Beliefs and Uses of Tagging Among Undergraduates

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i. Abstract

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Title: Beliefs and Uses of Tagging Among Undergraduate Students

Context: This dissertation examines beliefs and uses regarding tagging among current undergraduate students, and examines the ecology of communications practice and implications for formation and maintenance of identity within the population. Currently enrolled undergraduate students at UNC-Chapel Hill formed the population for examination.

Objective: To understand the current state of use and perception of tagging and tagging systems among undergraduates, and the place of tagging and tagging systems within the communications ecology of students. The larger context for this research concerns the formation and maintenance of identity over time, and how use of these technologies effects those processes. Research questions examined meaning and use of tagging and tagging systems in the population. The overall objective of the research was to determine to what degree previous research on tagging and tagging systems is applicable to the population of current undergraduate students.

Approach: This study employed a mixed-methods approach that included a survey and a series of semi-structured interviews. The survey consisted of two stages, with each stage sent to a random sample of 2000 undergraduate students; Stage 1 returning 208 responses and Stage 2 returning 203 responses. Between the two Stages of the survey, eight students were interviewed for greater detail of tagging belief and use.

Analysis: Survey data was analyzed both qualitatively (in the Uses and Gratifications section of the first stage) and quantitatively for the range of beliefs and uses of tagging, tagging systems and broader ecology of communications technologies. Interview data was coded and analyzed qualitatively for greater context of the survey results and to address any limitations of the initial stage of the survey.

Results: This dissertation found that undergraduate students are generally unfamiliar with the information-organization aspects of tagging. Survey respondents reported greater social than academic use of tagging by a 46% to 4% margin, and interview subjects unanimously named Facebook photo tagging as the first thing which came to mind regarding tagging. Undergraduates do not extensively use sites and services focused around tagging as information organization, with only 15% reporting using such sites and 82% not doing so. Rather, undergraduates are familiar with and use tagging almost exclusively within the context of Facebook photo tagging, which 92% of students reported using, with 88% also reporting untagging themselves from Facebook photos. Tagging can be understood as a communicative *genre system* within the community of undergraduate students perform according to a template of well-understood practices and expectations.

Results indicate that students use tagging primarily as a tool for social communication and recognition within the context of online photos, confirmed in the Uses and Gratifications survey responses. The first factor (explaining 51% of the variance) was comprised of eight items, of which six were related to photo tagging; the second factor consisted of items relating to social recognition and identification. Information organization is a subsidiary use of Facebook photo tagging, as seen in the third factor in the Uses and Gratifications analysis and confirmed in interview data.

This dissertation also examined the larger communications ecology of undergraduate students, assessing their experience with a range of technologies and differential use of same across social, familial and academic

audiences. Substantial differences were found in students' use of technologies depending on audience, with cell phones (and especially their text-messaging capabilities) forming the primary hub of communication for contacting friends and family, and messaging on social network sites (chiefly Facebook) preferred over email for computer-mediated social communications. By contrast, students reported using only email and face-to-face communications for their interactions with school instructors. Interview data confirmed students' preference to interact with school instructors using only these two methods, and suggested that segregating interaction with different audiences to different communications methods is a manner by which students combat the increasing context collapse of social network sites and mediated communications generally.

The implications for formation and maintenance of identity were discussed, with findings suggesting that segregation of audiences by communicative medium may be a way in which students maintain different "fronts." Further, tagging can function as part of a set of affordances by which students can extend their network of relations (both social and professional) beyond that which they can keep at hand or in mind at one time, using tags as reminders for differing contexts.

Conclusion: This research confirms undergraduate students are generally unfamiliar with the information-organization aspects of tagging, reporting greater social than academic use of tagging. Students use tagging primarily as a tool for social communication, recognition and identification within the context of online photos, which are posted and organized almost exclusively through the social network site Facebook rather than photo-sharing sites. Tagging functions as part of a set of technological affordances by which students can maintain different "fronts" and expand relational networks beyond those immediately accessible or memorable. Though information organization is not a primary context or use for tagging among undergraduate students, the range of practice surrounding Facebook photo tagging does exhibit a "way in" for new potential interfaces and implementations of tagging on the social web and for educators.

Students are also found to use different communications technologies in their interactions with social, familial and academic audiences, in part as a manner of combatting the context collapse taking place on social network sites and mediated communications generally. Contemporary communications practice among undergraduates is understood to be fast-changing and vary substantially across locations and populations, and so these results are best understood as pertaining to this particular population at this particular time. Future research should examine similar questions and the shift of behaviors over time and across different populations and locations.

ii. Tables and Figures

1 – Introduction

Tagging, as has been studied in the social media and information organization literature during the last five years, has been defined as the use of any one of a number of web-enabled, non-hierarchical systems (e.g., Flickr, Delicious) whereby users assign keywords or terms to data (e.g., photos, web addresses). The literature on tagging has been preliminary but also promising, with results showing a consistent power law dynamic emerging in social tagging contexts (see e.g., Golder and Huberman 2005), and areas of great potential relating to tagging and learning (see e.g., Bar-Ilan et al. 2006; Budiu et al. 2009). There are, however, limitations to the body of knowledge regarding uses and beliefs of tagging outside of the context of the several Web2.0 services where much of the research on tagging has taken place – Flickr and Delicious in particular. For example, it is not clear to what extent undergraduate students – whose social media practices are otherwise extensively documented – are familiar with the practices and definitions of tagging as information-organization tool. There are indications that students are more familiar with the sense of tagging as employed by Facebook, where its value as an informational practice is more one-dimensional (users tagging photos of themselves and others) and greater meaning can be found in the set of discursive social behaviors surrounding tagging and untagging decisions.

Tagging is an important area for investigation in the context of general research into social media practice for several reasons. Current research on tagging is marked by key limitations: most previous

investigations into tagging have focused on the large data sets created by social tagging (as in e.g., Flickr, Delicious – see Mathes 2004; Golder and Huberman 2005; Trant 2009a), and relatively few have to this point focused on tagging from the perspective of user behavior and perception. The focus on large-scale tagging systems means that most current data has been generated by relatively tech-savvy and tagging-specialist users. Given this circumstance, gathering data on tagging from outside of these self-selecting specialist communities will help construct a fuller picture of the behavior and technology. Further research on both qualitative and quantitative aspects of the user experience of tagging is of special interest given that tagging norms and practices have evolved within the context of mediated sociability, and so can provide potentially revealing insights into patterns of mediated sociability (Shirky 2005). This last aspect of future research in tagging is of interest to me as it speaks to issues of identity and mediated sociability, in particular how users construct and practice their selves in mediated social space over time.

Research is needed to fill this gap in knowledge, to allow for more accurate assessments of current behaviors, and that is the focus of this dissertation research. This data will be of great use to researchers, educators and designers, and allow for future comparisons of tagging use and belief – all key considerations given that social media and educational technologies are increasingly adopting tagging as a capability. This study investigates both the social and information-organization aspects of tagging and the tagging experience through a two-part survey and interview-observation sessions regarding the tagging experience. By investigating explicitly just what tagging is used for and how it is

perceived in these contexts, this research advances knowledge both about aspects of social media behaviors generally and the shape of tagging-related beliefs and behaviors more specifically.

The study has two research components and six phases: 1) survey solicitation, Stage 1; 2) multivariate analysis of descriptive terms and initial quantitative analysis; 3) semi-structured interviews observation of 8 undergraduate students on social media use and perceptions and uses of tagging; 4) construction of scales for uses and gratifications confirmatory analysis; coding and analysis of interview data; and re-assessment of other survey questions based on interview data; 5) survey solicitation, Stage 2; and 6) quantitative data analysis of all survey data. This multi-stage, mixed-method approach ensures a rigorous grounding of the investigations in current practice. The survey gathered both qualitative (in Stage 1) and quantitative (in both Stages) data, allowing space for student assessment of tagging and then verifying same, and further qualitative data will be gathered in the interviews. The survey examined the relative prevalence of the beliefs and uses regarding tagging, and was analyzed quantitatively to establish baselines of activity type for the population.

This research is part of a larger research agenda relating more generally to the formation and maintenance of identity in contemporary society, with an emphasis on the impact of information communications technologies on those processes. Tagging is merely one component of a large and complex picture, but it is one that is both worthwhile and practicable to evaluate. Identity formation and

maintenance is a continuous and ongoing process, and social media use generally is a context in which particular aspects of this process are observable.

Tagging, as a behavior that occurs within the context of social media use, is a yet-more-specific behavior which, when examined and understood more fully, can be one of many components of a greater understanding of both social media use and identity formation and maintenance. Isolating important dynamics in this context will allow for further investigations to better situate assessments of related phenomena, and for future research on tagging to incorporate better understanding of the practice as user behavior.

1.1 – Problem Statement

There are several key limitations of current research into tagging and emergent folksonomies, notably the limitations in generalizability; effectiveness of tags for information retrieval; and questions of expertise, among others (see e.g., Guy and Tonkin 2006, and Section 2.4 for a fuller treatment of these issues). Given the novelty and quick increase in popularity of social tagging systems over the last five years, much research has focused on the products of these systems, but less has dealt with tagging from the perspective of user behavior.

The shape of current research is well outlined by Trant (2009), as focusing on 1) tagging; 2) folksonomy; and 3) social tagging. She writes,

> "Authors interested in "tagging" as an activity focus attention on the user's role in linking terms to resources. Others interested in the vocabulary that results direct their study to 'folksonomy' – the collective assemblage of tags assigned by many users. Still others profile the social and technological context within which tagging takes place and folksonomies are constructed. We can think of tagging as a process (with a focus on user choice of terminology); of folksonomy as the resulting collective vocabulary (with a focus on knowledge organization); and of social tagging as a socio-technical context within which tagging takes place (with a focus on social computing and networks)." (Trant 2009).

This tripartite division of tagging, folksonomy and social tagging, and collapsing into neat complimentary areas is not entirely representative as it leaves unaddressed the question of how users themselves conceive of tagging. This research will address the questions relating to individual uses of and beliefs about tagging using a two-stage survey and interview-observation sessions to investigate aspects of the tagging experience, and assessing the norms and behaviors around social tagging.

Initial findings from my previous research with the Bot2.0 team (Shoffner et al. 2008, Greenberg et al. 2008, Edwards et al. 2009) point to insufficient knowledge of student beliefs and uses regarding tagging, including,

- General unfamiliarity of undergraduate students with tagging and tagging systems,
- Potential usefulness of free-text tagging in the early stages of new domain learning, and
- The range and of communicative channels utilized by students for social and learning goals

The findings from the above work indicate that while students are not generally familiar with tagging and tagging systems in a learning-based context, these tools and practices are of great potential value. Additionally, students are quite flexible in their use and adoption of different communicative channels for both social and learning goals. For instance, while students do not use e-mail extensively as a method of social communication (with friends and family), they report using it as their primary means of communication with professors, and also with peers in the context of collaboration and group projects (Edwards et al. 2009). And while most students reported not having previously used Flickr, they reported great satisfaction with its tagging capabilities and use of tags for plant identification. All of these findings point to the need for future research into tagging as an aspect of the experience of mediated sociability.

The research in this investigation helps establish where in the continuum of social and learning practices tagging in its multiple forms falls, providing both rich data of students describing their tagging practices in context and population data regarding the prevalence of these practices.

The swift uptake of Web 2.0 tools for mediated sociability, and the research into these tools, has been met with a great degree of attention. The combination of new areas for investigation with ease of access to large amounts of data on the open Web has resulted in multiple new lines of research – but much of it must be viewed with substantial caveats. This is the state of research on the Web and mediated sociability: exciting but in many cases containing consistent limitations or flaws, and it is that situation in part that this research seeks to address.

My review and assessment of the literature has allowed me to identify four limiting factors – *novelty*, *validity*, *barriers to access*, and *shifting norms* – and I articulate these and explore their implications in greater detail at the conclusion of the next section of literature review (2.5).

It is within the context of these limiting factors that any investigation of social media, and especially of users and use patterns within mediated sociability must take place. This research addresses these caveats by thoroughly contextualizing the investigations, and then adding to a better understanding of said context through the results and analysis. This investigation addresses the above limitations explicitly in its design, providing both qualitative and quantitative data on the actual uses of tagging by a

particular population of young people – in this case college students. The questions are outlined in more detail in Section 3 and concern three main areas of inquiry:

1. What does tagging mean to undergraduate students?
2. What are undergraduate student uses of tagging?
3. What are the contributing factors predicting greater student use of tagging and tagging systems?

Answering these questions will establish a baseline that can be revisited in subsequent investigations of social media use, which in turn can begin to construct a picture of practice in this area over time. By locating the survey outside of the context of expert tagging communities it will not rely on shifting levels of access to user data which occur with regularity in online SNS and other social media (e.g., tagging services such as Delicious and Ma.gnolia, the latter of which recently went offline entirely) but instead examine these behaviors in a broader and more naturalistic setting. The design has attempted to address concerns of validity by asking very basic foundational questions in both the interview and the survey section of the research.

The literature on tagging and folksonomies thus far has generally focused on the uses of tagging in technologically savvy, tagging-centric online communities – Flickr, Delicious, Connotea and similar Web2.0 services. Some research (e.g., Bateman et al. 2007, Lee et al. 2009, Smith 2006) has investigated the divergences between "expert" and beginning users within given subject areas, but little research has thus far investigated the uses of tagging on a larger scale in a more varied population. Self-selection helps explain this phenomenon: users of systems like Flickr and Delicious tend to be interested

in and know or quickly learn how to use those systems and technologies, and initially tagging as a technological tool was mostly limited those specialized services. With the wider adoption of tagging as an aspect of many Web2.0 technologies and services (most notably the picture-tagging capability on Facebook), a far larger body of users is now at least generally familiar and experienced with a range of practices called tagging. This investigation assesses the beliefs about and uses of tagging among undergraduate students generally – not focusing on experienced or self-selected expert tagging system users – and will investigate tagging as an aspect of their mediated social lives and its uses for both social and learning goals.

1.2 – Dissertation Structure

The above introduction has provided a general topical and thematic frame both for the research performed in this dissertation and the conceptual approach taken to study design and analysis. I will briefly outline the structure of the remainder of the document below.

The next section (Section 2) comprises the literature reviewed in forming the research agenda and study design for these investigations, including a section on Identity (2.1); Computer-Mediated Communication (2.2); Social Network Sites (2.3); and Tagging (2.4). The following section (Section 3) lays out the goals and objectives of the research, focusing explicitly on the scope of the investigations, research questions and hypotheses. Section 4 details the methods used in performing the research, and

Section 5 details the procedures performed in execution of these methods. Section 6 of the dissertation presents the research findings of each stage of the investigations and offers analysis of these findings. It begins with the qualitative and quantitative data of Stage 1 of the survey (6.1); a brief summary of the qualitative data from interviews (6.2); and an accounting of the quantitative data from Stage 2 of the survey and survey's overall findings (6.3). Analysis of the findings is covered in 6.4, and a summary of the interviews is included in 6.5. A broader discussion of the implications and possible interpretive frameworks, and discussion of implications for my future research and research agenda follows in Section 7. Finally, Section 8 concludes the dissertation, beginning with hypothesis testing and moving on to discussion of future research directions. References are included in Section 9 and supporting documents (e.g., survey questions) are included in the Appendices.

This investigation has had two main goals throughout in its methodological approach. First, it has aimed to situate the questions asked and answered to those reasonably addressed given the timeframe and resources. Second, it aims to provide a well-developed base on which the more suggestive findings in the investigations can receive greater context and attention in future research. It is my belief that this course of research has achieved both of these goals and that this document establishes a genuinely useful set of findings and opens several important paths for new investigations.

2 – Background Literature

The central motivation for this dissertation is to gain an understanding of how increased use of information communications technologies is changing how individuals conceive of themselves and relate to each other. Beginning this examination is an overview of previous studies of identity focusing on the basic issues of personality and identity pertaining to the self, followed by a review of literature in computer-mediated communication particularly focused on self-disclosure and privacy. The review identifies the areas of interface between the culture at large and research on social networking sites (SNS), particularly as they pertain to issues of self-disclosure and privacy concerns. Also examined are social tagging and emergent folksonomies, as they reveal a more directly purposeful set of activities by individuals in technologically mediated environments. Research examines student use and perceptions, and cognitive effects of, tagging behaviors in mediated environments, seeking to understand how this particular activity is viewed and utilized, and what its basic effects are.

The central motivation for this work has been and remains gaining an understanding of how increased use of information communications technologies is changing how individuals conceive of themselves and relate to each other. Beginning this examination and literature review is an overview of previous studies of identity focusing on the basic issues of personality and identity pertaining to the self - the iterative process of the I/me. To this end, theories of the self from Mead, Vygotsky and Goffman are examined to provide an initial understanding of the issues under discussion regarding identity from

the point of view of social scientists and humanities theorists. Additionally, some basic studies is examined from computer-mediated communication (CMC) as they apply in the context of much of the other background literature. Focus on the applicability of certain conclusions also reveals areas for further study, my research included, and possible future directions for research in this area.

SNS are and have been a key area for the performance of identity in technologically mediated environments. They are of interest not simply for themselves (that is, the particular sites e.g. Facebook, MySpace, Friendster) but in what varying elements of presentation of self occur in different contexts at different times. This review identifies the areas of interface between the culture at large and SNS research. For a practice so new, SNS have received a great deal of academic research attention and respect, even. However, this attention has been dwarfed by the often hysterical coverage of SNS in the popular press, especially focused on the perceived threat of "online predators."

This background literature especially focuses on issues of self-disclosure and privacy concerns, and emphasize the research done in the context that is, for the moment at least, most relevant for the most U.S. young people - Facebook. The importance of bonding and reinforcing behaviors is examined in light of both explicit and implicit examinations of social capital in these communities. Despite similar interests, the SNS and CMC literature do not sufficiently speak to each other at present. Bringing together this research and observations, I also examine the treatment of issues of online sociability and identity in mediated social spaces by CMC. The central shortcoming of much CMC literature -

environmental validity - is examined and discussed for both its possible impact on results of literature reviewed and the benefits and drawbacks that a CMC methodological approach brings to the data collection proposed.

The following section addresses the current state of research on tagging and emergent folksonomies by examining the literature from several distinct perspectives and examining the evolution of the behaviors and study of those behaviors. It grounds the examination in a basic overview of classification as behavior and the use of metadata more generally, moving on to observations of the patterns in free-tagging systems observed in a variety of studies. Based both on findings and user motivations, it examines the more theoretical disagreements over the usefulness (or lack thereof) of tagging systems, and the basic principled disagreements that lead to these disputes. This examination of theory, practice and discussion will set the ground for the the research to follow, which attempts to further quantify the use-cases and potential use-cases for tagging.

The literature discussed here provides a robust context for the investigations described later in this dissertation, outlining the basic issues of identity and technology, and the more specific contextualized behaviors and current practice performed in the context of mediated sociability, starting with a discussion of issues of identity.

2.1 – Identity

do you wonder where the self resides?/

is it in your head or between your sides?/

and who will be the one to decide/

its true location

Andrew Bird, "Dark Matter"

The process of identity formation is one of major concern to many fields – psychology, sociology, anthropology, communications and media studies, and library and information science. There are many approaches to answering questions surrounding identity formation and maintenance. "Identity" as contextualized in this literature review is not a unitary or essential self but rather a range of possibilities. In this review I will examine several approaches to the question of identity processes, and in each will stress what is revealed as the most important central element to any study of identity: framing the issue as an ongoing process.

This review is, by necessity, multi- and cross-disciplinary. There is no single approach to conceptualizing identity across the various fields of social science, or for that matter even within given fields – see for example the conflict between Meadian and Eriksonian notions of identity (which will be

covered in more detail below). Additionally, the area of my primary research interest – mediated sociability – is simply too young to have generated either a comprehensive or coherent single theory of identity. Other researchers into mediated sociability have taken similar approaches of couching their research in the scholarship of previous and other disciplines (see e.g., Palen & Dourish's [2003] utilization of Altman [1973]), and there remains no consensus on a single tradition or body of theory in which to couch these ongoing studies. This diversity can be attributed to not simply a young field but also a line of inquiry made up of researchers and practitioners from a wide variety of backgrounds: library and information science, communication studies, media studies, anthropology, sociology and others. Though there is a danger in the long term of a silo-ing effect, whereby different disciplines end up talking about the same things using very different terms and basic assumptions (there is already some of this in the contrast between information science and communication studies), for the time being this diversity of voices and traditions is a positive thing.

When considering new phenomena it can be preferable to have a larger rather than smaller number of perspectives and voices examining novel issues and ideas. There is also in this case the danger of many-angled lines of discussion and inquiry becoming too diverse and divergent for any one researcher to comprehend in a comprehensive way. The assemblage of researchers and theorists below is therefore comprised of those who best speak to the issues of greatest interest in my own research: the formation and maintenance of identity, the interaction of individuals in the context of larger social

systems, and the identity-related conflicts and dysfunctions that arise when these ideas, individuals and systems come into conflict.

I draw on a range of sources, utilizing Erving Goffman (1959; 1963), George Herbert Mead (1912) and L.S. Vygotsky (1978) to formulate an iterative and constantly reactive basic theory of identity formation and maintenance. The research on identity emerges from a wide range of disciplines and this review is not meant to be a comprehensive treatment of the subject or of any given subject domain. Rather, this review highlights those elements of identity that I believe are especially important for understanding our modern condition and the particularities of mediated sociability.

Multiple identities function as different ways for individuals to conceive of themselves and relate to others in ongoing social interaction; this larger context is of importance but is not in the main addressed by this review. I focus here on the processes leading to the creation of identity as an ongoing process centered in the individual – always socially positioned and influenced by environmental factors but always and crucially a single self in an ongoing process of transformation. The following sections include both generalized summations of theorists' foundational approaches to issues of identity. Additionally, a few larger quotations from their work are used in support of and to and provide greater explication of several key principles not easily summarized.

2.1.1. - Theories of Identity

Many theorists and researchers concerned with identity and identity formation focus on childhood as a locus of identity formation. From Mead (1912) to Vygotsky (1978) to Leonte'ev (1974/5) to Erickson (e.g., 1950) to Piaget (1967) and many others, childhood is seen as a time of crucial importance in laying down systems, patterns and faculties that determine who we are – or, working from Mead, the range of possible "I's" that the "me" can be (a process always in negotiation, narrowing and broadening to varying degrees). Below follows a review and examination of some of these theories.

2.1.1.1 - Theories of Identity: Vygotsky

L.S.Vygotsky's work (1978) is important both because and in spite of it relative isolation from mid-20th C. thought. Working independently from the late 19th-C. and early 20th-C. U.S. psychologists, he reached many of the same conclusions as Mead but also carried some a great deal further, and by the time Western psychologists "discovered" him they realized the important directions in which he had pointed half a century before.

How do individuals make sense of the world? Vygotsky is helpful on several key questions, positing that "...children solve practical tasks with the help of their speech, as well as their eyes and hands. Direct manipulation is replaced by a complex psychological process through which inner motivations and intentions, postponed in time, stimulate their own development and realization... with the help of speech children... acquire the capacity to be both the subjects and objects of their own behavior" (Vygotsky 1978, p. 26). Referring to one's self as one regards others is, according to Vygotsky, a key step in development, as it then paves the way for inner speech and imagination, in that "creating an imaginary situation can be regarded as a means of developing abstract thought" (Vygotsky 1978, p. 111). For Vygotsky, the biological and the psychological are inescapably intertwined – human possibility rests in us all but certain of the "higher psychological functions" must be developed by education and socialization. Providing a bridge to other theories is Vygotsky's notion that "Learning is more than the acquisition of the ability to think; it is the acquisition of many specialized abilities for thinking about a variety of things" (Vygotsky 1978, p. 83). Vygotsky emphasized the duality of development, how "the child's system of activity is determined at each specific stage both by the child's degree of organic development and by his or her degree of mastery in the use of tools." (Vygotsky 1978, p. 21) Not only tools but speech was key in Vygotsky's understanding of how children began to form a sense of self, as he wrote,

> "(1) A child's speech is as important as the role of action in attaining the goal...

> (2) The more complex the action demanded by the situation and the less direct its solution, the greater the importance played by speech in the operation as a whole...
>
> Direct manipulation is replaced by a complex psychological process through which inner motivations and intentions, postponed in time, stimulate their own development and realization... with the help of speech children... acquire the capacity to be both the subjects and objects of their own behavior." (Vygotsky1978, p. 25-26)

Thus, as children learn to refer to themselves as they refer to others, they begin to develop a sense of various individuals functioning in the world. They begin to treat themselves as social objects, label and categorize things in the world and form a system of time that goes backwards and forwards. Vygotsky also develops a distinct set of developmental aids used by children that he terms signs and tools. He writes about the differences between signs and tools – how tools "serve as the conductor of human influence on the object of activity" whereas a sign "changes nothing in the object of a psychological operation. It is a means of internal activity aimed at mastering oneself; the sign is internally oriented." (Vygotsky 1978, p. 55).

Signs are, in this conception, metaphors and the first steps in the developments of abstract thought; the subject of metaphors and mediation is addressed in greater detail later in this review. Also

important in Vygotsky's formulation is the role of play, which “gives a child a new form of desires.” He argues that play is key in developing abstract thought, and that “symbolic representation in play is essentially a particular form of speech at an earlier stage, one which leads directly to written language” (Vygotsky1978, p. 111).

Development for Vygotsky is a constant tension and interaction between the internal and the external, with each informing the other, and with development proceeding “not in a circle but in a spiral, passing though the same point at each new revolution while advancing to a higher level” (Vygotsky1978, p. 56).

One of Vygotsky's proteges, A.N. Leonte'ev, adds some important elements for consideration. He continues to develop the idea of a socially positioned individual, writing, "...in a society a person does not simply find external conditions to which he must adapt his activity, but, rather, these very social conditions bear within themselves the motives and goals of his activity, its means and modes. In a word, society produces the activity that shapes its individuals” (Leonte'ev 1974/5, p. 11). This could be modified slightly to say that society produces the range of possible activities that shapes it individuals. Building further on Vygotsky, Leonte'ev states, "...the higher and specifically human psychological processes can arise only through mutual interaction of person with person, as inter-psychological processes, which only later come to be carried out by the individual independently” (Leonte'ev 1974/5, p. 19). These lines of thought regarding the formation and maintenance of the self and its faculties form

a central core of my conception of identity as a process, both internal and influenced by environment, and always ongoing.

2.1.1.2 – Theories of Identity: Mead

Another important thinker and theorist regarding issues of identity formation and the self is George Herbert Mead. He is particularly useful in articulating the process of identity formation and re-formation. In "The Mechanism of Social Consciousness" (1912) and "The SocialSelf" (1913) he lays out a few key concepts, beginning with a theory of development in children quite similar to Vygotsky's:

> "The earliest achievement of social consciousness will be the merging of the imagery of the baby's first responses and their results with the stimulations of the gestures of others. The child will not succeed in forming an object of himself – of putting the so-called subjective material of consciousness within such a self – until he has recognized about him social objects who have arisen in his experience through this response of filling out stimulations with past experiences of response" (Mead 1912, p. 404).

Mead continues along these lines, emphasizing as Vygotsky does the importance of "the child... experiencing himself as he experiences other selves" (1912, p. 404-405). Where Mead has particularly novel additions is his discussion of the relationship of the "I" and the "me" He notes that, "The "me" is a man's reply to his own talk," and that "The self-conscious, actual self in social intercourse is the

objective “me” or “me's” with the process of response continually going on and implying a fictitious “I” always out of sight of himself” (Mead 1912, p. 405).This notion, that the self is itself a dynamic social process and something of construct, is another key consideration for examinations of mediated sociability, where users are often engaged in ongoing reading ad writing of their selves (or representations of self). Expanding on the idea in “The Social Self,” Mead writes,

> “The self appearing as “I” is the memory image of the self who acted toward himself and is the same self who acts toward other selves.
>
> On the other hand, the stuff that goes to make up the “me” whom the “I” addresses and whom he observes, is the experience which is induced by this action of the “I.” If the “I” speaks, the “me” hears. ...
>
> That is, it is only as the individual finds himself acting with reference to himself as he acts towards others, that he becomes a subject to himself rather than an object, and only as he is affected by his own social conduct in the manner in which he is affected by that of others, that he becomes an object to his own social conduct” (Mead 1913, p. 377).

This distinction of the I and the me is a key underlying element of identity formation and maintenance. The I and me in dialogue form the whole individual, the social self who participates in social life. An issue for greater exploration in the discussion of my results will be to what extent the I and me come into play during various stages and in various aspects of mediated sociability.

2.1.1.3 – Theories of Identity: Berger

Berger et al. in their 1974 book *The Homeless Mind* examine the effects of modern life and the changes of modernity on consciousness and identity. Berger et al. make a similar point to Mead in saying, “The limits of what is possible are set not only by the external requirements of institutions but also, and fundamentally, by the structure of the human mind” (Berger et al. 1973, p. 20). Contained herein is another differently-phrased but ultimately similarly-concluded phrasing of my general framework of externally imposed cognitive load. There is a semantic difference in that Berger et al. construct the situation as being an "also" rather than the human mind being the primary limiting – or rather, limited or defined – factor and institutions being one of the many factors demanding attention from that mind but fundamentally the conclusion is similar to Mead.

Berger et al. offer their own conception of identity that hews closely to my operative definition in saying, "By 'identity' we do not mean in this context whatever entity may be thus described by a scientific psychology, but rather the actual experience of self in a particular social situation. In other words, we mean by 'identity' the manner in which individuals define themselves” (Berger et al. 1973, p. 76). They also offer another phrasing of Vygotsky's idea of development passing through a spiral in

saying, "Biography is... both a migration through different social worlds and the successive realization of a number of possible identities" (Berger et al. 1973, p. 77).

Building on Goffman's theories, offering that, "...the individual will now experience that portion of his identity that contains his anonymization as a 'worker' as 'less real' than his identity as a private person or a family man. Since each portion of identity relates to specific roles, it now becomes possible for the individual to perform some of these roles 'tongue in cheek.' The componentiality of identity, as the componentiality of social relations, makes possible an 'engineering' practice" (Berger et al. 1973, p. 34).This is a different spin than Goffman's more agnostic stance – here, the performance of different selves is at best a coping mechanism for dealing with the oppressive systems of modern life. Berger et al. make a strong argument that modern life is in many ways best characterized by fracturation, as contrasted with a more coherent (if not superior in all ways) pre-modern order. This contrast is laid out in some detail below:

> "Through most of human history, individuals lived in life-worlds that were more or less unified. This is not to deny that through the division of labor and other processes of institutional segmentation there have always been important difference in the life-worlds of different groups within the same society. Nevertheless, compared with modern societies, most earlier ones evinced a high degree of integration. Whatever the differences between various sectors of social life, these would 'hang together' in an order or integrating meaning that included

them all. This integrating order was typically religious. For the individual this meant quite simply that the same integrative symbols permeated the various sectors of his everyday life. Whether with his family or at work or engaged in political processes or participating in festivity and ceremonial the individual was always in the same 'world.' Unless he physically left his own society, he rarely, if ever, would have the feeling that a particular social situation took him out of this common life-world. The typical situation of individuals in a modern society is very different. Different sectors of their everyday life relate them to vastly different and often severely discrepant worlds of meaning and experience" (Berger et al. 1973, p. 64).

The above passage vividly describes the cognitive turbulence that has described much of modern life. One item for later consideration is the possibility that a similar cognitive turbulence is being re-introduced to contemporary life by the breakdown of these structured life-worlds as facilitated by "context collapse" in mediated social environments (SNS and the like). But by the same token, it is also possible that these new technological affordances provide a novel set of devices for dealing with the challenges to consciousness that Berger et al. describe, as in their saying, "Bringing together the element of planning for the future with some of the facets of consciousness... we come upon a constellation that may be called multi-relational synchronization. This means that the individual must keep organized in his mind not only a multiplicity of social relations but also a plurality of careers that are relevant to his own life" (Berger et al. 1973, p. 71).

What are SNS but a method of multi-relational synchronization? The authors provide a basic frame for understanding the dislocations of modern life that holds as true in our era of massive technological change and acceleration as it did in theirs of social upheaval, some 35 years ago: "The institutional fabric, whose basic function has always been to provide meaning and stability for the individual, has become incohesive, fragmented and thus progressively deprived of plausibility... Stable identities... can only emerge in reciprocity with stable social contexts" (Berger et al. 1973, p. 92).The "deprivation of plausability" is a good way of describing many seemingly sudden shocks that new social and technological arrangements foist upon modern life. Berger et al. present a potential consequence of the fragmentation of societal life-worlds in saying, "...for a society to serve as a common context for individual life and action there must be an all-embracing frame of reference for at least most of these definitions of reality, and this frame of reference must be shared by at least most members of the society. The symbolic universe of a society is a body of tradition that integrates a large number of definitions of reality and presents the institutional order to the individual as a symbolic totality" (Berger et al. 1973, p. 109). As our society continues forward in an increasingly diverse (and perhaps fragmented), networked model, it is worth considering what the implications of such a fractured symbolic universe has on collective imagination, governance and identity.

2.1.1.4 - Theories of Identity: Critiques and Synthesis

Several more contemporary scholars have re-investigated the research of, among others, Vygotsky and Mead, and Holland along with Lachicotte provide an important bridge of those works to the present (Holland & Lachicotte 2007). They offer that, "In Vygotskian terminology, an identity is a higher order psychological function that organizes sentiments, understandings, and embodied knowledge relevant to a culturally imagined, personally valued social position. Identities formed on personal terrain mediate one's ability to organize and perform the intention of one's activity in the locales and "occupations" of cultural worlds" (Holland & Lachicotte 2007, p. 11). Holland and Lachicotte also hit on a concept advanced by Vygotsky that is examined in greater detail and with further support later, as they say, "Vygotsky's key to human existence was the capacity to escape enslavement to whatever stimuli humans happened to encounter whether from within or without" (Holland & Lachicotte 2007, p. 8). This is the essence of my argument that people seek to maintain in identity a predictable level of cognitive load, and that external stresses – unwanted impositions of cognitive load – are a major threat to this goal.

Holland and Lachicotte (2007) further offer that, "Identities, in the Meadian framework, are not only multiple and open, there is also no expectation that they will be well integrated" (Holland & Lachicotte 2007, p. 26-27). Holland and her co-authors emphasize both the ways in which individuals are positioned in social and cultural situations as well as the agency individuals retain in determining the ways in which they respond to those circumstances and circumscribements. Writing with Lave, Holland observes that "...the innermost, generative, formative aspects of subjects as social, cultural, and

historical beings...being relational, are always but never only "in" the person, never entirely a reducible to membership (voluntary or involuntary) in culturally, politically distinctive groups or social categories" (Holland & Lave 2001, p. 5-6). They tie these positionings and processes back to a set of concepts similar to my notion of cognitive load mediating performance of identities in saying, "...engaging in struggles in the name of specific identities means that other possible identities and struggles are crowded out" (Holland & Lave 2001, p. 25). In other words – there is a finite amount of cognitive load which individuals may apply to these goals, and not all possible expressions of identity (even as circumscribed within one's history-in-person) are possible in any given moment. At the same time, this does not preclude the possibility of other performances of other identities in the future – it does not imply either an essential self of a quest for one.

Holland makes this point more explicitly in *Identity and Agency in Cultural Worlds*, along with Lachicotte, Skinner and Cain saying, "Behavior is better viewed as a sign of self in practice, not as a sign of self in essence" (Holland et al. 1998, p. 31). Holland et al. also move forward with Vygotsky's idea of sedimentation, saying, "One's history-in-person is the sediment from past experiences upon which one improvises, using the cultural resources available, in response to the subject positions afforded one in the present" (Holland et al. 1998, p. 18). The positioning of the individual – in society, in practice – is a key here, as they say, "...tools of agency are highly social in several senses: the symbols of mediation are collectively produced, learned in practice, and remain distributed over others for a long period of time" (Holland et al. 1998, p. 38). They focus also on the use of generic characters and

storylines – commonly held cultural objects – the differing opportunities for individual expression given different positions that individuals occupy in figured worlds, and the fact that "...social classification systems tend to classify the classifier as well as the classified" (Holland et al. 1998, p. 152). This lines up well with Goffman's ideas about the ways in which individuals navigate various places in social contexts.

I have addressed several foundational approaches to theorizing identity and the self: L.S. Vygotsky on the development of the basic processes by which individuals form and maintain their selves; Mead's focus on the ongoing nature of these processes; Berger and his co-authors focus on the effects of societal transformation (and technological change in particular) on these processes. Holland and her collaborators focus on synthesizing and bringing to a modern context many of the issues addressed by Mead and Vygotsky, and examine the variously oppressive and liberatory possibilities of identity formation and maintenance.

These varying approaches are brought together here because each perspective has something useful to offer in understanding not only the basic processes of identity formation and maintenance, but how these play out over time, in social context, and in contexts of technological change. While they are not of a single mind, the approaches are suggestive of a broad framework for understanding identity and the self, which views identity as not a fixed thing but an ongoing process in an individual, thus forming

the self which is socially positioned and takes in further stimuli, inputted in an ongoing iterative process into the process of identity formation and maintenance.

This understanding of the process does allow for substantial agency for the individual – many and ongoing opportunities for the I to speak to the me – it is also easy to see how a system of so many inputs could become bogged down and disrupted. Disruption in some ways being the normal order of things, it therefore follows that individuals would seek to generally limit cognitive load to predictable levels. And so at times of unusual disruption, when individuals do not know what roles they will play day to day – or in oppressive situations, when individuals are mandated to play certain roles not of their choosing – or in situations of great technological and social change, when the meanings of roles change overnight – the self faces great challenges. The next section of my review focuses on the kinds of challenges the self may face.

get out your measuring cups and we'll play a new game/
come to the front of the class and we'll measure your brain/
we'll give you a complex and we'll give it a name

get out your measuring cups and we'll play a new game/
can't have the cream when the crop and the cream are the same/
liquid or gas no more than the glass will contain

Andrew Bird, "Measuring Cups"

2.1.2 - Challenges to Identity

Identity is a process mediated by cognitive load, by the limited number of channels that individuals have for dealing with their own presentation and the reality of the world as they experience it. Individuals as they go through life seek to reduce, or at least make predictable the cognitive load necessary for task performance, to better facilitate future learning and performance (Sweller 1988). Under "normal" circumstances – those where most procedures, interactions, etc. are routinized – individuals are able to effectively limit cognitive load, and among those limitations is the range of identities available for performance or expression. This is not to say, per Erickson, that individuals seek a stable, essential or unitary self. Rather there are under circumstances of low cognitive load a limited amount of energy devoted to identity expression, and that consistency is generally one of the easier ways to achieve this state. Self-switching requires a great deal of energy both in the switching itself and in the

previous presence in the individual of those other available selves. Indeed, under "normal" circumstances the apparently stable identity of an individual may be a product of a person consciously devoting all other available resources to the development of a different identity or range of identities – through rigorous programs of education, involvement in a youth sports league, etc. The individual may appear to be stable while effortfully seeking to alter their identity radically.

But "normal" circumstances may not necessarily be the norm for all individuals. For many, it is not possible to routinize the basic aspects of daily existence, and high cognitive load is demanded. One of the many ways in which this phenomenon presents itself is as relates to identity expression. Multiple expressions of self are often viewed as a luxury of privileged peoples, but they are often the result of external demands on individuals to play roles they do not necessarily want to play. This dynamic is often at work in times of technological or cultural change – essentially, whenever identities over which individuals do not have control but of which they are aware are assigned to the individual.

