not get much benefit from it.

Lorenz expressed an interest in the tags of other members. In response to the question, Have you learned anything new from your del.icio.us use since January?, he stated:

By looking at different tags you can see what different ideas and what other links people have put together. Just using it not so much on putting something in [my del.icio.us home page] and seeing so much how it is used, but seeing [del.icio.us] as a search engine.

Even though he did not contribute additional content to del.icio.us since the first interview, he added a few articles between the first interview in February and this second interview in March to his CiteULike homepage. He explained why he stopped using del.icio.us and CiteULike when he said:

I did use CiteULike a little bit and ran into the same conclusion with a dial-up. Limited and slower access to papers...For right now, I am researching different ideas and papers and I found [CiteULike] was taking too long to use.

So I ended up going to the [Association for Computing Machinery Digital Library] and once I am there and downloading it is really awkward with dial-up to go back and post to CiteULike when all I am doing is downloading to my machine to read it later and the post to CiteULike was an extra step. At the time, it was taking too much time so that's why I [sort of] stopped. I intended to use [CiteULike].

In response to the question, What is the end result of your searching?, he explained that his objective was:

To view a document. What I need is to get the document. To see the link to a document isn't that useful in and of itself in what I was researching. With CiteULike being a reference [management tool], it isn't giving me the paper, I still have to go to ACM [Digital Library] or wherever it is that the paper actually is located then download it from there and that is

another website that I have to go to, and all of that is very time consuming. It is not that any particular stage is time consuming, it is just that if I add CiteULike, that is another minute or two to every paper I want to look at. To me it was not time well spent because I did not see the tags and being able to help me find stuff I just went to a regular search engine and a bigger database like ACM.

In discussing Lorenz's behaviour from the first interview in February to this second interview in March, a one-month period, the dial-up difficulties limited his use of del.icio.us and CiteULike as he stated it was time consuming to wait for Internet pages to load. Recall that he said that his Internet browser bookmarks were "quicker...with the dial-up" than accessing del.icio.us or CiteULike. This led to Lorenz using his Internet browser bookmarks as an alternative to del.icio.us and to download pdfs to his computer rather than also using CiteUlike to add the corresponding reference information.

Lorenz only used del.cio.us once between the first interview in February and this second interview in March. He stated that the reason for his limited del.icio.us use was because his only access to a computer was his home computer using dial-up. As it took a long time to load a del.icio.us page, he decided to use his Internet browser bookmarks instead, to save information of relevance.

Regarding CiteULike, he posted three articles since the January interview they were all added within a 30-minute time period. When I asked Lorenz why he stopped adding CiteULike articles, he stated that originally he went to an online digital library to download pdfs and then went back to add bibliographic information to CiteULike, but found he had dial-up issues resulting in "limited and slower access to papers". He still had not determined how useful tags were due to his infrequent use of del.icio.us and CiteULike. Within his course, there were not any assigned readings that would specifically motivate the students to use CiteULike. Had there been, perhaps Lorenz would have felt encouraged to use tghe available computers on campus with high-speed internet to assist with his research in a more time efficient manner. Therefore, as Lorenz was restricted to using his home computer with dial-up technology, his ability to access del.icio.us and CiteULike was limited as it took a long time for pages to load onto his computer. Instead he saved URLs to his Internet browser, which was quicker to view pages, although it did not have tagging functionality.

4.8 Lorenz's tagging experiences in spite of technological limitations

It should be recalled from the first interview in February and the second interview in March that dial-up issues affected Lorenz's use of del.icio.us and CiteULike. He expressed a lack of willingness to spend time accessing these environments from his home computer. At the time of this third and final interview in May, two month after the second interview, Lorenz had two items on his del.icio.us home page and six items in his CiteULike library (see Table 4 in 4.1 Introduction). An examination of his data logs in CiteULike and del.icio.us revealed that the items in each library remained unchanged since the previous (second) interview in March. Lorenz stated that the subsequent length of time it took for CiteULike pages to load or to add content to the del.icio.us environment curtailed his abilities to use these tagging systems. Instead he decided to save content to his Internet browser bookmarks rather than del.icio.us and only downloaded pdfs to his computer rather than afterwards adding related bibliographic content to CiteULike. In this third interview in May, two months after the second interview in March, questions such as "What is your motivation for starting del.icio.us?" and "How has your tagging behaviour changed over time?" were asked of Lorenz. These questions explored his tagging system behaviour between January and May, the period of the study up to this third and final interview. Two themes emerged from this final one-hour interview to delve deeper into Lorenz's usage of these tagging systems as well as explore larger questions about his tagging behaviour.

4.8.1 Tagging generated ideas for Lorenz to connect and remember content

In response to the question, Can you tell me about a time when you used tagging systems to refind information that you've tagged?, Lorenz stated:

I think where the tagging has helped is if I could go to someone else's [del.icio.us or CiteULike home] page when I was looking for something and I go to their tags, that is probably the time that *tagging has helped me* remember something I've seen...when I'm on someone else's tag space...I think that is when the tags are helping me find something I think I can remember.

Lorenz continued to elaborate, and clarified his remarks:

I think that because I'm remembering an idea from a paper, the tags seem to reflect an idea in a paper or they trigger a memory better than say a title or something else. So between the person's space and their tags, I was able to find the paper that I'd read and just sort of glanced over and go back and get information from them. I can't really say why that is, except maybe it is just remembering a location and a few key words is enough to kinda jog the memory.

When the interviewer questioned what he meant by "jog your memory?", Lorenz responded:

It is just something that happens. You see a word and it just allow me, it triggers a memory that, 'oh yeah, that's the paper, or that's the idea that is similar enough to what I am thinking about in my head, maybe that's the one.' I was usually pretty good about two or three papers and I'd find the one that I was thinking of. Sometimes it would require them searching through the paper but, at least it got me to find something I though relevant relatively quickly.

In response to the question, "Can you tell me about a time when you retagged something, he stated:

At this point, I can see most of my tags and most of the stuff I've tagged in one go. So, I haven't really seen a reason to retag something. Because the tags I have are working for me. I'm not saying that there is a better tag I would put to something or that I won't change.

In an analysis of the responses in this third and final interview, in which Lorenz stated that "the tags seem to reflect an idea in a paper they trigger a memory better than say a title or something else", the tags used in del.icio.us and CiteULike appeared to have provided a memory aid for Lorenz when he used these tagging systems to view his own tags. Based on an analysis of Lorenz's responses to an interview question, it appeared that he saw tags as "triggering a memory" regarding what the paper was about, and as valuable aids for memory to re-find content he had previously tagged. He did not perceive it necessary to go back and place new tags on content he had added to del.icio.us or CiteULike, the process referred to as retagging, as suggested by his statement that he had not "seen a reason to retag". Lorenz viewed the tags he used to be sufficient, saying, "the tags I have are working for me", but it was unclear what role his problems with accessing del.icio.us due to dial-up technology difficulties may have played. Therefore, for Lorenz the process of tagging in CiteULike had served as a memory aid and generated ideas regarding the content of the article's bibliographic information.

4.8.2 Lorenz's individual tagging strategies using CiteULike and del.icio.us

With CiteULike, there appears to be two reasons why Lorenz tagged. In response to the question, *Can you talk/show me through the process of how you tag?*, he stated:

...I will be reading a paper. And I go, "oh". This is kind of interesting, I want to put it in my space. So, I would have already read, some of the paper, or enough of the paper, so that I would know what it is talking about, and the kind of gist of the flow of the paper.... The other way, is when I am just looking at titles of papers and I just want to kinda put in my space to read later. I do not really know exactly what they are about, so I just sorta rely on the title and say "I want to review this and I want to review it for this" and the tag will be for the thing I want to associate with it and read about it later.

Lorenz did not express a need for using del.icio.us, instead he stated that he used his Internet browser bookmarks to save information. In response to the question, "Can you talk/ show me through the process of how you tag?", he stated:

...I'm associating [del.icio.us] more with webpages only. I prefer using my [Internet browser] bookmarks and the way I have been organizing them before. I haven't found the extra step of going to del.icio.us is giving me anything when organizing the kinda sites that I want to look at.