The idea is much as Holland et al. offer in their discussion of Bakhtin's dialogism; "It is not imaginatively necessary to accommodate all voices at any given time" (Holland et al. 1998, p. 238). Indeed, it is simply not possible to accommodate all voices, or possible selves as adaptive or imaginative responses to a given scene or situation, at any given time. De Kerckhove in his book *The Skin of Culture*, discussing the allocation of cognitive resources for "external" perceptions makes a similar point in that "Certain senses require more energy than others, such as vision, for instance, which requires

eighteen times more energy than hearing" (De Kerckhove 1995, p. 101). So it is not, perhaps, that the blind have far superior senses of hearing as that they have more in the way of cognitive resources to devote to the relatively light-load task of hearing. Goffman in *The Presentation of Self in Everyday Life* also addresses these issues in saying,

> Knowing that his audiences are capable of forming bad impressions of him, the individual may come to feel ashamed of a well-intentioned honest act merely because the context of its performance provides false impressions that are bad. Feeling this unwarranted shame, he may feel that his feelings can be seen; feeling that he is thus seen, he may feel that his appearance confirms these false conclusions concerning him. He may then add to the precariousness of his position by engaging in just those defensive manuevers that he would employ were he really guilty. In this way it is possible for all of us to become fleetingly for ourselves the worst person we can imagine that others might imagine us to be (Goffman 1959, p. 236).

Taking on board negative stereotypes – this "unwarranted shame" of identities not one's own but able to be assigned to one by members of society – does indeed have substantial negative effects, for they widen the gap between what one considers oneself and what one is allowed to be by others. Goffman further notes that "To be a given kind of person, then, is not merely to possess the required

attributes, but also to sustain the standards of conduct and appearance that one's social grouping attaches thereto" (Goffman 1959, p. 75).

Goffman makes similar points with regard to counteracting stigma: "...a congenitally stigmatized child can be carefully sustained by means of information control. Self-belittling definitions of him are prevented from entering the charmed circle, while broad access is given to other conceptions held in the wider society, ones that lea the encapsulated child to see himself as a fully qualified ordinary human being, of normal identity in terms of such basic matters as age and sex" (Goffman 1963, p. 32-33). Additionally Goffman notes that

> "It seems generally true that members of a social category may strongly support a standard of judgment that they and others agree does not directly apply to them... The distinction is between realizing a norm and merely supporting it... Also, it seems possible for an individual to fail to live up to what we effectively demand of him, and yet be relatively untouched by this failure; insulated by his alienation, protected by identity beliefs of his own, he feels that he is a full-fledged normal human being, and that we are the ones who are not quite human. He bears a stigma but does not seem to be impressed or repentant about doing so" (Goffman 1963, p. 6).

Stigma and a whole range of these challenges to identity are products entirely of the social systems that individuals inhabit. The self does not exist except as a social object in these systems, as Mead noted, "only as the individual finds himself acting with reference to himself as he acts towards others, that he becomes a subject to himself rather than an object, and only as he is affected by his own social conduct in the manner in which he is affected by that of others, that he becomes an object to his own social conduct" (Mead 1913, p. 377). While the processes of identity formation and maintenance are taking place internally, the individual is always part of a social context.

2.1.3 - Identity and Technology

> "Even when an operation is carried out with a machine, it realizes the action of a subject. When one uses a calculating device to solve a problem, the action is not interrupted by this extracerebral link; the action is realized through this link as it is through its other links."
>
> *A.N. Leonte'ev, "The Problem of Activity in Psychology" (Leonte'ev 1974/5)*

Turkle in *Life on the Screen* posits that "...your identity on the computer is the sum of your distributed presence" (Turkle 1995, p. 13). But what does this really mean? In the end, a "distributed presence" is, like any "offline" identity, the sum of one's actions and the reactions of systems in the world. As Leonte'ev notes, the machine-ness of an action does not change its fundamental nature - "the action is realized... as it is through its other links." As De Kerckhove points out in *The Skin of Culture*, "The real object of computerization is to extend to the electronic environment the kind of control and monitoring relationships people experience within themselves" (De Kerckhove 1995, p. 209). It is a different thing, but the users are still human; it is for this reason that I believe technology's effects are quite analogous to those of other kinds of external stress.

De Kerckhove's conception of psychology, in this case, functions quite closely to what I conceive of as identity formation and maintenance, and his view of the changing nature of technology in relation to the self thus cleaves closely to my ideas about the nature of the individual's task in identity. He views television as not simply a one-to-many propaganda machine but also a form of collective rumination and

imagination, and then presents "...the quick and universal adoption of PCs [was] the necessary protest of the individual in a society dominated by video" - a way for the individual to detach, for a while, from the collective. This is of a piece of the other collapsing/ed systems of collective identity – blood, soil, church – themselves replaced by similarly individualistic identity markers and systems. De Kerckhove is perceptive in saying,

> One way to understand psychology, both as a fact of life and as a science, is to propose that its purpose is to provide a comprehensive and self-updating interpretation of our lives as they are being affected by our ever-changing cultural ground... psychology's role may be to interpret and to integrate the effects of technology upon us... to create an illusion of continuity when there are major cultural and technological breaks and, thus, to slow down the effects of technological feedback on our nervous system (De Kerckhove 1995, p. 4).

This again gets at the idea of reducing cognitive load, when possible, even in situations of high stress and change. Johnson addresses a similar idea in his book *Interface Culture*, saying,

> Conceptual turbulence – the sense of the world accelerating around you, pulling you in a thousand directions at once – is a deeply Modern tradition, with roots that go back hundreds of years. What differentiates

> our own historical moment is that a symbolic form has arisen designed precisely to counteract that tendency, to battle fragmentation and overload with synthesis and sense-making. The interface is a way of seeing the whole. Or, at the very least, a way of seeing its shadow, illuminated by the bright phosphor of the screen (Johnson 1997, p. 238).

The interface, in short – the central element of our techno-cultural moment – is a device to reduce cognitive load, reduce the pounding insistence of electronic culture. And indeed, psychology itself is a kind of interface – proscribing the world within certain bounds, ascribing various reasons and not others for events and thoughts. Returning again to Turkle, she observes that "We construct our technologies, and our technologies construct us and our times. Our times make us, we make our machines, our machines make our times. We become the objects we look upon but they become what we make of them" (Turkle 1995, p. 46).

Johnson focuses on the importance of the interface, on metaphors, and on the interface as metaphor. Early in the book he defines the interface thusly:

> "The interface serves as a kind of translator, mediating between the two parties, making one sensible to the other. In other words, the relationship

> governed by the interface is a semantic one, characterized by meaning and expression rather than physical force" (Johnson 1997, p. 14).

Johnson goes on to focus in great detail on the considerable tension that arises out of the fact that much of contemporary reality is shaped by things which "occur" in cyberspace – nowhere in particular and everywhere at the same time – and yet reality remains no less real for the uncertain status of cyberspace. All of these events are mediated - "There is no such thing as digital information without filters..." (Johnson 1997, p. 36) – and yet digital media's inherently mediated nature points out the inherently mediated nature of reality. There is a massive but finite amount of information on the Internet, to be viewed in massive but inherently circumscribed ways via interfaces of one sort or another. "The interface offers a... sidelong view onto the infosphere, half unveiling and half disappearing act. It makes information sensible to you by keeping most of it from view – for the simple reason that 'most of it' is far too multitudinous to imagine in a single thought" (Johnson 1997, p. 239). By the same token, life offers massive, constant but finite information – information that we mediate into ideas, concepts and categories with which we can deal in a predictable way. Both human and electronic interfaces are fundamentally about predictability of load – too much information, too many demands from outside, and the machine cannot run.

The spaces of identity formation and maintenance are not so dissimilar from the spaces of interface – our view to the world being an interface in and of itself. Johnson says,

> ...we should think of the interface, finally, as a synthetic form, in both senses of the word. It is a forgery of sorts, a fake landscape that passes for the real thing, and – perhaps most important – it is a form that works in the interest of synthesis, bringing disparate elements together into a cohesive whole (Johnson 1997, p. 238).

De Kerckhove touches on many other aspects of technological change – how, for instance, "...with real-time 3-D object manipulation, thinking and processing are becoming one and the same thing" (De Kerckhove 1995, p. 46) - whose ramifications are either too broad or tangential to this particular investigation to incorporate fully here. However, his ruminations on the fundamentals of technological change are worth revisiting. He notes,

> "It seems as if every major technology, before achieving saturation levels in the cultures has had to go through two basic stages: first to be in stark evidence; second to be interiorized to the point of invisibility" (De Kerckhove 1995, p. 97).

Here technology functions much in the same way as many cultural forms. Guitar-based rock music went from cultural affront to elevator music in less than a generation: generational change here is

an important aspect of the invisibility of technology. To young people, online identity is entirely unremarkable, invisible as an "other" thing. They suffer little in the way of externally demanded cognitive load, as the actions and representations are to them automatic and implicit – it's the rest of us who are being battered by the winds. The process of existence in the modern world is then much concerned with filtration: “A trained mind is a mind whose principal task is to eliminate noise, that is, unnecessary information, to make room for specialized responses” (De Kerckhove 1995, p. 110). For those for whom many types of information are novel, it becomes a very demanding task to determine what is and isn't noise, what is and isn't relevant.

Limiting cognitive load becomes all the more difficult with new inputs added, as De Kerckhove says, “Each technological extension that we allow into our lives behaves as a kind of phantom limb, never quite integrated into our body or mind functions, but never really out of our psychological make-up, either” (De Kerckhove 1995). De Kerckhove goes on to note that these electronic extensions are potentially confusing, making it more difficult not just to integrate them but to distinguish what is and isn't “us” or “natural” even as we extend with those devices a broader “kind of control and monitoring relationships people experience within themselves” (De Kerckhove 1995, p. 209). Thus can an iPhone or a Facebook wall become the “I” about which the “me” is speaking.

As these writers suggest, just as a well-designed interface can focus attention on those things important to us by filtering out unwanted cognitive load, so can a well-designed approach to learning –

one that focuses on hard work and the centrality of improvement – move focus away from negative affect and towards achievement. For tomorrow's technological natives, the distinction between our natural and electronic selves may seem an academic distinction – or perhaps even the Luddite nattering of their hopelessly out-of-touch parents. Some technologies do become integrated into our body and mind functions so deeply as to take on phantom-plus status. Like wearing glasses, driving a car, or, for that matter, typing on a keyboard as I am currently doing. The muscle memories of keystroke operations are mediated not by the keyboard but by my internal thought processes, which then translate intent to action – the keyboard mediates my translation of intended words to the computer screen, but it does so at a ratio very close to 1:1. What happens when mediation becomes entirely invisible?

2.1.4 – Identity Conclusion

This chapter has so far outlined aspects of the processes of identity formation and maintenance. The review presented and reviewed Mead's (1912, 1913) concept of the I/me; Vygotsky's (1978) theories of development; and Holland and Lachicotte's (2007) synthesis and updating of these theories. The review also focused on some issues relating to Goffman's (1959, 1963) examinations of lived identity, Berger et al.'s (1973) treatment of the effects of modern life on the individual and identity. The work of de Kerkchove (1995), Turkle (1995), Johnson (1997) were utilized to provide critical examinations of modern mediated identity. Below follows a synthesis of the themes covered in this section and some general conclusions.

Times of rapid technological change are always disorienting ones. Those who have spent lives building up experience, respect and accomplishments in their professions can find their skills useless overnight, their daily patterns of existence altered entirely. The world can seem an ever-accelerating treadmill, with ever more new skills, habits and knowledge to be acquired merely to stay in the same place. Children entering worlds of rapid technological change tend to fare well – everything is new to them, in any event – but can often be estranged from their parents and other previous generations. As Turkle says, “Today's children are growing up in the computer culture; all the rest of us are at best its naturalized citizens” (Turkle 1995, p. 77). Their experience of maturing is in many ways utterly alien to

those raising them. I have attempted to address parts of both experiences by focusing on basic processes of development in my review of Vygotsky, and on the conceptual turbulence of broad change in reviewing Berger.

An obvious thread connecting all of these phenomena is the formation and maintenance of identity. Over time, the process functions in many different ways - when it concerns a child who is still maturing biologically; when it is a young adult moving through worlds outside of the family and education for the first time; when it is a mature adult confronting a world drastically changed by technologies with which she has no familiarity – but I believe it is the same basic elements that figure into the process, utilized for these different (but ultimately comparable) ends. Holland and Lachicotte are helpful here in saying

> "An Eriksonian "identity" is overarching, weaving together an individual's answers to questions about who (s)he is as a member of the cultural and social group(s) that make up his or her society. A Meadian identity, on the other hand, is a sense of oneself as a participant in the social roles and positions defined by a specific, historically constituted set of social activities. Meadian identities are understood to be multiple... Eriksonian approaches, in contrast, attribute psychodynamic significance to achieving

> a coherent and consistent identity that continues over the course of adulthood" (Holland & Lachicotte 2007, p. 3).

Mead's position is closer to my own: I do not believe individuals subscribe to the goal of "achieving a... consistent identity", instead I believe individuals seek to limit cognitive load and that coherence is a significant element in seeking that goal. Also particularly useful is one of Vygotsky's metaphors for the concept of development: "Development, as often happens, proceeds... not in a circle but in a spiral, passing though the same point at each new revolution while advancing to a higher level" (Vygotsky 1978, p. 56). This addresses a crucial element of the formation of identity over time: the fact that while each individual's life as they experience it is unitary and unique, it consists of very similar operations and reactions over time. But it also emphasizes the essential difference and inconsistency of experience – each point in a spiral is unique and different from all others, never to be reached again, even as it is in important ways part of a unitary experience.

The experience of similarity day to day leads to the routinization of many basic patterns, as a way of lowering and controlling the cognitive load of experienced life. By lowering and making more consistent this load, individuals can use these cognitive resources for other purposes – expressive, explorational and the like. But when routine breaks down, as in times of crisis, technological or societal change there is an undesired broadening of cognitive load – an increase in the range of possible selves brought about from outside the I/me, from circumstances out of the individual's control.

The remainder of this chapter addresses the dynamics of computer-mediated communication (CMC); sites of mediated sociability – social networking sites (SNS) – and behaviors in mediated spaces – tagging and folksonomies. Investigation of identity is an especially appropriate starting point for contextualizing these further reviews, as both share the key characteristic of being mediated behaviors. As such and in any dynamic of mediation there are two key factors to investigate: that which is mediating, and that which is being mediated. Identity, in this case, refers to the latter: that which is being mediated. The former – those things which mediate, in this case technologies and social contexts – will be addressed in the upcoming sections.

The subject of mediation more generally deserves a fuller treatment than it can receive here, but a few more points should be made in this regard. It is not merely the technologies under discussion and their associated processes which are mediators and sources of mediation – all of the processes discussed in this section are processes of mediation. When Mead discusses the I/me, Vygotsky the iterative processes of the self, and so on, these too are processes of mediation. The difference is one of internal versus external location, but the effect is not dissimilar – there is in any mediated context an element of signal loss, which can be quantified to varying degrees. Which is to say, there are also elements which cannot be quantified, those parts of the signal lost in the process of mediation. What is the proper response to that, then? There is first the frustration at imperfect knowledge, at what cannot be known about those things lost. But there also ought be a reconciliation with the plain reality of imperfect

knowledge – that indeed, few if any things can be known to a total certainty (and certainly among those things done and experienced by humans), and one ought be especially suspicious of anyone who presents their knowledge as total or perfect. This caveat is especially useful to keep in mind in the upcoming sections of literature review and the claims to generalizability or not of various investigations.

In conclusion, I return to Turkle to frame a few other conclusions:

> "Every era constructs its own metaphors for psychological well-being. Not so long ago, stability was socially valued and culturally reinforced. Rigid gender roles, repetitive labor, the expectation of being in one kind of job or remaining in one town over a lifetime, all of these made consistency central to definitions of health. But these stable social worlds have broken down. In our time, health is described in terms of fluidity rather than stability. What matters most now is the ability to adapt and change – to new jobs, new career directions, new gender roles, new technologies" (Turkle 1995, p. 255).

The dynamics of adapting to technological change and redressing negative patterns of belief about self abilities are fundamentally similar. De Kerckhove succinctly summarizes many of my ideas about identity formation and maintenance in a contemporary context: "When you can do anything and

everything, the next step must be to find out who you really are and what you really want. The present is too busy to give us much information on that" (De Kerckhove 1995, p. 167). And indeed, it is only possible to become who you really are – for right now – by determining what you really want.

2.2 – Computer-Mediated Communication

The field of computer-mediated communication (CMC) has for some time dealt with the issues specific to the range of actions and interactions performed with and through technology. This review does not seek to comprehensively address CMC but rather to give a brief overview of the recent research in CMC on issues of particular relevance to these investigations – specifically, privacy and self-disclosure.

Much recent research in the CMC and online SNS literature has focused on issues of privacy and self-disclosure. These two are key elements and form according to Joinson and Paine (2008) a central "paradox" - that while anonymity generally heightens self-disclosure, it does not do so in the case of commercial websites. They therefore "propose that the wider context in which self-disclosure is given, or required, must be considered in order to develop a more defined picture of online behaviour across situations." (Joinson and Paine 2008).

However, the SNS literature is not quite so equivocal on these issues - users disclose information in the pursuit of social goals (Lenhart and Madden 2007) and their relative reticence in online mediated environments can be attributed to the varying degrees of what boyd (2008) defines as the attributes of a “networked public” - persistence, searchability, replicability and invisible audiences. Surveys have indicated consistent differences in the rate at which users disclose different kinds of information in

online SNS (Lenhart and Madden 2007), and suggest an effect for experience and awareness of privacy on those rates of disclosure (Acquisti and Gross 2005). Until now, these two strands of research – focusing on CMC and SNS – have not overlapped extensively, and recent CMC research in SNS (Walther et al. 2008) does not cite previous SNS research. The review below discusses some of the crucial aspects of mediated sociability as addressed by one strand of CMC research, before moving on to focus on SNS research.

2.2.1 – Personalization, privacy and self-disclosure in CMC

McKenna and Bargh in an early (1999) paper on online social interaction put forward a conceptual framework, building on the idea that "When an individual begins to interact with others on the Internet, he or she is, in essence, acquiring a new or supplementary peer group and social sphere that have no ties to that person's off-line social group" (McKenna and Bargh 1999). And in some corners of the Internet - including fora for what they describe as stigmatized or constrained identities - this is still sometimes true. But the central fact of mediated online communications today is that most of them take place between individuals who explicitly tie their online representations to real-world identities. Sites like Facebook are centered entirely around that premise, and the idea that "Identity can be constructed and reconstructed in numerous ways on the Internet with no "fallout" for the individual" (McKenna and Bargh 1999) does not hold water. Given this reality it is no longer as tenable to argue as they do for a spot for "Higgins' self-discrepancy theory [which] holds that when there are discrepancies between the

one's actual self and these important self-guides (such as the ideal self), an individual will be motivated to reduce them. Thus, an individual will be motivated to try to make these ideal attributes a reality" (McKenna and Bargh 1999). A key part of the undoing of the structural framework they construct is the fact that the majority of people now use the Internet, and so it's also no longer true, as they posit, that the "socially anxious" will use the Internet to form relationships, while those who are not "socially anxious" will not - everyone uses it for socialization. Ubiquitous computing also promises to shortly make obsolete their other theoretical construction - the idea of examining users "before, during and after" Internet use. For most modern college students and office workers, nearly continuous Internet presence is a fact of everyday life - intensity of use may modulate but the "off" switch is no longer of importance in the way they imagine it.

Constructing a model for understanding online socialization, Bargh et al. (2002) look at the pre-existing psychology literature and determine that the Internet "(1) ... by its very nature... facilitates the expression and effective communication of one's true self to new acquaintances outside of one's established social network, which leads to forming relationships with them; and (2) that once these relationships are formed, features of Internet interaction facilitate the projection onto the partner of idealized qualities." (Bargh et al. 2002) They contrast the "true self" with the "actual self" as lived day-to-day. Their idea of online spaces remains tied to previous understandings as they say that "...Internet interactions are analogous to those one sometimes has with "strangers on a train."" (Bargh et al. 2002) Intervening years and changes in practice have not eliminated these phenomenon entirely, but have to

my mind changed it substantially enough that the “true self/actual-self” dichotomy is at best a model for some kinds of online interaction: online spaces explicitly tied to a pre-existing offline identity (e.g., Facebook) are not these sorts of spaces.

Bargh et al.‘s research does continue to hold important lessons for impression formation, as their research shows, "Those who interacted on the Internet liked one another significantly more (M=5.55) than did those who interacted in person (M=3.05)." (Bargh et al. 2002) Further, Bargh et al. found -

> "In the Internet condition, there was a significant and substantial correlation between degree of liking for a partner and the tendency to project attributes of an ideal close friend onto that partner... a clear tendency to project onto a liked new Internet interaction partner (but not a new face-to-face interaction partner) the qualities one hopes for in a close friendship, but not the qualities one desires in a romantic partner." (Bargh et al. 2002) '

While the vast majority of socialization online occurs between users who already have strong offline relationships, there are many areas of life where increased online interaction between previously-unacquainted individuals will increase in the future: business, politics, education. This research shows that the Internet may in fact be the perfect social lubricant for those interactions.

In later work Bargh and McKenna (2004) focus on three major strands of CMC theory - (1) that emanating from Sproull and Kiesler's (1985) filter model, which sees CMC as an impoverished mode of communication leading to negative social outcomes; (2) Spears et al.'s (2002) "social science" model, which sought to place CMC in an individual's social context; and (3) their own (Bargh 2002, McKenna & Bargh 2000, Spears et al. 2000) blended approach, realizing that salient goals of individuals run up against certain unique properties of the Internet as a mode for communication. They conduct a thorough review of each strand of literature, noting that Walther et al. (1994) among others reported contradictory findings to Sproull and Kiesler's inital work. Likewise, they highlight the initial negative effects on close interpersonal ties by Kraut et al. (1998) and Nie and Erbring (2000), followed by nearly all subsequent research reaching opposite conclusions. They find strong effects in the research on support of marginalized identities in specialized internet fora. Additionally, they note from their research the strongly positive effects that initial impression formation online can have, with pairs of individuals expressing significantly more positive impressions of each other when introduced online than when in person and feeling they were more able to express their "true" selves online. (Bargh and McKenna 2004)

Bargh and McKenna do not get away entirely from earlier conceptions in saying, "The relative anonymity of the Internet can also contribute to close relationship formation through reducing the risks inherent in self-disclosure. Because self-disclosure contributes to a sense of intimacy, making self-disclosure easier should facilitate relationship formation..." (Bargh and McKenna 2004) But, the research of the intervening five years does push them to the conclusion that rather than being "an

isolating, personally and socially maladaptive activity, communicating with others over the Internet not only helps to maintain close ties with one's family and friends, but also, if the individual is so inclined, facilitates the formation of close and meaningful new relationships within a relatively safe environment" (Bargh and McKenna 2004). Ellison et al. (2007) find that mediated online social activity is actually positively associated with social capital in the more traditional sense.

Bargh and McKenna (2004) again are victims to the incredibly rapid rate of change in practice, as when the authors note, "The main reason people use the Internet is to communicate with other people over e-mail..." (Bargh and McKenna 2004), a generalization which may have been true in 2004 (when the article was written) but as Madden et al. (2007) show, e-mail has now become the least popular form of communication for youths, falling behind not just other computer-mediated modes - instant messaging, online SNS - but also face-to-face communication, land line, cell phones, and SMS. Similarly, their worries about "the continuing racial divide on the Internet" have been made less worrisome given results of the same study and others (e.g., boyd 2008) showing virtually no gap in access due to racial factors.

Bargh and McKenna note that "Research has found that the relative anonymity aspect encourages self-expression, and the relative absence of physical and nonverbal interaction cues (e.g., attractiveness) facilitates the formation of relationships on other, deeper bases such as shared values and beliefs" (Bargh and McKenna 2004). However, more recent research on impression formation (e.g., Walther et al. 2008)

shows that, especially in spaces where one's identity is not anonymous but is tied to a "real-world" self, looks do matter a great deal - and that lack of information can be taken as a negative signal in itself. Subsequent changes in practice also render problematic many of the assumptions Bargh and McKenna make in writing the following:

> "And in any event, when these Internet-formed relationships get close enough (i.e., when sufficient trust has been established), people tend to bring them into their “real world”--- that is, the traditional face-to-face and telephone interaction sphere. This means nearly all of the typical person's close friends will be in touch with them in “real life” - on the phone or in person - and not so much over the Internet, which gives the lie to the media stereotype of the Internet as drawing people away from their “real-life” friends.” (Bargh and McKenna 2004)

As nearly all online SNS research shows, many interactions online now take place in a mediated social space where one's offline identity is the very basis for the interaction - and further, that having this additional channel available does mean more interaction, much of it online, among those close friends. Bargh and McKenna note that “By providing an alternative interaction setting in which interactions and relationships play by somewhat different rules, and have somewhat different outcomes, the Internet sheds light on those aspects of face-to-face interaction that we may have missed all along." (Bargh and McKenna 2004)

In a study of self-disclosure in the context of online commercial websites, Chellapa and Sin note that "increased familiarity and positive previous experiences with a vendor is positively associated with trust and hence lowered privacy concerns of the consumer" (2005). This result is echoed in studies comparing information disclosure on, respectively, Facebook and MySpace, with the former having higher ratings of liking, and thus trust, and thus higher degrees of personally identifiable information disclosed.

Among their broader conclusions are that "trust building factors not only directly affect consumers' usage of personalization services but are also negatively related to their privacy concerns." and further that "consumers are concerned not just about their personally identifiable information, but even their anonymous and personally unidentifiable information" (Chellappa and Sin 2005).

Relying heavily on (Ben-Ze'ev 2003), Joinson and Paine (2008) further note an alternate explanation that "disclosing personal information to another person online might not involve the increased vulnerability that usually follows self-disclosure of personal information offline."(Joinson and Paine 2008) They find support for this view with several studies, in noting that "Parks and Floyd (1996)... found that people report disclosing significantly more in their Internet relationships compared to their real life relationships"; that "Tidwell and Walther (2002).. proposed that heightened self-disclosure during CMC may be due to people's motivation to reduce uncertainty." and that "Surveys and

research administered via the Internet, rather than using paper methodologies, have also been associated with reductions in socially desirable responding (Frick, Bächtiger and Reips, 2001; Joinson, 1999), higher levels of self-disclosure (Weisband and Kiesler, 1996) and an increased willingness to answer sensitive questions (see Tourangeau, 2004)." (Joinson and Paine 2008)

Joinson and Paine circle around to the paradox again in saying "Explanations for high levels of self-disclosure in person-to-person CMC have tended to focus on the psychological effects of anonymity... However, explanations for people's unwillingness to disclose personal information to e-commerce services invariably stress people's privacy concerns" (Joinson and Paine 2008). As a solution, they offer that, "The answer to this paradox is that it is the author to whom one is disclosing that is critical -- if one trusts the recipient of the personal information, then one can act with relative freedom in the pseudonymous world such disclosure purchases" (Joinson and Paine 2008). Subsequently, they independently arrive at one of the well-established tropes of online SNS research (though none is cited) in saying that "Disclosure, while often 'given away' is also something that is carefully considered within the context of an ongoing interaction and wider context" (Joinson and Paine 2008). Many studies including boyd 2008, Lenhart and Madden 2007, etc., confirm this point.

Buchanan et al. (2007) describe the development of Internet-verified and -relevant scales for measuring aspects of privacy online. They describe the multiple perspectives on privacy, including Burgoon et al.'s notion of "information privacy"; Malhotra, Kim and Agarwal's further explication of

information privacy in the Internet Users Information Privacy Concerns (IUIPC); Westin's notion of privacy concern; and Introna and Pouloudi's description of privacy as a subjective measure. They take into account the fact that "In some situations, expressive privacy may be obtained through the loss of informational privacy to a third party" (Buchanan et al. 2007), and in their construction of scales importantly frame them around the notion that "only asking people about their concerns will produce an incomplete picture: We also need to ask about privacy-related behaviors" (Buchanan et al. 2007).

Buchanan et al. construct the scales accordingly, around the aspects of accessibility, physical privacy, expressive privacy, possible benefits of surrendering privacy, privacy-related behaviors, and privacy attitudes. Based on their responses and tests for internal consistency, they construct three scales concerning general caution, technical protection and privacy concern (Buchanan et al. 2007). These scales, validated through multiple stages of testing and based on a nuanced understanding of current Internet practice, are and will be of great use in providing a rigorous base for comparison between contexts and across time.

Paine et al. (2007) find previous privacy measures – including the IUPIPC – problematic, stating that most existing surveys "tend to make assumptions about privacy. By only allowing users to respond on a fixed scale no additional information regarding the reasoning behind participants' responses can be gained." Finding fault also with the underlying assumptions - "it is not clear how these concepts were collected, or why they were used" - they therefore set out to develop a more thoroughgoing analytic

technique for examining privacy issues, noting that "Harper and Singleton described how the use of an unprompted survey can provide the most accurate data" (Paine et al. 2007) and then themselves going that direction.

Their solution is a clever one, but is not without significant methodological problems of its own. They developed a dynamic interviewing program (DIP) to interview subjects over ICQ. At this time, the user base of ICQ is not what one could take for a representative population or sample of anything but itself, skewing toward highly experienced computer users, among other things. Their 1.9% response rate was not especially problematic given the context, and an n=519 does give sufficient power - but the 75.1% male population is of concern. Further, the national origins of users was highly unrepresentative - the highest share, 20.6% came from Russia, followed 9.6% from Germany. And while given the highly Anglocentric nature of the high-end technology users, I am not particularly concerned that they misunderstood the questions, Paine et al. are right to list the lack of a fluency measure as a potential shortcoming of the study.

All that being said, the results are interesting for what they provide, if not generalizable. Paine et al. (2007) report that “The majority of respondents (56%) stated they do have concerns about privacy when they are online... The relationship between privacy concern and the age of respondent was found to be statistically significant. The results of the discriminant analysis suggest that Age is the best predictor of whether people are concerned about their privacy whilst they are using the Internet, and the

older users are, the more likely they are to be concerned." Additionally, they find that "the more hours users spend on the Internet a week, and the more years users have been using the Internet, the more likely they are to take actions to protect their privacy." (Paine et al. 2007) This leads to a number of possible explanations, but is intriguing in the way that it dovetails with Lenhart and Madden's (2007) findings that teenagers tend to post more truthful information online, the longer they have been at it. While perhaps an apparent contradiction to these findings (which occur within an older population, mean age=24.6), it is worth considering that both are pointing in the right direction, and that long-time Internet users may have increased levels of privacy concern because they have posted more (truthful) personal information online.

Continuing, Paine et al. (2007) find that "Of the respondents who stated that they do have concerns about their privacy when online, 58% detailed their concerns" giving support to the rationale behind the study. Interestingly, a similar percentage - 56% - of those who were not concerned about privacy online also detailed their concerns, and "the top reason provided by respondents for not being concerned about their privacy online was that they had some information technology (IT) experience and so had already carried out the appropriate actions to protect themselves online" (Paine et al. 2007). This finding would tend to lend support to my concerns about the particular nature of the sample in this study.

Concluding, Paine et al. note that "The detailed responses in the present study indicate that Internet users are not only concerned about informational privacy, even though this is the only privacy dimension they are usually surveyed on." Despite concerns about the particular population sampled here, I do not disagree.

Walther et al. bring a CMC perspective to Facebook research with promising results, but also a confused lineage. Their literature review is problematic, citing a single-context, geographically isolated study as though it were generalizable, and then failing to resolve the direct contradictions between previous CMC research and the SNS research they cite. They note that Facebook "differs" from previous CMC contexts but fail to explicate exactly how or why in more broadly theoretical terms. They assert, "the objectivity and validity of third-party information should be considered more reliable than self-disclosed claims of the same nature. Thus, in a Facebook profile, things that others say about a target may be more compelling than things an individual says about his- or herself. It has more warrant because it is not as controllable by the target, that is, it is more costly to fake." (Walther et al. 2008) But it's not at all clear why this should be the case, and they provide no background studies in either CMC, SNS or Facebook contexts that would support this broad generalization.

That being said, their study is a rigorous one, and they isolate their variables well in its operationalization even if their theoretical underpinnings are less solid than one might prefer. They returned significant results for their first hypothesis, with participants rating profile owners more

attractive when exposed to attractive photos of the profile owners' friends, than unattractive photos of the same. They also found that, “the physical attractiveness of one's Facebook friends does not affect observers' judgments of one's qualifications, either directly or in combination with the target's gender.” Positive wall postings were found to have broadly beneficial effects, though “It behooves one to have good- looking friends in Facebook. One gains no advantage from looking better than one's friends” (Walther et al. 2008). Taken with the increasing skepticism of traditional and arbitrary metrics and scales shown by Paine et al. (2007), Walther et al.'s experiments do suggest an increased willingness among CMC researchers to test both their theories and hypotheses in the context of mediated social spaces.

CMC research has great value in having addressed issues of interaction with and through technology for some time, often through controlled and repeated experiments. This has created a body of knowledge that is of great value for researchers of mediated sociability but is not without limitations and caveats, as detailed above. Environmental considerations are of continuing importance to note as the environments of mediated sociability shift and evolve over time, both socially and technologically. Experimental research will continue to be of great use but is of highest value when conducted in a well-established context of environment and use, further details of these environments of mediated sociability following below in a discussion of online SNS.

2.3 – Social Network Sites

In the past decade, the enormous increase in access to the Internet and World Wide Web has been accompanied by the development and massive adoption of tools for online sociability. While online activity has from its inception been primarily social in nature – e–mail, bulletin boards, instant messenger applications and many more all require the interaction of two or more people – there has been an evolution and refinement of the tools and opportunities for expression of individual identity, friendship and sociability. This review covers one central aspect of this phenomenon: profile–based social network sites (SNS). These sites have as their basis a profile page, where users usually post pictures of themselves and list their tastes and cultural preferences, likes and dislikes, and display their connections to other users, their friends or "friends." Traceable in their earliest forms to SixDegrees.com in 1997 and with several nascent efforts through the late '90s and early '00s, mass adoption did not begin until Friendster's launch and growth in late 2002 and 2003 (boyd 2007a).

SNS are and have been a key area for the performance of identity in technologically mediated environments. They are of interest not simply for themselves (that is, the particular sites e.g. Facebook, MySpace, Friendster) but in what varying elements of presentation of self occur in different contexts at different times. For a practice so new, SNS have received a great deal of academic research attention . However, this attention has been dwarfed by the often emotional coverage of SNS in the popular press, especially focused on the perceived threat of "online predators." A central question relating to identity is

how has research dealt with issues of privacy in the face of these larger societal narratives? A secondary question, also addressing identity, is how the discourse of SNS research is being established, from early studies to the present. This review specifically emphasizes the research conducted in the context currently most relevant for the most U.S. young people – Facebook. The importance of bonding and reinforcing behaviors is examined in light of both explicit and implicit examinations of social capital in these communities.

The following pages focus on the areas of interface between the culture at large and SNS research – to see how research has dealt with issues of privacy in the face of these larger societal narratives warning fear and caution for "our children," and a general survey of the discourse of SNS is being established. While it is clear that the framing of privacy issues and teen identity online has been heavily influenced by popular media narratives, it has not been subsumed by them. As boyd repeatedly shows (2003, 2004, 2007a), and Lenhart and Madden (2007) confirm with their studies, users are quite aware of privacy concerns and issues; but the orientation of boyd's research (and many others') is largely a defensive one, responding to perceptions and charges from the popular culture. The majority of research in this area takes as a given that "privacy" is one of the most important issues in play in SNS. While it is certainly of central importance in any contemporary computer–mediated communication (CMC) situation, what issues are not being addressed? And further, how do users' conceptions of privacy and disclosure overlap with or diverge from researchers'?

SNS research has achieved a certain kind of critical mass, but still lacks a single underlying theory or approach. The following pages are structured along thematic lines designed to follow both the experience of the user over time in adoption of and habituation to SNS, and also to roughly parallel the themes that have emerged in research around the same issues. First I first present a basic theoretical framework for addressing issues of boundary regulation and next move on to Section 2.3.2 – Discovery, following early use and exploration of online mediated social spaces. Section 2.3.3 covers issues of disclosure and its many sub–themes, including privacy. I borrow Bordieu's notion of habitus in Section 2.3.4 for dealing with the longer–term issues of socialization in these online social spaces, and in that section explore the variations in experience that emerge over time within and between communities of practice. I conclude in Section 2.3.5 with a review of the above issues.

2.3.1 – Boundary Regulation

As is common in new phenomena, there is not yet a central theoretical framework for addressing issues of mediated sociability in this context. However, ethnographic research began at the inception of SNS, with boyd's early studies of Friendster (boyd 2006, 2007, 2008). While Palen and Dourish's "Unpacking Privacy for a Networked World" (2003) does not touch directly on SNS, it signals that information disclosure generally was a concern and source of theoretical exploration already before the mass adoption of the massively–information–disclosing phenomenon of SNS. Their theoretical framework proves especially useful for viewing further studies, in fact, as it is unclouded by the media–

driven moral panic over the (perceived but nearly nonexistent) threat of online "predators," which unfortunately several recent studies have succumbed to even while they acknowledge a lack of any but anecdotal evidence. Palen and Dourish cite Altman's theories in developing their own, saying,

> "While traditional approaches understand privacy as a state of social withdrawal, Altman instead sees it as a dialectic and dynamic boundary regulation process. As a dialectic process, privacy regulation is conditioned by our own expectations and experiences, and by those of others with whom we interact. As a dynamic process, privacy is understood to be under continuous negotiation and management, with the boundary that distinguishes privacy and publicity refined according to circumstance" (Palen & Dourish 2003, p. 129).

This flexible and dynamic conception of privacy and boundary compliments well with Vygotsky's notion of development as an ongoing dialectical process (Vygotsky 1978) – both conceive of behavior as plastic and evolving, not innate and essential. Further,

> "Altman's fundamental observation is that privacy regulation is neither static nor rule–based. ...a fine and shifting line between privacy and publicity exists, and is dependent on social context, intention, and the fine–grained coordination between action and the disclosure of that action. Altman conceptualizes privacy as the 'selective control of access to the self'" (Palen & Dourish 2003, p. 130).

Palen and Dourish are particularly insightful in noting, “Technology itself does not directly support or interfere with personal privacy; rather it destabilizes the delicate and complex web of regulatory practices” (Palen & Dourish 2003, p. 133). Laying the groundwork for where boyd will later go with her “networked publics,” they note that “At any given moment, the balance between self and other, privacy and publicity, and past and future must have a single coherent and coordinated resolution” (Palen & Dourish 2003, p. 133). Finally, they sum up saying, “What is important is not what the technology does, but rather how it fits into cultural practice” (Palen & Dourish 2003, p. 135). That is a key consideration in the review of literature that follows.

Boundary regulation continues to be a useful framework for understanding mediated sociability. I believe that understanding the uses of channels for identity expression is key in these examinations, and my own previous research (Greenberg et al. 2008; Shoffner et al. 2008) suggests that the two work in tandem, with students using different channels for different audiences and different functions, regulating boundaries by channel type. I will return to these issues later but now move to a structured examination of SNS use patterns.

2.3.2 – Discovery

All major SNS – from Friendster to MySpace to Facebook – have gained audience through a model similar to "snowball" sampling, building from a small self–selected group who then recruit their friends to the service. New users upon joining tend to spend substantial time in what I term a "discovery" phase, finding all their own friends on the service. This tends to be the period of most intense activity, as users are motivated to establish their real–world network of friends in the mediated social space. In mapping this space, as users themselves have mapped it collaboratively, ethnography is an important first step in research as in any novel area; boyd in particular has provided extensive ethnographic research and theoretical insight in the initial period of SNS.