... I find that I am not trying to extract a whole lot of information from

websites. It is much more, it is guiding me to something else, another paper, which I'll put on CiteULike. Or I'll put it in my RSS feed, it is information that is changing regularly. *I do not necessarily need to tag it because I can leave it on its own and do a newsfeed on it.*

In an examination of the interview responses of this final and third interview, Lorenz stated that tagging in CiteULike occurred when he would be "reading a paper" and would put it into his CiteULike library, if "interesting". Lorenz appeared to be using CiteULike to store and tag papers that he wanted to remember because he read them or wanted to learn more about them after he read their title. His del.icio.us usage stopped as he stated he was not benefiting from the extra step of tagging content rather than using his Internet browser or an RSS reader such as Google Reader (http://reader.google.com) for the organization of content. Lorenz used CiteULike to store information about papers that might allow him to see their connections with other papers. At the time of the study, CiteULike had a visualisation tool that would show papers and articles that related to one another, based on their bibliographic information and their respective tags. It should be noted that this tool is no longer a part of the CiteULike interface.

Underlying the Internet activity of Lorenz is the fact that he only accessed the Internet at home using dial-up. Therefore, it can be understandable that the time spent waiting for del.icio.us pages to load when interacting with the environment either to add content or view the del.icio.us pages of other members, could be considered excessive compared with using his Internet browser bookmarks to store URLs of interest. As a student, time was an important factor for him.

Regarding CiteULike, Lorenz found value in using tags that were representative of ideas that have been extracted from a paper he had read or scanned the title of. Recall he said that would "put [a paper] in his [CiteULike] space to read later". In addition, these papers would connect to papers others listed (based on usernames with the same paper in their home library). Recall that during the period of the study, CiteULike had a visualisation tool that would show papers and articles related to one another across different usernames and their libraries. The benefit of visualizing these connections across CiteULike libraries meant that an added paper could connect Lorenz to members that also had saved the same paper's bibliographic information in their library. This might result in Lorenz discovering another user he had commonality with. This final interview revealed that when Lorenz used CiteULike, he added papers he had read so that the tags would be associated with the content and would enable him to visualize connections with other members through these papers. However, as observed in Table 4 in 4.1 Introduction and as noted by Lorenz, he no longer using either CiteULike or del.icio.us as the items in each library remained unchanged from the time of the second interview in March to this final interview (May). Therefore, as stated by Lorenz, the home dial-up network with his home computer curtailed the speed with which he could access the Internet, so he preferred to save pdfs to his

computer rather than CiteULike and chose to use his Internet browser bookmarks to save URLs rather than del.icio.us.

4.9 Discussion of Lorenz's tagging strategies in terms of social capital theory

Recall that Interview 1 took place in February, Interview 2 occurred in March, and Interview 3 was in May. In the interviews, Lorenz's discussion of his behaviour indicated individual actions regarding his limited use of del.icio.us and CiteULike primarily due to the fact he only accessed the Internet via dial-up on his home computer. For Lorenz to benefit from the use of CiteULike over time, he believed he needed value out of the service so that the extra time spent adding content would help him connect related articles. Lorenz did not understand what it meant to tag in del.icio.us and CiteULike and was waiting until he needed to conduct research for a class project. He believed a tagged article or URL needed to be read to determine what an appropriate tag would be. Lorenz felt he needed a purpose to use CiteULike. As Lorenz did not state sharing his del.icio.us or CiteULike libraries with anyone else, he did not appear to enhance social capital among his friends or classmates.

As previously stated, bridging social capital (Granovetter, 1982; Putnam 2000) related to the loose, informal links between people (e.g. fellow classmates) that may share relevant information with one another. In contrast, bonding social capital (Putnam, 2000) existed between individuals that had an emotionally close-knit bond (e.g. close friends or family). As social capital theory (Putnam, 2000) did not have concepts to explain Lorenz's

individual behaviour, his actions were not conducive to enhancing bridging or bonding social capital.

It is possible that social capital theory could explain Lorenz's actions at a future point, because of his experiences with del.icio.us and CiteULike. For example, his knowledge of del.icio.us could help a family member that wanted to share URLs online for a group work project. His exposure to CiteULike could benefit another student that needed assistance seeking reference information for a research paper. In addition, at a future point he could use del.icio.us to seek out a job or internship by clicking on usernames associated with topics in his area of interest and contacting these individuals via email regarding possible employment opportunities. Therefore, although these tools did not appear to be used to enhance Lorenz's social capital in this study, his knowledge about these tagging systems may be beneficial at a future point to enrich Lorenz's relationships with others and his social capital among them.

4.10 Christoph: Exploring tagging systems as a learning environment

Christoph was a BC high school math teacher that had prior experience using his Firefox Internet browser bookmarks. The initial questionnaire in February prior to the first interview that month revealed that Christoph had not used either del.icio.us or CiteULike before this study. In February the first interview with Christoph took place. At the time of this interview (see Table 4 in *4.1 Introduction*), he had sixty items in his school del.icio.us home page and six items in his school CiteULike library. Some of the

items from the school del.icio.us home page were from a del.icio.us account (27 items) that he created at the beginning of the course for himself.

In response to the question, How do [Internet] browser bookmarks compare to del.icio.us?, Christoph states why he preferred using tags in del.icio.us rather than his Internet browser bookmarks:

I like the fact that the tagged information spaces, you can give more than one tag to a thing, so if you looking at fractions and you want to be at a grade 8 level, then you can find both of those tags together so it kind of separates out their information, where as with regular bookmarks, they are set up that I have MathEight, 9, 10, 11, 12 and calculus bookmarks and in each one, I have a sub-folder and another sub-folder, it is a better system to use the tagged information spaces and more [kind of an] integration between things in grade 8 as well as grade 9 maybe in a slightly different way.

Christoph in response to the question, Could you explain why you created this tag? stated he used a common tag [PS100] (a pseudonym) associated with his school name:

Again, I do not have a lot of experience with this so I thought, it is better to put in a [PS100] tag for all of the things we've done, if anybody groups things they can just come across this entire [PS100] theme or page. But I do not know if there was not anyone else already using the tag "[PS100]".

Christoph noted he saw potential benefit to expose del.icio.us to the students in his school. In response to the question, *Will there be a benefit to using del.icio.us for your students?*, he stated:

Absolutely. Instead of having to log into WebCT [an online virtual learning environment] and look through each unit in the document and then hyperlink to whatever text is for that unit, perhaps the students can go into [our del.icio.us account] click on the MathEight bundle, perhaps even make unit bundles within those bundles and make unit bundles. It is like having a hyperlink document up on WebCT that they can go to without having to log into WebCT.

In response to the question, How you joined any [CiteULike] groups?, Christoph stated:

For me [my personal del.icio.us account] was a learning site....After I played around for a while, I was thinking to myself, hey it might be a good idea to make it up a [school del.icio.us account] and then have all of these bookmarks so that if any of these teachers found a site [of interest] rather than email me [that particular link], they could just tag it and go.... I became a member [of CiteULike] so that I could post. I find it very hard. I can't even... Once I get to the CiteULike page and click on me there, there isn't one group where I can with one click enter in any group I want.

In an analysis of the data from the questionnaire and this first interview in February, Christoph said that he never used del.icio.us or CiteULike before the study began. Compared with Internet browser bookmarks Christoph spoke about how he could add multiple tags (e.g. science, math, geometry) to his del.icio.us posts, which he stated was "more efficient" than using his Internet browser bookmarks folders. It appeared that as a teacher, Christoph explored how del.icio.us and CiteULike could best benefit students in his school department by creating school accounts in each tagging system. Recall that Christoph also expressed frustration trying to figure out the group functions in CiteULike, and noted that he could not just "with one click enter in any group [he] want[s]". Christoph continued to explore the value of del.icio.us, although he did not understand CiteULike functionality. Therefore, Christoph focused on understanding how del.icio.us and CiteULike could benefit students and teachers at his school.

4.11 How Christoph's del.ico.us experiences may benefit school departments

At the end of March, a second interview took place one month after the first interview in February. At the time of this second interview, Christoph had 61 items in his school del.icio.us account and six items in his school CiteULike account (see Table 4 in 4.1

Introduction). At the beginning of the second interview, Christoph noted that following a school math department meeting, the different school departmental subjects would start using the school del.icio.us library based on his recommendation. In response to the question, *"Since we last spoke have you been using del.icio.us?"*, Christoph stated:

[The plan to use del.icio.us] has been taken to all the dept meetings (like the curriculum leaders meeting at the school) so that all the departments will use /[PS100]/English /[PS100]/Math /[PS100]/french to put everyone on this master site and it could be pretty neat...

A departmental meeting let to an expressed desire to expand the use of del.icio.us to all the school departments. Christoph stated the benefits for posting content on del.icio.us for his department, "If I find something cool, so does everyone else in my department so it is easy for the kids to log on and see what everyone else has found". In response to the question, *"Have you noticed any changes in del.icio.us since we last spoke?"*, he said:

I need the Internet working and I need that site to be working in order to use it and if that site ever went down, all of a sudden I would have no bookmarks. Or if the Internet did not work one day, like with my personal bookmarks, I can cache pages so I can use it offline and it is java applet, with del.icio.us I need the Internet in order to go in and get a [del.icio.us] page A concern for Christoph was that del.icio.us could only be accessed online. If the Internet was not working during class, then the school del.icio.us library would not be available and valuable class time would be lost. Christoph noted that with URLs saved to his Internet browser bookmarks he could still access them offline.