Providing a first example of the discovery phase, an early exploration of online social networking sites, Adamic et al. (2003) examine Stanford University's Club Nexus, a basic context–specific (but apparently openly viewable) SNS rolled out in the fall of 2001. Their large sample size of 2469 is impressive, especially for the early days of SNS, and several items of note emerge in the course of their analysis – particularly the fact that among those 2,469 users, only 10,119 links existed between them, with over 200 listing no "buddies", users most frequently listing only one and the vast majority listing only a few. The authors focus much of their investigation on the links between personality and preferences, as evidenced by how users describe themselves in their profiles, and how their friends

describe themselves in theirs. Their analysis finds that "users tended to be consistent in how they described themselves and what they looked for in others" (Adamic et al. 2003). They also explore user ratings of their buddies and each other as being 'trusty', 'nice', 'cool', and 'sexy', an aspect of Club Nexus not replicated in later SNS. Their data here proves one of the more intriguing takeaways from the study, as they find "...users had a tendency to give a similar score to a buddy across all categories" and that "...users tend to reciprocate their 'trusty' and 'nice' scores... Users did not however seem to reciprocate on their 'cool' and 'sexy' opinions" (Adamic et al. 2003).

As one of the first SNS studies gives specific attention to aspects of discovery and one of the first studies of one of the first SNS, prior to the publication of this research, information on these issues was extremely limited. Adamic et al. use general social network analysis research, and their precedents in the online context are a study of multi-user domains (MUDs) and one of Everquest (an early popular online game). Intervening years and research have proven SNS and virtual worlds/MUDs/MMORPGs (massively multiplayer online role-playing games) to be distinct contexts – both worthy of study but comprising significantly different sets of behavior and necessitating significantly different theories and approaches. A recent Pew study found that while 97% of teens played games, only 11% participated in virtual worlds and 21% in MMORPGs, the lowest rates of any category of games (Lenhart et al. 2008).

2.3.2.1 – Discovery – Norms and Boundaries

Part of the process of discovery is the setting of norms and boundaries by users individually and in groups. Each context has different patterns of these norms and boundaries, and boyd's "None of this is Real" (2007a) tracks the rise and downfall of Friendster, from its gestation to the end of Friendster as a leading SNS. As discussed above, profile–based SNS had been attempted in various forms since the 1990s, but Friendster for a variety of reasons hit a sweet spot in terms of its features, community and timing. Conceived first as a dating site and structured for some time as invite–only, the idea behind Friendster was simple: users would construct a profile, listing their interests, likes and dislikes, and publicly display connections to their friends' profiles. Users could then view their friends' friends' profiles as a way of broadening the range of people they didn't know yet, but would probably get along with (or want to date). Friendster first found purchase in the communities of Silicon Valley geeks, gay men in San Francisco and "Burners," (attendees of the Burning Man festival in the California desert, drawn also in large part from the Bay Area).

Positioned as both participant and researcher, boyd applies a critical framework to what's both a widely–referenced and oft–misunderstood phenomenon. Casual observers will point to Friendster's downfall as due to its "just not being cool" anymore, but boyd shows the particular reasons that this

became the case – specifically, the aggressive pushback by Friendster's developers against the internal norms established by tastemakers and influentials within the network. boyd describes the tension created by Friendster's management not anticipating the rapid growth (which led to crawlingly slow interactions), and elimination of its "Most Popular" feature and systematic deletion of "Fakesters" (fictional characters used as both cultural tokens and ways of users' extending their networks). Her discussion here highlights the process of contesting norms and boundaries in explicit detail, and their central importance to online sociability. Specifically, the importance of these norms and boundaries being collaboratively decided amongst users rather than dictated from above. boyd's conceptual framework for understanding the conflict at the center of Friendster's expansion (which created in turn both the Fakester phenomenon and the pushback against it) is also key. She writes, "Because Friendster draws from everyday social networks, it incorporates these differences and boundaries while greatly diminishing people's abilities to manage them. ....It illustrates an inverse relationship between the scalability and manageability of social networks..." (boyd 2007a, p. 3). In short – not only should SNS not try to over–regulate norms and behaviors, beyond a certain point they simply cannot do so without destabilizing the whole enterprise.

boyd also makes useful observations about the nature of contemporary subcultures and the effects of digital representation on those, saying, "Although subcultures are often perceived as distinct, their social networks are frequently connected through shared late–night venues, music and clothing stores, and political activities. Many individuals bridge multiple scenes, resulting in labels like

“graver” (goth + raver). Friendster made many of these interconnections visible and gay men started to see Burners and vice versa” (boyd 2007a, p.11). Thus, with the discovery process revealing latent similarities, users begin to re-conceive the boundaries of their social networks. Continuing, boyd notes, “Social groups tend to converge collectively on a coherent presentation style and encourage, if not pressure, other participants to follow the collective norms (e.g., regarding photos). The domination of the early Friendster by a few distinct and relatively homogenous subgroups simplified this process. As the network grew and diversified, and as the Friendster developers promulgated more rules about acceptable content, participants developed new ways of structuring and signaling collective identities.” (boyd 2007a, p. 13). In this way, collective boundary regulation and norm–setting in virtual spaces re–conceived users' views of the world and their place in it. A question that arises then is when do (online) cohorts fracture and begin to lose coherence, to blend into one another, to spawn new practices?

Ito et al. (2008) in a summary report of a broad–ranging set of research projects over several years lay out a key set of concepts for understanding youth socialization, use of new media and participation in multiple contexts of behavior with same. The authors make a key conceptual point in saying, "Youths' online activity largely replicates their existing practices of hanging out and communicating with friends, but the characteristics of networked publics do create new kinds of opportunities for youth to connect, communicate, and develop their public identities" (Ito et al. 2008, p. 10-11). This fairly basic truth about online activity is central to any understanding of the dynamics of

mediated socialization, and not banal for its simplicity. Namely, that online socialization is basically the same as offline, but it also allows you to do different things.

Ito et al. frame methods of online participation into three categories, and make several important points on how the genres are viewed both by participants and others – "Unlike with other genres of participation (e.g., messing around and geeking out), parents and educators tend not to see the practices involved in hanging out as supporting learning" (Ito et al. 2008, p. 13). So thus, hanging out is restricted as an unproductive activity; however, "...most teenagers developed 'work–arounds,' or ways to subvert institutional, social, and technical barriers to hanging out... Because these work–arounds and back channels take place in schools, homes, vehicles, and other contexts of young people's everyday lives, teens become adept at maintaining a continuous presence, or co–presence, in multiple contexts" (Ito et al. 2008, p. 13). This is one of a range of practices that are not necessarily apparent without extensive ethnographic investigation, and is what make such studies as Ito et. al's large, long–term study of such value in drawing the contours of these spaces.

2.3.3 – Disclosure

Disclosure in this context refers to the sharing of personal information on SNS, and previous research deals with issues of disclosure and its many sub–themes, including agency; context; technological affordances; critiques of practice; and attempts to quantify disclosure practices. Among

early topics studied within the SNS behavior was self–disclosure, which makes sense, as never before had so many people made so much information about themselves available to so many others. Rather than a simple and fearful dynamic, what the research shows is that online disclosure is a complex, subtle, and social discursive practice – a new literacy in itself.

In one of the most cited early studies of online identity, Donath (1999) performs an ethnographic examination of user practices on various Usenet discussion boards and finds many of the same behaviors that have persisted and continue to be of interest today, from persistence of identity and deception to tolling to context collapse. Usenet, a system of bulletin boards that preceded the World Wide Web and was broadly popular through the 1990s for specialist communities, was an early example of the kind of computer–mediated sociability that is now found in similar forms on many websites. Donath provides key insight into the ways in which new users are acculturated into online mediated communities, and the ways in which these processes of acculturation both increase the value of the spaces and circumscribe the kinds of selves that users can present.

Stutzman (2006) performed a survey of university students early in Facebook's history (early enough that it was still called "TheFacebook") and explored several main questions: "Which SNC's do students participate in? What identity information is disclosed in the SNC's? How does it compare to identity information previously disclosed by the university? How much identity information are students disclosing in SNC's? What are student opinions about identity information disclosure in

SNC's?" (Stutzman 2006, p. 2) (Stutzman here uses "SNC" in the same manner I use "SNS"). He found even at that early date high adoption rates for Facebook, of 90 percent on one campus. He found similar patterns of information disclosure as other studies, with most users revealing name, gender, e–mail, pictures and similar basic information, with comparatively few revealing phone numbers or personal websites outside of Facebook. Stutzman also gauged perceptions of identity information disclosure, and found students very comfortable with friends accessing their profile, and significantly less but still positively rating strangers accessing their profiles. He found students valuing protection of their identity information and believing that it is not well–protected online. Stutzman concluded,

> "A large number of students share particularly personal information online... there is a disconnect between the value of traditional identity information (Name, SSN) and the new types of identity information being disclosed (photo, political views, sexual orientation) in SNC's. This disconnect identifies the need for a new discussion of identity information protection on campus, one that is effectively holistic and SNC–aware" (Stutzman 2006, p. 6).

Gross & Acquisti (2005) in a study full of valuable data points, note the weakly deterministic role of software in disclosure, saying, "The use of real names to (re)present an account profile to the rest of the online community may be encouraged (through technical specifications, registration requirements, or social norms) in college websites like the Facebook... Or, the use of real names and personal contact

information could be openly discouraged" (Gross & Acquisti 2005, p. 2). It's worth remembering that this takes place in a context where users are seeking to disclose information – the software does have a role in how they do it, but not the fact of their doing it. They find that "90.8% of profiles contain an image, 87.8% of users reveal their birth date, 39.9% list a phone number (including 28.8% of profiles that contain a cellphone number), and 50.8% list their current residence... the phone number [is] disclosed by substantially more male than female users (47.1% vs. 28.9%). Single male users tend to report their phone numbers in even higher frequencies..." (Gross & Acquisti 2005, p. 5).

Keeping again in mind the particular nature of Facebook at the time of their survey – a closed network, with most information accessible only to friends and associates at the same institution – they are able to independently confirm that "89% of all names to be realistic and likely the true names for the users ...with only 8% of names obviously fake. The percentage of people that choose to only disclose their first name was very small: 3%. In other words, the vast majority of Facebook users seem to provide their fully identifiable names, although they are not forced to do so by the site itself" (Gross & Acquisti 2005, p. 6). In a follow–up analysis, Acquisti and Gross (2006) find that Facebook users report high levels of concern over privacy and related issues but by and large do not implement privacy controls that are available to them on Facebook. Indeed, many are unaware that such controls exist.

In what now stands as one of the seminal papers in SNS research, Donath and boyd (2004) explore the dynamics present in early SNS, including Orkut, LinkedIn, Spoke and Friendster. They lay

out the basic typologies of profile–based social networking, noting that links between users "public, mutual, unnuanced, and decontextualized [which] shape[s] the culture that is evolving on these sites" (Donath & boyd 2004, p. 72). They make an assertion as to SNS behavior that future studies both verify and contradict: "since one's connections are linked to one's profile, which they have presumably viewed and implicitly verified, it should ensure honest self–presentation" (Donath & boyd 2004, p. 73). Studies in the past several years have shown that, indeed, when one's profile is connected to a verifiable offline identity – when real names are used, as in Facebook or LinkedIn – honest self–presentation does indeed seem to be the norm (see Acquisti & Gross 2005, Gross & Acquisti 2006). However, when profiles are further anonymized – such as on Friendster (in some cases) and MySpace (in more) – an element of play is introduced, and honesty (as in total truthful accuracy) tends to be less important than consistency with the norms and behaviors established and maintained by one's friend group (see Dwyer et al. 2007, boyd 2007a). In both situations, however, it is a kind of honesty that is at issue; as they note, "social groups have considerable power in enforcing norms. The power of reputation to enforce co–operative behavior lies not in confrontation with the subject, but in conversation surrounding him" (Donath & boyd 2004, p. 75-76). These different contexts show the variation in behaviors around disclosure.

Goodings et al. (2007) bring an altogether different perspective to the study of disclosure in online SNS, couching it in the prior work regarding online and virtual communities rather than other contemporary examinations of SNS behavior. They take a social–psychological ("discursive

psychology") approach to the analysis of public communications on two MySpace profiles. While the study itself is problematic in terms of generalizability, the theoretical–analytic framework is an intriguing one and worthy of further examination. They adopt a flexible framework for conceiving of identity as they write: "...identities are discursively formulated – that is, they are sets of claims and self–descriptions which persons adopt (and sometimes dispose of) in the course of everyday interaction" (Goodings et al. 2007).

Goodings et al. also develop a novel and rich theory regarding the very basic idea of community, in writing:

> "Our argument is that all communities, defined in this way, are 'mediated'. That is they correspond to the following – (a) a dialectic of place and collective; (b) the mobilisation of symbolic resources; (c) the maintenance of a collective history and (d) the underwriting of personal identity in place identity. What is crucial is the relative degree of mediation involved in a given community. Virtual communities are not then opposed to other kinds of community in some way, but instead differ in terms of the complexity of the mediation involved and the modalities through which this occurs" (Goodings et al. 2007, p. 466).

The perspective of mediated, dialectical and symbolic space with historic and identity–laden repercussions has wide implications for the study of not only SNS but all forms of communication and identity, and will prove very useful going forward in explicating the levels of mediation and markers of identity present in all manner of modern life. It suggests that rather than a simple home page of taste–statements, SNS profiles are sites with tremendous psychic import, and exist not merely in a relational database but also in their users' ongoing psychological processes of identity formation and maintenance – as a weigh–station in the I/me. Continuing in their discussion of communities, they note that,

> "All communities are faced with the task of constructing a relationship to place, which effectively mediates the social relations of community members. In this sense mediation – whether electronic or not – is a structural feature of both off–line and on–line communities (Brown et al., 2001). The question is then around the modalities through which mediation is conducted, and how this resources identity" (Goodings et al. 2007, p. 475).

As the basic mechanisms of socialization in mediated spaces are further identified and ever–more–minutely studied, SNS researchers will face the same trap that many other social sciences face – tunnel–vision. Obsessive focus on how things happen on, e.g., Facebook – and insistence that "that's just how it is" – would poorly serve both the researchers and the public at large. The Internet is going to continue to grow, rapidly and massively, for the forseeable future – more and more people means more and more interactions between people, and more and more different kinds of interactions between

people. Researchers in social media should be constantly on the lookout for these new methods of behavior, and not be afraid of a failed approach or non–generalizable data.

In an ethnographic exploration of behaviors relating to profile formation and maintenance, messaging and testimonial–writing on Friendster in 2003, boyd and Heer (2006) develop the idea of "profiles as conversation." They provide much in the way of useful theoretical structure for interpreting and understanding SNS behaviors, writing, "The process of developing and interpreting context is simultaneously a foundation for communication and a conversation itself" (boyd & Heer 2006, p. 5). boyd and Heer find tentative support for the idea that close Friend networks provide the cues and tools for performance of identity in online mediated environments in their 2003 ethnographic field work on Friendster, writing, "In the case of Burners, newcomers would see that their friends used their 'Playa name' (nickname used at the festival), uploaded photos from Burning Man or other related parties, and listed a set of interests resonant with Burner culture. In turn, newcomers would do the same, reinforcing the Burner–esque sub–culture within Friendster" (boyd & Heer 2006, p. 4). Again, tentative support for the awareness and avoidance of appropriateness violations is shown in boyd and Heer's (2006) research on Friendster, as they noted, "When looking for hook–ups, users typically initiated conversations with people four degrees away, as far removed from one's friend group as possible. It was assumed that this would limit the potential social harm of talking to Friends' Friends" (boyd & Heer 2006, p. 7). This distance also allows greater freedom from direct social sanction in the case of appropriateness violations

by users – but the Friends as displayed still provide the context from which the user and their performance emerges.

Among the devices by which this context is made explicit is Testimonials. As boyd and Heer write, "...intimate Testimonials clearly signaled the strength of people's relationship. While Testimonials were designed for friends to recommend each other as lovers, in actuality, they provided a different type of social glue. People mastered use of the pithy Testimonial to simultaneously recognize the value of the receiver, validate the relationship, and reflect on the writer" (boyd & Heer 2006, p. 8). Continuing, they note that this is another manner of norm–formation and where the potential exists for sanction, saying "Testimonial authorship is not self–less. Reciprocity is expected and failure to gift a Testimonial in return signals disrespect at best" (boyd & Heer 2006, p. 8). Finally, they note another way in which Testimonials serve as this social glue and grounding, writing, "While Testimonials appear on the receiver's Profile, users would often seek out Testimonials written by someone with an interesting Profile to get a better sense of who they were. Both Profiles and Testimonials are performative, yet the Testimonials one writes are perceived as better indicators of a person's personality than either their constructed Profile or the Testimonials their Friends write about them" (boyd & Heer 2006, p. 8). Just as in physical social space, not all acts of socialization are intended merely for the immediate subject of discussion.

In a basic but illuminating qualitative study on use of technological channels, Dwyer (2007) asks simple questions and gets answers that border on the obvious – but it's exactly the kind of foundational study that is necessary for more broad–ranging work to be done in the future. She investigates how individuals use technology to manage interpersonal relationships, and how that technology mediates behaviors managing those relationships. (Dwyer 2007) Her findings, broadly, are that "...the use of communications technology for social interaction is carried out through multiple channels. Each participant indicated they have cell phone, and make frequent use of text messaging, instant messenger, and social networking sites to maintain contact with friends as well as make new friends. ...With so many channels available, and most available for free, informants easily switch back and forth between them, and simply drop any method they do not like..." (Dwyer 2007, p. 9). Again, a very basic proposition, but a key one in terms of identifying areas for future research – having established that users display these behaviors, questions arise over why, and studies can be done regarding, e.g., what makes a given communication channel preferable or salient for a given user at a given time, or what kind of burden must be satisfied to cause switch of channel, etc.

Another main point that arises from Dwyer's paper is that of digital agency, that impression management is one of the chief functions of SNS (Dwyer 2007). She found that, "The most common attitude towards privacy indicated was that the participants felt it was their responsibility to control what information was available. 'You put it out there, everybody should be able to see it, if you don't want anyone to see it, then you don't put it out there'" (Dwyer 2007, p. 6). This again is an important post–

marker for future research, allowing further studies to ask just what it is that makes something worth putting “out there” or not, and is a good point at which to transition into studies more explicitly focused on self–disclosure and privacy.

In a study well–situated within the context of a given online SNS – in this case, MySpace – Perkel describes the context–specific practices of users and proposes a novel description within which to situate those practices: that is, literacy. Primarily using diSessa's theory for his core analysis, Perkel effectively re–conceptualizes the view of teens' MySpace use from an idle time–wasting activity to "a social niche [that] represents the 'complex web of dependencies' in communities that allow (or do not allow) various competencies to thrive” (Perkel 2006, p. 4), and "involv[ing] an understanding of many generic forms and the use of generic competencies that cross spheres of activity” (Perkel 2006, p. 5). This new literacy is collective and distributed, and "...each profile is the product of many people, not just the work of the individual MySpace member” (Perkel 2006, p. 4). He concludes that

> "remixing media by copying and pasting is a collective technical practice; people's creations are dependent on each other in many different ways. One could see remixing as a sign of a new, networked material intelligence, to adapt diSessa's concept... through MySpace and sites like it, knowing, socially and technically, how to re–use media in this particular way has become foundational for communication and creative expression over the web” (Perkel 2006, p. 10).

Perkel then asks a key question for future research, positing, "in what social niches might copying and pasting in the process of re–using a diverse array of media be considered the sign of a deep shift in how people engage with one another?" (Perkel 2006, p. 10). This is indeed a fruitful area for further explanation.

Not all analyses are as optimistic about practices relating to online disclosure; Barnes' (2006) feeds into common misconceptions regarding online disclosure, asserting that teens putting information online is a "problem" of which they are insufficiently aware. This analysis repeatedly mentions the hype over the danger of "online predators," noting without specific citation that "Several young girls have been molested by men they have met on social networking sites" (Barnes 2006). Barnes continually re–asserts that teens putting information is a "problem" of which they are insufficiently aware without even attempting to address teens' views on privacy and personal information disclosure. For Barnes, teens are the problem, and parental control is the solution. Barnes also leads from initial concern that "government agencies may not be a solution to the privacy dilemma" to an assertion that "the education of teens and their parents to the growing privacy problem will require an educational effort that involves schools, social networking organizations, and government agencies" (Barnes 2006). Barnes repeatedly emphasizes that "Young people do not seem to be aware of the uses of their personal information," "Some students may be aware that Facebook is not a private space, but many act as if it is private," without ever asking students or young people if they are aware of said uses, or attempting to determine

how they would distinguish between private and public behavior. She observes that "...once private information is posted on the Internet, it becomes available for others to read. We have no control over who can read our seemingly private words," (Barnes 2006) and that "Students may think that their Facebook or MySpace journal entries are private but they are actually public diaries" (Barnes 2006). Madden and Lenhart (2007) show that, contra Barnes' assertions, teens are actually more aware of these issues than adults.

In preliminary findings from a two–year study, Hewitt and Forte (2006) report little movement in affect – either positive or negative – from student contact with professors on Facebook. However, as they note, this may be due to a "ceiling effect" – professors were rated at 4.7 on a 5–point Likert scale both with and without Facebook contact. There simply wasn't much room to move. More anecdotally, they report, "some students self–reported that Facebook interaction had had a positive impact on their perception of the professor. No students reported that the Facebook had had a negative effect" (Hewitt & Forte 2006). And in one of the clearest findings from their preliminary results, they find that "gender seems to be a predictor of comfort with faculty on the site – men were over twice as likely to condone faculty presence on Facebook [as women]" (Hewitt & Forte 2006), men approving by a 73–27 margin and women disapproving by a 65–35 margin. Given the small sample, preliminary nature and ceiling effect, more study is clearly needed to determine the effects of student–teacher interaction on Facebook (see Mazer et al. 2007).

While there has been a great deal of tsurris stirred up by media reports focusing on the negative and isolating aspects of online disclosure, which has in some part leaked over to research on the same (e.g., Barnes 2006), for the most part the research shows a more subtle dynamic at work than lonely, out–of–control teens destroying their future job prospects. Disclosure is found to be a complex, discursive and inherently social communicative process occurring not simply at the individual level but between users as they negotiate norms and boundaries of mediated sociability. There is a great deal of thought given to disclosing different forms of information and the contextual appropriateness of such disclosures, and such thought and savviness can in fact be thought of as a new kind of literacy. In addition to issues of disclosure, itself, many researchers have investigated the impacts on privacy and perceptions of privacy that disclosure in online mediated environments inspires, and these are reviewed below.

2.3.4 – Habitus

Looking for a framework to examine mediated sociability, I turned to a prominent social theorist of institutions, Pierre Bourdieu. In this section I borrow Bordieu's notion of habitus for dealing with the longer–term issues of socialization in these online social spaces, and explore the variations in experience that emerge over time within and between communities of practice. Habitus as defined by Bordieu (1977) is "systems of durable, transposable dispositions... structured structures." (Bourdieu 1977) I review how various researchers have in turn attempted to quantify the habitus of SNS (Section 2.4.1);

the implications for social capital (Section 2.4.2); the contestestation of habitus in communities of practice (Section 2.4.3); demographic variances in habitus (Section 2.4.4); and interpersonal communications within the habitus of online SNS (Section 2.4.5).

boyd's 2007 "Social Network Sites: Public, Private, or What" is meant explicitly as an antidote to the fear–mongering over SNS present in much contemporary media coverage. In the article, boyd lays out a framework for understanding how youth actually understand and use SNS, and how adults (especially educators) should interface with them in those spaces. She notes quite rightly the main tension: "New social technologies have altered the underlying architecture of social interaction and information distribution. They are embracing this change, albeit often with the clumsy candor of an elephant in a china shop. Meanwhile, most adults are panicking. They do not understand the shifts that are taking place and, regardless, they don't like what they're seeing" (boyd 2007b, p. 1). Adults not liking what they are seeing does explain some of the media narrative of moral panic often surrounding SNS. But if they are undermining existing social structures, what structures are they offering in their place? In boyd's reading, the framework for understanding SNS has several parts: "three features – profiles, Friends lists, and comments – comprise the primary structure of social network sites," which she then goes on to say "are the latest generation of 'mediated publics' – environments where people can gather publicly through mediating technology" (boyd 2007b, p. 2) Mediated publics are defined by four key attributes – persistence, searchability, replicability and invisible audiences. These structural and operational foundations underlie much of what happens on SNS.

Regarding behavior within these structures and operations, boyd makes a key observation regarding how youth hold in tension the desire for privacy and disclosure of personal information in SNS, saying, "most participants in networked publics live by 'security through obscurity' where they assume that as long as no one cares about them, no one will come knocking. While this works for most, this puts all oppressed and controlled populations (including teenagers) at risk because it just takes one motivated explorer to track down even the most obscure networked public presence" (boyd 2007b, p. 4). Many anecdotal cases of especially coaches and other adult authority figures misusing these power dynamics and informational imbalances underline this latent danger.

boyd continues, saying,

> "Just because it's possible to get access to information, is it always OK to do so?... Because mediated publics are easier to access, they afford less privacy than unmediated publics. When asked, all youth know that anyone could access their profiles online. Yet, the most common response I receive is '...but why would they?'" (boyd 2007b, p. 4).

This observation points in an intriguing direction, and another possible source of conflict and misunderstanding between generations regarding use of SNS – conceptions of privacy that are not simply different but parabolic. Adults have grown up in a world where privacy has been a presumption,

and where there are moral and legal structures to address violations of privacy. Young people have grown up more "in public", where privacy is not of particular concern – what is of greater concern is the "why would they" question. That is, why would anyone pull information out of its proper context for ill use in another. This is a fair point, and accepting this may be part of the underlying implicit ethical system at work in mediated sociability – but there are at present neither legal nor broad societal sanctions for opprobrium when this convention is violated. Adults may think young people are naïve and get what they deserve when disclosing information online and having it revealed elsewhere, but what they do no – perhaps cannot – grasp is that when they are doing so, it is they who are committing the ethical violation.

With similar ideas in mind and while prescribing steps educators can take to be involved but not oppressive, boyd outlines several more key points, saying,

1. Recognise that youth want to hang out with their friends in youth space...
2. The Internet mirrors and magnifies all aspects of social life.

   When a teen is engaged in risky behaviour online, that is typically a sign that they're engaged in risky behaviour offline. (boyd 2007b., p. 5).

This last point underlines a further extension of the above–discussed ethical disconnect, and suggests that one crucial step forward is to consider online activity as a continuous part of modern life, rather than a lark or a game.

boyd provides a further rigorous and refreshing corrective to preaching seen elsewhere with some of the initial results of her two–year ethnography of teen practices in online social spaces, framed by her development of the idea of a "networked public" and definition thereof, in "Why Youth (Heart) Social Network Sites" (boyd 2008). She writes, "social network sites are a type of networked public with four properties that are not typically present in face–to–face public life: persistence, searchability, exact copyability, and invisible audiences" (boyd 2008, p. 2). Continuing, she says, "Networked publics are one type of mediated public; the network mediates the interactions between members of the public" (boyd 2008, p. 8). boyd goes on to expand upon the four key properties of networked publics, saying,

"These four properties thus fundamentally separate unmediated publics from networked publics:

1. Persistence: Unlike the ephemeral quality of speech in unmediated publics, networked communications are recorded for posterity...
2. Searchability: Because expressions are recorded and identity is established through text, search and discovery tools help people find like minds...

3. Replicability: Hearsay can be deflected as misinterpretation, but networked public expressions can be copied from one place to another verbatim such that there is no way to distinguish the "original" from the "copy."
4. Invisible audiences: While we can visually detect most people who can overhear our speech in unmediated spaces, it is virtually impossible to ascertain all those who might run across our expressions in networked publics" (boyd 2008, p. 9).

Utilizing her previous ethnographic research on Friendster, boyd also traces the evolution of a social practice key to SNS, from Friendster's testimonials to Facebook's wall. She examines the tensions between parental desires for teens to implement privacy controls on their SNS profiles and the need for those privacy controls to be switched off for proper social functioning in those contexts. In a barb directed at those who misread – willfully or not – teen online social practices, she notes, "While MySpace is public, it is unlike other publics that adults commonly face. This presents a generational divide that is further complicated by adults' mis–readings of youth participation in new media" (boyd 2008, p. 18). This tendency is especially pernicious given the increasing lack of boundaries between mediated social spaces and "real" interaction; this particular problem, however, may abate as this becomes just as true of adults' social spaces as youths'.

2.3.4.1 – Habitus Analyses

Lenhart and Madden (2007) deliver results from a measured and wide–ranging survey of American teenagers on attitudes towards and practices relating to privacy online and with regard to SNS, Lenhart and Madden offer a refreshingly straightforward and respectful picture of teens. While noting that "32% [of teens] have been contacted online by someone who was a complete stranger," they place this in its proper context – 65% "just ignored or deleted" the message. Further, Pew's 2000 study of teen internet usage had found that "close to 60% of teens had received an instant message or email from a stranger," and that today, "Looking at online teens as a whole, roughly 93% have never had the experience of being contact online by a stranger in a way that made them feel scared or uncomfortable" (Lenhart & Madden 2007, p. 35-36). On the whole, "...many youth actively manage their personal information as they perform a balancing act between keeping some important pieces of information confined to their network of trusted friends and, at the same time, participating in a new, exciting process of creating content for their profiles and making new friends" (Lenhart & Madden 2007, p. i-ii). Teens, they say, "consistently say that the decisions they make about disclosing personal information on social networks and in offline situations depend heavily on the context of that exchange" (Lenhart & Madden 2007, p. 2). Finally they conclude, "Teens make a serious distinction

between online harassment and physical harm, and that distinction informs many of the choices they make to share online" (Lenhart & Madden 2007, p. 30).

Some very useful benchmark findings from Lenhart and Madden include that, "Age is a particularly important factor for understanding teen use of social networks. For 12 and 13 year olds, social network use is not as prevalent, with just two in five (41%) of teens those ages using the sites. Once teens approach or enter high school, their use jumps – 61% of teens 14–17 use online social networks" (Lenhart & Madden 2007, p. 12). These numbers are sure to have shifted in the intervening years, given their finding that 85% of teens with online profiles use MySpace most often, with Facebook at 7%. Importantly, Lenhart and Madden say in a footnote to their analysis of SNS adoption that,

> "While MySpace and Facebook are both social networking sites, they are very different types of social networking systems. MySpace is open to anyone, and has loose age restrictions, but in essence, users can create whatever type of profile and network there that they choose. Even with its new openness, Facebook is still primarily organized around real–world physical communities – first college campuses and later high schools, employers and geographic regions. On Facebook, creative expression is limited to text, posted photos and links to other outside material" (Lenhart & Madden 2007, p. 12).

While true in 2007, it is possible Facebook now has more outlets for creativity and expression, and it is certainly the case that many more teens are using it as their primary SNS.

The Pew survey also shows that "A mere 2% of teens have posted their ultra–personal cell phone number to their online profile" (Lenhart & Madden 2007, p. 16). This contrasts with the still-minority but much-higher posting rates found by Acquisti and Gross (2006) in their study of Facebook users, where 47.1% of male and 28.9% of female users posted their cell number. Lenhart and Madden's emphasis on the importance of context again applies here, and helps to illustrate one of the differences that appears to surface in practice between Facebook and MySpace users. Further longitudinal study in this regard would also prove useful – for those high school MySpace users, how did behavior change (if at all) upon arriving on college campuses, and establishing Facebook as their primary SNS? Were there some who did not make the switch? How does the behavior differ among non-college-attending teens and young adults? All of these questions, of course, apply to online behavior more generally and not just with regard to disclosure of cell phone numbers. A more profound difference, in fact, can be found in posting of names, where the Pew study found that "26% of teens with online profiles post their full names. However, most of these teens who include their full name restrict access to their profile; just 6% of online teens and 11% of profile–owning teens post their first and last name to a publicly viewable profile that is visible to anyone online" (Lenhart & Madden 2007, p. 17). Contrast this to Acquisti and Gross' findings that 89% of Facebook users posted their full real name. The contrast continues with more general levels of truthfulness in disclosure – Acquisti and Gross found that the vast majority of

Facebook users were entirely honest in their profiles, while Lenhart and Madden find, 56% of teens posting at least some false information; slightly less than a third saying "a little" of their information is false; 17% saying that some of the information is false; and 8% saying that most or all of their profile information is false; with 44% who say that their profile is completely truthful (Lenhart & Madden 2007, p. 23).

The data in the Pew survey on differences in SNS adoption and information disclosure by age, when taken with these various contrasts, seem to indicate several intersecting patterns of behavior. Even within this survey, it's clear that as teens mature, they divulge more information, more truthfully "Younger teens are more likely to say they have fake information on their profiles than older teens. Nearly 7 in 10 (69%) younger teens 12–14 say they've got false information on their profiles, while less than half (48%) of older teens 15–17 say they've posted untrue information to their online profiles" (Lenhart & Madden 2007, p. 24). Acquisti and Gross' data on Facebook, while not longitudinal or generalizable to these findings, would seem to indicate a further continuation of that trend into the college population. An important question to address with future research is the degree to which these differences can be attributed to any of several possible independent variables: age, college/ non-college, Facebook/MySpace, etc.

Lenhart et al. (2007) add more data in their report "Teens and Social Media"; among the most important for my purposes is their finding that 39% of teens restricting access to their photos "most of

the time," 38% doing so "only sometimes"; 21% "never" restrict access to the images they upload. By contrast, adults are more permissive, with 34% restricting access most of the time, 24% some of the time, and 39% never doing so (Lenhart et al. 2007, p. 14).

Further, with regard more specifically to SNS, Lenhart et al. find that two-thirds of teens with SNS profiles restricting access in some way compared to 50% of adults. Additionally, they find that teens limit the type of real information shared online, with 11% of teens with profiles sharing both first name and last names and only 5% sharing their full name, photos and city or state (Lenhart et al. 2007). There is one behavior that diverges strikingly from this norm – the posting of online videos. Lenhart et al. report that "Just 19% of video posters say they restrict access to their videos "most of the time."... More than one–third of teens who post videos (35%) say they restrict access to their videos "only sometimes," and 46% say they "never" limit who can watch their videos" (Lenhart et al. 2007, p. 14-15). This finding, teamed with data also showing the extensive thought that teens put into restricting different kinds of content, underlines the importance of placing all findings explicitly in the context of their particular practice.

This section examined adoption, disclosure activities, and general sensibilities regarding mediated sociability on a very broad level in large–scale surveys. Key findings included contrasts in the kinds of information users disclosed and when they disclosed it, suggesting consistent patterns of behavior for certain measures.

2.3.4.2 – Habitus and Social Capital

Social capital is in some sense the currency of all interactions in mediated social space – the reputation and resources acquired and maintained by people in their interactions with one another. Putnam's (2000) work suggested our society has lost significant reserves and outlets of the expression of social capital, and his and subsequent analyses have pointed fingers at the atomizing effects of technologies; as such, assessing the accuracy of these propositions is a key line of research for those concerned with online SNS and their broader effects. In a tightly focused study, Lampe et al. (2006) examine a central question pertinent to all online SNS activity – namely, "Are Facebook members using the site to make new online connections, or to support already existing offline communities?" (Lampe et al. 2006, p. 167). In this particular case – which they hasten to explain, is located firmly in a particular moment of a service especially tied to an offline community – they find that Facebook users "use the site to engage in social searches, i.e., find out more about people in their offline communities. Social browsing, finding people online for offline encounters, was widely reported as an unlikely use by the survey respondents" (Lampe et al. 2006, p. 169). Future studies of other online social networks should examine these behaviors and the distinctions (or possible lack thereof) between them; Lampe et al. provide a useful template and precedent for approaching the question.

In a further examination of Facebook user behavior, Lampe et al. (2007) hypothesize and find significant support for the positive association between information disclosure and larger numbers of friends. Interestingly, they find that "...it doesn't appear to matter how much information is included in profile fields, just that some information is included" (Lampe et al. 2007, p. 7-8). While the limited scope of the research questions allowed for increased focus, it also leaves many unanswered questions – for starters, what does having more friends really mean? They do not directly address this question, but Lampe et al. are also aware of the different meanings that profile elements may carry, writing, "...a user may not be searching for people who like Citizen Kane to add to their friends list, but they may be seeking out users who went to their high school" (Lampe et al. 2007, p. 8). and "While univariate analysis seems to indicate the amount of information in profile fields isn't important, the content of the fields may very well be" (Lampe et al. 2007, p. 9). The authors understand, at some level, online mediated communication to be a sense–making process – not unlike the earlier–discussed notion of profiles as conversation – writing, "...there is a consistency of action across the different users that allows for variance to be more clearly articulated and examined" (Lampe et al. 2007, p. 1) and "...in an online social network that is constructed around an existing offline community, certain types of profile information might be particularly important" (Lampe et al. 2007, p. 8).

Ellison et al. (2007) in a further study use the frame of social capital analysis to assess the relationship between Facebook use and offline interactions, and return some fascinating results that advocate strongly in favor of further research. Broadly, they conclude that "Facebook use among

college–age respondents was significantly associated with measures of social capital" (Ellison et al. 2007). More intriguingly, the find, "Students reporting low satisfaction and low self–esteem appeared to gain in bridging social capital if they used Facebook more intensely, suggesting that the affordances of the SNS might be especially helpful for these students" (Ellison et al. 2007). Indeed, high–intensity Facebook users with low reports of both self–esteem and satisfaction scored almost identically on bridging social capital measures as students with high self–esteem and satisfaction. As they mildly put it in their conclusions, "Our empirical results contrast with the anecdotal evidence dominating the popular press" (Ellison et al. 2007); in fact their research flatly contradicts the ever–popular image of young people retreating into alternate realities through computer use and eschewing "real-life" social interactions. Ellison et al.'s findings point to the possibility that Facebook can be a meta-social tool which can increase offline social interactions among shy, socially isolated, dissatisfied students. As they put it, "Although more research is needed to understand the nature of this trend, we suspect that Facebook serves to lower the barriers to participation so that students who might otherwise shy away from initiating communication with or responding to others are encouraged to do so through Facebook's affordances" (Ellison et al. 2007).

Ellison et al. also make excellent use of Haythornthwaite's concept of "latent ties" in their analysis, and in examining how latent ties may function in the context of Facebook and social capital:

> "Latent ties are those social network ties that are 'technically possible but not activated socially'. Facebook might make it easier to convert latent ties into weak ties, in that the site provides personal information about others, makes visible one's connections to a wide range of individuals, and enables students to identify those who might be useful in some capacity (such as the math major in a required calculus class), thus providing the motivation to activate a latent tie" (Ellison et al. 2007).

This is one of the most under–researched questions surrounding use of online SNS as metacognitive and metasocial tools, and "latent ties" in this formulation is to date the best description of the dynamic. The study is not without problems. It does have a relatively healthy sample size – but 66% of respondents were female; all were MSU students with an average age of 20.1. Additionally, the questions are all posed and caged very specifically within the context of Facebook, which while it may return answers with more specificity also decreases further the generalizability of the results. And their assertion that "The high penetration and lack of any systematic difference between members and non–members suggests that Facebook has broad appeal [and] does not exclude particular social groups..." has been belied by more recent research showing class divides in Facebook and MySpace user (see boyd 2008a, Lenhart and Madden 2007).

In a computationally rigorous analysis of seemingly quite different social networks – LiveJournal and the DBLP database – Backstrom et al. (2006) nonetheless find similar behaviors, and behaviors that

again support Granovetter's "strength of weak ties" arguments and Burt's "structural holes" concept. Their analysis goes quite deep into the weeds of computer science analysis, but for my purposes two chief findings are of use – namely, that "We find that individuals whose friends in a community are linked to one another... are significantly more likely to join the community" (Backstrom et al. 2006, p. 2). Additionally, they conclude that "instances of successful social diffusion typically unfold in highly clustered networks. In the case of LJ and DBLP communities, for example, Macy observes that links among one's friends may contribute to a 'coordination effect,' in which one receives a stronger net endorsement of a community if it is a shared focus of interest among a group of interconnected friends" (Backstrom et al. 2006, p. 5).