In this second interview in March, Christoph stated that he longer used CiteULike, which was confirmed in an observation of his CiteULike library; the number of items stored remained unchanged (see Table 4 in 4.1 Introduction) since the first interview in February. In response to the interviewer question, *"Have you noticed any changes in del.icio.us since we last spoke?"*, he said "I don't use CiteULike, I just got frustrated with it as it wouldn't pick up a lot of the things we would want to find so I downloads pdfs". Rather than try to understand how CiteULike worked, it may be that his limited time as a graduate student and teacher restricted the time he could devote to understanding it.

In an analysis of the second interview notes from March, there appeared to be a drawback when Christoph realised that del.icio.us could only be accessed online, as he might not have access all the time at school. In addition, he expressed frustration with understanding how CiteULike worked and subsequently stopped using it. It appeared in this second interview (March), Christoph continued to use del.icio.us for the organisation of school material for his department with a future objective to expand to other departments at his school based on a collective go-ahead from a departmental meeting.

Therefore, it appeared that Christoph saw the social value of using del.icio.us in his school environment to assist his fellow teachers.

4.12 The continued value of del.icio.us for Christoph's school

Recall from the first interview in February and the second interview in March that Christoph created a school del.icio.us site, developed a strategy for maintaining common tag names, and began to let teachers within his department and his school departments be aware of the positive benefits of incorporating del.icio.us as a tool for information sharing. In early May, the third and final interview took place for an hour. Questions asked in the interview included: What environments do you see incorporating tagging in the future? How do you know how to use [del.icio.us and CiteULike]? Do you observe any differences in the tagging behaviour of others that differ from your own? At this time (see Table 4 in *4.1 Introduction*), Christoph had 135 items in his school del.icio.us account and six items in his school CiteULike account. Two themes emerged from Christoph's del.icio.us usage as shown below.

To better understand the functionality of del.icio.us, in response to the question, "Do you self-identify as a newcomer, regular, or expert?", Christoph stated:

I'm still learning. I'm a beginner. I don't know how much more there is to the site. I've read all the help things and played with the site and tagging in general, I think I'm fairly new at, but it's not difficult to pick up.

When asked the question, *What is your motivation for starting del.icio.us?*, Christoph began by discussing how he created a school account when the course started as a tool for sharing bookmarks. Immediately he saw the benefit for his department and began adding URLs and tagging them with both his school and department tags. Christoph noted how other departments in his school could benefit from del.icio.us when he said:

One of the problems that we were having was with sharing our resources, so we could send our bookmark lists to one another, but I was in charge of finding cool websites and things like that and then having to share it with everyone else, and email them each time I found a new site was totally impractical as they would email me saying 'Could you pass it to our lists of bookmarks?'

We had kept a web document, and not even a web document, that's on our shared drive that we could all access and then type in a new website as we found it. You could type the URL right into the document, so del.icio.us became a way that we could log into one site and as long as we logged into the same site [same username and password] we could contribute, so it took a little bit of organisation on my part to get it started and explore with it, which I learned about in [my school course] and played with it and then to actually get it to be useful and worthwhile I needed to get the other teachers to learn to use it and we need a coding system, the tagging system that actually made sense to everyone.

Christoph first saved content to his Internet browser bookmarks before it was added to del.icio.us. In response to the question, *Can you tell me about a time when the design affordances and tools have influenced how you tag?*, he stated:

I do not tag right away and I haven't tagged right away because I [kind of] want to make sure that whatever goes up on del.icio.us are things that we actually use. So I will bookmark things into a general bookmark and then explore it for a bit and make sure that it is good and then put it up on del.icio.us.

Christoph felt that a system was needed to provide uniformity in the department among tags. Rather than limit the use of del.icio.us to his department, he noted the collective advantages of adding other school departments. In response to the question, *What is your motivation for starting del.icio.us?*, he stated:

So I approved of the way we tagged everything and placed restraints on some of our tagging features, and some of the keywords that we would have to use so that they would make sense when a student used them a year from now or when we wanted to develop it further across the whole school. My intent was for the math department, but I quickly realised that if we built it the right way to start then the French dept or the English dept could use the same del.icio.us account and teachers could all be logging in as long everyone used the correct tagging procedure to organise the website.

Christoph, however did not use the del.icio.us Notes field to add comments about the posted URL. In response to the question, Why haven't you used [the del.icio.us Notes field], he stated:

For me, most of the sites, the actual title is description enough and the same for my colleagues, if the title is fractions with online manipulative, there is nothing like that, then I do not need to put a remark that says 'this is a good site'. I wouldn't have bookmarked it if it was not. Or, 'this is a site that uses manipulatives and fractions' because it is in the title. So I haven't actually found a use for putting the remarks down.

Christoph did not access another member's del.icio.us library. In response to the question, *Do you observe any differences in the tagging behaviour of others that differ from your own*?, he said:

The funny thing is, I haven't actually looked at another site that another person has created. Everything that I have done on del.icio.us has been
stuff that I have put up and tagged...No I do not, I haven't looked to see how people are tagging.

When asked the question, *How has your tagging behaviour changed over time?*, Christoph discussed how his tag descriptions had improved:

I think I am more detailed. I think in the beginning, tags were math and [school tag] and now I have to know exactly what unit (e.g. fraction) this is going in. I am creating more tag areas or tag descriptions so that I can know more precisely what it is that is on a certain page or if I search for a certain thing, I am going to get all of the criteria I am searching for, I am adding more information to the tags, I am adding more tags to the listings.

In response to the question, Do you see your retag or reuse of your tags changing in the future?, Christoph stated:

I do not tag right away and I haven't tagged right away because I [kind of] want to make sure that whatever goes up on del.icio.us are things that we actually use. So I will bookmark things into a general bookmark and then explore it for a bit and make sure that it is good and then put it up on del.icio.us. Right now I am still in the process of sorting through, I think right now I am only half-way through my Grade 9 bookmarks

Therefore, Christoph developed a strategy to keep his tagging organised to benefit benefit himself and others that might visit the school del.icio.us site.

In an analysis of his responses to the interviewer questions from this third and final interview, Christoph recalled being the person responsible for sharing resources at his school and the impractical method of emailing lists of Internet browser bookmarks to other teachers they previously used. Then the school began to use a web document on a shared directory, but that did not have the ease of del.icio.us in enabling everyone to access it at the same time as well as add URLs seamlessly. Christoph took the initiative and realised that del.icio.us provided a platform superior to WebCT or a website with links as a common platform for information organisation. With del.icio.us he was able to create a resource for organising and sharing math and science content with fellow teachers. Recall how he viewed del.icio.us as a space for sharing resources between teachers where everyone that logged in with the same school username could contribute to the school del.icio.us page.

Christoph self-identified as a "beginner" and remained focused on testing out different features in del.icio.us as well as keeping up to date on the help sections. The departmental meeting resulted in an action plan to expand del.icio.us usage to all of the school departments. It appeared that Christoph wanted to remain informed on existing

and new aspects of del.icio.us to be of assistance to other teachers or students when questions arose. This would allow him to share the value of del.icio.us to the various school departments as needed.

4.13 Christoph's social and personal actions in terms of social capital

Social capital is defined in terms of bridging social capital and bonding social capital according to Putnam (2000). Bridging social capital (Granovetter, 1982) is linked to weak ties (e.g. work colleagues) that are advantageous for the diffusion of information and for "better linkage to external assets" (Putnam, 2000, p. 22). It can be beneficial in drawing people together around a common concern who usually do not interact with one another and allow them to participate in information sharing while developing the ability to cooperate together (Cowan, 2006, p. 250). Granovetter (1982), an economic sociologist, noted that when individuals are looking for employment, weak ties that connect people to distant associations were more valuable than strong ties of bonding social capital that provide links to one's network of family and close friends. Bridging social capital does not provide the opportunity to draw emotional support from these connections, as their value is in information distribution among these connections (Granovetter, 1982; Cowan, 2006; Williams, 2006).

In contrast, according to Putnam (2000), bonding social capital provided the glue between people of a community typical to those relationships that are emotionally tight such as family members and close friends, while bridging social capital enabled

communities to connect with each other as needed for the sharing of artefacts. Bonding social capital is defined by Putnam (2000) as being exclusive, while bridging social capital is inclusive. The backgrounds of these close relationships, although similar, resulted in strong personal ties and a greater breadth compared with bridging social capital where the weak ties of one's network had little depth, but a greater access to information (Putnam, 2000, Williams, 2006).