Analyzing network–wide patterns of membership and friending behavior in Flickr and Yahoo! 360, Kumar et al. (2006) arrive at several theorems of online SNS network behavior, which may or may not apply more broadly. They classify online SNS into three areas – "singletons" not connected to other users; a "giant component" of closely–linked users; and the "middle region," comprised of "various isolated communities, small groups who interact with one another but not with the network at large," often centered on "stars" who have many links surrounding them but whose links are not otherwise widely linked (Kumar et al. 2006). Within this framework, they find that "online social networks often contain more than half their mass outside the giant component, and the structure outside the giant component is largely characterized by stars" (Kumar et al. 2006, p. 7). Additionally, the growth pattern of (at least these) online SNS seems to follow a predictable pattern of density growth wherein they

"follows the same unexpected pattern... rapid growth, decline, and then slow but steady growth" (Kumar et al. 2006, p. 1). These two schema lead Kumar et al. to propose a third, describing the types of users of online SNS:

> "There are three types of users: passive, linkers, and inviters. Passive users join the network out of curiosity or at the insistence of a friend, but never engage in any significant activity. Inviters are interested in migrating an offline community into an online social network, and actively recruit their friends to participate. Linkers are full participants in the growth of the online social network, and actively connect themselves to other members" (Kumar et al. 2006, p. 6).

Research seems to belie Putnam and others' worries about atomization, as in some contexts at least, online activity is positively associated with measures of social capital. These measures are early ones, however, and limited to single contexts. Further research examines in greater detail the contrasts between different online SNS communities and the tensions that can arise there.

2.3.4.3 – Contested Norms and Demographic Variations of Habitus

As discussed above, norms are established collectively, and consequently they are also at later stages and iteratively contested in similar fashion. It also follows that these processes unfold differently with different collective contexts, and research shows that this is in fact the case.

In an SNS survey that takes further steps in deconstructing online sociability, Dwyer et al. (2007) begin to examine differences and similarities between SNS contexts, in this case Facebook and MySpace, concerning privacy and other issues. They find significant differences on a number of measures, some of which surprise them. Expectations of a social space also play into the analysis of some findings, as in their finding that, "Facebook members reveal more information, but MySpace members are more likely to extend online relationships beyond the bounds of the social networking site. Paradoxically, MySpace has stronger evidence of new relationship development, despite weaker trust results" (Dwyer et al. 2007, p. 7). It's not entirely clear why this would be paradoxical – indeed, following Granovetter (1973), this would be expected. MySpace has tended to capitalize on more fluid, gestalt communities among young adults looking for entertainment and dating, and so even with the general wariness that people exhibit when often meeting new people, there is more relationship development because that's the goal – it is the salient activity, and relationship status is a salient piece of information for that activity. Facebook on the other hand is more about both developing strong ties and maintaining weak ties with a minimum of effort – dating and entertainment are inherent in the broader college experience and not as necessary a piece of the social work to be performed by/on the SNS.

As to the results themselves, Dwyer et al. found Facebook more trusted by users than MySpace, while (other) MySpace users are thought to exaggerate more than Facebook users. It would be interesting to run these questions again in the current setting, where Facebook is viewed more skeptically by many. The authors find that Facebook members reveal their real name, while only two–thirds do on MySpace; 94% of the former disclose an e–mail compared to 40% of the latter, though MySpace members were found significantly more likely to reveal their relationship status. These are significant differences (both in the statistical and common–sense meaning), and ought be kept in mind when formulating theories that attempt to generalize across contexts.

Herring et al. (2007) explore the formation of both language–specific networks within LiveJournal, and also their intersections and interactions. Crucially, they are very explicit about couching their study and findings within their context, writing, "As a relatively self–contained 'community' (as it refers to itself), LiveJournal has its own culture and practices that do not necessarily represent those of other blog hosting services or the blogosphere as a whole" (Herring et al. 2007, p.3). That being said, their findings are intriguing ones and point in many directions for future research, the hallmarks of an excellent study. Among other things, they find substantial differences between the different language networks they analyze – Russian, Portuguese, Finnish and Japanese – and find three typologies of "bridge" members between differing language communities: "LiveJournals that bridge between languages and language networks tend to have broadly accessible, non–linguistic content, or else they are written by multicultural, multilingual individuals such as expatriates and foreign language

learners" (Herring et al. 2007, p. 1). Further, they find that "Bridge journals – especially those that bridge between two different language networks – tend to favor universal modes of expression such as photographs, graphics, and popular song lyrics that allow users to interact with little or no understanding of the language of the journal" (Herring et al. 2007, p. 8). This ties further back into the social capital findings of the previous section, and again confirms earlier thoughts by Granovetter on the importance of weak ties and bridge figures.

Analyzing the density and intensity of friend–networks within different languages, Herring et al. find that "the greater the presence of a language on LJ, the larger the universe of potential friends its speakers have to choose from, and the more friends they are likely to have" (Herring et al. 2007, p. 5). Thus, while Russian users can find many other Russian friends – "a large number of well–connected nodes that are almost entirely Russian" – the more sparsely populated Japanese network dictates that "it would be difficult to have extensive conversations in Japanese on LJ; Japanese users would also have to know English" (Herring et al. 2007, p. 8). Fascinatingly, the rate of bilingualism among Finns appears to be high enough that in their network "most of the English journals in this network appear to be written by Finns. Thus Finns have conversations on LJ in both Finnish and English, but mostly among themselves" (Herring et al. 2007, p. 7).

In addition to contested norms between communities, there are some demographic variations in how populations use SNS. In a key piece of research filling in the gaps of knowledge about self-

presentation, disclosure and perception in online SNS, Tufekci (2008) returns some surprising results and points to several profitable ares for further research. Chiefly, she finds that "...demographic variables, rather than the concerns about future audiences queried in this survey, seemed to have more of an effect on subjects' behavior on these Web sites" (Tufekci 2008, p. 31). While this does not nullify the approach and line of research begun and continued by, e.g., Acquisti and Gross, it does add an explanatory layer to SNS users' operationalization of privacy concerns. Among other interesting findings, she notes that "Contrary to expectations, there was no association between using a real name and making the profile visible to everyone. In other words, subjects were equally likely to make their profiles visible regardless of whether or not they used their real name" (Tufekci 2008, p. 26).

While finding – consistent with previous studies of SNS self–disclosure – more men than women listing their phone number, Tufekci also finds that "women are more likely to indicate their favorite music and books, and their religion. While Anglo-American students are more likely to use their real names on MySpace and indicate their romantic status and interests, African-American students are more likely than Anglo and Asian students to indicate their religion" (Tufekci 2008, p. 27). Indeed, there seems to be something still quite powerful about religion as a marker of identity: "...fear of profile being seen by unwanted audiences (unwanted gaze) has a significant impact on whether students use their real name on MySpace, but not on Facebook (where real name use is nearly universal). The only other impact of the fear of being found by unwanted audiences was apparent in whether the students indicated

their religion" (Tufekci 2008, p. 27). This is one of the first studies to examine religion as a variable in SNS self–disclosure, but this finding indicates it as a fertile ground for further research.

Additionally, and consistent with boyd's ethnographies, Tufekci finds "...students do try to manage the boundary between publicity and privacy, but they do not do this by total withdrawal because they would then forfeit a chance for publicity" (Tufekci 2008, p. 33). She closes in part by saying, "...instead of being able to experiment with multiple identities, young people often find themselves having to present a constrained, unitary identity to multiple audiences, audiences which might have been separate in the past. As we leave behind the 20th century, it is almost as if we have come full circle back to the village where everyone potentially knows your business" (Tufekci 2008, p. 35). Everyone will know your business – but you'll know theirs, too, in all its strange wonder and unexpectedness. People will be forced to tolerate difference in new and unexpected ways, because they won't have any choice.

2.3.4.4 – Interpersonal Communication and Habitus

One set of practices of chief interest for investigation within the habitus of SNS is how users communicate with each other. This issue is of particular interest given the relatively novel nature not just of online SNS but of the multi–modal communicative patterns they engender and support. Golder et al. (2007) take an approach distinct from many other studies to examining Facebook, focusing on the

network-wide transmission of millions of messages rather than a smaller-scale focus on a given university or geographic network via survey. This is good, and results in more significant and generalizable results, but there is also a severe limitation. While their findings on messaging and poking behavior are fine so far as they go – though one might resist their use of messaging patterns as a proxy for computer use generally – their study contains a massive blind spot in not including wall posts as an element for analysis. Quite simply, wall posts are one of the main mode sof communication on Facebook, and while it's possible that the rhythms of social interaction shown through wall posts would mirror those shown by messages and pokes, it is impossible to know for sure. It is just as possible there could be massive differences in wall post behavior, due to their public nature, or that they would show the relatively minor role that messaging plays in Facebook as a mode of communication. That being said, there are some very interesting findings from Golder et al.'s study, such as the fact that, "college students follow two patterns, a 'weekend' pattern between midday Friday and midday Sunday, and a 'weekday' pattern at all other times" (Golder et al. 2007, p. 1). Additionally, in what was probably the most important takeaway for future research, they found that "Nearly all communication was found to occur between 'friends,' but only a small proportion of 'friends' exchanged messages" (Golder et al. 2007, p. 1).

There is a possible confound in that Golder et al. did not examine at Wall Posts; they found that,

> "Compared to email, Facebook messages are sent infrequently: an average of 0.97 messages per user per week in our dataset. The distribution of messages sent per user has a heavy tail... which means that a small number of users sent many messages; however, even among those who sent comparatively many messages, the rate of messaging use is smaller than that observed for email..." (Golder et al. 2007, p. 3).

This seems to indicate that, indeed, messaging within Facebook is not a very important mode of communication – college students are always at their computers, often communicating, often on Facebook, but send less than one (on average, with a heavy tail) Facebook message per week? The students are clearly communicating in other ways – traditional e–mail, but also IM, and – Wall Posts. So while it is true that, "Sending a message or poke is a discrete event that represents an active, socially meaningful gesture by the sender" (Golder et al. 2007, p. 3) it is also true that within the context of Facebook it's a less meaningful gesture than a Wall Post, even if as they also note, "since messaging is private, it is less subject to the pressures of self–presentation that affect other online social networking capabilities such as friend selection and profile items." (Golder et al. 2007, p. 3) (though really, why wouldn't you want to look at those peer–influenced items in a social space?). A strange non-sequitur also appears when they say, "How college students spend their time is of great concern. Their physical, academic and social well-being is having the freedom and responsibility to make the majority of those choices for oneself. Students' academic performance is predicted by how much time they spend studying and where students spend their time and with whom they spend it predicts whether they will

binge drink, for example" (Golder et al. 2007, p. 4). In an otherwise solid paper, this descent into moral scolding is jarring, and odd. Nonetheless, it functions as a useful investigation into the multi-modal medium of intra-SNS communication.

This section has examined what I term, in borrowing from Bourdieu, the habitus of spaces of mediated sociability. It has reviewed the basic structures of enduring online sociability; examined various analyses of the important factors at work in these spaces; considered the implications for social capital formation and maintenance; reviewed contested norms and demographic variances within these structures; and begun a review of norms surrounding interpersonal communication in these social and socially structured spaces. I believe that these investigations are of crucial importance in better determining the fundamental dynamics at work in areas of mediated sociability, and in moving research forward to as better to test gradually more specific propositions. It is within the context of these understandings that further research ought be based, and in which context I base much of the next literature review section, on folksonomy and tagging, the latter a behavior which takes place explicitly within these ongoing mediated socialization situations.

2.3.5 – SNS Conclusion

This section has reviewed literature relating to the study of online social networking sites (SNS), particularly those studies focused on issues of disclosure, privacy and the emerging persistent dynamics of mediated sociability, and structured to reflect the arc both of user experience in SNS and of research surrounding those experiences. Boundary regulation is a suitable framework for understanding mediated sociability, and research shows strong themes of creativity and resistance to external norm–establishment as key components in mediated social spaces. In other words, users create their own norms and boundaries rather than adopting what developers and designers think they "should" do. The case of Friendster, the first broadly popular SNS – and also the first to suffer a spectacular flame–out – was examined in particular by boyd (2004, 2006). Recent changes by Facebook show that despite its current dominance, a similar path is no longer unthinkable for them, either.

In aggregate, research around disclosure in mediated social spaces shows this topic to be a complex, discursive and inherently social communicative process. The process occurs not simply at the individual level but between people as they negotiate norms and boundaries of mediated sociability, with a great deal of thought given to the disclosure of various categories of information and the contextual appropriateness of such disclosures. Contra mass–media narratives and some more alarmist analyses (Barnes 2006), users – young people especially – were found to have awareness of as and nuanced ideas surrounding what is and is not appropriate to disclose (Lenhart & Madden 2007; Gross and Acquisti 2005).

Studies of privacy in both user and system contexts focus both on basic attitudes around privacy from users (Gross & Acquisti 2005; Acquisti and Gross 2006) and on the basic structures of mediated social spaces. A useful framework for understanding these dynamics is boyd's (2008a) idea of "networked publics," which highlights the ways in which mediated sociability is similar to and differs from previous systems of sociability and socialization. The framing of persistence, searchability, replicability and invisible audiences as those key factors of both difference and importance for analysis is of great assistance in laying the boundaries for discussion of these issue. Within this context it is useful to examine, as this review did, issues of adoption (e.g., Stutzman 2005), disclosure activities (e.g., Donath 1999; Tufekci 2008), and general sensibilities regarding mediated sociability. Expanding on these themes are the implications of mediated sociability for social capital (Ellison et al. 2007) where there is some support for the application of social capital theories to the online context. Further, the research seems to suggest that online activity is positively associated with measures of social capital.

Just as in offline social contexts, tensions exist within and between differing mediated social contexts (Dwyer et al. 2007; Madden and Lenhart 2007). This underlines the need for keeping context central in any investigation of mediated sociability, and are particularly important aspects for assessment of practices native to mediated social context. Some initial investigations in this line were addressed in this review, focusing on communication within an SNS (Golder et al. 2007); further examination of native and "authentic" patterns within mediated sociability follows in the Folksonomy Section.

It is critically important to understand the realities of mediated sociability, as current research can best address; this understanding is critical for many reasons, two of particular importance in my mind. First, understanding the contours of current research findings is of obvious importance for positioning my own research going forward both within that context and set of findings, and in being able to address as–yet–unanswered questions regarding the shape of practice and behavior going forward. And second, many of the findings of research to date flatly contradict narratives in popular media around the uses and impacts of social media and communications technologies.

This assessment of background literature is not meant to be fully exhaustive but rather has examined those areas of research most important to understanding the fundamental dynamics of online mediated social spaces such as they are currently understood, and to highlight the most essential scholarship in the area to date. One limitation of current research is that many of even the best studies and avenues of inquiry have mostly been reactive rather than explorative. By instead taking the latter approach and observing the basic salient and functional elements, future research can lead to theories of how the spaces work, which can then be tested with further research and experimentation.

In conclusion, while this emergent body of literature does not have any single home in terms of discipline, theoretical underpinnings or even broadly–agreed–upon name, broad thematic outlines do emerge from this review. One key takeaway from these many approaches is that they show how, even while the sets of behaviors undertaken in the context of mediated sociability are novel in their

particulars, their social functions are emerge from existent social systems. Tools for greater ease of communication and socialization are being used primarily in service of greater communication and socialization. While not a controversial observation, this is a point about which broad agreement does not currently exist, either in popular media treatments of these issues or even across academia itself. And while it is not realistic to imagine total consensus across either front, it is nonetheless important to both disseminate current knowledge and broaden the range of understanding. My own research aims to do just that, and later sections of this review will address more specific applications of some of the dynamics explored above, and develop the research questions made explicit and implicit following on this research. Future work should focus on informing behavior with research from related areas of inquiry in computer–mediated communications, further incorporating theories of personality and identity formation and maintenance, and in looking for those elements of SNS behavior that are unique to the context or have been thus far unexamined by either research or popular press.

This does not mean to imply or state outright that online sociability only happens in the contexts and spaces discussed here; rather, it is meant as a broad brush to establish certain starting points for understanding how a great number of young people currently experience mediated online sociability. Above and elsewhere, it is important to keep in mind that these practices are highly contextualized and constantly shifting. This fact increases rather than decreases the importance of continuing research in a broad range of areas, so as to better understand the experiences that an increasing share of the populace are having in their everyday lives.

2.4 – Tagging and Folksonomies

> *The act of tagging "cleverly harnesses selfish acts and directs them towards the common good."* (Quintarelli 2005)

Social tagging and emergent folksonomies reveal a more directly purposeful set of activities by individuals in technologically mediated environments, and particularly a set of activities that are naturally evolving behaviors of those environments. Research in these areas is important in order to capture another part of a very complex picture of rapidly-changing and new behaviors. The individual is (to varying degrees unselfconsciously and) confidently using a technology to its own ends, and it is worth examining what an early mass "mastery of technology" activity looks like.

The following pages address the current state of research on tagging and emergent folksonomies by examining the literature from several distinct perspectives, beginning in Section 2.4.1 with a review of tagging and folksonomy theories and their functioning as patterns of behavior and methods of knowledge organization. Section 2.4.2 examines the evolution of the behaviors and study of those behaviors, and the patterns in free-tagging systems observed in a variety of studies qualitatively (2.4.2.1); quantitatively (2.4.2.2); and examinations of systems in practice (2.4.2.3), concluding in Section 2.4.3 with an overview of the body of research into tagging and folksonomy to date. This

examination of theory, practice and discussion will set the ground for the the research to follow, which attempts to further quantify the use-cases and potential use-cases for tagging.

2.4.1 – Theories of Tagging

Developing a theoretical construct is important for understanding the issues surrounding tagging and tagging behaviors. Shirky (2005) asks, "Does the world make sense or do we make sense of the world?" The implicit answer is clear, here. We do make sense of the world, though the "sensemaking" implied by Shirky here and used by several other scholars in the literature reviewed are subtly different from the more traditional sensemaking of library and information science. Here, it is taken to mean the iterative process of adapting to the environment, in this case the digital informational environment, and in particular the use of tagging as a signpost and adaptive technique in that process. This section outlines the development of theories regarding tagging, debate surrounding them, and how tagging and folksonomy systems function at both the individual and mass level, as both psychological and social phenomena.

Many commentators, researchers and scholars have spent much time thinking about the relevant considerations in this new area of activity and research. Trant succinctly sums up current research in saying, "The literature as it now stands offers a number of intriguing theories about how social tagging systems develop and are used, and how folksonomies are formed. There are few reports of experimental

studies or surveys of mature tagging systems" (Trant 2009a, p. 23). This section focuses on the former – investigations of intriguing theories.

In a very current review of literature on tagging, Trant introduces a tripartite division of existing research. She is also insightful in delineating the substantive issues in each and across all, noting that, "There is a tendency in the relatively young literature of social tagging and folksonomy to conflate concepts, and to equate social bookmarking (systems that enable the sharing of tagged links to Web resources) with tagging and folksonomy. ...Clarity of concepts is critical for understanding this complex phenomena" (Trant 2009a, p. 5). Beginning in the framing of these issues is Trant's observation that, "The motivations for tagging or categorizing can be approached in terms of cognitive science. Sensemaking organizes change by identifying variances and labeling them; 'categories have plasticity because they are socially defined, because they have to be adapted to local circumstances' (Weick et al., 2005). Tagging can be considered as an act of sensemaking, with shared tags becoming a form of collective meaning. Users tag to make sense of – or organize – a part of their world" (Trant 2009a, p. 16). Trant also cites Sinha saying "The act of tagging can be placed within the context of cognitive processes... tagging is "lighter" than categorization because it is comprised of only one stage (associating an object with multiple concepts) rather than two (associating an object with multiple concepts, and then choosing the most appropriate) (Sinha, 2005a)" (Trant 2009a, p. 16).

Campbell (2006) builds a convincing case for viewing the contrasting systems of controlled-vocabulary organization – as in the Semantic Web – and unstructured tagging – as in del.icio.us – through the lens of Husserl's theories of phenomenology. His contrasts and descriptions of the various functions of each system in this context are highly illuminating, and worth considerable thought and discussion. He notes,

> "What is the relationship between social tagging systems and the Semantic Web? Is social tagging merely "mob indexing," as Peter Morville suggests (2005): a transiently popular but unsatisfactory substitute for better, more sophisticated concepts of findability? Or does social tagging represent the successful realization of a better, more useful Web, while the Semantic Web languishes as a failed dream? Are the two on a continuum? Or are they opposed to each other?" (Campbell 2006, p. 2).

Even if tagging systems are indeed "mob indexing," is there anything inherently wrong with the mob? Indeed, Campbell identifies a chief attribute of the mob: "Tagging systems have an additional factor that makes them attractive: scalability." (Campbell 2006, p. 4)

Campbell identifies the educative and learning-based advantages of tagging systems in writing, "... if you let users tag their own resources in their own ways, with their own words, patterns of order

will emerge; these patterns will be truer, more convincing, more user-centered, and more useful than the patterns imposed by formal classification schemes. What's more, they will acquire greater accuracy and greater sophistication as more and more people use them; schemes like del.icio.us, then, can scale up in ways that conventional organization systems, constrained by limited personnel and limited time, cannot" (Campbell 2006, p. 5). Campbell does not subscribe to Web-utopian or technological determinist arguments about the benefits of tagging and unstructured approaches, writing, "...complex systems don't just happen. Some systems freeze into stasis, either immediately or after a very short burst of activity; other systems spin into chaos. Only occasionally does genuinely complex growth take place. We cannot assume that useful information will emerge from systems like del.icio.us, simply by backing off and leaving them alone" (Campbell 2006, p. 5).

Echoing Vygotsky and Mead (see Section 2.1), Campbell notes that "Husserl argues that the psychic process of reflection and intentionality is accessible through the experience of others" (Campbell 2006, p. 7). Campbell also notes how this framework accounts for the co-construction of identity and meaning in these systems and contexts: "Individual users, each with specific tasks, needs and objectives, act as Husserl's "I-poles": their tags enable them to establish commonly-held intentional relationships with resources that make resource sharing interesting and meaningful for others. The now-ubiguitous tag clouds of tagging systems establish domains of intersubjectivity that make interaction and knowledge-building possible" (Campbell 2006, p. 11).

Campbell's theoretical framework enables him to construct one of the most elucidating descriptions of the Semantic Web, locating the point of action not in the technical system but in human action. He writes,

> "The Semantic Web, therefore, locates multiplicity not at the level of the individual user, but at the level of individual domains to which the users will presumably belong" (Campbell 2006, p. 13-14).

Another key contrast between tagging and Semantic Web systems is that

> "...tagging systems enable the emergence of an intersubjective consensus on important entities and relationships based on loose structure and high flexibility. The patterns of this intersubjective realm are unstructured, time-sensitive and inconsistent; they are also, in their simplicity and flexibility of implementation, useful, rapidly-evolving and surprising. The Semantic Web presents an instersubjective realm which is constructed far more painstakingly, far more slowly, and far more methodically... [the patterns of the Semantic Web] may be more cumbersome and less adaptable than the patterns of social tagging; but they may also be more stable and enduring building blocks of a Web-based information infrastructure." (Campbell 2006, p. 14-15).

Campbell's framework of viewing tagging and information organization as primarily individual, phenomenological processes is a very helpful and illuminating one, and it is one that is of great use in bridging the divides between the various other literatures reviewed in this dissertation.

Tennis (2006) creates a framework for comparing social tagging and indexing systems and approaches, and concludes that the activities "use different structures, and it is this point that allows us to see many differences" (Tennis 2006). Among these are that tagging is "intensely personal, whereas subject cataloguing is an act of delegation mediated by institutions" (Tennis 2006). He constructs several different useful tables contrasting the approaches, and rather than a Utopian verdict announcing the death of indexing or a condescending dismissal of social tagging, instead concentrates on what each can offer to the other. He writes,

> "Social tagging, as a phenomenon, has allowed us to reflect on what indexing can do better in this contemporary environment... [it] highlights the interstices of authorship, intertextuality, and context in indexing, and asks us to fill in the gaps. It is a catalyst for improvement and innovation in indexing" (Tennis 2006, p. 14).

Tennis also addresses the contrast with the Semantic Web, saying,

"Tagging systems, then, are a cheaper, easier, faster substitute for the elaborate systems designed by libraries and potentially facilitated by the Semantic Web: furthermore, they are more democratic, exercising less overbearing control in the choice of terms and the decisions of which relationships are valid and which are not.

...both tagging systems and the Semantic Web foster an intersubjective domain for the sharing and use of information resources. The Semantic Web, however, resembles traditional library systems, in that it relies for this intersubjective domain on the conscious implementation of domain-centered standards which are then encoded for machine processing, while tagging systems work on implied principles of emergence" (Campbell 2006, p. 1).

Despite areas of overlap, the thrust of my research interests in this area do not include those relating to Semantic Web implementation. Fields does a good job of explicating this distinction: "We can see the tendency to oppose these methodologies in the current discourse that frames the development of the Semantic Web. On the one hand, the artificial intelligence community works towards an engineering solution in creating a massive, global computing system that can be queried and return answers which reflect the accumulative knowledge of the human race. On the other hand, the

digerati are mobilised by the need to prevent the system from becoming a monolithic representation of culturally dominant viewpoints and limiting future creativity. For the moment, let these arguments stand as remote positions in the argument that motivates the development of the so-called Semantic Web" (Fields 2007, p.101). The case that Fields is implicitly making is that folksonomies are not so much a matter of information organization as of individual behavior. He is eloquent in saying that, "Folksonomies result from the pooled social perceptions of context and categories" (Fields 2007, p. 101). The Semantic Web may at some point be a place where behavior happens but, as he notes, it is not as of yet anything like what is often imagined – that is, an agent in interactions.

The commentary and theoretical approaches to understanding the uses and behaviors behind tagging and emergent folksonomies are quite helpful in addressing the further research conducted thus far into their uses by people. They provide a base on which to understand not just the behaviors themselves but also the historical perspective, the deviation from prior methods of behavior and organization, and possible implications for the future of similar behaviors and organization. This section has discussed several explanations of how tagging and tagging systems function on an individual and mass scale, as both psychological and social phenomena. The next section covers the emergence of folksonomies, definitional issues and the initial findings from research and practice.

2.4.2 – Emergent Folksonomies

One line of research in the use of Web2.0 technologies and social media is the ability for users to tag information items – to not simply bookmark them or describe in prose, but to use unstructured keywords to describe items. This section examines the development of folksonomies and initial research into them, and reviews of the first several years' study of this research which outline the basic properties common in folksonomy and tagging systems.

Entrepreneur and researcher Thomas Vander Wal coined the term "folksonomy" to describe tagging systems in online discussion in 2004, and describes it thusly: "Folksonomy is the result of personal free tagging of information and objects (anything with a URL) for one's own retrieval. The tagging is done in a social environment (usually shared and open to others). Folksonomy is created from the act of tagging by the person consuming the information" (Vander Wal 2004). He makes the distinction between what he calls "broad" and "narrow" folksonomies. Broad folksonomies "[have] many people tagging the same object and every person can tag the object with their own tags in their own vocabulary" (Vander Wal 2005). Narrow folksonomies are "done by one or a few people providing tags that the person uses to get back to that information. The tags, unlike in the broad folksonomy, are singular in nature (only one tag with the term is used as compared to 13 people in the broad folksonomy using the same tag)" (Vander Wal 2005).

These basic contrasts are important to keep in mind while reviewing the literature on tagging and folksonomies. In a widely comprehensive review of literature on tagging and folksonomy, Trant (2009a) lays out a very useful framework for understanding the tripartite division of research in this area to date. She writes, "Authors interested in 'tagging' as an activity focus attention on the user's role in linking terms to resources. Others interested in the vocabulary that results direct their study to 'folksonomy' – the collective assemblage of tags assigned by many users. Still others profile the social and technological context within which tagging takes place and folksonomies are constructed. We can think of tagging as a process (with a focus on user choice of terminology); of folksonomy as the resulting collective vocabulary (with a focus on knowledge organization); and of social tagging as a socio-technical context within which tagging takes place (with a focus on social computing and networks)" (Trant 2009a, p. 4). While I do not utilize this precise framework in organizing the examination of the literature, it is also worth keeping in mind those differing foci of research.

Several services are organized around this free-text tagging as a method of information organization, from the social bookmarking site Delicious to the photo-sharing site Flickr to research sites like Connotea and many others. A popular aspect of these sites is their open and public nature – it is not just that users can freely tag and describe their own items, but that other users' descriptions of their items are available publicly. As Weinberger notes, "Tagging lets a user of online resources – Web pages, photos - add a word or two to them so she can find them again later... Tags let you remember things

your way" (Weinberger 2007, p. 92). In the case of Delicious, this means that users can see how other users describe the same websites that they have bookmarked; in the case of Flickr, users can search and browse by tags through others' photos. As Golder and Huberman define it, "...collaborative tagging is the practice of allowing anyone - especially consumers - to freely attach keywords or tags to content. Collaborative tagging is most useful when there is nobody in the 'librarian' role or there is simply too much content for a single authority to classify..." (Golder & Huberman 2005, p. 1).

Weinberger notes of folksonomies that, "The folksonomies that are emerging bottom-up are characterized by ambiguity, multiple classification, and soft-of kind-of relationships" (Weinberger 2007, p. 196). Mathes makes a similar point on the messiness of folksonomies, saying "A folksonomy lowers the barriers to cooperation. Groups of users do not have to agree on a hierarchy of tags or detailed taxonomy, they only need to agree, in a general sense, on the "meaning" of a tag enough to label similar material with terms for there to be cooperation and shared value" (Mathes 2004, p. 10).

Quintarelli (2005) is helpful in further illustrating basic aspects of these systems, in saying, "As Jon Udell defined them on a more formal level, both Del.icio.us and Flickr are collaborative systems for:

- building a shared database of items,
- developing a flat metadata vocabulary,
- performing metadata-driven queries (also using multiple tags at a time),
- monitoring change in areas of interest,

- discovering the most popular metadata" (Quintarelli 2005).

Quintarelli also makes the key observation that "it does not matter whether we 'accept' folksonomies, because we are not going to be given that choice. The mass amateurization of Web publishing makes the mass amateurization of cataloguing a forced move. Folksonomies are a trade-off between traditional structured centralized classification and no classification or metadata at all. And they are the best we actually have" (Quintarelli 2005). With this in mind, the review of this literature is especially useful in that it signifies away in which users are not simply relating to each other online, but shaping the way that all others will relate to mediated environments.

In an early examination of user-generated metadata and emergent folksonomies, Mathes (2004) provides a general framework for understanding the issues involved that continues to be of great use. Mathes is particularly insightful in noting, "This tight feedback loop leads to a form of asymmetrical communication between users through metadata. The users of a system are negotiating the meaning of the terms in the folksonomy, whether purposefully or not, through their individual choices of tags to describe documents for themselves" (Mathes 2004, p. 9). A further examination of these issues can lead to cases like the following, which he also notes – "Examining all photos in Flickr tagged with "iraq" includes photographs Iraq, US troops in Iraq, as well as photographs of war protests. Although this may not be a community, what we are seeing is a group of people helping to define a term with their photographs and metadata" (Mathes 2004, p. 10).

Mathes was also quite prescient in saying, "One area to examine is the distribution of tag use: I hypothesize that it follows a power law scenario" (Mathes 2004, p. 11). Golder and Huberman (2005) and many other subsequent investigations confirm exactly this hypothesis. One area Mathes singles out for future research is still relatively unexplored, however – "Examining user behavior through ethnographic observation or interview to understand user motivations and cognitive processes in tagging items would clarify what factors directly influence the formation of a folksonomy, and how individual incentives and group communication motivations influence use of the system" (Mathes 2004, p. 11). While there has been much subsequent investigation of the products of tagging and the implications of massively distributed efforts, still relatively little research has examined directly the intent of users and the utility of various kinds of tagging activities to those users at either the moment of tagging or across time – this is still a worthwhile avenue of investigation.

Quintarelli (2005) also provides many helpful frameworks. His description of folksonomies and their power is as useful today as it was at folksonomies' dawn:

> "Folksonomies are not simply visitors tagging something for personal use: they also are an aggregation of the information that visitors provide. The power of folksonomy is connected to the act of aggregating, not simply to the creation of tags. Without a social distributed environment that suggests aggregation, tags are just flat keywords, only meaningful for the user that has chosen them. The power is people here. The term-

significance relationship emerges by means of an implicit contract between the users" (Quintarelli 2005).

Quintarelli also highlights the difference in function between Vander Wal's broad and narrow folksonomies: "In a broad folksonomy, the power law reveals that many people agree on using a few popular tags but also that smaller groups often prefer less known terms to describe their items of interest... A narrow folksonomy provides various target audiences (maybe with a rather specific shared vocabulary) with the instrument to add tags in their own language. This property makes later retrieval fast, efficient and enjoyable" (Quintareli 2005). Quintarelli's highlighting of the positive attributes of folksonomies also illuminates one of the chief areas of my own interest in folksonomies, namely that, "folksonomy produces results that more accurately reflect the population's conceptual model of the information. Folksonomies are simple, emergent and iterative systems. Their advantage over traditional top-down classification is their capability of matching users' real needs and language, not their precision" (Quintarelli 2005).

Fields (2007) offers an incisive analysis of the three differing perspectives on the implementation of folksonomies. He cites Peterson arguing the point that folksonomies are "based on philosophical relativism, and therefore will always include the failings of relativism. A traditional classification scheme will consistently provide better results to information seekers" (Fields 2007, p. 102). He contrasts this to Shirky, summarizing the latter's conclusions as concluding that "There is no

adjudication of a link's veracity other than a statistical survival of the fittest; errors and misspellings are not discarded" (Fields 2007, p. 102). He is also quite insightful in noting in this section that "Systems of categorisation rarely reflect internal essences, but more commonly reflect systems of belief" (Fields 2007, p. 102).

2.4.2.1 Folksonomies Qualified

There has been a substantial body of qualitative research into issues of social tagging and folksonomies. Marlow et al. (2006) provide an excellent introduction to a more ethnographic approach to evaluating tagging behaviors. Key is their observation on differing motivations for tagging behaviors: "Users are motivated both by personal needs and sociable interests. The motivations of some users stem from a prescribed purpose, while other users consciously repurpose available systems to meet their own needs or desires, and still others seek to contribute to a collective process" (Marlow et al. 2006, p. 5).

Marlow et al. also report a finding that is notable for its contrast to other photo-posting media: "In addition to tagging one's own photos, the Flickr system also allows users to tag their friends' photos. However, this feature is not largely used; of the 58 million tags we have observed, only a small subset are of this type; an overwhelming majority of tags are applied by the owners of photos" (Marlow et al. 2006, p. 6). This contrasts heavily with Facebook, where tagging others' photos is one of the chief

motivators of viewing them, and having their photos tagged and commented upon is a major motivation. Marlow et al. emphasize the need, as with all social media, not to generalize across platforms: "While we sometimes refer to social tagging systems as a coherent set of applications, it is clear that differences between tagging systems have a significant amount of influence on resultant tags and information dynamics" (Marlow et al. 2006, p. 4). They make a key observation of the medium in saying, "Tagging can be a public and sociable activity, but not all tags emerge with an intended audience. Many users begin with the conception that they are tagging for themselves; some begin to appreciate the sociable aspects over time, while others have no interest in that component" (Marlow et al. 2006, p. 5). Further exploring this dynamic of divergent tagging use-cases is a rich area for future research, and is a central aspect of the interviews conducted in this research.

Smith (2006) in her investigation of the divide between expert classification and general user tagging elucidates several key concepts in investigations of the basic elements of tagging behaviors. Her focus on "meeting them where they are" is especially useful: "As museum system audiences change from primarily specialist users (curatorial and academic) to a more diverse mix of audiences, and as attendees to art museums now include online as well as in-house visitors, designing new approaches to accessing museum content to appeal to and be meaningful to this variety of learners is essential" (Smith 2006, p. 2-3). She also notes that, "A number of writers on cultural heritage information point out that art and museum terminology for both subject and object description may baffle non-specialists and

hinder information seeking in museum texts and information systems" (Smith 2006, p. 4). This lesson applies more generally in many subject areas.

Outlining a consideration that all designers, implementers and researchers of tagging systems should keep in mind, Smith notes how "tagging as simply identifying generic visual content does not further broader understanding, except as a first step in getting viewers to really look at artworks carefully and begin a descriptive and further information-seeking process" (Smith 2006, p. 12). Building true understanding requires designers to be mindful and actually think about how to structure and transfer knowledge. Smith also introduces an important framing of the dynamic at work in many such situations, writing, "there is a "semantic gap" between specialists' artwork descriptions in standard museum records and what non-specialists are familiar with that shuts out many information and image seekers" (Smith 2006, p. 5). This of course applies not simply to art museums but more generally between any specialist and neophytes, and in part does explain much of the tension between opponents of folksonomies and users: they are literally speaking different languages, in many cases.

Smith illustrates the problems of traditional forms of description and organization and in so doing makes the perfect case for a user-tagging approach:

> "What has been called "label copy" forms the core descriptive formula of factual identification information about art objects in museum information systems. It provides

> creator, title, date, medium, measurements, credit lines, and object number within the museum. However, label copy does not contain subject or thematic descriptions or contextual material for the objects (other than that embedded in some artwork titles). Only a handful of art museums worldwide offer extensive artwork "subject" searching specifically, that is, keyword access through a website browser or in-house system to persons, events, locations, and objects depicted in individual artworks or to abstract themes, narratives, styles, or historic contexts that are either unique to single artworks or tie together sets of artworks. However, these search systems often rely more on free-text keyword searching of image captions than on fielded subject vocabularies, thus, retrieval consistency is a problem" (Smith 2006, p. 3).

Additionally, it can be useful in that, "Museum researchers see viewer tagging as creating new types of access to art images and information, because it generates search concepts and vocabularies from a non-specialist point of view" (Smith 2006, p. 5). Smith also shows the usefulness of tagging from an institutional perspective, saying, "Art museums focus on eliciting terms for "subjects" in artworks, that is, pictured people, objects, events and actions, locations, and simple moods or emotions, since these are not normally captured in traditional artwork description in museum object records" (Smith 2006, p. 2). Keeping in mind not just the drawbacks of expertise gaps but also the opportunities that they can present is another potentially fruitful are for researchers and designers.

Bateman et al. (2007) provide an illuminating set of data in their investigations of tagging in an e-learning context, contrasting the tags and metadata created by novice students with automatically created metadata on the one hand and expert-created metadata on the other. Bateman et al.'s research findings suggest the potential usefulness of an unstructured approach to tagging in the context of Bloom's Taxonomy of Learning, saying, "learners who use tags show evidence of moving up the hierarchy from the lower 'consumption'-based levels of learning (knowledge and comprehension) to higher levels of applied and metacognitive knowledge (application and analysis). Further, reviewing of tags (i.e. comparing tags used by a community of taggers) would potentially facilitate the move to the highest levels of Bloom's Taxonomy of Learning (synthesis and evaluation)" (Bateman et al. 2007, p. 1). The research conducted in this dissertation examines this proposition in greater detail and in a more specific context.

Bateman et al. place their own studies and perspective in the larger context of ongoing discussions around tagging and metadata more generally in saying, "Recent work has criticized [the IEEE Learning Object Metadata specification] as being overly broad and ineffective due to the time and skill that it takes to fill in the metadata fields, and that metadata authors need support during the metadata authoring process" (Bateman et al. 2007, p. 1). In contrast, they frame their own approach clearly, "We subscribe to the notion that metadata is best created if it focuses on a particular goal, is contextualized to a particular user, and is created in an ambient manner by observing the actions and interactions of students in learning environments. We believe collaborative tagging has a strong

possibility of being a leading method by which we collect this learner-centric metadata" (Bateman et al. 2007, p. 1). This approach forms a key component of my perspective and methodological approach in both the critical review of this literature and the design and objectives of my own research.

Bateman et al. conclude their article with a very useful set of open questions for future research, writing, "Do learners prefer expert-created tags, or do these tags limit the vision of the students? Can we leverage data mining to overcome the cold-start issue with collaborative tagging in e-learning? Does the kind of student (e.g. learning style, time spent reading a learning object, or other attribute such as level of achievement) affect the quality or fitness of purpose of a given set of tags?" (Bateman et al. 2007, p. 6). Beginning to answer some of these questions will also be a focus of my research. The authors put out a key design consideration in saying, "Tagging systems, like most forms of social networking software, require a critical mass before they become useful to a community" (Bateman et al. 2007, p. 6).

In a brief but extensive literature review and synthesis of tagging systems and research into the same, Voss touches on all facets of the research but grounds the review in Marlow et al. (2006)'s typology. Voss concludes by returning again to a point made throughout the review, one of synthesis, saying, "Collaborative Tagging is neither the successor of traditional indexing nor a short-dated trend but... a catalyst for improvement and innovation in indexing" (Voss 2007, p. 7). Voss discusses the automated research concerning the social phenomena, the interface between free-text and knowledge

organization systems and the hybridization of both. He notes, "Through feedback the drawbacks of uncontrolled indexing are less dramatic than in previous systems and the border between controlled and free indexing begins to blur. Vocabulary control and relationships between index terms should not be distinctive features of tagging systems and traditional knowledge organization systems but possible properties of manual indexing systems" (Voss 2007, p. 7). Voss also provides theoretical deconstruction of the classification system using the semantic triangle and discussing conceptual analysis and translation processes.

This section has covered examinations of the different motivations for tagging behaviors, differing behaviors between audiences within systems, usefulness and issues involved in e-learning and collaboration more generally, and other issues. One of the most important take-aways from this research is the importance of contextualization in both the design of a system and in research concerning its functioning; this lesson is revisited later in this review, and incorporated into the research design of the data collected for this investigation. The next section reviews more quantitative approaches to assessing these behaviors.

2.4.2.2 Folksonomies Quantified

There have been a number of empirical studies that have examined various aspects of the behaviors in and patterns emerging from tagging behaviors and folksonomy systems, and these are

reviewed below. As discussed above, the main areas of action and research in folksonomies have been the social websites Delicious and Flickr. Keeping in mind the distinctions outlined between the "broad" and "narrow" folksonomies in practice in the former and latter, below are the initial investigations quantifying the dynamics of social tagging.

Golder and Huberman (2005) make an early examination of the structure of tags on Delicious (formerly del.icio.us) in a study that has become seminal. Central among the findings of their analysis is long-term stability in proportions of tags within users' collections. After "100 or so bookmarks, each tag's frequency is a nearly fixed proportion of the total frequency of all tags used" (Golder and Huberman 2005). Additionally, "URLs often receive most of their bookmarks very quickly, the rate of new bookmarks decreasing over time" (Golder & Huberman 2005). These "laws of folksonomy" have held up over time and form the backbone of much subsequent research in this area.

Golder and Huberman also provide useful thinking about the functioning of tags as opposed to hierarchies and taxonomies. They propose that "tagging is like filtering; out of all possible documents (or other items) that are tagged, a filter (i.e., a tag) returns only those items tagged with the tag... From a user perspective, navigating a tag system is similar to conducting keyword-based searches; regardless of the implementation, users are providing salient, descriptive terms in order to retrieve a set of applicable items" (Golder & Huberman 2005, p. 2). Tagging, they offer is "fundamentally about sensemaking." Again, this is a slightly different use of the term than in traditional library and information science.

They discuss the implications of their results in saying, "This stability has important implications for the collective usefulness of individual tagging behavior. After a relatively small number of bookmarks, a nascent consensus seems to form, one that is not affected by the addition of further tags. Users may continually add bookmarks, but the stability of the overall system is not significantly changed. The commonly used tags, which are more general, have higher proportions, and the varied, personally-oriented tags that users may use can coexist with them. Moreover, because this stability emerges after fewer than 100 bookmarks, URLs need not become very popular for the tag data to be useful" (Golder & Huberman 2005, p. 7).

Golder and Huberman do point out one of the limitations of tagging, noted repeatedly by detractors in commentary that follows, in saying, "Synonymy, or multiple words having the same or closely related meanings, presents a greater problem for tagging systems because inconsistency among the terms used in tagging can make it very difficult for one to be sure that all the relevant items have been found" (Golder & Huberman 2005, p. 2), and that, "plurals and parts of speech and spelling can stymie a tagging system" (Golder & Huberman 2005, p. 2). The authors also hit on a key truth of tagging in saying, "users bookmark primarily for their own benefit, not for the collective good, but may nevertheless constitute a useful public good"(Golder & Huberman 2005, p. 3).

Lee (2006) examines the social context of tagging behaviors, specifically in the context of link-sharing site Delicious, and finds that "The effect of disclosing personal information was surprising; the

regression model doubles its prediction for annotated bookmarks when users list both name and URL over those who list no information" (Lee 2006, p. 194). Across several different variables, Lee finds that "...users who perceive greater degrees of social presence are more likely to annotate their bookmarks with information that could facilitate the sharing and discovery of bookmarks for other del.icio.us users" (Lee 2006, p. 191). Generally, the greater the social presence felt, the greater the amount of information shared, i.e., "disclosure begets disclosure." Lee also provides useful contextual information in describing the larger picture of behaviors on Delicious: "...it is also possible that the success of del.icio.us depends on minimal social cues. Ignoring the cognitive costs of social presence may disturb a carefully stricken balance on del.icio.us and similar systems. This is perhaps why the notion of returning bookmarks is especially attractive to del.icio.us' goals of sharing and discovery; they present subtler cues of social presence while including a serendipitous aspect" (Lee 2006, p. 194). Nuanced analyses like this are key for contextualizing all research and findings in social media, and Lee's study is careful to narrowly position itself to only say what the data shows.

Lee highlights Golder and Huberman's bifurcation, saying, "This blurring between single-user application and shared public space suggests that different social dynamics and design principles may be at work than in traditional online communities" (Lee 2006, p. 191). Additionally, "Though posts are primarily motivated by the need to organize personal repositories of bookmarks, users who perceive the presence of others on del.icio.us included annotations more frequently, giving others valuable information about the information that they shared" (Lee 2006, p. 194).

In a case study that moves forward the research on tagging behaviors and suggests a wide range of future lines of research, Bar-Ilan et al. (2006) contrast the outcomes of structured versus free-tagging metadata approaches. They find that, "...on the one hand structured tagging provides guidance to the users, but on the other hand different interpretations of the meaning of the elements may worsen the tagging quality instead of improving it" (Bar-Ilan et al. 2006, p. 1). Their investigation leads them to conclude that, "The main advantage of free tagging that it does not put any limitations on the users and allows them to tags through association. It allows to characterize the images from a priori unexpected aspects" (Bar-Ilan et al. 2006, p. 4). Their investigations also provided valuable methodological analysis, which will be utilized in this paper's methodology section. Bar-Ilan et al. also note,

> "Our findings show that structured tagging usually resulted in more detailed descriptions. However, there are specific problems related to structured tagging. In this experiment we observed two such problems:
>
> 1) Some of the elements were not well-defined and could be interpreted in several ways (e.g. event and location)...
> 2) Some values can be assigned to several fields..." (Bar-Ilan et al. 2006, p. 4).

Introducing a novel framework for analyzing social media, Voss (2006) compares Wikipedia's category system with other systems of classification to best determine the inherent properties of each,

and best analogy for Wikipedia. Analyzing collaborative tagging systems (e.g., Delicious), classification systems (e.g., Dewey Decimal System) and thesaurus indexing (e.g., Medical Subject Headings), Voss concludes that Wikipedia's system of organization is best thought of as a collaboratively developed thesaurus. He writes, "Assigning categories to Wikipedia articles is a form of collaborative tagging with some particularities. Namely the category system is a thesaurus with hierarchical relationships between tags and categories can both added and removed" (Voss 2006, p. 1).

Voss covers several ways in which the collaborative process of organization in Wikipedia is different from other schema, including, "An essential difference between known collaborative tagging systems and Wikipedia's categories is that one can also assign categories to other categories. This way hierarchical relationships with supercategories and subcategories are defined" (Voss 2006, p. 2). This is an important case to keep in mind as much other research on collaborative organization focuses on flat, non-hierarchical tagging systems, to the point that "collaborative tagging" is sometimes equated with "non-hierarchical." As Wikipedia shows, users can indeed collaborate on constructing hierarchical relationships.

Voss lays out the contrasts between different methods of organization in a helpful chart, reproduced below:

Table 3. Distribution of structural parameters of classification (DDC), thesaurus (Wikipedia) and flat collaborative tagging (del.icio.us)

	DDC	del.ico.us	Wikipedia
tags per record	1*	distributed exponentially with a power law tail	
broader terms per term	1 (tree)	0 (no hierarchy)	distributed exponentially
levels	distributed normally	1 (no hierarchy)	distributed normally
records per tag	power law distribution		

* but you can also use more than one class

Table 1 – Tagging systems

Voss is also helpful in noting that "all indexing systems share typical distributions of tags, records and level – instead of confronting collaborative tagging and indexing by experts you should consider the conceptual properties of the different indexing systems presented in this paper." (Voss 2006, p. 5)

Farrell and Lau (2006) describe the implementation of a people-tagging utility for a corporate intranet, and their assumptions and results reveal important aspects of the nature of tagging and its usefulness for given contexts. While they take as their starting point the usefulness of free-tagging systems such as Delicious, the (very natural) modifications and additions Farrell and Lau make to the system as implemented, in the name of greater data harvesting, fundamentally alter the nature of the interaction. By making tags persistent in a wide range of social interactions (e.g., in IM windows

between colleagues) and introducing automatic extraction and highlighting of users and their expertise in a range of applications, they change the structure of tagging from one of individual agency and organization into something more like a persistent corporate surveillance system. This is not necessarily malign, as corporations have a vested interest in observing employees and gathering what they can of their knowledge (including knowledge of each other) but it does lead to the possibility that rather than promoting greater freedom for users to categorize and describe objects and each other, tagging in this environment may induce anxiety and modified social interactions. The authors are aware of some of these implications, as they discuss in their future research section, saying, "Another direction for future work is to compare people-tagging against existing collaborative tagging practice, such as social bookmarking or photo tagging. Do people use the same tags to describe other people as they do web pages or photographs? Does the fact that tagging can be reciprocated (I tag you, you tag me) lead to different tagging behavior?" (Farrell & Lau 2006, p. 5).

In an empirical investigation of the structure of collaborative tagging systems, Kipp and Campbell apply co-word analysis to the set of popular tags from Delicious, reasoning that "If user tags are forming useful patterns, co-word analysis provides a means of detecting them, based as it is on the assumption that the co-occurrence of words in a particular field in two or more documents is a measure of the strength of the relationship between the co-occurring words" (Kipp & Campbell 2006, p. 2). Their analysis "provide[s] some illuminating insights into the way tagging patterns emerge. [Frequency and co-word analysis] reveal that closely related terms are not necessarily reealed through co-

occurrence; they also reveal that users employ a wide variety of conventions in constructing tags" (Kipp & Campbell 2006, p. 11). Among the other findings from their analysis, the most pertinent was the presence of time-related tags as among the most popular (e.g., "toread"). They theorize that these tags "suggest that users are also doing something else with their tags: something that conventional subject access systems have always avoided... express[ing] a response from the user rather than a statement of the aboutness of the document" (Kipp &Campbell 2006, p. 10). They conclude that these tags "bring a new temporal dimension to a classification: one related not to long-term shifts in terms and their relationships, but rather to short-term needs and enthusiasms, which, by relating to a specific interest or a specific task, place the document in a set of relationships that, while not expected to endure, pull documents into idiosyncratic relationships. If temporal tags were to become more sophisticated, their effect on subject access systems might be transformative" (Kipp & Campbell 2006, p. 10). This manner of nuanced investigation of user practice is welcome.

van Zwol in a short detailing of research findings, provides a concise and important slice of audience behavior regarding Flickr. The general takeaway is that nearly all activity for most photos – both discovery and subsequent viewing – occurs within 48 hours of the photo's posting: "...the average number of photo views for the same 10 slices over a 50 day period... Each slice follows the same trend, where it receives a high number of views per photo on the first day, which grows even further on the second day and then steadily declines" (van Zwol 2007, p. 3). Additionally, "within the first 3 hours already 65% of the photos in the most popular slice (0-10%) have been discovered by the users. This

grows up to 92.5% for the first two days. This basically means that only a small fraction of the frequently viewed photos in the 0-10% slice is discovered after the peak" (van Zwol 2007, p. 3).This is a useful finding as it reveals another piece of the puzzle of how social tagging actually happens "in the wild."

In a paper that describes a range of research to be done, questions to be asked and possible results to be discussed, Trant (2009b) nonetheless provides some useful numbers outlining the usefulness of an unstructured, user-centered approach to describing resources. She notes that, "Museum documentation is known to address works of art from a perspective different that that of the public. Within the context of art museums, user contributed tags might help reflect the breadth of approaches to works of art, and offer access to alternative points of view" (Trant 2009b, p. 3). And indeed, she offers some initial evidence of just how far that might be the case, saying, "In a study of tags contributed during prototype steve.museum data collection, tags for works of art were compared to museum documentation, to explore the actual contributions made by naîve users. Surprisingly large proportions (in one case >90%) of tags represented terms not found in museum records" (Trant 2009b, p. 4). This speaks very well to the value of an unstructured approach, and suggests future investigations in other subject areas – is art unusual in this regard, or is the expert-generalist divide really this big? Trant also employs a very nice turn of phrase in saying, "Tags exist in a liminal phase between a user and an information resource, and as such represent a critical facet of personal meaning-making" (Trant 2009, p.

8). Beyond that, the paper mostly describes the ongoing steve.museum project, which seems bound to deliver interesting results.

In a study that is one of the first tagging-based investigations to take an experimental and user-based approach, Lee et al. (2009) find "high familiarity with the concept of tagging, Web directories, and social tagging systems are significantly and positively associated with high tag effectiveness for content sharing" (Lee et al. 2009, p. 1). Though the methodology is of limited generalizability – a very small sample set and relatively arbitrary sampling of tags for analysis – it does represent a welcome addition to the large-scale post-hoc data analysis that has described much of the literature in tagging to date. Observing that "tags harness the tacit knowledge of possibly large numbers of ordinary people. This presumably better describes resources in such a way that users are able to find relevant information more effectively," (Lee et al. 2009, p. 2) they frame their research so as to better understand a more nuanced vision of user practice in tagging activities. Discussing their results, Lee et al. note that "Our results indicated that the level of familiarity with the concept of social tagging ($p<0.01$), Web directories ($p<0.05$) and social tagging systems ($p<0.01$) had significant effects on the number of correct tags. However, the level of familiarity with search engines was not significant" (Lee et al. 2009, p. 8). The last finding is not particularly surprising, as they note in saying, "searching using search engines and creating tags have different objectives and require different skill sets even though both are related to information access... when users are creating tags, the focus is on organizing the information, and possibly sharing the content with other users" (Lee et al. 2009, p. 11).

Lee et al. do make some extrapolations that are not necessarily justified, as when they say, "[the results do] not seem to fully support the Wisdom of Crowds theory which suggests that the quality of tags created by a community is thought to be better than that provided by an expert. Specifically, our overall finding suggests that experts (i.e. high familiarity) are likely to perform better than novices (i.e. low familiarity) in terms of using more effective tags for content sharing" (Lee et al. 2009, p. 11). This conflation of "experienced tag creator" with "expert" is not warranted. While experts tend to be masters of (often highly structured) areas of knowledge, experienced tag creators in this context are merely Internet users who have been moderately acculturated within a lightweight online practice. "Experienced tag creator" is no more a synonym for "expert" than "gMail user."

Lee et al. make a suggestion for design of future systems that seems to miss the context of user experience, when they suggest that "...to reduce the number of poor quality tags or to curb tag spamming that impede content sharing, social tagging systems may want to restrict tag creation to more experienced users who are familiar with the concept of tagging rather than allowing any new and inexperienced users to create tags" (Lee et al. 2009, p. 12). This suggestion both badly overestimates the generalizability of their findings – which, while potentially enlightening, were for a very small sample set and a small number of users – and also, if heeded, could work to create and reify the status quo in perpetuity. If new users are not allowed to tag, how could future new users ever become "experienced"? They do acknowledge potential barriers to such an approach, and further suggest that perhaps "some

form of online training for new users to familiarize them with the different aspects of social tagging" which would seem reasonable enough.

In an investigation of tagging and memory, Budiu et al. (2009) develop a low-effort tagging system, Click2Tag, designed to increase both participaiton and memory. They find initial support for the proposition that "Click2Tag does not impair memory performance and, in fact, appears to strengthen memory for the tagged content. Compared to type-to-tag, the lower-cost Click2Tag is beneficial to recognition memory, due to strengthening of relevant words in text" (Budiu et al. 2009, p. 623). The authors place their investigations in several theoretical traditions, including information foraging theory, and posit that, "In the case of the current tagging model, we assume that the user's tagging activity around an individual article constitutes a "patch" of productive activity of some value to the user" (Budiu et al. 2009, p. 617). The authors note that, "The strength of a memory trace captures the relationship of practice to memory performance. It has been shown that repeated practice increases strength, and strength decays as a function of time since last practice" (Budiu et al. 2009, p. 618).

Budiu et al. further note that, "the memory traces that elaborate the original content provide additional retrieval routes to recall the content. This is because self-generated elaborations have some high likelihood of being re-generated at recall time as a retrieval route to the content. Since type-to-tag requires users to generate tags to associate with the original content, we expect it to produce more elaborative encodings and to improve recall performance" (Budiu et al. 2009, p. 618). Their research

does not end up supporting this proposition but I believe this particular aspect of the findings may be an artifact of the experimental design. By encouraging users to perform the exercise "as fast as possible" they do shift the time available for review of text relative to elaboration in the type-to-tag setting (reflected in their later elaboration model to explain this result – "the recognition accuracy in the type-to-tag condition is lower, simply because the reading time Tread is lower than in the other conditions, and thus probability of recognition are lower" (Budiu et al. 2009, p. 622). However it is plausible that given a different kind of tagging exercise – one without time pressure, and where elaboration in tags was the goal rather than side effect (e.g., tagging visual resources), type-to-tag would show substantial benefits.

The authors do make an assertion that to my mind is nearly backwards, in saying, "Type-to-tag is a top-down procedure, and it induces users to fit the content into their own 'ontology' and retain only those facts matching their view of the world. On the other hand, Click2Tag is more bottom-up, content-driven. People tag with relevant words in the passage, paying less attention to their own ontology" (Budiu et al. 2009, p. 623). It is easy to argue exactly the opposite – that Click2Tag is a top-down procedure, making available only those tags that appear in a particular passage rather than allowing a reader to tag with their own synthesized or general sense of the meaning. They further note that, "Although the full implications of tagging by typing still remain to be explored, we have shown that a lower-cost interaction technique (Click2Tag) has beneficial effects on human information processing when compared to a higher cost technique (tagging by typing), possibly because it allows the

users to tag without trading-off content reading time" (Budiu et al. 2009, p. 623). Again, I believe that this particular finding may be an artifact of the experimental design: in the real world there needn't be a trade-off between reading time and tagging time, because users are not booted off of articles after artificial time constraints of one or two minutes.

Cosley et al. (2009) in a constructive account describe the development, implementation and lessons from "MobiTags, a mobile, social system we developed to help people engage with 'open storage' museum collections" (Cosley et al. 2009, p. 1953). Broadly they found that, "people use tags for multiple purposes: navigating, thinking about art, and creating a sense of social presence. People valued this sense of presence, but found it sometimes made them unwilling to evaluate others' tags" (Cosley et al. 2009, p. 1953). This last is inference based on a lower rate of "down-voted" tags than social systems like Digg; it may or may not follow that a similar dynamic is at work in this space, where there is relative informational poverty (i.e., most objects are not described extensively) and so perhaps a lower threshhold for what is useful. And indeed, the authors make a similar point, building on the lessons from other work in saying, "steve.museum shows that people are willing to contribute tags despite not talking about art in the way experts do. The resulting folksonomy provides visitors with access points to the collection that would be missing with expert-only information – and is especially important in open storage collections, where visitors' tags may be the primary source of information about objects" (Cosley et al. 2009, p. 1955-1956). Regardless, this is a helpful set of conclusions and research on tags and mobile devices in semantic and spatial relations. As the authors note, "Tagging

brings together the ideas of social and semantic navigation by allowing people to label things and places" (Cosley et al. 2009, p. 1954).

Cosley et al. also begin to paint a more nuanced picture of uses and behaviors around tagging, noting, "people also used the tags to form impressions of objects... Some participants reported that the tags helped them think about the art in new ways or notice things they had overlooked. Evaluative or uncommon tags often revealed a novel perspective about the art" (Cosley et al. 2009, p. 1957). This is a compelling case of the usefulness of the long tail in action. But by the same accord, it won't please everyone: "Four participants, who voted some tags down that they found silly and unhelpful, suggested either a filtering system or a knowledgeable people" (Cosley et al. 2009, p. 1958). In another interesting development, the authors find that "Three participants reported being willing to go wherever the device took them, moving freely through space to find objects they had chosen through tag searches" (Cosley et al. 2009, p. 1958). And in a useful conclusion, the authors note that, "People wanted different tags at different times, and wanted to contribute tags for many reasons: expressing themselves, improving the system, and helping others navigate... Designers should support these multiple ways to use tags and not necessarily privilege informational aspects of tag use" (Cosley et al. 2009, p.1960).

Quantitative research into social tagging systems has so far been limited; more research is needed on the user side of the equation, not simply automatic extraction of large data sets but an

increased focus on user practices as located in the individual. The research performed in this dissertation and discussed at length later aims to fill part of that gap.

2.4.3 Tagging Conclusion

> "*...tagging is too young to be predictable. We don't even yet know if people will tag for themselves to refind pages or to help others find pages."* (Weinberger 2007, p. 165)

This background assessment has surveyed much of the literature covering the user-based aspects of tagging and folksonomies – from theory to boosterism to practice to critique and response. It has done so with the aim of establishing the basic agreements (and disagreements) around tagging and folksonomy as currently exist in research and practice, so as to better understand the possible affordances the behavior provides and what else might be possible.

As with many areas of new behavior and research, much of the scholarship to date on tagging and folksonomies has been opportunistic, as researchers have utilized the large and easily searched public sets of Delicious, Flickr and similar social media. There is no inherent problem in this research approach, but it is important to understand the limitations of such opportunistic sampling, as well as the

biases brought to the scholarship by researchers themselves. Most researchers focusing on tagging and folksonomies are themselves users or in some cases designers of or practitioners in social media software development. It is therefore no surprise that they are aware of these emerging technologies and would be early adopters not only of their use but also their research. But there is a limitation in this approach that comes from generalizing results based on the behaviors of tech-savvy early adopters. Popular social media can make for tempting and easy-to-access data sets, but they are only part of the picture, and an early and self-selecting snapshot at that. In contrast to some other lines of research, where early papers provide foundations on which all subsequent research ought be based, the picture in this case is more complicated and fluid. Early studies of given populations, services and practices in social media ought be understood as the first chapters in a narrative rather than necessarily as foundational bases and sets of assumptions for future research. For instance, the behaviors of relatively un-tech-savvy Facebook users tagging themselves and friends in photos are not necessarily descended from the practices of expert user early adopters of Delicious.

Research in the case of tagging and folksonomy, as with other social media, ought to be iterative, narrative and evolutionary rather than moving towards calcification. Some elements of these behaviors may prove over time to be generalizable (such as, perhaps, the power-law properties of object description first described by Golder & Huberman [2005]), while others may be more changeable and varied. Continuing research into the full range of behaviors and perceptions is therefore desirable; my own dissertation research attempts to help fill this area by assessing behaviors and perceptions of

tagging among undergraduate students, a population much-studied in general but not as of yet in this specific case.

Current research does, however, tell us a few things about what tagging is and how it and folksonomies can work in some situations. As mentioned above, in social tagging situations the power-law dynamic appears to be fairly stable and predictable: when tagging is visible across a community, descriptions of objects will stabilize fairly quickly around a relatively limited set of terms (see e.g., Golder & Huberman 2005). As well, the Long Tail properties of object tagging appear consistent: most objects will be described by a smaller number of tags a larger number of times, and a larger number of tags will describe fewer objects and be used less frequently. It seems to be the case that the usefulness of tags created by experts is questionable in a social or educational context – different communities and user types use different terminologies (see e.g., Smith 2006; Trant 2009b). This last point is also a general lesson for tagging and social media in general, and an important caveat for future research efforts in these contexts.

Future research will likely continue to examine all the above, as well as the more extended applications of tagging in social space – for instance, practices surrounding tagging and un-tagging of photos on Facebook (see Stutzman & Kramer-Duffield 2008 and 2010). The review of literature undertaken here suggests tagging is a worthy area for further research in that it reveals a more directly purposeful set of activities by individuals in technologically mediated environments, and particularly a

set of activities that are naturally evolving behaviors of those environments. The individual is (to varying degrees unselfconsciously and) confidently using a technology to its own ends, and it is worth examining what an early mass "mastery of technology" activity looks like. Tagging is a particularly useful behavior in this regard, as it is in many ways a behavior "authentic" to the medium of mediated sociability.

As Weinberger (2007) notes, tagging is not yet concretized as a behavior, despite a relatively limited range of contexts in which it is currently used. It is quite possible (likely even) that tagging-as-behavior may in fact take several different forms depending on context, audience and purpose. The way that users tag themselves and each other in photos on Facebook, for instance, is likely to differ in significant ways from the ways in which users tag web pages for their own use on Delicious; which in turn is likely to differ in important ways from the ways in which users tag web pages for public audience or collaborative efforts on the same service; which will differ significantly (as Vander Wal [2007] notes) from how users tag photos in Flickr for their own organizational needs. To get at these questions also requires further ethnographic research into tagging-as-practice, as well as experiments to examine the basic cognitive mechanisms at work.

2.5 – Background Literature Conclusion

The literature reviewed above provides an overview of issues necessary to gain an understanding of how increased use of information communications technologies is changing how individuals conceive of themselves and relate to each other. The review began with previous studies of identity focusing on the basic issues of personality and identity pertaining to the self, followed by a review of literature in computer-mediated communication particularly focused on self-disclosure and privacy. It identified the areas of interface between the culture at large and research on social networking sites (SNS), particularly as pertains to issues of self-disclosure and privacy concerns and examined social tagging and emergent folksonomies.

The swift uptake of Web 2.0 tools for mediated sociability, and the research into these tools, has been met with a great degree of attention. The combination of new areas for investigation with ease of access to large amounts of data on the open Web has resulted in multiple new lines of research – but much of it must be viewed with substantial caveats. This is the state of research on the Web and mediated sociability: exciting but in many cases containing consistent limitations or flaws, and it is that situation in part that this research seeks to address.

My review and assessment of the literature has allowed me to identify four limiting factors – *novelty*, *validity*, *barriers to access*, and *shifting norms* – and these are discussed in greater detail below.

2.5.1 – Research Caveats: Novelty

Novelty refers not only to the novelty of the medium itself (still only a few years old) but also the kinds of behaviors and interactions that take place within the context, as well as the range of research and evaluative approaches employed to assess these phenomena. The latter fact results in a number of difficulties, including,

- poor fit of approaches to contexts
- lack of large-scale generalizable data, due to varied techniques
- lack of longitudinal data collection efforts

The wide array of research approaches to these issues presents a challenge in building a critical mass of relevant research addressing similar questions in similar manners, but may be unavoidable given the circumstances. No department or discipline has a monopoly on addressing these issues, and indeed mass implementation of social media has affected and been adopted by a wide range of disciplines – each with an idiosyncratic culture and set of traditions – in relatively short order. No unitary theory seems likely to emerge that will explain the full range of social interactions in mediated social spaces. There will therefore continue to be a certain discontinuity between disparate research agendas.

2.5.2 – Research Caveats: Validity

Much research into social media suffers from problems related to sample validity or environmental validity. In terms of the latter, research questions are too often insufficiently contextualized within communities of practice; in terms of the former, researchers will too often draw from non-representative populations (e.g., a given online community) and attempt to generalize findings. These issues feed into one another given the closed and specific nature of many online communities. Researchers looking for large sample sizes will often use automated scripts to collect profile information that is publicly available from those online communities where some or many users make such information available, and whose interfaces allow for mass data collection along these lines (e.g., Flickr, Delicious).

Evidence is lacking on whether such communities constitute anything like a representative sample of the population generally, or any coherent sub-population. By definition, such efforts do not collect data from those profiles which are hidden or private within the context of even the surveyed communities (especially SNS such as Facebook and MySpace, with high rates of private profiles), biasing the results in favor of those users who choose to be most open and public with their information disclosure (especially problematic in the context of those studies examining disclosure or privacy). Such studies are also explicitly designed with a central limitation in mind – the inability to gather data in a similar manner from "closed" sites such as Facebook. Thus it is not possible to build a valid,

generalizable sample from large-scale script-based data collection of publicly available data, and so researchers should endeavor to examine practice within a given context more closely.

2.5.3 – Research Caveats: Barriers to Access

As noted above, many online communities restrict access to data, either broadly at a community-wide level, or more narrowly at a level of individual user control over various privacy settings. The problems associated with the latter are addressed above, and the limitations imposed by the former are obvious, while understandable. Again using the example of Facebook, user data is their most valuable commodity – it is merely good business practice that they restrict the ability of outside parties to collect said data in large amounts, nor that they no longer (after doing so for a brief time with a few parties) allow user log access for academic researchers. This presents a major gap in data regarding important online practices, but there is no obvious solution barring a major shift in norms of those companies running the largest online communities.

2.5.4 – Research Caveats: Shifting Norms

Practice online shifts continually, in multiple directions and in multiple communities. Online communities are much like – are often digitally mediated extensions of – playgrounds, lunchrooms and water coolers. Trends develop, mutate, migrate and metastasize at the speed of gossip (itself an important object of cultural exchange), and the locality of actions and interactions is critically important.

Digital records of these transformations would seem to be an invaluable asset, but several factors limit the usefulness of these records, most especially that there are not nearly enough scholars researching these issues to sufficiently observe the development and evolution of so many practices and, given the barriers to access mentioned above, valuable context clues may and invariably will be missed. To cite merely one example among many – boyd in her early work (2004) examines in great detail the patterns of friending behavior and network exploration on Friendster, and had the advantage of being a participant observer from a very early moment in the network's existence. Similar dynamics on MySpace and Facebook, however, were not examined at similar periods in the networks' lives, if only because no scholars thought to watch. Given the substantially different composition of the latter two networks and the differences in interface and network growth, it is not possible to generalize from boyd's (2004) findings.

The central motivation for my overall research has been and remains gaining an understanding of how increased use of information communications technologies is changing how individuals conceive of themselves and relate to each other. The literature reviewed here provides a robust context for the investigations described later in this dissertation, outlining the basic issues of identity and technology, and the more specific contextualized behaviors and current practice performed in the context of mediated sociability. The section that follows focuses on the goals and motivations for this research, followed by a review of the methods used in formulating the research questions and conducting the research itself.

3 – Goals and Objectives

The goal of this research is to assess current beliefs and uses regarding tagging by undergraduate students. Better understanding these practices is key to better understanding one component of identity formation and maintenance in mediated sociability. This line of inquiry helps to fill gaps in the research on tagging, folksonomy and social media not yet extensively explored by other researchers. As discussed in the previous sections, very little in the way of user-centric research has explored tagging, and most of those investigations have focused on self-selected expert-user communities (e.g., Flickr, Delicious). Thus, expanding the focus of investigation and investigating a larger population's incorporation of tagging in the blended working and living space of Web2.0 – where it is a behavior native to the medium – can greatly increase our understanding of tagging and related issues. Establishing baselines on what students are actually using tagging for, in short, is a question that has not previously been explored in research to date.

In exploring the above issues, there are three themes central to understanding this work: *meaning*, *use*, and *experience*.

- *Meaning* concerns the basic but fundamental definitional issues concerning the practice(s) of tagging, and is not simply an issue of semantics. Understanding what students mean when they say, hear and

think about tagging is crucial understanding its place in the spectrum of technology practice, and it is only by asking for these meanings explicitly that a fuller and richer context can emerge.

- *Use* follows in part from meaning but is also an independent variable for consideration, as perception and action are not always aligned – individuals do not perfectly know their own minds, or actions. Exploring the sets of uses and practices regarding tagging helps further contextualize it within the larger scope of technology practice, and can help explore possible re-use beyond intended uses.

- *Experience* is a further area for investigation in constructing a model for technology practice and understanding the whys and wherefores of tagging. Placing tagging in an ecosystem of behaviors requires investigating not only fixed but temporal elements, to determine how tagging is utilized by experts and novices alike (or if this is a distinction worth making).

There are three main hypotheses guiding this study, which are laid out below. Firstly, based on literature reviewed in Section 2 and the results of my previous research (Greenberg et al. 2009) it is hypothesized that within the undergraduate population, tagging is not used for information organization purposes but rather is a more communicative form.

- **H1:** Tagging is generally viewed as a discursive social activity

This hypothesis is tested based on analysis of both direct-question sections of the survey (e.g., "Do you think of tagging as primarily a social technology?") and through analysis of the Uses & Gratifications data.

Literature reviewed in Section 2 and especially recent preliminary research (Stutzman and Kramer-Duffield 2008 and 2010) indicate that tagging is used for social communication. Thus it is hypothesized:

- **H2:** Tagging is primarily used as a tool for social grooming and communication

As with much of the research on tagging (and my further contexualization of the self-selecting expert communities of tagging systems) suggests, it is an activity practiced more often by experts than novices, and so it is expected that technology experience will predict use of tagging systems and tagging as information organization tool.

- **H3:** Use of tagging and tagging systems for information organization goals is predicted by technological experience

Following from the above hypotheses on use and belief, I developed a set of research questions to guide the implementation of this investigation, which are as follows:

- **RQ1:** What does tagging mean to undergraduate students?
    - **RQ1a:** What are the differing conceptions of tags and tagging for students based on experience with different social media interfaces (e.g., Facebook versus Flickr, Delicious, etc.)?

- **RQ2:** What are undergraduate student uses of tagging?
    - **RQ2a:** What are undergraduate student uses of tagging in their social lives?
    - **RQ2b:** What are undergraduate student users of tagging in their educational lives?

In addition to the range of uses it is, as mentioned above, important to contextualize tagging as activity within the information ecosystem, and how it is used by experts and novices. This further area for investigation will examine the contributing variables involved in use of tagging and tagging systems

- **RQ3:** What are the contributing variables predicting greater student use of tagging and tagging systems?
    - **RQ3a:** Does greater technology experience predict greater use of tagging and tagging systems?

- **RQ3b:** Does greater SNS experience predict greater use of tagging and tagging systems?

These hypotheses and research questions have been developed to be specific and grounded enough to be falsifiable and achieve useful findings in either support or denial of the claims offered. By necessity and as expected with exploratory research, they are also reasonably broad and do not make a more specific set of predictions about behavior, because many of the behaviors this research encountered (and expected to encounter) were novel or at least undocumented in prior work. Many of the results presented in the following sections, and in the analysis and discussion, are offered not as purely descriptive data but outside of the context of any particular hypotheses. This data is nonetheless of great use and interest, especially in suggesting directions and foci for future research in this and other areas.

The next section (Section 4) of the dissertation presents the methods used in conceptualizing the research scope and agenda, and in selecting the particular instruments used for this investigation (a summary of which is included in the following section, Section 5).

4 – Methods

This section addresses a multiplicity of approaches to studying identity, with Section 4.1 reviewing methodologies from studies of social network sites (SNS), Section 4.2 providing a synthesis and Section 4.3 presenting my own methodological framework. I take this approach for two main reasons: first, there is no single accepted theory or set of theories for researching or understanding the issues at play in mediated sociability. Second, no single existing theory or theoretical tradition – emerging as they did from quite different social and technological circumstances – accounts for the range of factors necessary to consider when investigating mediated sociability. The synthesis presented in this review is but one of many possible methods of accounting for the salient characteristics of life online, which may vary according to context and research goals. However I believe it is an appropriate avenue for investigation of my chief issues of concern, which relate to the reconciliation of identities and goals across social and educational contexts, and the effect and possible benefits of mediated social and educational spaces on learning processes. Among the challenges I see for students and educators now and especially in the future is the increasing blurring of lines between educational and social identities, and between what is "work" and what is "play" or social. Addressing the fundamental dynamics at work in each of these contexts as they relate to identity and the uses of communications technologies is central in formulating a research agenda that will begin to address these issues.

My own investigations of identity, and in particular how increased use of information communications technologies is changing how individuals conceive of themselves and relate to each other, has followed a path that has also included a wide range of methodological approaches in the studies I have reviewed. These methods have included the early semi-controlled experimentation of Vygotsky (1978); the observational fieldwork of Goffman (1959, 1963); technological anthropology from boyd (e.g., 2004, 2008); large-scale survey research and automatic extraction from numerous Internet researchers (see e.g., Lenhart & Madden 2007, Gross & Acquisti 2005, Bateman et al. 2007); and technologically mediated quasi-experimentalization (e.g., Lee et al. 2009). With such a wide range of methodologies from a range of disciplines, it is not possible to exhaustively examine each, but I attempt to focus on those elements of the methodology that are most salient to my interests and proposed investigations.

My approach in the investigations discussed later in this dissertation borrows from this range of intellectual traditions and methodologies because I do not believe any one single discipline or methodology can sufficiently explain the range of practice in mediated sociability. More specifically, the particular motivations associated with those behaviors that comprise the practice of tagging are incompletely addressed by both the literature on tagging and the literature on mediated sociability. Informing these investigations with both approaches will yield a more complete picture of both, and contribute greater understanding to each respective literature.

4.1 – Profile-Based Social Network Site (SNS) Methodologies

Much of the early research on profile-based social networking sites (SNS) has taken the form of observational ethnography. Given the volatile nature of mediated online space and the accelerated schedule of "Internet time," continued ethnographic research will be necessary for the forseeable future to determine if initial observations continue to hold true or if new patterns of behavior are emergent. This section reviews the evolution of this research, adoption of new methods, and proposes some limitations and possible new future directions for research. There is an extensive focus in particular on where researchers have erred or not gone far enough, owing to the lack of consensus on a single approach to researching these issues. This lack of consensus is warranted and for the moment even productive, as many researchers from differing backgrounds each have their own useful contributions to offer. Thus I hope to draw the outline of a more complete and comprehensive approach mostly in negative relief, by examining in great detail what isn't there in even some of the more illuminating studies.

The earliest research into online SNS (e.g., boyd 2003) took the form of ethnography and provided useful bases on which future researchers could anchor their work. The ethnography seeks to establish what the key, salient aspects of the context are, and how its users utilize and relate to them and each other. Surveys follow on these results by identifying the seemingly salient factors and examining the opinions of a large population (Babbie 1998), and large-scale surveys have become popular in online

SNS research, addressing such issues as attitudes toward privacy (Gross & Acquisti 2006), social capital formation (Ellison et al. 2007) and self-disclosure (Tufekci 2008). This follows, given the facility many researchers of online SNS have with web interfaces, and the ease of software implementation – and mass subject contact – in those contexts.

More recent SNS investigations of the last three to four years began to take advantage of improved APIs, increased processing power and data storage, and faster Internet connections to automatically extract massive numbers of profiles and their contents from SNS (Backstrom et al. 2006). This more computer-science-inspired approach is not of chief concern to my own investigations but related research is more relevant.

More recent surveys of Facebook have not been able to take advantage of the ability to scrape large amounts of data, and so instead came to rely on large-scale surveys to answer their research questions. A series of investigations from researchers at Michigan State University (Ellison et al. 2006 and 2007; Lampe et al. 2006 and 2007) utilize what has become more standard practice for studying Facebook, by working with their university's office of the registrar to obtain a random sample of the university population, and then e-mailing them to complete the survey (see also Stutzman and Kramer-Duffield 2008 and 2010). This allows for relatively robust sample but is not without limitations; it is limited to a single institution, and excludes non-users. As to the former, only large well-funded institutions in the business of performing surveys are so far returning anything like generalizable results

on national populations, and this does not seem likely to change any time soon (as Facebook seems unlikely to open their data for research purposes and severely restricts the personal data that third-party application developers can harvest from their users). But given Facebook adoption rates across most institutions ranging upwards of 80% and often above 90% (Stutzman and Kramer-Duffield 2008), the latter is not entirely problematic, but examining that population not using Facebook is worthy of consideration.