Recall that Interview 1 with Christoph took place in February, Interview 2 occurred in March, and Interview 3 was in May. An analysis of these interviews with Christoph revealed that he was not using del.icio.us to enhance bridging social capital with other del.icio.us members that were unknown, but rather using it to augment the loose off-line social ties within his department and other school departments. Students and teachers at Christoph's school could collectively benefit from the del.icio.us space, as more departments created their own tags, and as their del.icio.us homepage continued to emerge as a shared learning space. The school use of del.icio.us in this manner could conceivably allow them to acquire social capital from one another. In terms of social capital, the numbers of items saved in Christoph's CiteULike and del.icio.us library (see Table 4 in 4.1 Introduction) in and of themselves did not have meaning (Putnam, 2000). Whether there were six items or 600 items was not relevant, but rather that an account was created in order to develop or further enhance relationships with others. An analysis of the three interview notes found that Christoph actively engaged del.icio.us for this social purpose.

As a school-teacher, Christoph's objective for his school del.icio.us library was to provide a platform for sharing knowledge to his fellow teachers and students through: the use of a tag specific to his school; his assistance in getting other departments involved with del.icio.us; and his insistence on uniform tags for del.icio.us content within his department. According to social capital theory, these actions represented social strategies designed to enhance and help maintain relationships with others in one's network.

Christoph's social behaviour represented relationship-building as it related to these offline relationships with the other teachers at his school within the context of social capital theory, specifically bridging social capital. His fellow teachers, as co-workers would be expected to be part of these weak ties or the informal, loose network that could be accessed for information sharing with one another, such as science URLs. Strong ties as stated previously, involved the connections, which tie together one's family or close friends. During the interviews from February - May, Christoph never mentioned having family or close friends at his workplace, so in terms of social capital theory, it was unknown whether his tagging strategies also increased his bonding social capital at his school.

The focus by Christoph on his school del.icio.us page in which he spent time managing and creating tag names deemed of value for information organisation, represented strategies designed to enrich social capital, specifically bridging social capital. A positive effect of social capital in the school may be enhanced cooperation between the different

teachers as they collectively worked together for a common goal of educating students. According to Putnam (2000), workplace relationships are more likely to be "casual and enjoyable, but not intimate and deeply supportive" (p. 87). A positive outcome of social capital in the various departments at his school may be increased bridging capital, which could result in cross-subject collaboration (e.g. French teachers and math teachers) that ordinarily might not have taken place.

CHAPTER 5 CONCLUSION AND FUTURE RESEARCH

5.1 Introduction

In this section, I summarise the conclusions drawn from my project that used social capital theory to analyze and interpret post-secondary student usage of social media in the context of two university level courses. I begin this chapter by outlining the main findings from each student or unit of analysis. The findings are discussed in terms of the following research questions:

Research Question 1: What personal, individual strategies emerge from newcomers using tagging systems?

Research Question 2: What social, collective strategies emerge from newcomers using tagging systems?

The discussion is in terms of social media as well as social capital theory. To conclude, I suggested future research possibilities for social media research in the areas of livestreaming video and recorded video using a social capital theoretical framework.

5.2 Central conclusions of study

This thesis explored through a social capital theoretical framework and case study methodology, the strategies that emerged from three post-secondary students using del.icio.us and CiteULike over the course of a university term. There were five central findings:

The two main findings to emerge from a study of Shoshanna's behaviour using social media were:

- Shoshanna's perception of del.icio.us as a public vs. a private/public space appeared to have influenced her usage;
- Shoshanna employed social strategies by sharing her del.icio.us URLs with her real-world/off-line friends.

From a study of Lorenz's usage of social media, the following conclusion emerged:

• Technological limitations defined Lorenz's use of individual tagging strategies regarding del.icio.us and CiteULike.

Two major findings from a study of Christoph's behaviour were:

- Christoph developed tagging strategies for sharing math and science material through del.icio.us;
- Christoph created personal strategies for organisational management of del.icio.us tags.

These five central findings are elaborated upon in relation to the following research questions.

5.2.1 What personal, individual strategies emerge from newcomers using tagging systems?

Prior to the third and final interview, Shoshanna's usage of del.icio.us changed from social to exclusively personal when she decided not to upload personal URLs to her publicly visible del.icio.us library. Shoshanna expressed concern about the impression her friends might have if they viewed these personal URLs. To resolve this, Shoshanna stopped shared her del.icio.us URLs with her friends. Knowledge of the privacy feature in del.icio.us, which allowed members to hide uploaded URLs from the public (see *Appendix J Del.icio.us privacy feature*), would clearly have benefited Shoshanna and allowed her to continue sharing del.icio.us URLs of value to her close friends while concurrently adding personal webpages of interest to her.

When discussing his CiteULike usage, Lorenz appeared to gain value in using tags that were representative of the ideas he extracted from reading a paper in order to assist his memory about its contents. As del.icio.us and CiteULike became too slow to use because his home computer used dial-up technology, he saved content on his Internet browser bookmarks or downloading pdfs to his computer rather than access del.icio.us or CiteULike. Therefore, Lorenz's tagging strategies emerged out of his limitations in accessing the Internet with dial-up. Over the course of the study, Christoph became

more detailed in creating tag descriptions that best represented the content that has been stored by controlling what tag names were used. Christoph explored the different features in del.icio.us and kept informed about the help sections so that he could best determine how to tag appropriately. Therefore, Shoshanna, Lorenz, and Christoph each had personal strategies emerge from their tagging systems experiences.

5.2.2 What social, collective strategies emerge from newcomers using tagging systems?

Shoshanna shared her del.ico.us URLs with her real world friends until prior to the third interview in April. She wrote comments in the Notes field to help them understand that a website was interesting. Shoshanna expressed enjoyment in recommending her favourite websites to her close friends and felt that this behaviour would enhance her image among them. Lorenz did not appear to have any social strategies emerge from his use of these tagging systems. He did not indicate in the interviews that he shared his del.icio.us or CiteULike libraries with anyone else, nor did he discuss accessing the libraries of any other members. His lack of social strategies may be attributed to technical limitations as his home computer only could access the Internet using dial-up.

Christoph was in charge of sharing math and science resources in his department and found that the current method of distributing resources between teachers to be impractical. He saw that del.icio.us enabled everyone using the same account to have simultaneous access with an easy approach to adding URLs. Perhaps, because of his role

as a teacher, he naturally used his emerging knowledge of del.icio.us to create a system that made del.icio.us useful for sharing information in his department. Therefore, both Shoshanna and Christoph developed social strategies for sharing their del.icio.us content.

5.3 Discussion in terms of social capital theory

Putnam addressed the social capital phenomenon in terms of a bonding-bridging dichotomy (Putnam 2000; Putnam & Goss, 2002). Bridging social capital brought people together that were not similar to each other through social networks (e.g. a sports club) while bonding social capital referred to social networks that reinforce close ties of people with similarities in key attributes (e.g. race, age, gender) (Putnam, 2000; Putnam & Goss, 2002). Shoshanna, Lorenz, and Christoph are discussed below in terms of social capital theory, first bonding social capital in terms of Shoshanna, followed by Lorenz, and ending with Christoph in relation to bridging social capital.

Regarding bonding social capital, an analysis of the first two interviews with Shoshanna in February and March, revealed that she shared her del.icio.us URLs via email to her close real-world friends. These strategies suggested the development of bonding social capital in order to maintain her off-line relationships. Recall from the interview discussions that Shoshanna's friends were not members of del.icio.us, nor her fellow classmates. The rational behind her behaviour may be because she desired to bank her social capital until needed in the future. This reciprocity within strongly tied

relationships as found in bonding social capital may be especially beneficial to Shoshanna as a graduate student with her limited time and extensive responsibilities.

An analysis of the interviews with Lorenz revealed that his behaviour could not be explained by social capital theory. There was nothing to indicate in the interviews that Lorenz used strategies to show he was focused on enhancing his social capital with others. As Lorenz did not state using any social strategies, it should not be expected that social capital theory would be able to explain his behaviour. Although, it is possible that his knowledge of these tagging systems may enable him to enhance his relationships with others at a future point in time (e.g. job hunting, helping another student understand CiteULike for a research project bibliography), the social capital theory does not seem to account for those exceptions about future actions. In addition, further exploration in this area regarding potenital future social capital is beyond the purview of this thesis.

In terms of bridging social capital theory, an analysis of each interview in February, March, and mid-May with Christoph revealed he was using del.icio.us to enhance bridging social capital within his department and by extension his school. Organisational relationships were more likely to be "casual and enjoyable, but not intimate and deeply supportive" (Putnam, 2000, p. 87). Positive outcomes of social capital in Christoph's school may be enriched cooperation as his fellow teachers collectively worked together to educate students and a platform for future cross-subject collaboration (e.g. French teachers and chemistry teachers) could emerge that ordinarily might not have taken place.

These findings from Shoshanna and Christoph suggest that social media is valuable in building or maintaining offline relationships with close friends as observed in Shoshanna's usage over time, as well as colleagues as shown in Christoph's use over the term of the study. Shoshanna's findings showed that by sharing her del.icio.us URLs she focused on providing website recommendations in order to maintain her real-world relationships with these friends, resulting in enriched bonding social capital. Christoph's findings suggest that the creation of a del.icio.us account for his school department would allow fellow teachers to benefit from accessing this information space for shared learning and enhanced bridging social capital.

5.4 Implications of study for social media research and development

This thesis was the first to apply a social capital framework to tagging systems research adding to the literature of Facebook (Ellison, et al., 2007; Steinfield, et al., 2008) and MySpace (Gibert et al., 2008) in which social capital was used to explain social media behaviour. If social capital was declining within society due to media taking away time from face-to-face interactions as my interpretation of Putnam (1995; 2000) suggested or as Putnam (2000, p. 18-20) stated, social media may be able to counter this decline by developing and enriching relationships, both real-world and online.

By understanding how people use tagging systems and the way behaviours may increase social capital, this could lead to insights for developing social capital models that

enhanced knowledge and built relationships in social media. However, the influence would not be limited only to the online space – students could increase social capital among their fellow students, a teacher could increase social capital among their colleagues, an entrepreneur could build connections beyond their immediate geographical area. As shown in the findings of Shoshanna and Christoph, each used del.icio.us to enhance their real-world social relationships rather than online connections.

As social media emerged over the last five years as a place for building relationships and sharing conversations between other members, it is important to explore how social capital might be influential, so that if social capital is declining within society, we can determine how social media could counteract this decline. The value of social media in increasing social capital may be simply experienced through membership (e.g. simply signing up as a Flickr member) or it may be that active membership (e.g. commenting on another member's photo on Flickr) was necessary for social capital to enrich relationships. To conclude, future research ideas regarding video technologies with a social capital framework are shared.

5.5 Video technologies as areas for future research

As video technologies becomes more pervasive within our society they are increasing used as a communication tool to disseminate information in real time. The use of streaming video with Instant Messaging, mobile phones to capture live concerts, and digital cameras to record personal events suggest that people are continuing to use

technologies to capture and share episodes and events in one's everyday life using shared digital platforms. I would like to suggest two possible PhD studies that would extend my social media research into the areas of: live-streaming video and recorded video using a social capital theoretical framework.

Broadcasters on live-streaming video sites such as Blogtv.com (http://blogtv.com), Ustream. Tv (<u>http://ustream.tv</u>), or Justin.tv (<u>http://justin.tv</u>) are referred to as lifecasters because they use live video through a webcam to expose their everyday life to the viewing audience. These lifecasters can be observed online in real-time sharing mundane activities such as doing homework, eating, or chatting with people in their personalised chat room. Over time, relationships can develop between these lifecasters as well as the regular visitors to their chatroom. In addition, some lifecasters will use additional social media (e.g. YouTube or MySpace) to enhance their connections with these friends and followers. An ethnographic study would explore the role that this lifecasting behaviour might play in their real-world and online relationships. Data would be gathered through interviews, questionnaires, and an analysis of the environments where lifecasting takes place. Possible research questions could be: How does lifecasting affect one's existing real-world relationships? What effect does this form of social media have on social capital? What types of relationships develop through this lifecasting activity?

YouTube (n.d.) (established February 2005) is a free digital video streaming service with the tagline "Broadcast Yourself" that enables people to watch, comment on, and rate

videos (homemade or commercial) posted and shared by members using digital cameras and cameraphones. There are examples of these members expressing themselves through their channel to share their creativity such as singing or playing music. It is unknown what motivates these people to create these videos and express themselves in this way. Possible research questions could be: How to people use music within YouTube to express their self-identity? How do relationships emerge through YouTube between members and the audience? The objective of an ethnographic study would be to gather data through interviews and recorded video logs in order to explore how music is being used to facilitate relationships through YouTube.

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APPENDICES

Appendix A The advantages of tagging

- Tagging includes the vocabulary of everyone both common and diverse viewpoints (Kroski, 2005).
- Tagging benefits the novelty factor as one can measure rise and falls in popularity of tags and tagged content as Golder and Huberman (2006) has found that some URLs were rediscovered after a significant time in del.icio.us resulting in a spike in popularity.
- They are current, flexible, and are able to adapt to changes in vocabulary, culture, political changes (Kroski, 2005) (e.g the emergence of the term ajax in del.icio.us) (Speroni, 2005).
- Tagging promotes serendipitous discovery of unexpected content (Kroski, 2005) (e.g. like finding a book one shelf over in the library that really gave your thesis direction).
- Tagging is non-binary as content does not need to fit into an existing category as in a traditional Library of Congress system but uses a multi-faceted process involving multiple descriptors if desired. (Kroski, 2005).
- Tagging is democratic and self-monitoring as people choose appropriate descriptors that will facilitate memory in the future while aware of the social dynamics when the content is added to collective, shared environments (see Sifry, 2006) discussion of technorati tagging).

- Tagging follows "desire lines" as they reflect the thoughts of the users in how they organise content (Kroski, 2005)
- Tagging provides the opportunity to study ethnographically people's behaviour that tag in addition to explore tagging patterns that emerge (e.g. see Golder and Huberman's (2006) study of del.icio.us tag patterns)
- Tagging can empower community behaviour as tagged content is visible to others (e.g. on 43 Things, 2009) one can cheer on others in reaching common goals) (Kroski, 2005)
- Tagging is here to stay. They are becoming integrated into digital and physical landscapes so best to learn to adjust to them (Kroski, 2005).
- Tagging is useful for memory recall to re-find something seen previously (Surowiecki, 2007)

Appendix B The disadvantages of tagging

- Lack of synonym control, no control over plurals, acronyms (e.g. ETEC 533, 533, SISO) (Kroski, 2005)
- Since a single piece of digital content may have multiple tags or a single tag may be associated with different meanings, the retrieved results of a certain query have a greater likelihood of being noisy (low in precision) and incomplete (low in recall) meaning that as Sterling (2005) notes, "a folksonomy is nearly useless for searching out specific, accurate information, but that's beside the point"
- Tags may not be good for ontologies such as a traditional hierarchical system for classification by subject with a controlled vocabulary such as the Dewey Decimal System (Mathes, 2004).
- Open to spamming and other malicious behaviour (Kroski, 2005)

Appendix C Flickr photo UBC campus



Add your comment

(Some HTML is OK)

PREVIEW OR POST COMMENT

View recent comments / Comments you've made



Uploaded on December 1 2007

tyfn's photostream



This photo also belongs to:

First Snowfall in Vancouver (Set)





- UBC (Set)



- + Vancouver (Pool) (3.
- + UBC (Peet)
- Canon EOS 400D (nka. Rebel XTL) + KISS Digital X) (Pool)
- + Canon EF 50mm //1.8 (ll(Pool)

Tags

- 3 spc vancouver
 snow

Add a tag

Additional Information

💬 🛞 🕑 Some rights reserved. edit) This photo is public (edit)

- Place this photo on a map
 Taken with a Canon ECS Digital Rebel XTi
- More properties Taken on December 1, 2007 (edit)
- Photo stats
 2 people call this photo a favorite
- viewed 65 times. (Not including you)
- Edit title, description, and tags
 Replace this photo

Flag your photo



또했다.오. Deutsch English Español Français 관금 Italiano Portugués

Appendix D Initial questionnaire

- 1. What gender are you?
- 2. Which age group are you?
- 3. Do you use the bookmark feature on your internet browser?
- 4. Do you separate bookmarks into folders?
- 5. What types of organizational tools do you use such as a calendar or daytimer?
- 6. Do you have any experience with del.icio.us?
- 7. If yes, how much (how many urls ahave you stored)?
- 8. Do you have any experience with CiteULike?
- 9. If yes, how much (how many URLs have you stored)?

Appendix E Interview 1 (10 minutes)

- 1. What tagged information spaces do you use?
- 2. How have you used tagged information spaces recently?
- 3. Did you learn anything new?
- 4. How do you tag information found online?
- 5. Will you continue to you tagged information spaces?
- 6. Could you explain why you created these tags?