Other research (Walther et al. 2008a and 2008b) introduces a methodology taken from a different intellectual tradition – computer-mediated communication (CMC) – to the study of Facebook. Previous CMC studies did attempt to replicate SNS contexts prior to Facebook and the above research shares much in both its limitations and positive attributes with that literature. In both Walther studies, the setup is a fairly standard controlled-experiment CMC approach, with a created context – not actually Facebook but a facsimile of it – and some degree of deception involved. While this does do the job of isolating variables, it does not to my mind make for compelling research or even research that is particularly "about" Facebook. Facebook or any other SNS is not primarily about its interface, how it presents on the screen or the weak determinism of predefined categories; rather, it is about the particular kinds of social activities in which the particular user base of an SNS engages. Controlling the socialization by creating statements from invented interlocutors – as in both above studies – removes the social element from the context. In my view, this has the effect of removing the context from the context, and cannot necessarily say how their questions are answered within Facebook so much as how

they are answered within their idea of Facebook. They purport to test propositions of how users relate to "friends" without the interactions actually observing the users' views or perceptions of their own friends; this lack of environmental validity is a significant limitation of the study.

A promising approach to research in SNS was undertaken in a cross-context comparison of trust and privacy concern within and between users of Facebook and MySpace (Dwyer et al. 2007). Dwyer (2007) first performed a series of semi-structured interviews and then, based on the results of that investigation, designed the survey instruments for a larger-scale and cross-context survey (Dwyer et al. 2007). Reporting on the results, they found similar levels of privacy concern across both contexts, with Facebook users expressing more trust in the service and being more willing to include identifying information in their profiles, while MySpace users were more active in developing new relationships. Most Internet researchers will in the near-term continue to have access only to the convenience samples of university registrar-mediated student samples or online solicitation snowball sampling, neither broadly generalizable. Therefore it is especially important that this research be based explicitly on the norms and practices of the moment within those spaces, as Dwyer does an excellent job of demonstrating, and as my own research is based.

Joinson (2008) took a novel (within the context of SNS research) approach to investigating the range of practice on Facebook, and adapted a two-stage Uses & Gratifications survey to better explore the different uses to which its users put the service. Stage 1, in addition to including a range of questions

on number of friends, time spent on Facebook, privacy measures, etc., also included a qualitative component asking subjects what they used the technology for, answers of which were used to create scales for Stage 2. After factor-loading the scale responses for Stage 2, Joinson was able to determine seven categories of use for Facebook. This approach is adopted in this dissertation among several other instruments to determine the range of uses of both Facebook and more specifically tagging, among my undergraduate population.

This section has dealt with the practices and limitations of research into online SNS as has been conducted thus far, offered criticisms and suggested some possible future directions for research and examined several promising recent approaches to research in this area. The mostly critical framework above informs my basic understanding of how SNS research ought and ought not to be, and a key part of the foundation for studying those activities which take place in the context of mediated sociability.

4.2 – Methods Synthesis

This section has reviewed a range of methodological approaches to the study of identity, mediated sociability and behaviors within that context as relates to tagging. Several approaches to investigating issues mediated sociability were addressed, including boyd's (2004) largely ethnographic investigations, Dwyer's (2007 and Dwyer et al. 2007) more successful multi-stage interview- and

survey-based investigations. Overall, research into mediated sociability was found to be promising but often holding room for improvement.

However, it is possible to go too far in critiquing contemporary research – this is a new and unsettled space, which demands new thought in investigation and assessment just as it inspires novel behaviors and relationships. Much of both the early sociological research and later research into mediated sociability took the form of ethnography, which continues to be an especially useful technique for investigation of most human behaviors. Criticisms that emphasize the small sample sizes and individual differences common in ethnography miss its larger usefulness not as the one manner of establishing behaviors but as an excellent tool for discovering a range of practice beyond anecdote or conventional wisdom, and in greater detail than large-scale research often allows. Large-scale survey research was also assessed in this review (see e.g., Gross and Acquisti 2005; Acquisti and Gross 2006; Madden and Lenhart 2007; Lenhart et al. 2007, 2008; Dwyer et al. 2007; Tufekci 2008; Ellison et al. 2006, 2007; Lampe et al. 2006, 2007), and found to be a useful secondary investigatory tool, most helpful when the basic outlines of behavior are well-drawn due to previous ethnographic research. It is generally only in the latter case that surveys can be truly useful – that is, when researchers know the right questions to ask.

Given the combination of recent rapid increases in computing power and storage capacity, Internet access speeds, and unprecedented public disclosures of personal information and publicly available data

on behaviors online, it can be tempting for researchers to posit interesting questions, write a script to harvest data, and analyze that data based on what they believe they know about the medium. However, this manner of research often falls prey to several traps which leave the results of these studies of questionable usefulness. At their inception, these studies are often based on either false, misleading, uninformed, or not theoretically rigorous premises, e.g., "[all] users do X", where it is not necessarily clear (or the case has not been sufficiently made) that users behave in X way, or that if they do, it means what the researchers believe it does. Beyond this limitation, many studies also make errors of interpretation via insufficient understanding of a medium. Even researchers who are active users of a given service or members of a given context can fall into this trap by generalizing their own habits and experiences rather than assessing what the body of research says (or doing said research themselves). In this instance researchers also transpose interpretive traditions from different contexts, which may or may not be appropriate for a given context of mediated sociability.

Additionally, I believe that controlled experimental research (see e.g., Bateman et al. 2007; Lee et al. 2009; Bar-Ilan et al. 2006; Budiu et al. 2009) can be a key tool for the answering of very narrowly-sliced questions of behavior with a substantial caveat. In order for behaviors to be accurately assessed, researchers must have a very solid grasp of the wide range of issues at play in a given mediated context and a given user population. As experimentally designed studies tend to be very resource intensive, it is important to get all of the data points informing the study design correct, lest they lead to research

findings which either overstate tendencies or point in entirely the wrong direction. Given the constraints of time and resources, however, controlled experimental research is not part of this dissertation research.

The above are the basic issues at play in assessing the usefulness of a wide range of research across many disciplines – how appropriate is a given tool to the questions at hand, and how well-grounded in a context are the given questions? This last point is of great importance in reviewing the methodological approaches to assessments of tagging. Some of the key limitations to the research in this area have centered around mistaken assumptions regarding user goals and motivations; these mistakes are all the more frustrating given how little cost there would be to simply reviewing a bit more of the literature or performing basic ethnography to contextualize the research.

I have reviewed this multiplicity of approaches because the dynamic nature of mediated sociability demands a broad and flexible set of tools for inquiry. No single theory explains the range of factors at work, and no single research tradition can lay claim to a history of addressing the salient issues. The synthesis presented in this review is my own and others may formulate differing approaches – given differing theoretical backgrounds I would expect so, and indeed hope so. Infinite fracturing of methodologies is clearly not desirable, but in such an unsettled area as that of mediated sociability – where the tools, user practices and basic technical factors at work change substantially on the scale of months rather than years or decades – a wide array of approaches is desirable. I believe my particular blended framework is appropriate because it begins broad and narrows gradually with each more

specific line of inquiry, building a pyramid with the most solid theoretical grounding as the base and the less-tested propositions only at the narrow end of the construct. By basing the greatest part of the model on what is fairly well-known, established and agreed-upon, more attention can then be focused more narrowly on those more novel aspects of inquiry, and on the varying successes or insufficiencies therein.

Mediated sociability presents a wide range of novel behaviors and factors, which function both as challenges and opportunities for researchers. It does not appear, however, to be a wholesale revolution in human existence and behavior, and so there is much still worthwhile in the traditions of the social sciences – psychology, sociology, anthropology, etc. – in explaining the functioning of interpersonal and intrapersonal dynamics. Thus the use of novel research tools and approaches should be based solidly on what we know about how people behave.

4.3 – Methodology Framework

The research methods used in this dissertation borrow from many of the reviewed studies and methodologies, attempting to fill gaps in knowledge regarding user behavior in the context of mediated sociability generally, and as regards tagging perceptions and behaviors more specifically. My approach for this dissertation research is a multi-stage, multi-method approach to assessing the current range of practice and belief regarding a range of communications technologies, mediated sociability and tagging. It begins with a survey borrowing scales and questions from Ellison et al. (2006), Lenhart and Madden

(2007), Greenberg et al. (2008), Stutzman and Kramer-Duffield (2008 and 2010) and Joinson (2008), followed by a set of interviews to explore in greater detail pertinent issues discovered in the survey, and concludes with a second stage of the survey as per Joinson's (2008) adoption of a uses and gratifications framework for investigating social media. The specific procedures used are discussed in the following section.

By incorporating previously-used and -verified scales and question sets, I receive the benefits of other researchers' experience and also gain a basis for some comparison of behavior and belief (albeit across time and context, and not generalizable). Given the iterative (or fragmentary) nature of Internet research, gathering data that can be compared with previous and future research – even with the above caveats – is of great importance, and a key consideration in my research design. The research presented in this dissertation is neither exhaustive nor authoritative, but by bringing together the best of several approaches I believe will begin to both fill gaps in existing knowledge and open up new avenues for inquiry.

5 – Procedures

The research program supporting the study of undergraduate beliefs and uses of tagging was both multi-method and multi-stage. The study involved six stages, three stages of data gathering and three of data analysis, which are shown below.

I) Survey Stage 1

II) Multivariate analysis of descriptive terms and initial quantitative analysis

III) Semi-structured interviews

IV) Coding and analysis of interview data; construction of scales for uses and gratifications confirmatory analysis; minor edits to other survey questions

V) Survey Stage 2

VI) Quantitative data analysis of all survey data.

The procedures for each are detailed below; quantitative analysis is covered in Section 7 – Analysis.

5.1 – Survey 1

The survey was based on preliminary surveys of social media usage patterns (e.g., Greenberg et al. 2008, Shoffner et al. 2008, Stutzman and Kramer-Duffield 2008, Edwards et al. 2009, Ellison et al. 2006, Lenhart and Madden 2007 and Joinson 2008 – see Appendix I for full Survey I questions). The

survey incorporated existing scales and also focused more specifically on student perceptions and uses of tagging as a component of social media usage. Once assembled and approved by the IRB, the survey was implemented using the Qualtrics web survey tool, installed and administered by the Odum Institute. Before full launch the survey was reviewed by fellow doctoral students and a consultant from the Odum Institute, and then piloted with a sample of n=100 for verification purposes. Following minor modifications, the survey was then prepared for full distribution.

The five sections of the survey included

i) general technology use, using modified scales from Pew Internet and American Life investigations (Lenhart et al. 2007), previously used in BotCamp investigations (Greenberg et al. 2008, Shoffner et al. 2008, Edwards et al. 2009)

ii) social media use, using the Facebook Intensity Scale (Ellison et al. 2007)

iii) tagging usage questions, from my own investigations of Facebook (Stutzman and Kramer-Duffield 2008), and all in accordance with established survey methodology (Couper 2008, Dillman 2007)

iv) uses and gratifications questions modified from previous research (Joinson 2008), presented as free-text in Stage 1 and as Likert-type scales in Stage 2

v) general demographic data.

The survey solicitation was sent via e-mail in two Stages to a random sample of 4000 undergraduate e-mail addresses, each Stage comprising 2000 undergraduate students. Respondents

received an email, and clicked a link in the e-mail directing them to a consent form web page, where they chose to either render consent by clicking a box outlining their acceptance of the terms of the survey, or declined to participate. Those choosing to participate answered a set of 38 questions in five sections regarding their usage of social media, communications technologies, and tagging.

5.2 – Semi-Structured Interviews

Semi-structured interviews were conducted following the recruitment of participants from Stage 1 of the Survey. When completing the survey, subjects had the option of entering their e-mail address if they were interested in participating in a 20-minute interview-observation session on their social media usage, for which they would be compensated. Subjects and the researcher coordinated location and time of interview, and upon arrival the interviewees were asked to sign a consent form for participation and recording of the interview. The researcher asked open-ended questions regarding their use of and beliefs about tagging and communications technologies generally (see Appendix II for the script). The questions focused on three main areas: i) student use of technology, generally; ii) student use of social media generally; and iii) familiarity with and use of tagging. The questions were used in similar pilot-level focus groups during the 2009 BotCamp session (Edwards et al. 2009). The interviews lasted from 8 to 28 minutes at which time the students were thanked for their participation.

5.3 – Data Analysis

Following the interviews, the recordings were transferred to transcript form by the researcher, and the transcripts and notes reviewed and subjected to qualitative data analysis. Key themes were highlighted, impressions recorded, and the survey section of the research revised to best reflect the findings of the interviews, being examined in particular for previously unfamiliar practices. Additionally, the free-text responses from the uses and gratifications section of Stage 1 of the survey were analyzed and grouped in thematic areas to facilitate the construction of the scales as outlined in previous research (Joinson 2008, Stafford et al. 2004). For the Facebook Uses & Gratifications section, the initial themes were borrowed directly from a previous study on Facebook (Joinson 2008), and expanded upon as the data was analyzed (see Appendix III for a full listing of the responses) and grouped into 16 major themes. Representative statements for each theme were chosen – from actual responses when possible – and the scales were composed of these responses. The same procedure was performed for the Tagging Uses & Gratifications responses, leading to 19 major themes (see Appendix IV for both of these scales and the revised Survey 2). The survey was further revised for Stage 2 in mostly minor ways, with revisions discussed with the committee chair, dissertation committee, and Odum Institute personnel before being submitted with revisions to the IRB for approval.

5.4 – Survey 2

Following construction of the uses and gratifications scales and revisions of the survey following from the feedback in interviews, Stage 2 of the survey solicitation was sent via e-mail to a random sample of 2000 undergraduate e-mail addresses. Save for the uses and gratifications scales, Survey 2 was identical to Survey 1.

6 – Results

The research comprising this investigation consisted of both survey and interview data. The interview data was coded for explanatory purposes rather than quantitative analysis , and will be discussed in greater detail in Section 7 – Discussion, where respondents' discussion of technology uses will help frame the larger picture of use and practice. This section includes a descriptive presentation of the survey data, to be followed with a further exploration and analysis of the dynamics of the data.

The survey consisted of two mostly-identical solicitations, Stage 1 and Stage 2, differing only in the Uses and Gratifications section (open-ended in Stage 1, Likert-type scales in Stage 2) and in the technology experience section (Stage 1 including options for <1 year, 2 years…, 10 years or more; Stage 2 leaving responses open-ended). As detailed below in Table 2, both were sent to random samples of 2000 current undergraduate students at UNC-CH, with Stage 1 returning 208 responses and Stage 2 returning 203 responses. After processing and discarding incomplete and ineligible respondents, Stage 1 comprised 175 responses and Stage 2, 172 responses.

Table 2 – Response Rate

Survey Solicitation	Solicitations Sent	Responses	Response Rate	Valid Responses	Valid Response Rate
1	2001	208	10.39%	175	8.75%
2	2000	203	10.15%	172	8.60%
Total	4001	411	10.27%	347	8.67%

6.1 – Demographics

Of the respondents completing a valid survey, 91 were male (26.2%) and 256 were female (73.8%), with similar figures for each Stage of the survey. Stage 1 of the survey was sent to a random sample of 2001 students the current undergraduate population, consisting of 1174 women (58.67%) and 827 men (42.33%). Stage 2 consisted of a random sample of 2000 students, including 1170 women (58.5%) and 830 men (42.5%), giving a total sample of 2344 women (58.59%) and 1657 men (41.41%) These samples are representative of the current student population. The response rate (as detailed below in Table 3) was therefore disproportionately higher – by a factor of two – among women (10.9%) than men (5.49%); systematic differences will be examined in Section 6.

Table 3 – Gender

	Solicitations Sent	Valid Responses	Valid Response Rate
Male - Survey 1	827	45	5.44%
Male - Survey 2	830	46	5.54%
Male - Total	1657	91	5.49%
Female- Survey 1	1174	130	11.07%
Female - Survey 2	1170	126	10.77%
Female - Total	2344	256	10.90%
Combined Total	4001	347	8.67%

The age of the respondents in both surveys combined ranged from 18-42 (as shown below in Table 4), with a mean age of 20.5; 95.7% were between 18 and 22 years old. The distribution across the

academic years was mostly normal (full numbers below in Table 5), with sophomores slightly under-represented (69, for 19.9%) relative to other years.

Table 4 – Age

Age	Responses	%
18	44	12.7
19	72	20.9
20	75	21.7
21	91	26.3
22	49	14.2
23	3	1
>23	12	3.5
Total	346	100
Mean	20.5	
Median	20	
Standard Deviation	2.9	

Table 5 – Class Year

Class Year	Responses	%
Freshman	83	24.1
Sophomore	69	20.1
Junior	93	27.0
Senior	99	28.8
Total	344	100

The respondents' self-reported ethnic backgrounds were also in line with the current UNC population, with 84.4% of respondents identifying as white, 6.3% black, 4% Latino, 4.6% East Asian, 3.2% South Asian, 0.9% Native American and 2.3% as Other (see Table 6 below for full results).

Respondents were permitted to choose as many ethnic identifications as they wished, resulting in the cumulative total larger than 100%.

Table 6 – Ethnicity

	White	Black	Latino	East Asian	South Asian	Native American	Other
Count	293	22	14	16	11	3	8
Percent	84.4%	6.3%	4%	4%	3.2%	0.9%	2.3%

6.2 – Communications Usage and Experience

Respondents were asked about their usage of a wide range of communications technologies in a scale adapted from Pew's long-standing surveys of communications technology usage (Lenhart and Madden 2007) on a five-point Likert-type scale ranging from "1 – Never" to "5 – Every Day." In line with previous investigations (Greenberg et al. 2008) these questions were asked across not only the seven categories of communications technology – email, landline phone, cell phone, in-person, text messages, instant messenger, and SNS messages – but also across three target groups of great and contrasting importance for undergraduates: friends, family and school instructors. Results are presented below focusing first on each technological medium in comparison across the three audiences and through experience, and then in comparison with each other within each audience. Questions were also asked regarding length of use of each given communicative medium, with "Internet" taking the place of "in-person" for these. Additionally, given the centrality of Facebook to student life, several additional questions were asked regarding length of membership, time spent weekly and size of friend network on Facebook.

6.2.1 – Communications Usage and Experience: Email

The results in this investigation show that there is a considerable difference in how the current undergraduate population uses email depending on audience, and that email is not the central communications technology of their social lives; see Figure 1 and Table 7 below for full results.

Figure 1 – Email Usage

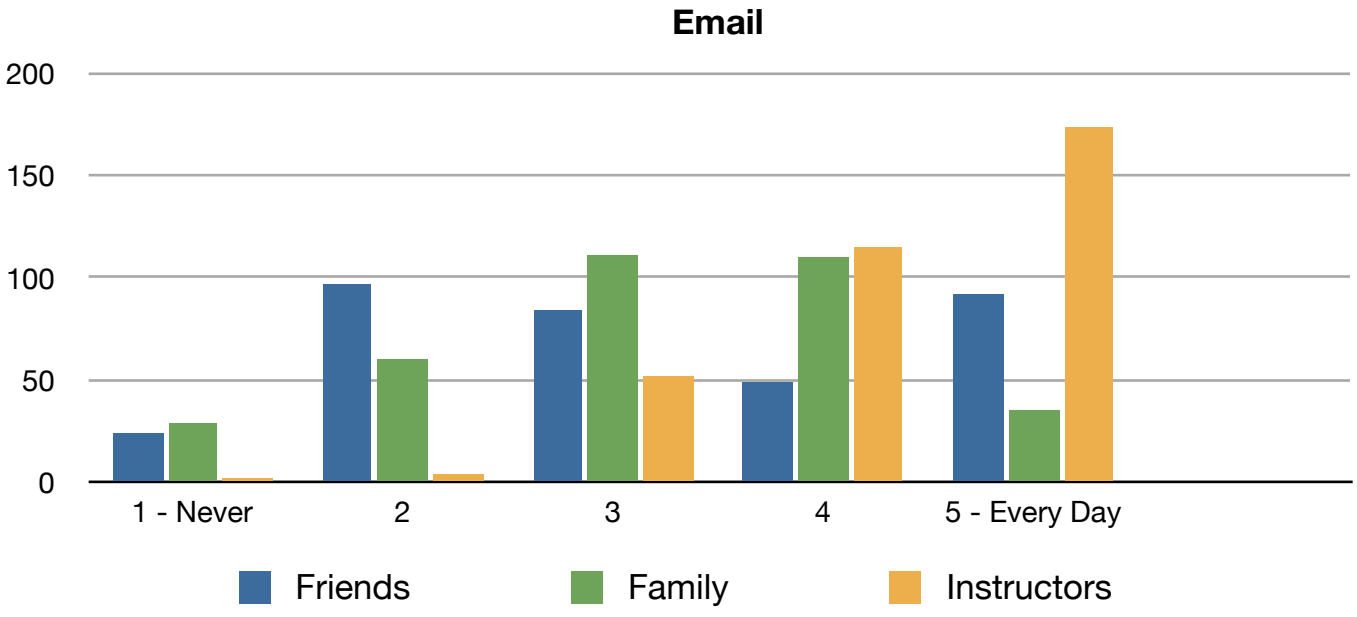


Table 7 – Email Usage

	Friends	Family	Instructors
1 - Never	24	29	2
2	97	60	4
3	84	111	52
4	49	110	115
5 - Every Day	92	35	174
Mean	3.25	3.18	4.31
Variance	1.70	1.21	0.65
Standard Deviation	1.31	1.10	0.81

Email experience was measured in years in Stage 1 of the survey ranging from <1, 1, 2…10 or more, while it was measured in Stage 2 of the survey with an open-ended variable, as detailed below in Table 8a and 8b. This was true of all the questions regarding experience, and will be reflected throughout in presentation of the results in Stage 1, Stage 2 and Total.

Table 8a – Years Experience with Email

Years	Stage 1	Stage 2	Total
1	0	0	0
2	2	2	4
3	7	7	14
4	10	13	23
5	19	26	45
6	25	13	38
7	26	28	54
8	32	32	64
9	17	10	27
10	37	25	62
11	N/A	6	6
12	N/A	4	4
13	N/A	1	1
14	N/A	2	2
15	N/A	3	3
Total	175	172	347

Table 8b – Years using Email

	Stage 1	Stage 2	Total
Mean	7.26	7.43	7.35
Median	7	7	7
Variance	4.45	7.01	5.71
Standard Deviation	2.11	2.65	2.39

Despite the slight incongruities in measurements between Stage 1 and Stage 2 (shown in Table 8a above) the overall picture remains clear – users on average have seven years' experience with email,

which given the average age of 20 in this population projects a typical user in this population having begun email usage at the age of 13.

6.2.2 – Communications Usage and Experience: Landline Phone

Landline phones are the most mature of mature communications technologies, and conventional wisdom has it that they may be on the way out. However, they remain a largely ubiquitous element of our communications infrastructure and ecology (e.g., every business that you call answers with a landline phone). It is an open question, however, to what extent landline phones are used by students; the results of this survey are presented below in Figure 2 and Table 9.

Figure 2 – Landline Phone Usage

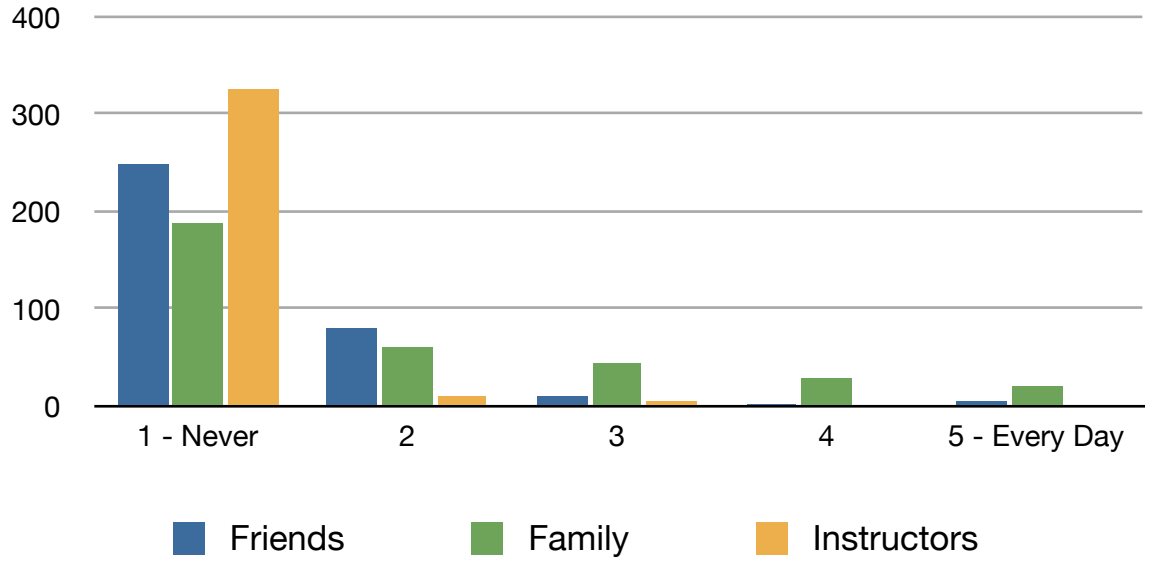


Table 9 – Landline Phone Usage

	Friends	Family	Instructors
1 - Never	248	188	325
2	80	60	10
3	10	44	5
4	2	29	0
5 - Every Day	5	20	0
Mean	1.37	1.92	1.06
Variance	0.50	1.55	0.09
Standard Deviation	0.71	1.24	0.29

Students almost never use landline phones to communicate with instructors, and only rarely for social communications with friends. Landline phones seem to occupy a secondary or tertiary role as a means for communicating with family. Table 10a and 10b (below) show student experience with landline phones.

Table 10a – Years Using Landline Phone

	Stage 1	Stage 2	Total
Mean	9.20	13.08	11.18
Median	10	15	10
Variance	4.48	36.94	24.73
Standard Deviation	2.12	6.08	4.97

Table 10b – Landline Phone Experience

Years	Stage 1	Stage 2	Total
0	4	12	16
1	0	1	1
2	1	2	3
3	2	1	3
4	1	4	5
5	6	3	9
6	4	5	9
7	0	1	1
8	7	4	11
9	4	2	6
10	137	21	158
11	N/A	3	3
12	N/A	12	12
13	N/A	3	3
14	N/A	4	4
15	N/A	35	35
16	N/A	10	10
17	N/A	7	7
18	N/A	14	14
19	N/A	4	4
20	N/A	9	9
21	N/A	9	9
22	N/A	5	5
...			
39	0	1	1
Total	166	172	338

As the table above shows, the data lost from mis-calibration in Stage 1 of the survey is substantial with landline phone experience, though given the tertiary role of landline phones in students‘

lives this is not a crucial loss. The next sub-section begins to investigate a more central telephonic area of experience, the current habits of undergraduate cell phone usage.

6.2.3 – Communications Usage and Experience: Cell Phone

The results from this survey, as presented below in Figure 3 and Table 11, confirm that cell phones are very central to students' social lives, with the vast majority reporting using them every day for communication with friends and family.

Figure 3 – Cell Phone Usage

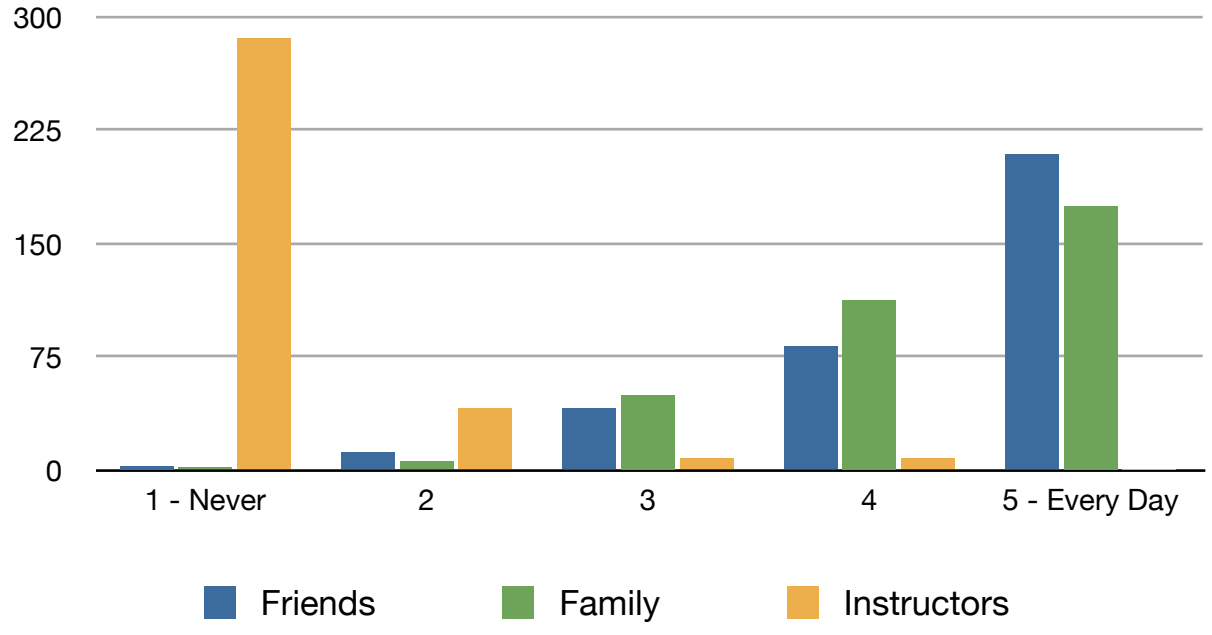


Table 11 – Cell Phone Usage

	Friends	Family	Instructors
1 - Never	3	2	286
2	12	6	41
3	41	50	8
4	82	113	8
5 - Every Day	209	175	1
Mean	4.39	4.31	1.25
Variance	0.79	0.68	0.41
Standard Deviation	0.89	0.82	0.64

Cell phones are a central pivot of students' mediated sociability (a fact reinforced in the next subsection's examination of text messaging and later excerpts from interviews). Nearly all students use cell phones very frequently, with a large majority using them every day. Communications with friends are most central but a majority (50.4%) also report using cell phones every day for communications with family. The vast majority of students (82.4%) report never using these central devices in their communications to contact school instructors, with a small number leaving open the possibility of sometimes but very rarely doing so. Cell phones, while a more recent addition to students' communicative practices than email or landline phones (see Table 11a and 11b below for experience with cell phones), are much more firmly established as a tool of social interaction. As later discussion of interviews reveals, cell phones also as a tool for peer-to-peer academic coordination, but explicitly not for communication with school instructors.

Table 11a - Cell Phone Experience

Years	Stage		Total
	1	2	
0	0	1	1
1	1	1	2
2	2	1	3
3	2	5	7
4	17	11	28
5	41	33	74
6	43	37	80
7	27	31	58
8	25	30	55
9	6	6	12
10	9	9	18
12	N/A	4	4
13	N/A	1	1
14	N/A	1	1
15	N/A	1	1
Total	173	172	345

Table 11b – Cell Phone Experience

	Stage 1	Stage 2	Total
Mean	6.21	6.67	6.44
Median	6	6	6
Variance	2.91	5.66	4.32
Standard Deviation	1.71	2.38	2.08

6.2.4 – Communications Usage and Experience: Text Messaging

Text messaging has become one of the central methods for peer-to-peer communication among undergraduates, confirmed in both survey (see Figure 4 and Table 12 below) and interview data. Interviewees underlined the particular use-case of quick communications: that is, given that all peers have cell phones and have them at nearly all times, text messaging provides the most surefire way to ensure both that a given communication will reach a peer, and that they will respond quickly.

Figure 4 – Text Messaging Usage

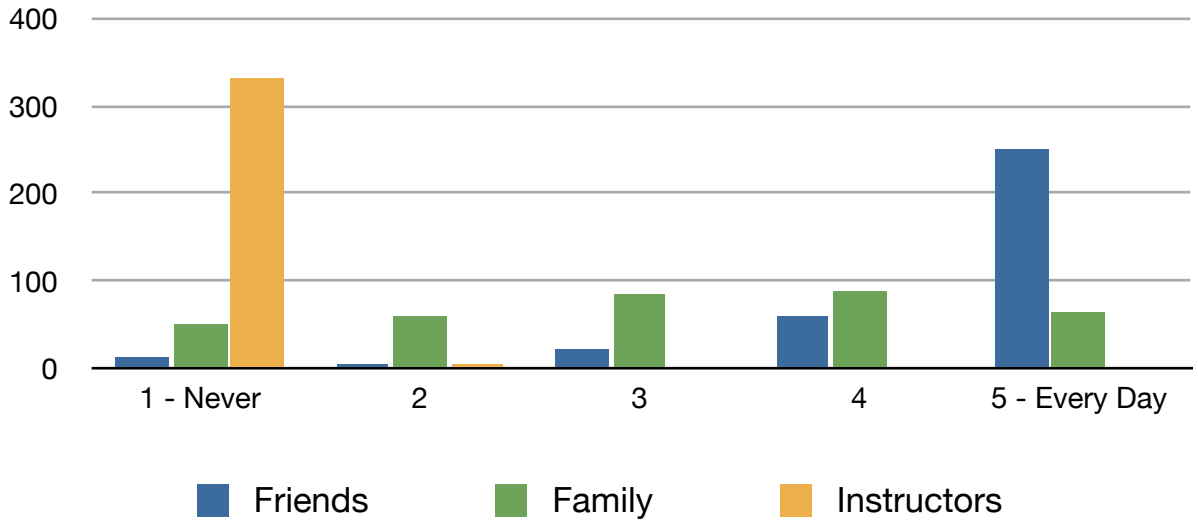


Table 12 – Text Messaging Usage

	Friends	Family	Instructors
1 - Never	12	50	332
2	4	59	4
3	21	84	1
4	59	88	1
5 - Every Day	250	64	0
Mean	4.53	3.17	1.03
Variance	0.86	1.73	0.05
Standard Deviation	0.93	1.31	0.22

The stark divides in use of text messaging by audience are even clearer for text messaging than in other communicative mediums. Nearly three-quarters (72%) of students report sending texts to their friends every day, and nearly all (96%) would never consider sending one to a school instructor. The relatively even distribution across all categories for use of text messages to communicate with family is intriguing and will be investigated in greater detail in Section 7 – Discussion. Table 13a and 13b below show students' experience with text messaging.

Table 13a – Text Message Experience

Years	Stage		Total
	1	2	
0	3	5	7
1	9	11	20
2	0	1	1
2	20	13	33
3	18	29	47
4	42	22	64
5	27	37	64
6	27	22	49
7	12	19	31
8	8	8	16
9	2	2	4
10	5	1	6
11	N/A	1	1
12	N/A	0	0
13	N/A	0	0
14	N/A	1	1
Total	173	172	345

Table 13b – Test Message Experience

	Stage 1	Stage 2	Total
Mean	4.53	4.50	4.52
Median	4	5	4
Variance	4.53	5.21	4.86
Standard Deviation	2.13	2.28	2.20

As shown above (Table 13a and 13b), text messaging is a relatively recent addition to the suite of students' communicative practices, and that is reflected in these results. While mean and median years

experience with cell phones is 6.44 and 6, respectively, text messaging experience is reported as roughly two years less, with a median and mean of 4.52 and 4. In that time it has become perhaps the central method of communications among this population, reflected in both survey and interview data – in most circumstances, students will send a text message before they would make a phone call on their cell phone, and before any other communicative act. The only category of communication that rivals text messages for centrality is use of social network sites, discussed below in the next subsection.

6.2.5 – Communications Usage and Experience: Social Network Sites

If cell phones are the communicative devices around which undergraduates' lives are centered, then social network sites (SNS) are the websites around which their mediated sociability pivots. In the case of current UNC undergraduates, nearly universal adoption of Facebook makes it the hub of many social interactions, but it is far from the only SNS used by undergrads, as shown below in Figure 5 and Table 14.

Figure 5 – SNS Membership

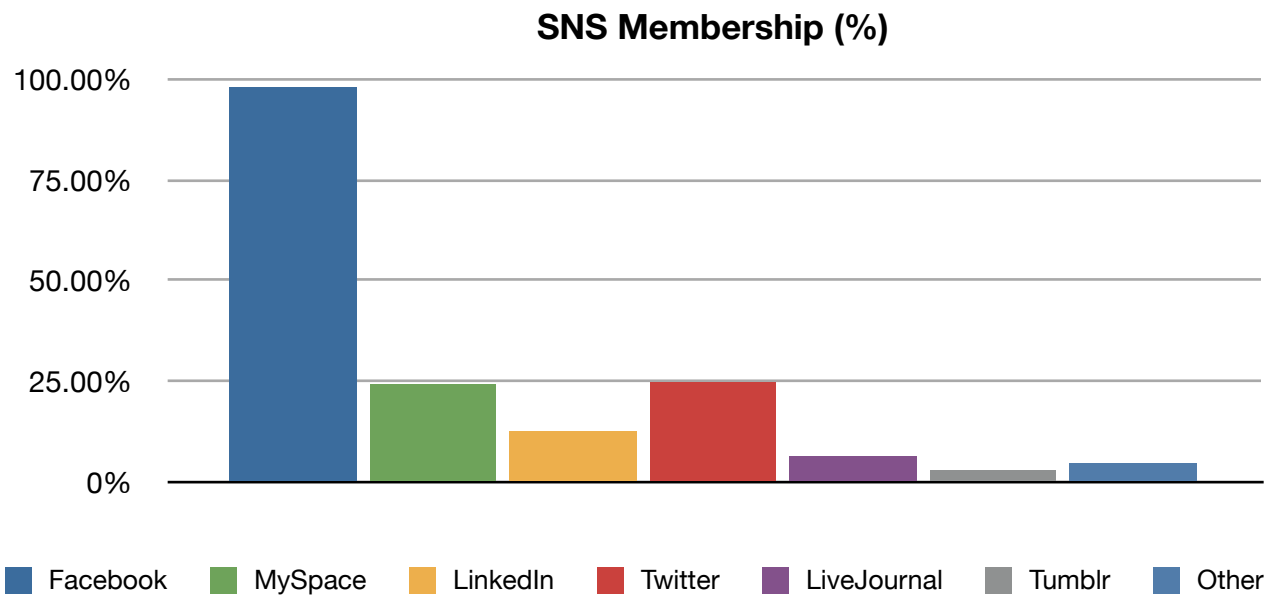


Table 14 – SNS Membership

	Facebook	MySpace	LinkedIn	Twitter	LiveJournal	Tumblr	Other
Percent	98%	24.2%	12.7%	24.8%	6.3%	2.9%	4.6%
Count	340	84	44	86	22	10	16

One caveat of interest is the prevalence of Twitter. While it shows up with the second-most users of any SNS in this survey (86, for 24.8% of the respondents) this number is almost certainly a severe under-count. Twitter was not included in the top-line options of Stage 1 of the survey; it was nonetheless included by 19 respondents, or 10.9% of the total. Included in Stage 2, it was selected by 67 respondents, for a full 39%. While this certainly does not challenge Facebook's dominance at 98% of

respondents, this does well to cut down the "young people don't use Twitter" argument (Martin and MacDonald 2009).

Given the prevalence of Facebook, data was gathered regarding number of years' experience on the site, summarized below in Figure 6 and Table 15. The median and mean years' experience on Facebook was four years, meaning that for nearly all current undergraduate students, Facebook membership has been synonymous with sociability at college (or even high school).

Figure 6 – Years on Facebook

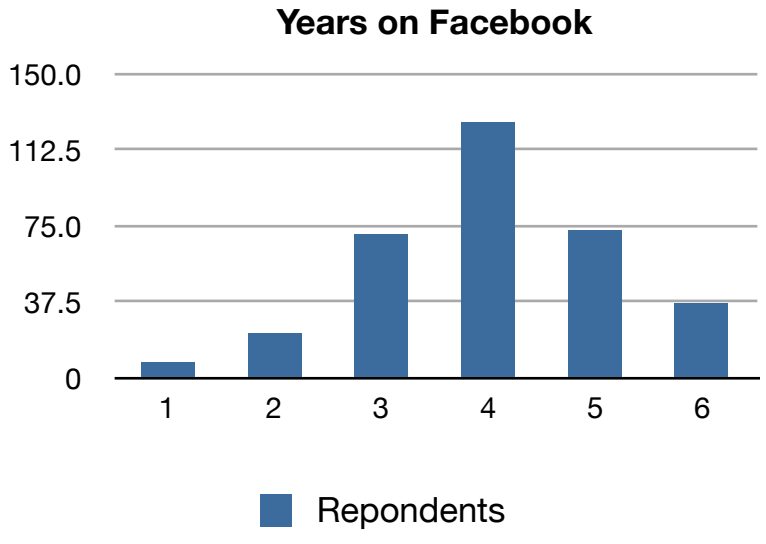


Table 15 – Facebook Usage: Years

Years	Repondents
1	8
2	22
3	71
4	126
5	73
6	37
Mean	4.0
Median	4
Variance	1.4
Standard Deviation	1.2

When asked more generically about the length of membership of SNS (presented below in Table 16a and 16b), respondents answered similarly as to the Facebook-specific questions, with a mean years' experience of 4.38 and a median of 4.

Table 16a – SNS Experience

	Survey		
	1	2	Total
0	1	4	5
1	3	1	4
2	11	11	22
3	29	35	64
4	55	46	101
5	43	40	83
6	17	23	40
7	3	4	7
8	6	6	12
9	1	1	2
10	5	1	6
Total	174	172	346

Table 16b – SNS Experience

	Stage 1	Stage 2	Total
Mean	4.47	4.30	4.38
Median	4	4	4
Variance	2.99	2.79	2.89
Standard Deviation	1.73	1.67	1.70

Given the centrality of Facebook, several other questions were asked regarding habits with the site in particular, including size of friend network, time spend on the site (shown below in Table 17), and

intensity of usage. The latter were assessed using the Facebook Intensity Scale (Ellison et al 2006), which despite some limitations has been used fairly widely and can provide greater insight when used within a population longitudinally, and is shown below in Table 18.

Table 17 – Facebook Usage: Current

	Facebook Friends	Minutes per week on Facebook
Mean	630	86
Median	600	60
Standard Deviation	365	140

Table 18 – Facebook Intensity Scale (Ellison et al. 2006)

	Facebook is part of my everyday activity	I am proud to tell people I'm on Facebook	Facebook has become part of my daily routine	I feel out of touch when I haven't logged onto Facebook for a while	I feel I am part of the Facebook community	I would be sorry if Facebook shut down
1 - Strongly disagree	9	8	7	20	15	12
2	20	33	27	66	55	28
3	16	143	21	55	105	44
4	132	102	147	124	119	158
5 - Strongly agree	163	54	138	74	45	98
Mean	4.24	3.47	4.12	3.49	3.37	3.89
Variance	0.95	0.90	0.96	1.43	1.09	1.06
Standard Deviation	0.97	0.95	0.98	1.20	1.04	1.03

The above measures are of some interest in themselves but are also of greater use in exploring the range and differences in individual behavior, which will be discussed in greater detail in Section 7 – Discussion.

For comparative purpose with other forms of mediated communications (email in particular), the survey also gathered data on the use of SNS messages in particular, shown below in Figure 7 and Table 19.

Figure 7 – SNS Message Usage

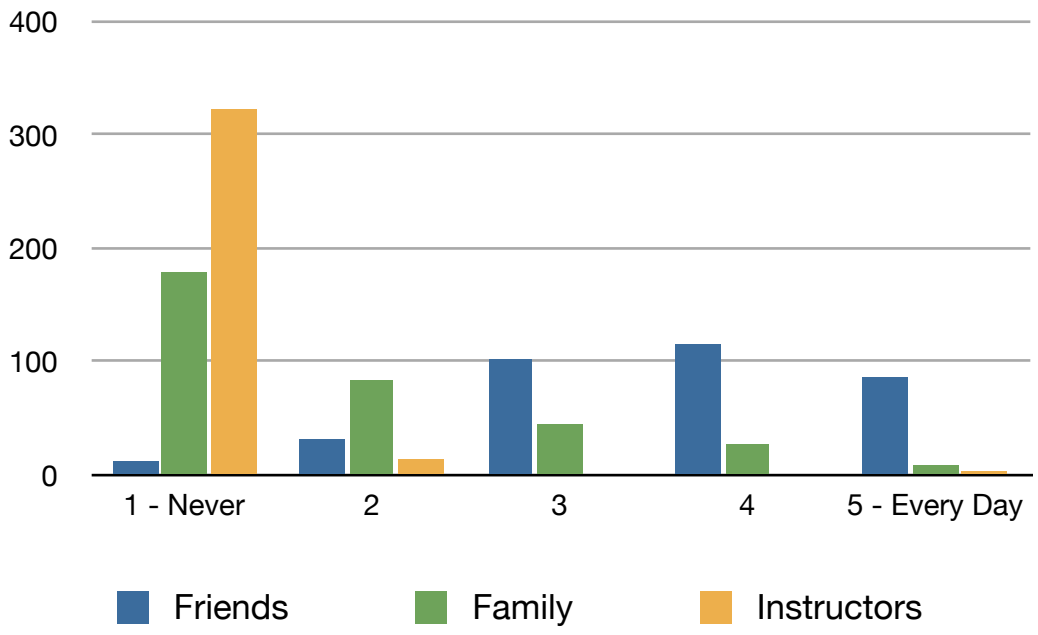


Table 19 – SNS Message Usage

	Friends	Family	Instructors
1 - Never	12	179	323
2	32	84	14
3	102	45	1
4	115	27	1
5 - Every Day	86	9	3
Mean	3.67	1.85	1.09
Variance	1.11	1.18	0.21
Standard Deviation	1.06	1.09	0.46

SNS messages are seen most strongly as a way **not** to interact with instructors (93%); a majority (51.6%) also never uses them to connect with their families, though nearly 50% also report sometimes doing so. Similar numbers of students report sending SNS messages to friends every day (86) as report

sending emails to friends every day (92), though overall usage of SNS messages to friends is more frequent (3.67 mean versus 3.25 mean for email).

6.2.6 – Communications Usage and Experience: Instant Messenger

The survey also assessed usage of instant messenger, shown below in Figure 8 and Table 20.

Figure 8 – Instant Messenger Usage

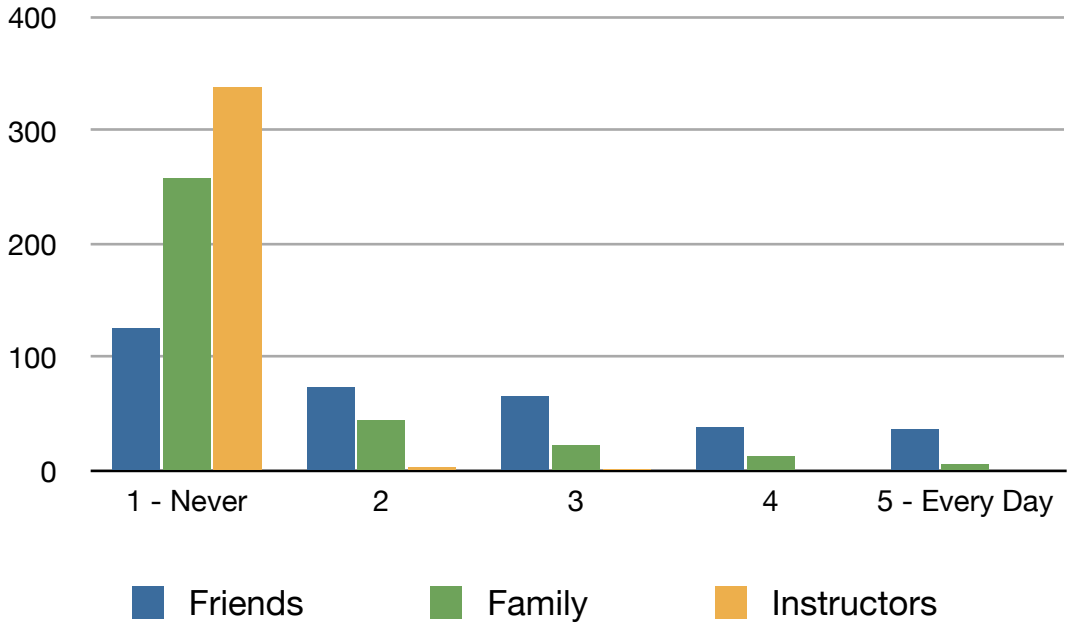


Table 20 – Instant Messenger Usage

	Friends	Family	Instructors
1 - Never	126	258	339
2	74	45	3
3	66	23	2
4	39	13	0
5 - Every Day	37	6	0
Mean	2.38	1.45	1.02
Variance	1.85	0.82	0.03
Standard Deviation	1.36	0.90	0.18

By and large, instant messenger does not appear to be a central element of students' communicative practices, with more than a third (36.3%) never using the medium for communication with friends and a further 21.3% doing so only very rarely. Totally unused for communicating with professors, it is also rarely used for communicating with family. Length of use is shown below in Table 21a and 21b:

Table 21a – Instant Messenger Experience

Years	Stage 1	Stage 2	Total
0	8	19	27
1	6	8	14
2	4	7	11
3	14	20	34
4	10	15	25
5	16	9	25
6	21	16	37
7	20	14	34
8	27	19	46
9	13	13	26
10	25	22	47
11	N/A	4	4
12	N/A	3	3
13	N/A	1	1
14	N/A	0	0
15	N/A	2	2
Total	164	172	336

Table 21b – Instant Messenger Experience

	Stage 1	Stage 2	Total
Mean	6.25	5.70	5.98
Median	7	6	6
Variance	8.09	13.04	10.66
Standard Deviation	2.84	3.61	3.27

Given the significant range of experience, a question worthy of future investigation is the whether use of IM is more prevalent among older populations, who began using it in their own formative social years. Among younger students, it is likely that the universality of cell phones and text messages has replaced what was once a well-used technology for short conversations. Both of these questions will be investigated in some detail in Section 7 – Discussion. For the most part, it is likely that the universality of cell phones and text messages has replaced what was once a well-used technology for short conversations. The Uses and Gratifications section investigates further the use of Facebook chat in particular, though even this is not extensive.

6.2.7 – Communications Usage and Experience: Internet

Also investigated for comparative purposes was students' experience with the Internet, generally. Below are Table 22a and 22b, presenting findings of Internet experience among respondents to this survey.

Table 22a – Internet Experience

	Stage 1	Stage 2	Total
Mean	8.22	9.06	8.63
Median	9	9	9
Variance	3.91	8.20	6.21
Standard Deviation	1.98	2.86	2.49

Table 22b – Internet Experience

Years	Stage 1	Stage 2	Total
0	0	1	1
1	0	0	0
2	0	0	0
3	2	3	5
4	8	6	14
5	12	9	21
6	16	13	29
7	17	11	28
8	26	31	57
9	18	17	35
10	73	40	113
11	N/A	10	10
12	N/A	16	16
13	N/A	3	3
14	N/A	3	3
15	N/A	8	8
16	N/A	0	0
17	N/A	0	0
18	N/A	1	1
Total	172	172	344

As Table 22b (above) shows, most students report between six and 12 years' Internet experience, with the clustering around "10 or more" in Stage 1 and the 41 respondents indicating a number above 10 in Stage 2 suggesting that Stage 1 did cut off some data. Even this slightly suppressed number, however, indicates that Internet experience is second only to use of landline phones in its length of presence in students' lives.

6.2.8 – Communications Usage and Experience: In-person

For comparison against other both social and academic modes of communications, the survey also investigated uses of in-person communication, presented below in Figure 9 and Table 23.

Figure 9 – In-person Communications

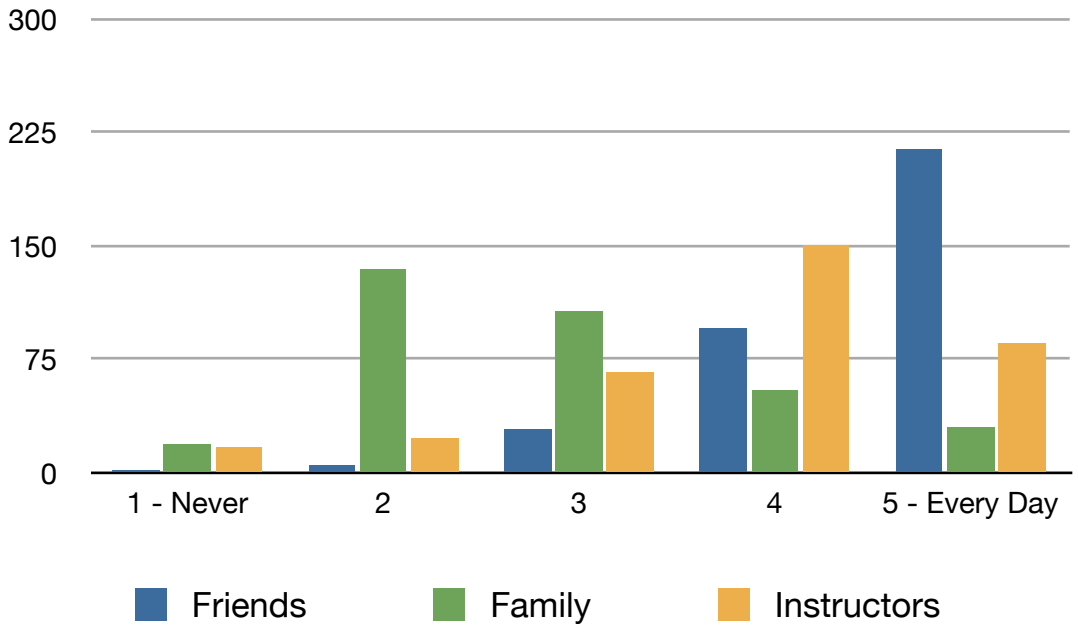


Table 23 – In-Person Communications

	Friends	Family	Instructors
1 - Never	2	19	17
2	5	135	23
3	29	107	67
4	96	55	151
5 - Every Day	214	30	86
Mean	4.49	2.83	3.77
Variance	0.58	1.09	1.11
Standard Deviation	0.76	1.04	1.05

Respondents reported communicating with their friends in-person every day, school instructors every day or close to it, and families much more rarely, casting doubt on the idea that increased use of mediated communications is deceasing face-to-face communications.

6.2.9 – Communications Usage and Experience: Summary

The contrasts between how each communication channel is used between audiences, and experiences using them, are clearly marked. This section will summarize those findings by comparing channels within audiences. Presented below are Figure 10 and Table 24, showing the prevalence of use of all communications channels with friends.

Figure 10 – Friends Communications Channels

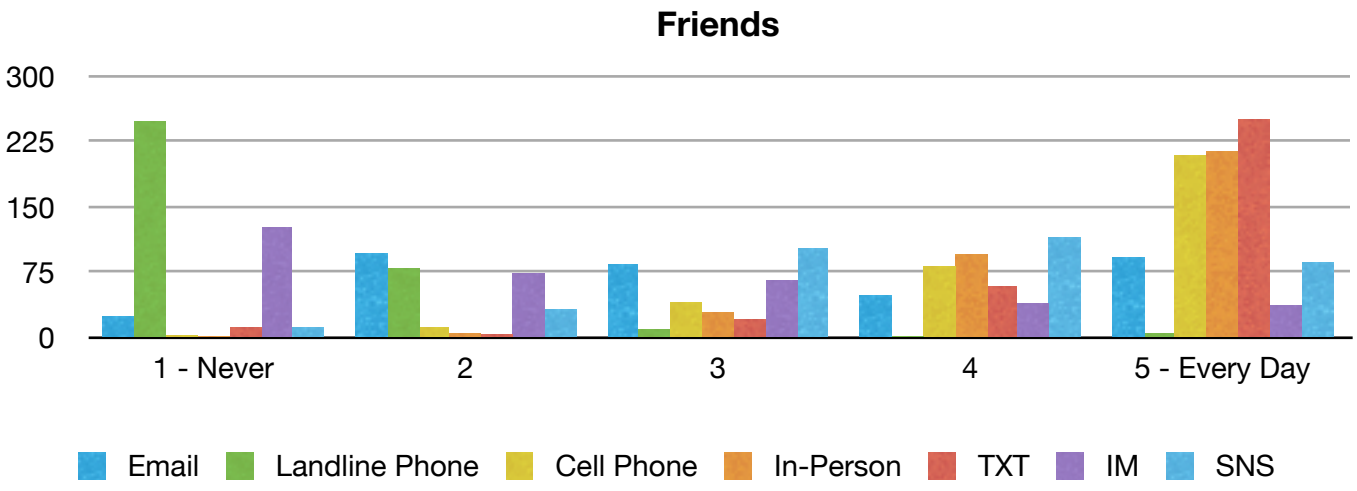


Table 24 – Friends Communications Channels

	Email	Landline Phone	Cell Phone	In-Person	TXT	IM	SNS
1 - Never	24	248	3	2	12	126	12
2	97	80	12	5	4	74	32
3	84	10	41	29	21	66	102
4	49	2	82	96	59	39	115
5 - Every Day	92	5	209	214	250	37	86

Undergraduates' social communication habits are multi-channel and contextual, and the above chart makes clear where those communications are centered, and where they are not. Landline phones are used almost never for social communications, while in-person communications and both forms of cell phone-based communications (including text messaging) are the every-day tools for communicating

with friends. SNS messages are used frequently it not as often as the above-mentioned, email less often and instant messenger less often that.

Presented below are Figure 11 and Table 25, showing the prevalence of use of all communications channels with family.

Figure 11 – Family Communications Channels

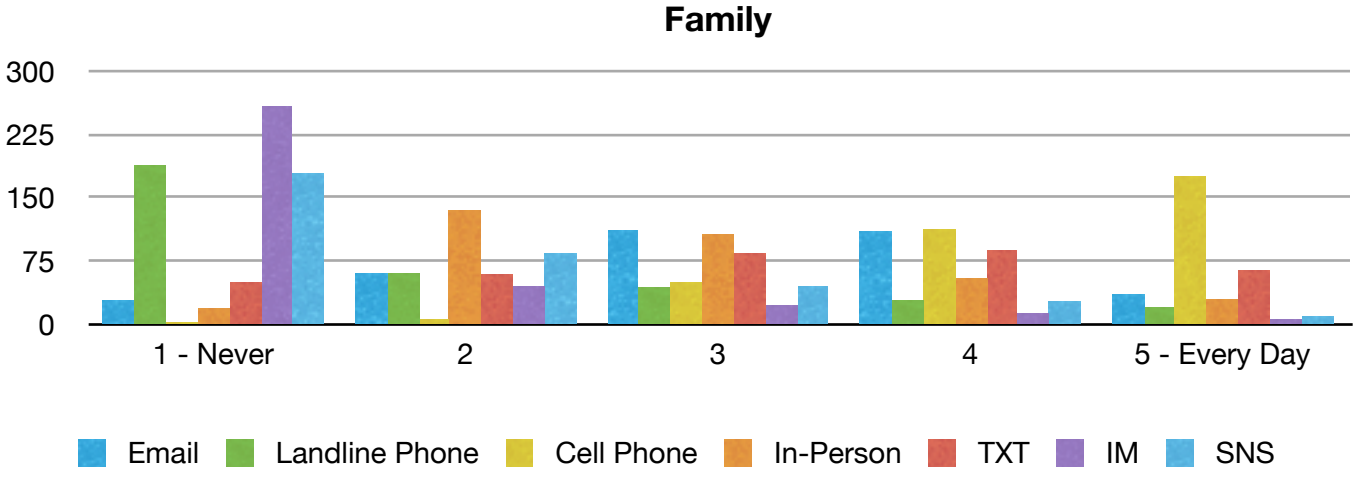


Table 25 – Family Communication Channels

	Email	Landline Phone	Cell Phone	In-Person	TXT	IM	SNS
1 - Never	29	188	2	19	50	258	179
2	60	60	6	135	59	45	84
3	111	44	50	107	84	23	45
4	110	29	113	55	88	13	27
5 - Every Day	35	20	175	30	64	6	9

As the above Figure and Table demonstrate, undergraduates report communicating with family less often than friends across almost all channels, though the ubiquity of the cell phone appears to facilitate frequent communication in a way that will hearten parents. Most but not all students report never using landline phones for communicating with family, and instant messenger is seen as almost entirely off-limits as a communicative medium, with SNS messages only slightly less verboten. Text messaging returns a wide variety of responses, which is intriguing and worthy of further investigation.

Presented below are Figure 12 and Table 26, showing the prevalence of use of all communications channels with school instructors.

Figure 12 – Instructor Communication Channels

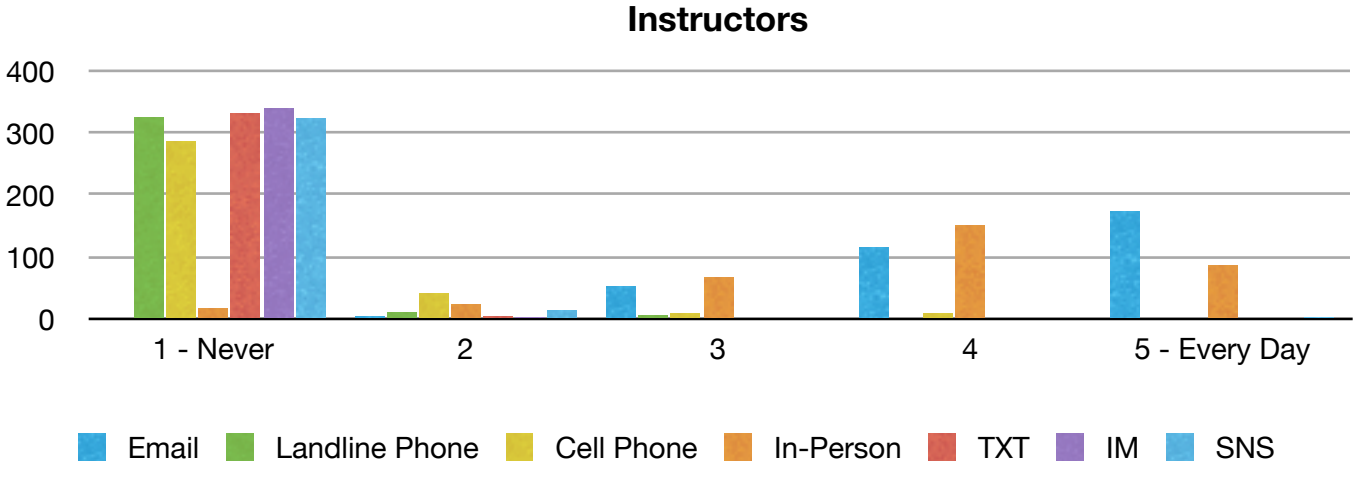


Table 26 – Instructor Communication Channels

	Email	Landline Phone	Cell Phone	In-Person	TXT	IM	SNS
1 - Never	2	325	286	17	332	339	323
2	4	10	41	23	4	3	14
3	52	5	8	67	1	2	1
4	115	0	8	151	1	0	1
5 - Every Day	174	0	1	86	0	0	3

The most unambiguous results regarding segregation of communication channel by audience are without a doubt those regarding communications with instructors, as shown in the above Table and Figure. Nearly all communication channels – landline phone, cell phone, text messaging, instant messaging, and SNS messaging – are for all intents and purposes never used for communicating with school instructors, with only in-person and email communications used with any degree of frequency. Whatever else it may be, email is in part thoroughly branded as the way to talk to professors, and almost everything else is very much not the way to talk to professors.

The ecology of undergraduates' communication habits is an important starting point for investigation into their further information habits and practices of mediated sociability. I will return to many of the above results in the following Discussion section as a way of distinguishing practices and framing issues. The following sub-section focuses more specifically on the tagging habits of undergraduates.

6.3 – Tagging

Several categories of questions were asked to gauge the behaviors and uses of tagging among undergraduates, both generally and in the context of Facebook. These questions asked whether students had posted photos online; described them or friends' photos; untagged themselves from photos; and asked a friend to remove or make private a photo with their image. The results are presented in Table 27 below.

Table 27 – Photo Tagging Behaviors

	Posted photos online	Added descriptions to your photos online	Untagged self from a photo	Added descriptions to a friend's photos online	Asked someone to completely remove a photo containing your image	Asked someone to make private a photo containing your image
Yes	94.80%	90.50%	87.60%	71.50%	50.10%	20.70%
No	4.90%	8.93%	11.24%	26.80%	48.41%	77.23%
Don't know	N/A	0.58%	1.15%	1.73%	1.44%	2.02%

Most central to many students' perceptions and uses of tagging is its photo-related capabilities. As shown above in Table 27, nearly all students report posting photos online, and nearly all of those add some sort of description. A similar vast majority also report having untagged themselves from a photo, and a large majority though fewer report having added descriptions to friends' photos. About half report having asked someone to remove a photo entirely, and very few report requesting a photo be made private.

Respondents were also asked in the survey about the use of a range of Web 2.0 sites and services for the posting and organization of photos; results are presented below in Table 28.

Table 28 – Photo Posting Sites

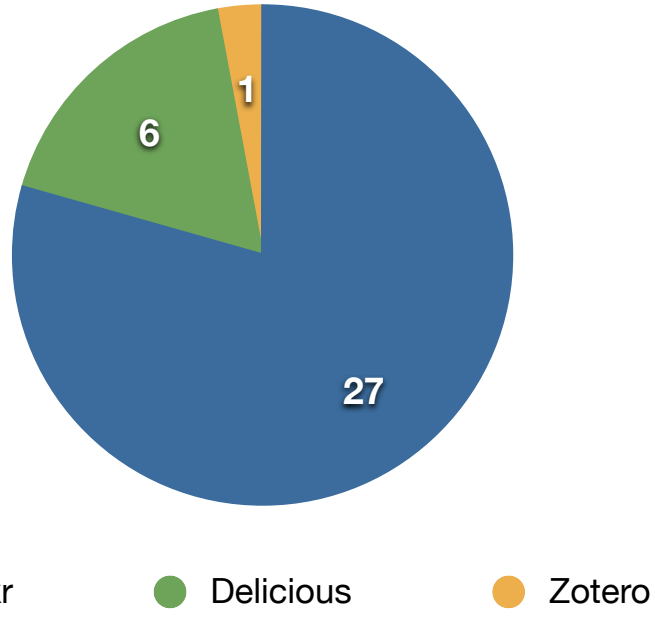
	Facebook	MySpace	Picasa	Flickr	Webshots	Photobucket	Other
Responses	321	116	44	35	28	73	14
Percent	92.20%	33.10%	12.70%	10.10%	7.80%	2.10%	4%

Among undergraduates, photo posting takes place mostly within the context of their preferred SNS (for the vast majority, Facebook), rather than specialty photo sites. For the minority who do use photo sites, further investigation is warranted to determine what their uses are – perhaps journalism or arts students. Respondents were also asked about use of sites that use tags; results are presented below in Table 29a and Figure 13.

Table 29a - Tag Website Usage

	Used other software or websites that use tags
Yes	15%
No	81.27%
Don't know	3.75%

Figure 13 – Tag Website Usage



Just as very few students report using photo-specialty websites, very few report using websites centered around tagging, and few report using the tagging features of these sites, shown below in Table 29b and 29c.

Table 29b – Tag Website Usage

	Have you ever used the tagging features of these sites?
Yes	22.50%
No	77.23%
Don't know	N/A

Table 29c – Tag Website Usage

	If so, how often do you use the tagging features of the site?-How often?
1 - Never	11
2	28
3	27
4	10
5 – Always	2
Mean	2.54
Variance	0.95
Standard Deviation	0.98

Overall, the picture of photo posting and tagging is that, as with many other activities online for undergraduate students, they take place mainly within the context of Facebook and for social purposes. These questions were also asked directly, results of which are presented below in Table 30.

Table 30 – Tagging Beliefs

	Do you in general view tagging as something you do in your social life?	Do you in general view tagging as something you do in your academic life?
Yes	43.20%	4.30%
No	46.40%	86.17%
Don't know	10.37%	9.51%

These results are unambiguous, and further reflected in the lists of terms used to describe tagging in the following section on uses and gratifications.

6.4 – Uses and Gratifications

For the Uses and Gratifications section (as discussed previously in the Methods section), Stage 1 asked open-ended questions regarding the particular uses of both tagging and Facebook among respondents. The responses were grouped by theme and converted to scales for Stage 2, where respondents were asked "How important are the following uses of tagging/Facebook to you personally?" from "1 – Not at all important" to "7 – Very important." These responses are presented below for an initial representation, followed by analysis and more extensive discussion in Section 7. The results are presented in Tables 31a, 31b and 31c below, first the results for the tagging uses and gratifications scales.

Table 31a – Tagging Uses and Gratifications

	Sharing photos	Being able to see my friends' pictures	Organization	Being able to see my pictures	Ease of use
1 – Not at all important	9	6	15	9	10
2	2	4	8	5	3
3	4	7	11	6	2
4	16	15	38	17	20
5	72	79	62	70	59
6	55	46	26	49	61
7 – Very important	14	14	12	16	15
Mean	5.10	5.05	4.45	5.01	5.11
Variance	1.77	1.63	2.44	2.01	1.98
Standard Deviation	1.33	1.28	1.56	1.42	1.41

Table 31b – Tagging Uses and Gratifications

	Reliving the memories	Getting tagged	Others get to see my pictures	Linking people together	Acknowledging friendship with someone	Letting people know they're in a picture
1 – Not at all important	7	13	12	15	16	9
2	3	13	10	4	8	6
3	6	25	19	12	19	4
4	25	35	24	30	38	16
5	52	52	69	59	49	57
6	56	26	30	47	35	63
7 – Very important	23	8	7	5	7	16
Mean	5.16	4.22	4.44	4.60	4.33	5.10
Variance	1.94	2.42	2.27	2.30	2.50	2.09
Standard Deviation	1.39	1.56	1.51	1.52	1.58	1.45

Table 31c – Tagging Uses and Gratifications

	Being able to automatically find something I'm looking for easier	Laughing at funny pictures	Recognizing people	Being able to recognize people in photos I don't know	Identifying friends and groups of friends
1 – Not at all important	11	9	7	14	13
2	3	5	2	9	8
3	7	9	5	22	12
4	20	40	13	30	20
5	60	58	78	59	66
6	50	38	55	32	48
7 – Very important	20	13	12	6	5
Mean	5.02	4.74	5.13	4.34	4.64
Variance	2.24	2.01	1.54	2.37	2.30
Standard Deviation	1.50	1.42	1.24	1.54	1.52

As before, the key uses of tagging identified and confirmed by respondents are social. The particulars of that sociability are explored in the Facebook Uses and Gratifications, presented below in Table 32a, 32b and 32c.

Table 32a – Facebook Uses and Gratifications

	Keeping in touch with friends	Keeping in touch with friends that aren't close by	Communicating with friends	Connecting to people	Photos	Seeing what my friends are up to
1 – Not at all important	6	5	6	10	6	5
2	0	2	1	5	2	2
3	2	4	2	11	8	6
4	6	6	10	22	21	19
5	38	28	48	56	63	64
6	76	68	66	49	49	55
7 – Very important	44	59	39	19	22	21
Mean	5.76	5.85	5.60	4.93	5.15	5.23
Variance	1.54	1.75	1.66	2.31	1.76	1.58
Standard Deviation	1.24	1.32	1.29	1.52	1.33	1.26

Table 32b – Facebook Uses and Gratifications

	Fun	Meeting new people	Facebook Chat	Birthday reminders	Games	Information Sharing
1 – Not at all important	7	49	35	12	78	16
2	4	28	18	5	26	7
3	7	40	24	16	20	6
4	21	27	21	21	20	46
5	66	17	49	57	13	66
6	52	8	19	46	14	22
7 – Very important	14	3	5	15	1	9
Mean	5.03	2.83	3.63	4.77	2.48	4.40
Variance	1.79	2.54	3.28	2.45	2.95	2.25
Standard Deviation	1.34	1.59	1.81	1.56	1.72	1.50

Table 32c – Facebook Uses and Gratifications

	Ease of use	Event planning	Reconnecting with old friends	Communicating over distances	Community	Creeping
1 – Not at all important	6	6	5	6	9	25
2	1	7	3	1	9	16
3	4	11	9	1	20	22
4	24	25	16	9	55	38
5	69	52	64	43	51	34
6	50	50	53	66	21	22
7 – Very important	18	21	22	46	7	15
Mean	5.16	5.00	5.20	5.70	4.28	3.97
Variance	1.54	2.12	1.72	1.66	1.88	3.32
Standard Deviation	1.24	1.45	1.31	1.29	1.37	1.82

Examination again confirms that the main set of uses for Facebook centers around its communicative capabilities.

6.4.1 – Uses and Gratifications Analysis: Tagging

Exploratory Factor Analysis was performed on the data, with an initial factor analysis (varimax rotation) returning three components with eigenvalues over 1, explaining 67.397% of the difference; these results are presented below in Table 33. These three factors are, then, the only significant groupings of answers, meaning that they have the most in common among the responses.

Table 33 – Initial Tagging Factor Analysis, Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.655	50.912	50.912	8.655	50.912	50.912	5.000	29.410	29.410
2	1.468	8.636	59.549	1.468	8.636	59.549	3.697	21.748	51.159
3	1.334	7.848	67.397	1.334	7.848	67.397	2.761	16.239	67.397
4	.948	5.575	72.972						
5	.798	4.696	77.668						
6	.615	3.619	81.287						
7	.476	2.799	84.086						
8	.446	2.621	86.707						
9	.410	2.410	89.117						
10	.366	2.151	91.268						
11	.344	2.024	93.292						
12	.281	1.652	94.943						
13	.237	1.394	96.338						
14	.202	1.187	97.525						
15	.169	.992	98.517						
16	.142	.834	99.351						
17	.110	.649	100.000						

Items were identified as markers for each factor based on a loading greater than .5; all items loaded at this level on at least one factor, with only one excluded for loading on two factors at this level; these results are presented below in Table 34.

Table 34 – Initial Tagging Factor Analysis, Rotated Component Matrix			
	Component		
	1	2	3
Sharing photos	*.786*	.222	.250
Being able to see my friends' pictures	*.830*	.194	.234
Organization	.072	.208	*.804*
Being able to see my pictures	*.675*	.081	*.504*
Ease of use	.401	.201	*.783*
Being able to automatically find something I'm looking for easier	.295	.211	*.806*
Laughing at funny pictures	*.576*	.323	.187
Recognizing people	.399	*.583*	.318
Reliving the memories	*.753*	.239	.196
Getting tagged	*.542*	.420	.142
Others get to see my pictures	*.647*	.408	.080
Being able to recognize people in photos I don't know	.363	*.761*	-.005
Identifying friends and groups of friends	.371	*.809*	.178
Linking people together	.125	*.843*	.293
Acknowledging friendship with someone	.251	*.726*	.265
Letting people know they're in a picture	*.634*	.301	.289
Keeping in touch with friends	*.681*	.265	.084

The factors were thus reassigned and grouped by their loadings, and these results are presented below in Table 35. Factor 1 items all related to photos and the aspects of sociability inherent in the process of posting, tagging and sharing photos with students' social networks, particularly aspects of communication, and Factor 1 was thus labeled "Social Photos."

Table 35 – Items and Loadings (Factor 1)

Factor 1: Social Photos	Item Mean	Standard Deviation	Loading
Sharing photos	5.13	1.30	.786
Being able to see my friends' pictures	5.08	1.24	.830
Laughing at funny pictures	4.77	1.40	.576
Reliving the memories	5.20	1.36	.753
Getting tagged	4.26	1.55	.542
Others get to see my pictures	4.47	1.50	.647
Letting people know they're in a picture	5.13	1.42	.634
Keeping in touch with friends	5.79	1.19	.681

Factor 2 also contained several items regarding photos, but the items also focused more on recognition, in both of its meanings: recognition of known or unknown people, and also the public recognition of students' social networks, and was labeled "Social Recognition." The table comprising Factor 2 is presented below in Table 36.

Table 36 – Items and Loadings (Factor 2)

Factor 2: Social Recognition	Item Mean (SD)	Standard Deviation	Loading
Recognizing people	5.16	1.21	*.583*
Being able to recognize people in photos I don't know	4.38	1.53	*.761*
Identifying friends and groups of friends	4.67	1.50	*.809*
Linking people together	4.63	1.50	*.843*
Acknowledging friendship with someone	4.37	1.58	*.726*

Finally, the last three items (Factor 3, presented below in Table 37) concerned the more traditional information-organization aspects of tagging and the tagging process, and was labeled "Personal Organization." This suggests that while Facebook photo tagging is primarily a process of social communication and recognition, there is an aspect of the more widely-understood and -studied

aspects of tagging even here.

Table 37 – Items and Loadings (Factor 3)

Factor 3: Personal Organization	Item Mean	Standard Deviation	Loading
Organization	4.49	1.55	*.804*
Ease of Use	5.14	1.38	*.783*
Being able to automatically find something I'm looking for easier	5.05	1.47	*.806*

6.4.1.1 – Demographics and Tagging U&G

Performing a MANOVA revealed a significant difference between genders across the three scales (F (3, 163) = 11.713, $p < 0.01$), with further analysis (analysis is presented below in Table 38) revealing significant differences by gender in Factor 1 – Social Photos and Factor 3 – Personal Organization (but not Factor 2 – Social Recognition). This is well in line with previous research showing gender differences in use of SNS and photo posting behaviors in particular.

Table 38 – Gender Differences in Tagging Factors

Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Factor 1 – Social Photos	25.467[a]	1	25.467	29.901	*.000*
Factor 2 – Social Recognition	.004[b]	1	.004	.004	.948
Factor 3 – Personal Organization	3.967[c]	1	3.967	4.040	*.046*

6.4.2 – Quantitative Analysis of Uses and Gratifications: Facebook

As with the Tagging U&G data, Exploratory Factor Analysis was performed on the Facebook U&G data, with an initial factor analysis (varimax rotation) returning three components with eigenvalues greater than 1, explaining 59.143% of the difference. These results are presented below in Table 39.

Table 39 – Initial Facebook Factor Analysis, Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.143	42.017	42.017	7.143	42.017	42.017	6.031	35.476	35.476
2	1.655	9.734	51.751	1.655	9.734	51.751	2.178	12.813	48.288
3	1.257	7.392	59.143	1.257	7.392	59.143	1.845	10.855	59.143
4	.938	5.517	64.659						
5	.870	5.118	69.777						
6	.722	4.246	74.023						
7	.691	4.067	78.090						
8	.597	3.513	81.603						
9	.577	3.394	84.997						
10	.498	2.929	87.926						
11	.446	2.623	90.549						
12	.374	2.199	92.749						
13	.314	1.845	94.594						
14	.296	1.742	96.336						
15	.267	1.569	97.905						
16	.185	1.086	98.991						
17	.172	1.009	100.000						

Items were identified as markers for each factor based on a loading greater than .5; all items loaded at this level on at least one factor, with only one excluded for loading on two factors at this level. Table 40, below, lays out the loading across the three factors, showing which factors loaded together and thus share commonality of response among the survey respondents.