Appendix F Interview 2 (10 minutes)

- 1. Since we last spoke, how have you used del.icio.us?
- 2. Has your behaviour changed since January, have you learned anything new?
- 3. Have you noticed any changes within the del.icio.us interface since January? Opinions?
- 4. How has your organisation of bookmarks changed from your use of del.icio.us?
- 5. Since we last spoke, have you used CiteULike?
- 6. How has your organisation of digital articles changed from your use of CiteULike?

Appendix G Interview 3 (1 hour)

- 1. Personal story about how began tagging
- 2. Motivation for starting
- 3. Why do you use tagging systems?
- 4. How do you know how to use the tagging systems you use?
- 5. Do you self-identify as a newcomer, regular, or expert?
- 6. Average number of friends that believe also use tagging systems?
- 7. Do you use tagging systems to refind/reuse information you've saved?
- 8. Can you tell me about a time when you retagged something?
- 9. Can you tell me about a time that you discovered something new through tagging?
- 10. Can you tell me about a time when you used tagging systems to find information you've tagged?
- 11. What features/tools in tagging systems do you use to help you reuse your information? Can you provide a specific example?
- 12. What features in del.icio.us/CiteULike would help you organise your information?
- 13. How has your tagging behaviour changed over time?
- 14. Can you provide an example of a critical event or 'aha' moment?
- 15. Has using tagged systems changed how you organise information?
- 16. Can you talk/show me through the process of how you tag?
- 17. Can you provide examples of when you determined to tag something vs. ignoring it or bookmarking it?
- 18. What are the advantages and disadvantages over other organisational systems you use?
- 19. Can you tell me about a time when the design affordances and tools have influenced how you tag?
- 20. What tools do you use to tag (e.g. del.icio.us extension)?
- 21. Can you tell me about a time that you used strategies to tag?
- 22. Can you provide an tips on better ways to tag?
- 23. Can you tell me about a time when you wanted to do something in del.icio.us/CiteULike but found it difficult or it worked differently than you thought?
- 24. Can you tell me about a time when you used a feature/tool differently than how it is intended to be used?
- 25. How does del.icio.us use differ from other tagging systems you use?
- 26. Do you observe any differences in the tagging behaviour of others that differe from your own?
- 27. What applications do you use to share information?
- 28. Do you share your tags with others specifically (e.g. friends/colleagues) or create groups?
- 29. Do you use tagging systems to share content or organise content?

- 30. Can you tell me about a tie when you had content you wanted to tag but not share? How resolve?
- 31. Does the public space of tagging systems influence how you use it?
- 32. How do you share information?
- 33. Can you tell me about a time that a strategy was used to help you others find your tagged information?
- 34. Can you tell me about how you use the interface to search for information?
- 35. Can you tell me about a time that you were encouraged to click on another username or tag?
- 36. Do you tag within or outside the tagging space?
- 37. Can you tell me about a time, your navigation took you outside the tagging system?
- 38. How do you see del.icio.us and CiteULike aging?
- 39. Do you see your retag/reuse of tags changing in the future?
- 40. What environments do you see incorporativing tagging in the future?
- 41. What wil it take for tagging to be more adopted by the masses?
- 42. What features do you wish existed in tagging systems you use?
- 43. What need does tagging fulfil for you?
- 44. Can you provide an example when you benefited from del.icio.us or CiteULike?
- 45. What is the value of information sharing?

Appendix H CiteULike user interface

Figure 12 How to add article to library, July 22, 2008



When a member finds an online article of interest there are three ways they can add it to their personal library (see Figure 12). By installing a "post to CiteULike" browser button and clicking or if the "post article from web page" drop-down menu is selected, then for articles that are supported by the system, by posting an article, metadata such as the title, author, journal, year, and page number is automatically extracted. If "post manually" is selected, then all the bibliographical information must be added by the user. For example, if the reference is based on a video interview, personal communication, or if the journal matches the recognized list in the CiteULike directory, then this option can be chosen. Rather than archiving the actual paper, only a link to the location (e.g. ACM digital library or PubMed) is stored. Each paper that is added appears on the main page (see Figure 13) displaying recent papers added by everyone as well as in one's personal library. The following information is displayed with each paper: title, author name with initials, author-generated tags, username that uploaded papers, anticipated reading status as stars (1-5, 1 meaning "I do not really want to read it" to 5 meaning "Top priority!"), a hotlink displaying, if any, the number of users that also have the paper in their library, and the date and time that each paper have been uploaded. Articles can be exported to one's BibTex or Endnote.

Figure 13 CiteULike home page, July 23, 2008



At the top are 5 drop down menus. Under CiteULike, users can view recent news (e.g. release of IEEE Digital Library plugin), *CiteGeist* showing popular posts over the last month based on frequency with which the article has been posted, Discussion, provides a forum for members to discuss topics (e.g. printing a ref with notes and abstract), Invite Your Friend is a text box where users can invite their friends to CiteULike by providing an email address and text message. Under Journals, users can browse the articles from the most recent version of the journal. Under Groups, users can search for a group name (e.g. Psychology), which will return all the group names that match with an option to join. The My CiteULike' tab (see Figure 14) will display the user's library of articles, their groups, their watchlist, which are users, tags or authors that are being followed, personal profile visible only to user (default is email address and date joined), my connections, which displays correspondence (if any) with other users, neighbours shows usernames that have also saved the same article as the user order by frequency of article (e.g. ijones, 35), and My Blog is where a user can create blog entries. The main page displays some of the recent papers that have been posted by members.

Figure 14 My CiteULike	menu,	July	22,	2008
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Post Article -	My CiteULike -	Journals 🔻	Groups 🔻
Librar GE nce, My li Recent	Library Groups Watchlist Profile Connections Neighbours Blog	Recent Unread Search Authors Tags Export Import	Blog xport Imp

Under Library, Recent displays the user's library, Unread shows articles in order of importance as marked by the user (e.g 5 stars = very important), Search is for a user to browse their library, Authors displays the author names in alphabetical order with larger fonts meaning more frequently attached to posted articles, Tags displays tags used in alphabetical order with font size signifying frequency used. Tags may also be renamed or deleted. Export will export the user's library as a BibTeX and Import will import a BibTeX or RIS file. On the right column are the most active tags used by the members ordered alphabetically. Tags used more frequently have a larger font and a filter box will narrow down the list to match only letters placed there.

Figure 15: Posting to CiteULike, July 23, 2008

Title:	Identifying the influential bloggers in a community
Abstract:	none
Authors:	Agarwal N, Liu H, Tang L, Yu PS
Tags:	blogging socialmedia commuity intern
	Note: This is just a list of keywords which you'd like to associate with the article,
Suggestions	i: internet
	Press tab key to autocomplete
Þ	186 tags in your library
Post to:	🗹 Your library
Priority:	I might read it!
Privacy:	Don't let other people see that I've posted this article
▶ Notes:	
PDF:	Browse)
BibTeX Key:	

Figure 15 shows the displayed page when an article is posted by a recognised journal. Bibliographical information is extracted such as metadata for example, title, abstract (if any), and authors. Users can add keywords as tags for personal benefit that they would like to associate with the article. The article can be posted to a user's library or just sent to the main page. If desired, the article can be kept private. Notes can be added visible to anyone. A pdf can be uploaded and if a BibTeX Key is available, they it can be added as well.

The CiteULike classification system is based on tags as a user-generated organisational model using keywords that are meaningful to a user. On each article it is possible to see the other users that have also posted the article and their respective tags. Users are able to navigate through tags and members can experience discoveries of new literature serendipitously that ordinarily might not have been found. The individual act of tagging articles becomes a community benefit within the shared space of CiteULike and may influence member motivation to tag, in order to also drawn others to articles of interest (e.g. using common words like *tagging, hypertext, blog* as well as personal words such as *ubc* formytrip).

The middle screen displays the articles in chronological order from the most recent. Each entry consists of the title (clicking will display the article page of tyfn), year and page number, author and the tags associated (e.g. *tagging, social, hypertext, folksonomies*). The entry shows: the posting date by tyfn of the article; priority to read (2 stars = I might read it); and the number of other users and groups as a hyperlink that also contain the article.

Figure 16 Library of tyfn, July 23, 2008

Library Groups Watchlist Profile Blog Recent Unread Search Authors Tags Export Import	tyfn's tags All tags in tyfn's library
My library [176 articles] Recent papers added to My library.	Filter:
 Harvesting social knowledge from folksonomies (2006), pp. 111-114. by Harris <u>Wu</u>, Mohammad <u>Zubair</u>, Kurt <u>Maly</u> posted to <u>tagging social hypertext folksonomies</u> by tyfn on 2006-10-15 00:42:00 as ** along with 65 people and 16 groups 	anthropology application architecture balderdash biog biogging biogresearch bonnienardi bookmarks britain business camera campus casestudy citeulike
 Improved annotation of the blogosphere via autotagging and hierarchical clustering (2006), pp. 625-632. by Christopher H Brooks, Nancy Montanez posted to blog tagging toprint by tyfn on 2006-10-15 00:36:38 as ** along with 35 people and 8 groups 	classification COgnition cognitiveload cognitivescience cognitiveload collaboration

Since the data was collected there have been design changes to CiteULike. There is no longer a menu sidebar, instead there is a drop-down menu. In addition, advertising and google ads are supported. The new features since my data collection are as follows: members can create blog entries on their personal page and allow other members to comment; members can create a profile page (e.g. photo, date joined, graph of recent activity); members can share their publications; and members can view who else has the most articles in common with them (called neighbours). There has not been any recent news regarding the future of CiteULike. CiteULike continues to remain a stable tool for organising and sharing academic articles; it is expected that changes will continue to occur.

Appendix I Flickr user interface

Flickr (see Figure 17) is a popular photo management and sharing platform in which user-generated tags are used to share, navigate, retrieve, and explore videos, photos and digital images that have been uploaded by its members. Flickr enables users to organize images or videos retrieved from the Internet, mobile device, or personal computer in a centralised location and to share them using a variety of digital media such as Facebook, RSS feeds, Twitter, or one's blog. Users are able to categorise their images using tags, to enable members to easily search for images on a desired topic such as the place where a photo was taken or the name of the person displayed.

When launched 4 years ago, it was unique in providing a common platform for digital content storage and *sharing* with Flickr members. Prior to Flickr, storage of photos, similar to the saving of URLs before del.icio.us existed, was an individual endeavour limited to one's personal harddrive or private server space. What Flickr provided was a space for one's photos – analogous to the sharing of food at a family potluck rather than eating alone in one's kitchen. As a site focusing on user-generated content, its value and community benefit varied: e.g. as an art gallery, a repository to enhance presentations, or a place for amateurs to improve their photography skills through member feedback on uploaded images.

Figure 17 Flickr home page, July 23, 2008



Flickr was launched in February 2004 by married couple Stewart Butterfield from Vancouver and Caterina Fake from San Francisco. It emerged out of Ludicorp, as they were developing an online game and evolved into an instant messaging service before becoming the platform it is today (Levy and Stone, 2006). The idea of using tags came about from seeing them used in del.icio.us (Levy and Stone, 2006). The rational behind the user-generated platform as stated by Caterina (Levy and Stone, 2006) was that as a new company, funds were limited so tools were created that harnessed the viral nature of the community in order to best minimise staff. In 2005, Yahoo acquired Flickr for an estimated 35 million (Fake, 2005). In 2008, Flickr implemented a *Find Friends* feature (Rothenberg, 2008) in which one's email account could be accessed (e.g. Yahoo, Hotmail, gmail) allowing Flickr to match people in one's address book with current members. In April 2008, a video feature was enabled in which videos of up to 90 seconds could be added for paying customers defined as Pro (Champ, 2008) as long as the community guidelines were followed.

Flickr enables members to create, store, annotate and organise their digital content (photos, images, screenshots) within a shared environment, thus changing the nature of photography through public sharing. There are a number of ways that photos can be uploaded to Flickr. Flock, a Social Web browser provides an interface to upload to Flickr, a Flickr Uploadr (see Figure 18) can be downloaded from Flickr, or photos can be uploaded via the Flickr website as a set from one's computer or manually.



Photos	Photo Batch				
	Batch Privacy: O Private Friends Friends Pamify O Public Public: 1 Photo.				
	Batch Safety: Safe Hide batch from public site areas Batch Type: Photo : Changes to Batch Privacy, Safety Level and Type will overwrite settings on individual photos.				
	Batch Tags: Batch tags are combined with tags on individual photos.				
	Add to Photoset: Late Fragment Displays - DVD Launch Party\$				

Tags (see Figure 19) are an option within Flickr that is available on the User Interface (UI) when uploading photos. For example, with the Flickr Uploadr, when the Upload button is depressed, the next screen requests the title, description, and tags and displays a picture of the image being uploaded to assist the user. If the information has been previously added (e.g. with the Flickr Uploadr), then it is already visible.

Figure 19 Adding metadata for photo, July 23, 2008



Success! Your upload worked!

Now you can add titles and descriptions.



Or, go to your photostream page.

When browsing Flickr pages, members have the ability to tag a contact's photos (dependent on privacy settings) in addition to their own; however this feature is not widely used among the members (Marlow, Naaman, boyd, & Davis, 2006). This may be because people are worried about how attaching a personal keyword to another member's photo will be perceived by that member. If I tag "rich" to a picture of another's member's home, would that be considered offensive, and might they block me? Participants can view their tags as a list or as a tag cloud. Flickr was one of the first website to implement tag clouds (see Figure 20), which are a visual display of popular tags used on the website in alphabetical order. Tags that are more frequently used are depicted as a larger font.

The most popular tags associated with photographs can be displayed in alphabetical order as tag clouds over the last 24 hours, the last week, or all time. For example, *wedding*, *friends*, *party*, and *family* are some of the most popular tags in Flickr.

Figure 20 Flickr most popular tags as cloud, July 23, 2008

etrice emsterdem animals architecture art australia baby band barcelona beach berlin bird birthday black blackandwhite blue boston bw California cameraphone camping canada canon car cat chicago china christmas church city clouds color concert cute dence day de dog england europe family festival film florida flower flowers food france friends fun garden geotagged germany girl girls graffiti green halloween hawaii hiking holiday home honeymoon house india ireland island italia italy japan july june kids ia lake landscape light live london macro may me mexico mountain mountains museum music nature new newyork newyorkcity night nikon nyc ocean paris park party people photo photography photos portrait red river rock rome san sanfrancisco scotland sea seattle show sky snow spain spring street summer sun sunset taiwan texas thailand tokyo toronto tour travel tree trees trip uk urban USa vacation vancouver washington water Wedding white winter yellow york zoo

Users can create networks of contacts, family, and friends and are able to share photos with members within each network. Users can geotag (Butterfield, 2006), by adding location information to their photo so that others can see where it was taken and what actually was photographed there. Or users can explore the map just to view existing photographs that have been geotagged. Members can join a group, for example 24 hours of Flickr (see Figure 21) or create their own and Flickr provides guidelines to help

maintain a happy community. Groups may be used to share photographs either publicly

or privately with users expressing similar interests through membership.

Figure 21 24 hours of flickr group, July 23, 2008



Users can interact with photographs in a number of ways that create a social space. A photograph can be added to one's favourites ("add to faves"), one can enclose the photograph in a blog entry, and one can add a comment to a photograph. Additional functionality by the owner can enable other users to annotate sections such as "this is me" around their face, or add a tag, if given contact status.

There are a number of features provided to assist with the management of a member's photos. When uploading photos, they can be organized into sets (e.g. friends, Vancouver) that are analogous to labels in gmail, an online email service provided by

google (http://google.com) in which a photo may appear in more that one set. A feature called Organizr, enable members to find and edit photos, create sets, and add photos to group pools. A Flickr Uploadr (see Figure 18) can be used to more easily upload a batch of photos from one's computer. Each photo that is added appears in one's personal library as well as being publicly visible to everyone ("Everyone's photos").

A number of games have emerged that extend beyond the Flickr environment such as Fastr (Fastr, n.d.) a game in which people are shown Flickr images before guessing what the shared common tag is. Flicktionary (Flicktionary, n.d.) is a game where people try and guess compound words from Flickr pictures and Photomunchrs (Photomunchrs, n.d.) is a game where participants move around a 6*5 grid of photos "munching" 7 correct photos before moving up to the next level.

At shown in Figure 22, beneath the "Flickr loves you" logo are 5 drops down menus: (Home, You, Organize, Contacts, Groups, Explore). The Home menu takes the Flickr member to their personal home page. The You menu provides user-specific information particular to one's photostream (e.g. one's tags, one's sets, one's profile page) or account (e.g. recent activity on one's photos such as which ones have been commented or favorited or statistics which displays daily view counts). Members can access the FlickrMail page to allow them to send intra-Flickr messages to another member or upload individual photos from one's computer using a basic Flickr Uploadr. The Organize menu enables members to organise their photos, sets, and collections. If desired they can be placed on a map providing a geographical location to the photos. The Contacts menu provides access

intended to connect a member with their Flickr community (e.g.

contacts/friends/family) or provide an opportunity to extend it (e.g. Invite your friends, People Search, Latest Photos). The *Groups* menu links the member to the groups they belong to or administer, one can search for a particular group, create a new group, or view recent changes on the groups they are a member of. The *Explore* menu contains links that are more catch-all regarding unique features of Flickr (e.g. the FlickrBlog, Flickr Services such as Third Party Applications created using the API, Camera Finder sharing the photos taken by a particular model, Explore Page allowing photos to be easily searched on interestness or popular tags).





With respect to a particular photo, each member is provided with a number of onebutton options for their photostream. Within Flickr, these options can be adjusted for the particular audience that is provided access to a member's photos (e.g. everyone, contacts, family, friends). These options are: *Add Note*, which allows commenting of a particular section of a photo; *Send to Group*, to send a photo to an existing group membership is in; *Add to Set*, to add a photo to a set/create a new one; *Blog This*, to send to one's blog; *All Sizes*, provides the photographer with different image sizes from thumbnail to original, the ability to download, HTML code, and a URL link to the photo size; *Prints & More*, will create print versions of a picture to be picked up at a desired location; *Rotate*, will rotate the image clockwise or counterclockwise; *Edit Photo*, overlays the online photo editing service Picnik (n.d.) for editing; *Delete* will permanently delete the photo.

As shown in Appendix C Flickr photo UBC campus) as a pdf, beneath a photo is a short description "First snowfall of 2007", which can only be added by the account holder. There are two comments listed from *bunz234* and *tyfn* as *tyfn* allows comments from all Flickr members. Associated with each comment is the Flickr member's buddy icon (e.g. Snoopy), the username and type of account, such as Pro, the comment, the amount of time that has passed since the comment, a permanent hyperlink, and the ability to delete (only visible to account holder or user making comment). Comments can be added in a comment box and can be previewed before being posted, if desired. "View recent comments" will display actions (comments/favorited) by any Flickr member on the photos associated with the Flickr member that clicked the hyperlink. "Comments you're made" will

only display comments and the photos they are associated with by the Flickr member clicking the hyperlink.

At the top of a page, the Flickr member that is logged in will see their username displayed "Signed in as tyfn". As "tyfn" is a hyperlink visible only to that member, by clicking it they are taken to a page displaying their account information: *Personal Information*, such as the unique web address for their account; *Privacy & Permissions*, such as determining who can view, comment on, or annotate one's photos (e.g. only contacts); *email*, such as one's contact email which is used for Flickr to send notifications or Flickr mail to; *Extending Flickr*, such as one's blog name and URL. The number of new FlickrMail messages is displayed as a hyperlink, which takes the Flickr member to their inbox. The *Help* hyperlink provides a page displaying a variety of help tools such as an FAQ, list of community guidelines, and a search box.

Beneath that is a search box for using keywords to return different categories on Flickr (e.g. everyone's photos, your contacts, Flickr members).

Beneath that is labelled *tyfn's photostream*, and two thumbprints that display the previous and subsequent photo from the one displayed. Clicking either of the images will display a larger version of that image on that page. The photostream window is browsable as clicking either directional arrow will display the previous and subsequent photos, if exist. Clicking the projector screen metaphor will display the photostream as a slideshow. The total number of public photos in *tyfn*'s photostream is shown as 5 109. This photo is part

of two personal sets (First Snowfall in Vancouver and UBC) and exists in four group Flickr Pools (Vancouver, UBC, Canon EOS 400D, Canon EF). A pool is similar to a community group for the members of Flickr, sometimes with restrictions. For example, the Vancouver Flickr pool would contain images from Vancouver rather than Juneau, Alaska.

There are 3 tags associated with the photo (*ubc, Vancouver, snow*). The Flickr member can restrict the adding of tags to everyone, contacts, or keep it private. The *Additional Information* section shows the rights that the Flickr member has assigned to the photo. The default setting maintains copyright to the owner, however Flickr allows members to attach a Creative Commons license (see Figure 23) with the photograph as visible below (Creative Commons, n.d.).

Figure 23 CC license for UBC campus photo, April 4, 2008



The status of the photo is shown as public with a green colour meaning that it is visible to anyone accessing Flickr. If the colour is yellow, the photo is visible only to the family and friends of tyfn "only friends can see". If the colour is red, then only tyfn can view it "this photo is private". Clicking "Place this photo on a map" will open up Flickr Findr to enable the Flickr member to drag and drop their photo onto the map. As the photo was taken with a Canon EOS Digital Rebel XTi, by clicking the hyperlink, the Flickr member is taken to a page about that camera with statistics such as the number of photos that were uploaded the day before using it. Thumbnails of photos taken with the camera can be viewed according to a variety of categories (e.g. interesting, portrait, night, recent). Under the More Properties hyperlink, if available, the photography as well as Exchangeable Image File (EXIF) data is displayed which is stored information about the camera settings and scene such as shutter speed, computer used, and date/time the photo was taken. The date the photo was taken is shown, in this case December 1, 2007 clicking on it will display a calendar page of any other photos taken by that Flickr member on that particular date.

Beneath are photo stats, which as a hyperlink will display information such as the number of views over the last 28 days, total view counts, and where the Internet traffic came from such as a particular blog or search engine. If any exists, beneath is a hyperlink "2 people count this photo as a favorite" which displays the photo and which Flickr members have "favorited" the photo as well as the date they did so. The photo is shown as being viewed 65 times by people other than Flickr member *tyfn.* The title, description, and tags can be edited and if desired, the account holder can replace the image.
"Flag your photo" when clicked on a Flickr member's own page, will open up a widget that will enable the member to change the type of safety level that have been previously applied to the image (e.g. safe, moderate restricted) or content type (e.g. photo, screenshot, art/illustration). If the link is clicked by a Flickr member that is not the owner, then the staff can review the image.

At the bottom of the page, there are 4 sections with hyperlinks to quickly link to different sections: *Activity* will display actions by others (e.g. "comments you've made that displays all the comments made by the Flickr member that clicked it). *You* provides information related to the Flickr member's account (e.g. Upload will provide a page to upload photos); *Explore* allows the Flickr member to traverse aspects of Flickr that showcase the photos of other members (e.g. Popular tags displays a tag cloud of the most used keywords). *Help* provides a number of hyperlinks to assist the Flickr member (e.g. Community Guidelines outlines boundaries for behaviour in a shared space). Beneath are broad hyperlinks to assist Flickr members (e.g. Flickr Blog and Terms of Service).

"Send to a Friend" in the lower right-hand side will open up a email-type form displaying the photo, a short personalised message about the photo, the photo, the rights associated with the photo, and a link to follow. Save to del.icio.us will allow the Flickr member, if also a del.icio.us member, to save the photo link to that account using a popup window.

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Since June 2007, the Flickr site has provided translation in 7 additional languages as displayed on the bottom in order: Chinese, German, English, Spanish, French, Korean, Italian, Portuguese.

As noted on the bottom, there is a hyperlink labelled "Your privacy" which takes the Flickr member to a Yahoo privacy page that shares information regarding general Yahoo! policies for the Flickr community. For example, options available to a member if made to feel uncomfortable by another Flickr member. In addition, although statistics are available about the number of people that have viewed a particular photo, it is not possible to see the actual usernames. If a Flickr member perceives another member as being disruptive (e.g. rude comment on a photograph), the option is available to block that member. When Flickr member A blocks Flickr member B, it means that Flickr member B is prevented from interaction with Flickr member A (e.g. sending a message through FlickrMail) or be able to interact with their photos (e.g. comment, favorite, tag). However, it is not possible to prevent another member from viewing one's public images.

In the summer of 2008, the founders left Flickr, perhaps due to the uncertainties in the parent company Yahoo, which also owns del.icio.us. It is unknown what changes will occur to Flickr in the future, however it will be without the involvement of Catrina Fake and Stewart Butterfield.

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Appendix J Del.icio.us privacy feature

On March 19, 2006 during my study, the "do not share" checkbox (see Figure 4) was introduced (Schachter, 2006). Checking the box would allow only the account holder to view their particular post. Its introduction resulted in a lot of discussion regarding del.icio.us as a personal vs. social space in the comments of the del.icio.us blog post that announced the change (see comments in Schachter, 2006). Although conferences and courses may create a common tag (e.g. *blogconf08*, there isn't a way to create a private tag seen only by the tag creator or for a member to place their posting into the shared space of a group. This means that creating a *Psych100* tag, although viewed as unique, may actually be quite common when used by multiple members attending different universities.