Table 40 – Initial Facebook Factor Analysis, Rotated Component Matrix

	Component		
	1	2	3
Keeping in touch with friends that aren't close by	*.737*	-.305	.038
Communicating with friends	*.823*	-.123	.169
Connecting to people	*.748*	-.223	-.186
Photos	*.683*	-.240	.078
Seeing what my friends are up to	*.777*	-.038	.208
Ease of use	*.762*	.056	.081
Event planning	*.564*	.039	-.319
Reconnecting with old friends	*.747*	-.109	-.265
Communicating over distances	*.753*	-.317	.001
Community	*.710*	.113	-.374
Creeping	.388	.259	*.631*
Fun	*.772*	.052	.278
Meeting new people	.380	*.501*	-.566
Facebook Chat	.373	*.527*	.109
Birthday reminders	*.631*	.033	-.029
Games	.150	*.764*	.065
Information Sharing	*.560*	.354	.110

The factors were thus reassigned and grouped by their loadings. Factor 1 (presented below in Table 41) concerned most forms of social communication, sociability and connection, and is thus termed "Social Communication."

Table 41: Factor 1 (Social Communication)

Factor 1: Social Communication	Item Mean	Standard Deviation	Loading
Keeping in touch with friends that aren't close by	5.88	1.274	*.737*
Communicating with friends	5.63	1.242	*.823*
Connecting to people	4.97	1.498	*.748*
Photos	5.19	1.297	*.683*
Seeing what my friends are up to	5.27	1.223	*.777*
Ease of use	5.19	1.206	*.762*
Event planning	5.02	1.422	*.564*
Reconnecting with old friends	5.23	1.277	*.747*
Communicating over distances	5.73	1.242	*.753*
Community	4.32	1.362	*.710*
Fun	5.06	1.311	*.772*
Birthday reminders	4.80	1.541	*.631*
Information Sharing	4.44	1.491	*.560*

Factor 2 (presented below in Table 42) comprised several items more related to greater time spent on Facebook, and is labeled "Facebook Exploration."

Table 42 – Items and Loadings (Factor 2)

Factor 2: Facebook Exploration	Item Mean (SD)	Standard Deviation	Loading
Meeting new people	2.83	1.593	*.501*
Facebook Chat	3.63	1.811	*.527*
Games	2.51	1.735	*.764*

The low mean scores for items in this factor and high standard deviation suggest that these behaviors are associated with a particular and relatively small group; this factor in particular will be analyzed for effects of age and class year.

Factor 3 (presented below in Table 43) was the sole single-loading factor, and is thus labeled for its only item, “Creeping.”

Table 43 – Items and Loadings (Factor 3)

Factor 3: Creeping	Item Mean (SD)	Standard Deviation	Loading
Creeping	3.99	1.814	*.631*

6.4.2.1 – Demographics and Facebook U&G

Performing a MANOVA revealed a significant contrast across the three scales (F (3, 165) = 8.289, $p < 0.01$), with further analysis revealing significant differences by gender in Factor 1; this analysis is presented below in Table 44.

Table 44 – Gender Differences in Facebook Factors

Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Factor 1 – Social Communication	20.704[a]	1	20.704	23.474	.000
Factor 2 – Facebook Exploration	.625[b]	1	.625	.623	.431
Factor 3 – Creeping	.673[c]	1	.673	.672	.414

Additionally, although it did not produce a significant effect across all three scales, school year was significant in Factor 2 – Facebook Exploration (F (3, 165) = 8.289, $p < 0.01$) though age did not produce a significant effect.

6.5 – Interviews

Eight semi-structured interviews were conducted following the recruitment of participants from Stage 1 of the Survey. I asked open-ended questions regarding their use of and beliefs about tagging and communications technologies generally (see Appendix II for the script), with questions focused on three main areas: i) student use of technology, generally; ii) student use of social media generally; and iii) familiarity with and use of tagging. The questions were used in similar pilot-level focus groups during the 2009 BotCamp session (Edwards et al. 2009). The interviews lasted from 8 to 28 minutes at which time the students were thanked for their participation; all interviewees were compensated for their time. The students interviewed were five female and three male undergradute students; four students were white, two were Latino/a, one was of East Asian and one of South Asian descent. Two students were seniors, three were juniors, two were sophomores and one was a freshman.

As stated at the outset of the research, the interviews were conducted for two main purposes – first, to make sure that there were no large areas of practice that were going unobserved in the survey; and second, to supplement the analysis of the survey data with thoughts on tagging and communications usage provided by students. Below is a presentation of the the main results of the interviews, which will be excerpted at greater length in Section 7 – Discussion. The three main areas of question and discussion were General Technology Usage**,** Social Media Usage, and Tagging; these are reviewed below.

6.5.1 Interviews: Tagging

Students were asked first about their conceptions of tagging and then to extrapolate on what their uses of tagging were. All eight interviewees responded first that they were familiar with tagging primarily (or exclusively) in its uses for Facebook Photo Tagging. Four of the students did report some familiarity and experience with Flickr and basic ideas of tagging as an information organization affordance, but none reported using tagging in that manner. Within the context of Facebook Photo Tagging, three key themes emerged: 1) the social expectations surrounding the tagging of photos; 2) the reasons for untagging photos; and 3) the elements of collective curation of digital photo albums entailed by friend groups collaboratively tagging photos.

1) Social Expectations: five of the students reported that the general practice regarding tagging photos of friends was to upload photos from a given event and then to tag each of their friends appearing in the album once, but not to necessarily tag each and every photo in which those friends appeared. Interviewees described this practice as being the customary notification so that friends could both be automatically alerted that new photos were online, and be given a degree of control over which photos of themselves they wanted to tag and make more public. Interviewees also expressed the time-saving benefits of this approach.

2) Untagging: interviewees described two main categories of rationale for untagging themselves from photos which their friends had posted – those that were unflattering and those that were embarrassing

or incriminating. Unflattering photos were described as the main reason for untagging themselves from photos, with embarrassing or incriminating photos usually judged as such thanks to the increased salience of an unwanted or outside audience (e.g., parents, other relatives, boss or coworkers). All interviewees reported having untagged themselves from photos but also said that it was not a common occurrence.

3) *Collective Curation*: interviewees described two main benefits from collective curation of online photos within friend groups. First, three students reported not frequently taking photos and so appreciated and benefitted from their friends' photographs. Second, four students reported amassing enormous numbers of photos that they would not have otherwise had or been able to organize without the unlimited photo storage and linking between tagged profiles which Facebook provides.

6.5.2 – Interviews: Social Media Usage

Interviewees were also asked about their usage of social media sites, including both social network sites and other Web2.0 sites. All were Facebook users and described Facebook as both the central social media site as well as primary website and for many, primary site of communication and social activity. Three were Twitter users, with only one (a Journalism student) a frequent user of the service; her particular experiences are discussed at greater length in the following section. Several described having had some experience with Flickr and other photo sites but none were heavy users of those sites. The one category of social media site other than Facebook which several interviewees did

report using heavily was streaming music sites, especially Pandora. Many interviewees described their music listening habits as so centered on Pandora that they did not actually have any music on their hard drives, preferring only to stream it.

6.5.3 – Interviews: General Technology Usage

Students were asked about the range of communications technologies they used, focusing on both educational and social uses of technologies. Regarding educational technologies, most reported using Blackboard and being generally satisfied with their experiences. Two reported using Facebook for coordination of group efforts, including a nursing student whose class coordinated most study activities through a Facebook group. Two other students reported using Google Docs and Calendar for coordination of extracurricular group activities. Interviewees reported (confirming the survey results) that cell phones were their primary mode of social communication, especially the text messaging features. Two reported using iPhones and Blackberries, and also reporting that their usage of different communicative channels and mediums remained unchanged despite the co-location of all mediums and services within the single device.

6.6 – Results and Analysis Summary

This section has presented the results of the survey portion of this research, and analyzed these findings, in particular performing factor analysis on the Uses and Gratifications data. Basic outlines of the themes discussed in the interviews were also presented. The basic picture presented by these results is that undergraduates use a range of technologies in contrasting and complementary ways to support their social and academic lives. Cell phones (including their texting capabilities) are the prime social technology in their day-to-day lives, with Facebook the center of their computer-mediated social interactions and email segregated to generally academic purposes. These findings were underlined in the interviews conducted after Stage 1 and before Stage 2 of the survey, which will be discussed in greater detail in the Discussion section. The following section will delve in greater detail into the numbers and their meaning, what we can learn from the relationships between answers and behaviors, and other further directions for investigation.

7 – Discussion

The previous section presented the findings from this research in terms of both basic descriptive findings and through several stages of statistical analysis to test hypotheses and explore other relationships in the data. This section provides a more broad-ranging discussion of the meaning of the data, and how better to understand its implications, highlighting both the main findings from this data and the areas where the data suggest further research would be warranted.

This section is organized as follows: the first sub-section deals with the main findings regarding tagging, the central research questions and hypotheses. Section 7.1 proposes a framework for understanding the practice of tagging within the ecology of contemporary communications practice both among undergraduates and more generally. Section 7.2 expands the focus of investigation to look at the larger picture of contemporary communications practice among undergraduates, focusing in particular on their use of cell phones (7.2.1.) and Facebook (7.2.2). Section 7.3 weaves the findings together with the previous review of contemporary literature and contemporaneous research and discussion into a discussion of Digital/Life in 2010, speculating on how and why users segregate channels and audience, and where practice is headed.

7.1 – Discussion: Tagging

The central research questions and findings of this dissertation centered on undergraduate perceptions and uses of tagging. Tagging was found to be a behavior used almost entirely for social and communicative, rather than information-organization, purposes. These results were consistent throughout the investigations: in the initial survey data, in the qualitative and quantitative sections of the Uses and Gratifications section of the survey, and in interviews. When asked directly (as shown in Table 45, below), students were unequivocal in their assessment of where in their lives tagging was most used:

Table 45 – Tagging Orientation[1]

	Do you in general view tagging as something you do in your social life?	Do you in general view tagging as something you do in your academic life?
Yes	43.20%	4.30%
No	46.40%	86.17%
Don't know	10.37%	9.51%

[1] Some tables in this section are replicated from the previous section, but are given new numbers for clarity; some of the tables are new or combinations of previous tables.

The bulk of prior academic research on tagging has focused on the large social tagging services, especially Flickr and Delicious, and examined aspects of both social tagging and the emergent folksonomies they create. The research in this dissertation has focused on uses and perceptions of tagging among undergraduates and found a very different set of dynamics, with tagging taking place mostly in the context of Facebook and mostly for social communicative purposes. The data in this investigation makes clear that contra much of the body of literature on tagging, undergraduates do not primarily view or use tagging in its folksonomy-associated contexts. Rather, tagging is a practice that is primarily associated with a particular interface (Facebook) and set of basic practices (photo tagging), as demonstrated in Table 46-48, below. Table 46 shows relative prevalence of membership in SNS; Table 47 shows the top-loading factor from the Tagging Uses and Gratifications, "Social Photos"; and Table 48 shows the Tagging Uses and Gratifications Factor 2, "Social Recognition."

Table 46 – Photo Posting Site Usage

	Facebook	MySpace	Picasa	Flickr	Webshots	Photobucket	Other
Responses	321	116	44	35	28	73	14
Percent	92.20%	33.10%	12.70%	10.10%	7.80%	2.10%	4%

Table 47 – Uses and Gratifications Factor 1

Factor 1: Social Photos	Item Mean	Standard Deviation	Loading
Sharing photos	5.13	1.30	.786
Being able to see my friends' pictures	5.08	1.24	.830
Laughing at funny pictures	4.77	1.40	.576
Reliving the memories	5.20	1.36	.753
Getting tagged	4.26	1.55	.542

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Reliving the memories	5.20	1.36	.753
Others get to see my pictures	4.47	1.50	.647
Letting people know they're in a picture	5.13	1.42	.634
Keeping in touch with friends	5.79	1.19	.681

Table 48 – Uses and Gratifications Factor 2

Factor 2: Social Recognition	Item Mean (SD)	Standard Deviation	Loading
Recognizing people	5.16	1.21	*.583*
Being able to recognize people in photos I don't know	4.38	1.53	*.761*
Identifying friends and groups of friends	4.67	1.50	*.809*
Linking people together	4.63	1.50	*.843*
Reliving the memories	5.20	1.36	*.753*
Acknowledging friendship with someone	4.37	1.58	*.726*

The data in these investigations also makes clear that tagging is a multifaceted practice, and while it is primarily used for social communication it is also a method of information organization (albeit in a different manner than much previous tagging literature examines), as shown in Table 49 below, which shows Tagging Uses and Gratifications Factor 3, “Personal Organization.”

Table 49 – Uses and Gratifications Factor 3

Factor 3: Personal Organization	Item Mean	Standard Deviation	Loading
Organization	4.49	1.55	*.804*
Ease of Use	5.14	1.38	*.783*
Being able to automatically find something I'm looking for easier	5.05	1.47	*.806*

This investigation also showed that there is a culture and set of expectations with regard to tagging practice – it is generally understood that those uploading photos will perform at least the initial tagging of the photos' main participants, as one interviewee explained:

> AR: Unless I upload pictures myself, I don't tag pictures. Generally there's this unspoken norm that you upload pictures, then you tag the people in those pictures. If other people upload pictures of you, they usually tag you...
>
> I rarely tag myself. However, I do always check through any and all pictures I'm tagged in, and I untag or delete pictures that I don't want attached to my profile for various reasons and keep the ones that I do.

This set of expectations and understandings can be explained in a number of ways, including by viewing tagging as a form in a *genre system* of communicative practice. Genre systems as defined by Yates and Orlikowski are "organizing structures within a community that provide expectations about the purpose, content, participants, form, time, and place of communicative interaction… both genres and genre systems carry expectations about why, what, who/m, when and where." (2002, p. 16) Tagging in this context becomes not simply an issue of software interface or an idiosyncratic use-case but rather a part of a larger ecosystem of communicative action, with multiple genres filling complementary (and sometimes overlapping) purposes.

Thinking of tagging as a genre is further reinforced by Yates and Orlikowski's saying, "A genre established within a particular community serves as an institutionalized template for social interaction – an organizing structure – that influences the ongoing communicative action of members through their

use of it within and across the community. Genres as organizing structures shape, but do not determine, how community members engage in everyday social interaction." (Yates and Orlikowski 2002, p. 15) This frame works well for thinking about the shape of communicative practice generally, and will be used throughout this discussion to order thinking about the use of various communications technologies and methods.

7.1.1 – Social Tagging

The key concept for consideration is the nature of user experience in social tagging. This section will examine in a broader context the contrasting elements of user experience in the context of various social tagging interfaces and experiences. When an individual first enters into a social tagging context, their actions can be described purely as tagging, and as absolutely and unequivocally bottom-up: they are making things up as they go along according to their own understanding of the world, and of the ways in which information objects are described in that world. If a user continues in this manner, observing no other tags than their own, no other information than what they have described, and ignoring or disabling such features as, e.g., Delicious' "suggested tags," and "popular tags" they will maintain this purely bottom-up state, much as if they were organizing these information objects on their own hard drive.

In most social tagging contexts, users explicitly seek to explore and understand "how" to do

tagging. They will note and be aware of suggested and popular tags to describe their information objects, will explore similarly-tagged objects, and generally seek to conform in at least limited ways to the norms of the community. This is true also of the practice of tagging in Facebook, as one interviewee described:

> CS: I don't tag myself too much, I tag my friends... I tag myself every once in a while if it's a photo I really like but generally I just tag my friends.
>
> JKD: Would you say your friends do similarly?
>
> CS: Yeah. The ones who I am often in pictures with and who usually upload - 'cause there are certain friends who take pictures and ones who don't. I'd say that pretty much everyone that I end up in pictures with, when they upload, they'll usually tag me.

There is a good reason for these kinds of standardizations of behavior: greater harmonization of tags allows users to more easily find (and share) information objects of interest with like-minded community members (e.g., developers of a particular software on Delicious; orchid enthusiasts on Flickr) and allows users access to the collective intelligence of the community on how to best organize information. This helps explain both why the share of users' tags remains relatively stable over time and why information objects' descriptions likewise remain relatively stable over time (Golder and Huberman 2005): it is in the interest of all members of a social tagging community that a folksonomy be generally comprehensible and stable. Similarly, if all Facebook members in a given friend circle hew to the social norm of tagging at least the initial photo of each friend featured in a new photo album, the

communicative genre system is sustained. Each member of the friend group can then both gain enjoyment from seeing new photos – as noted in the Tagging Uses and Gratifications data, this is a chief use of tagging – and also where necessary can untag themselves from unflattering or otherwise inappropriate photos (also shown in the survey data to be a common practice).

Additionally, Shirky's shelf metaphor for folksonomies also applies for one of the main uses of Facebook photo tagging – the collaborative assembly and curation of online photo albums. Most interviewees described Facebook's photo storage and organization capabilities as one of its central uses, and while they highly valued access to both their own and their friends' photos, few reported backing up their own (let alone their friends') photos offline. Facebook is for them the infinite photo shelf, existing both nowhere and pervasively through all their friends' profiles.

7.1.2 – Social Tagging and Identity

As discussed in the initial background literature section of this dissertation, I conceive of identity as an ongoing, iterative process, whereby individuals are continually reacting to the environment and each other as social objects, and forming their selves in pursuit of their goals. The relationship of tagging to identity should thus primarily be viewed through the lens of *social tagging* – the sets of socio-technical contexts from which folksonomies emerge.

Social tagging takes place within the context of sites of mediated sociability, both on sites focused specifically on tagging activity (e.g., Flickr, Delicious, CiteULike) and social networking sites (SNS) where tagging is just one of many technological affordances and capabilities (e.g., Facebook, MySpace). In the case of the former, tagging is often the primary motivation (Delicious) or one of the main capabilities (Flickr); in the case of the latter, tagging is often limited in its capabilities and may not be used extensively or by all users. Facebook in particular utilizes tagging in only two ways: 1) for the identification of individuals in photos, and 2) for the collaborative sharing of notes and links. Tags and tagging can then have very different uses and ramifications for identity, depending on the socio-technical context in which they are performed. Each of these cases is examined in greater detail and contrasted below

- ***Flickr****:* Flickr is first and foremost a service for the posting of photos. The interface is designed to allow for both the easy assignment of tags to photos when users upload photos, and the easy navigation through all users' photos which are similarly tagged. Most users assign at least some tags to their photos, and more involved users will often assign many tags to their photos, including geotags (GPS-derived positioning of location, represented through latitude and longitude). Social tagging takes several forms on Flickr. Individual users have profiles on the service, and can add other users as friends, which unusually for SNS often includes more virtual-only than face-to-face friends. Friends will often comment on each others' photos (Kramer-Duffield and Hank 2008), offering compliments on both subject and technique. This aspect of

social tagging is best described as *social grooming*, and fulfills those aspects of the formation and maintenance of social capital, with comments often answering one another and following models of reciprocity.

Another aspect of the social tagging context on Flickr is the aggregation of photos into groups and pools. These pools often contain hundreds or thousands of pictures on a single subject or topic, ranging from silly to serious to licentious to disturbing (Kramer-Duffield and Hank 2008). Inclusion of one's photos in a pool – often accomplished via recruitment in photo comment threads from pool administrators – is a manner by which users are socialized into communities of user practice on Flickr, and can be thought of as an aspect both of socialization and in some cases, work towards the harmonization of tagging practice. A further practice of the social context on Flickr involves the browsing of photos by tag(s), and this likewise can be seen as a manner by which users both interact with the community and harmonize themselves into the practice of tagging on Flickr.

- ***Delicious****:* Tagging on Delicious is both the reason for membership and primary activity. While recent site redesigns now allow for a more extensive "notes" field, for the most part the action on Delicious revolves around the tagging of links. Delicious features very rudimentary user profiles, containing little more than a user's name, basic lists of interests and links to other users they follow and who follow them (reciprocity of following is not a precondition, and is less

uniform on Delicious than on other social media platforms). The social tagging context on Delicious is explicitly organized around the i) organization, ii) dissemination and iii) intake of information. Organization of information is accomplished through the assignment of tags to links; dissemination of information is accomplished through the sharing of links with specific users or through users following another user; and intake of information is accomplished by following other users, browsing across tags and following popular or recent tags.

- ***Facebook****:* Facebook, as the literature reviewed and data presented in this dissertation demonstrate, is primarily a social context for the performance and maintenance of identity. It is a distinct social tagging context in that tagging and tagging capabilities are of tertiary importance to users, and in fact tagging capabilities (limited as they are) were added well after the site's inception. One of the uses of "tag" in the context of Facebook – the inclusion and notification of given users in a posted note – is arguably not even the same kind of "tag" as being discussed in the rest of this review, falling closer to "Tag, you're it." The other use of tagging – the identification of other users in posted photos – presents a novel social dynamic worth consideration. Though little research has examined the full scope of practice regarding Facebook photo tagging, both this dissertation and other recent investigations of Facebook privacy behaviors (Stutzman and Kramer-Duffield 2008 and 2010) found that large majorities of users reported untagging themselves from posted photos (users are notified whenever they are tagged in a photo and can decline if they desire). Interviewees confirmed the range of reasons for

untagging, including desire for privacy generally, and desire for limitation of specific revealing or embarrassing photos. Social tagging within the context of Facebook is thus best viewed as primarily a discursive social practice centered on negotiating the boundaries of privacy and disclosure. It is also an information organization tool in a limited sense (collecting all photos of a given user posted across other profiles), and provides only a very basic set of potential actions (tag or untag).

Identity is, as discussed above, a dynamic with great variation in action and practice across different systems of social tagging. Depending on the design of the system and the goals of users, social tagging may be used as a form of social grooming, information organization, exploration, socialization and harmonization, or as a discursive negotiation of privacy and disclosure boundaries. Even further practices exist across various other communities, and will continue to emerge as tagging is adopted as a function or motivation in more social media platforms.

7.2 - Contemporary Communications Practice

As suggested, contemporary communications practice can be well understood as comprising a genre system consisting of "purpose, content, participants, form, time, place" of communicative action, with concomitant expectations of "why, what, whom and where." Given the findings in this research, a matrix of communicative genre is proposed below in Table 50.

Table 50 – Communicative Genres

Genre	Tools	Audience	Purpose
Social-continuous	TXT, SNS, Cell phone, FtF (friends)	Friends, Family	A continuous extension of students' everyday social lives
Social-iterative	Email, IM, FtF (family)	Friends, Family	An easy way for students to maintain longer-distance strong ties and a larger number of weak ties relationships
Academic-professional	Email, FtF	Professors, Organizations	Greater distancing and planning allows for more strategic thought in presentation of self

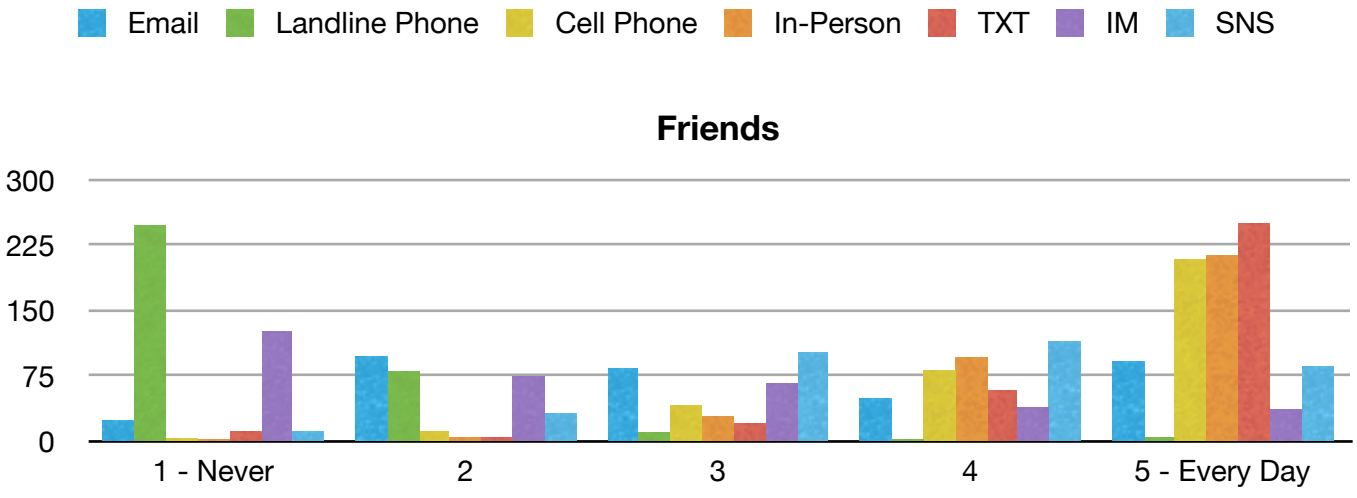
There are many possible ways of interpreting the data and practices revealed in these investigations, but I believe the above contextualizes students' contemporary communications practices

well. Each communicative genre serves a very different purpose and utilizes different aspects of the technology in use, allowing for differing levels of control over identity and communicative access. Much previous work on use of information communications technologies and computer-mediated communications has, in my view, either explicitly or implicitly viewed use of these technologies through the lens of the latter two use cases. That is, these technologies are used strategically and iteratively towards certain goals, but always at one remove – hence even the name of computer *mediated* communications. What is of great interest – and some novelty – in current undergraduates' use of these communications affordances is the ways in which the technologies are both socially and perceptually integrated in a continuous manner into students' lives. More than any others, two technologies stand out as particularly central and integrated into the contemporary communications ecosystem for undergraduates: cell phones and Facebook. They are discussed in greater detail below.

7.2.1 – Cell Phones

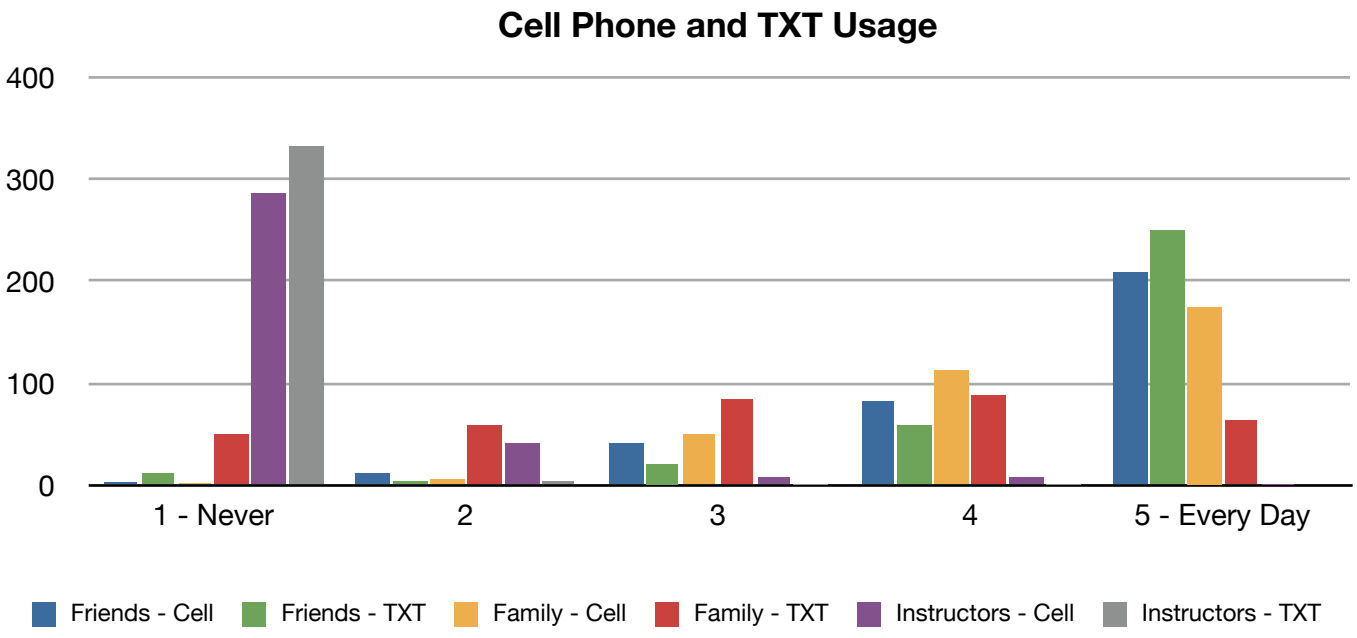
Cell phones were not the primary focus of this research, and to date have not received substantial attention as a key aspect of mediated sociability – but nonetheless emerged as a crucial component of students' everyday communicative practice. They (and especially text messaging) are part of a continuum of electronic communications that includes Facebook, email, and appear to have displaced instant messenger entirely for most students as a method of immediate communication, as shown in Figure 14, below:

Figure 14 – Friend Communication Channel Preferences



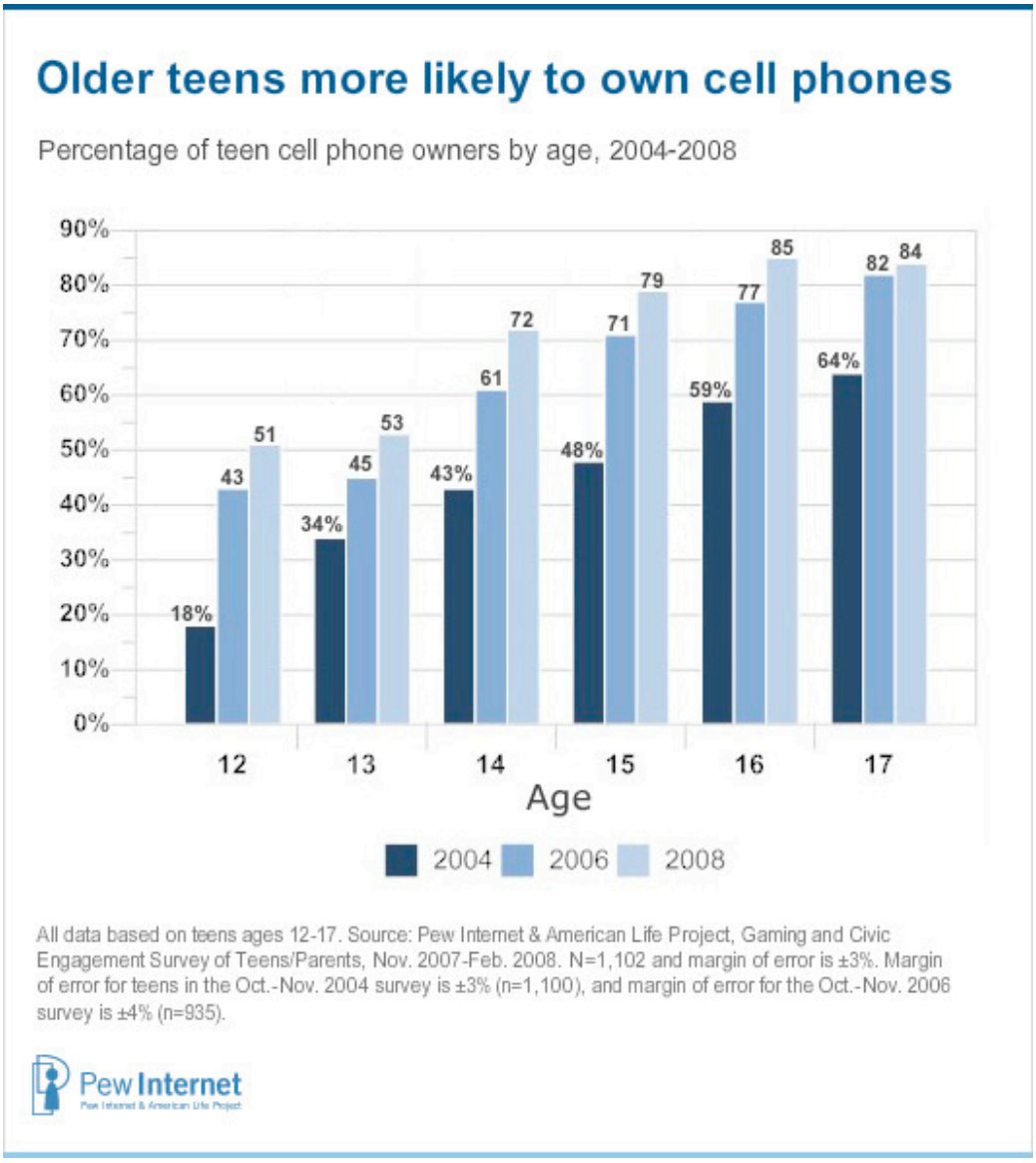
Cell phones and their text-messaging capabilities are also a prime example of the segregated nature of communications channels for undergraduates: central and essential for social purposes, never used for academic purposes, as shown in the Figure 15, below:

Figure 15 – Cell Phone and TXT Usage



Further, cell phones appear to be taking on an even more central role in mediating these other technologies and communications channels with the adoption of smart phones accelerating and cell phone ownership and use increasing dramatically among teens over the past five years. Thus, most or all students now arrive on campus with cell phones already centrally integrated into their lives, as shown in Figure 16 below (Pew 2008).

Figure 16 – Cell Phone Ownership



While it appears unlikely that cell phones will entirely displace computers as a mode for communication or especially productivity, based on results of this dissertation investigation and other work, it is fair to suppose they will continue to increase their share of the "eyeball time" for this and

other demographics for at least some time into the future. Therefore, investigations of mediated sociability should account for these shifts in several distinct ways which raise interesting questions for consideration, including

- *Shifting access habits on mobile platforms*. As cell phones are integrated ever-more-seamlessly into users' lives, not only will they be a site of voice and SMS communications but also increasingly of addressing other information needs. These include information needs currently addressed on traditional computing platforms, which with increased processing speed, memory, screen resolution and range of applications phones are coming to resemble more and more. Facebook Mobile and phone-based Twitter clients are already used by many for accessing those respective SNS; search and mapping functions are central to the appeal and advertising campaigns of many smart phones. Social connection and just-in-time search functions seem likely to continue their growth in popularity, and as further capabilities are added to mobile phones, and users become more used to using their phones for a range of information needs, researchers should continue to examine the range of users' mobile information practices.

- *Shifting design considerations for mobile platforms*. With users accessing resources through mobile phones, design considerations of many web-based resources may shift away from the current model towards a mobile-centric model. Now, most sites and resources are designed with a desktop or laptop computer user as the assumed end-user, with mobile sites as translations of the information and design

considerations of the site into the more cramped and less bandwidth-rich mobile environment. This design stance will become increasingly nonsensical for developers and users who may have mobile handsets as their primary communication or information access environment. Researchers should track this transition and develop qualitative and quantitative metrics for assessing the usability and interaction effects of handset-native and -translated resources. For instance – could Twitter (originally based entirely on mobile phones) be understood as the "publicity affordance" of a space that is otherwise still mostly private peer-to-peer communications?

- *The new Digital Divide(s)*. Despite a great deal of discussion regarding the possible dangers to society of a "Digital Divide" between haves and have-nots online, many of the main indicators show that access to the Internet, SNS and mobile phones is fairly evenly distributed across racial, ethnic and to a slightly lesser extent, class lines (Pew 2009). The *kinds* of access, however, do show some signs of divergence, and given the generally fragmented nature of societal relations and communities in the digital age, it bears renewed examination just what divides exist in especially the fast-growing and -changing mobile information landscape. Clark (2009), for example, found great differences in the use of mobile devices among teens depending on whether they or their family paid for the phone bills.

- *Insufficiency of Big Data for understanding mobile practices.* The rise of public networked communications and sociability has been a great boon for researchers in terms of access to great reams of data on user behavior. As I have discussed elsewhere in this dissertation, I believe an over-reliance

on “Big Data” does much to obscure as well as illuminate. It can allow researchers to speculate on user motivations based on statistically significant contrasts bought by huge sample sizes, rather than simply asking users about their motivations and behaviors directly. Increased use of mobile phones as a site for communication will continue to generate Big Data on the public Web but will also move many interactions outside of the automated eye of data-scrapers, as researchers (rightly) do not have the ability to mine personal phone conversations or SMS messages. These communications – which this research shows are central to at least undergraduate students’ social lives – will have to be investigated via the more traditional, expensive (in researchers’ time) but also in many cases more illuminating method of actually asking people what they do.

These are but a few of the wide range of potential questions raised by the increasing centrality of increasingly-powerful mobile devices into students’ and other users’ lives.

7.2.2 – Facebook and Mediated Sociability

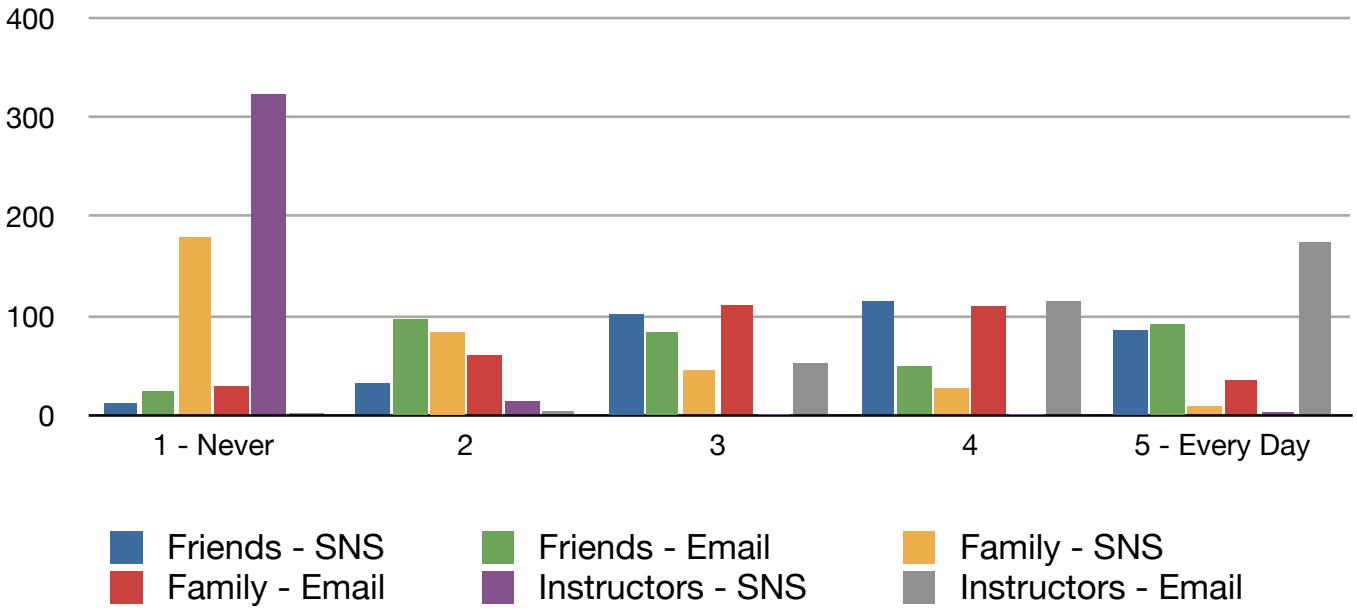
As the research presented in this dissertation makes clear, Facebook is the center of current undergraduates' social and technological lives, with large friend networks articulated, consistent time spent on the service, and strong feelings attached to its usage, as shown in Table 51, below.

Table 51 – Facebook Intensity Scale

	Facebook is part of my everyday activity	I am proud to tell people I'm on Facebook	Facebook has become part of my daily routine	I feel out of touch when I haven't logged onto Facebook for a while	I feel I am part of the Facebook community	I would be sorry if Facebook shut down
1 - Strongly disagree	9	8	7	20	15	12
2	20	33	27	66	55	28
3	16	143	21	55	105	44
4	132	102	147	124	119	158
5 - Strongly agree	163	54	138	74	45	98
Mean	4.24	3.47	4.12	3.49	3.37	3.89
Variance	0.95	0.90	0.96	1.43	1.09	1.06
Standard Deviation	0.97	0.95	0.98	1.20	1.04	1.03

Facebook mediates relationships and communications pervasively, with some of its internal communicative affordances taking the place of existing, external forms of communication. For instance, Facebook messages have become at least as popular as email for undergraduates' social (but not academic) communications, as shown in Figure 17, below.

Figure 17 – Email and SNS Message Usage



7.2.2.1 – Facebook Usership

Of the respondents to survey section of this investigation (all current undergraduates at UNC-Chapel Hill) 98% are members of Facebook. It is the default and pervasive digital extension of their social lives, and by far the dominant social network site, as shown in Figure 18 and Table 52, below.

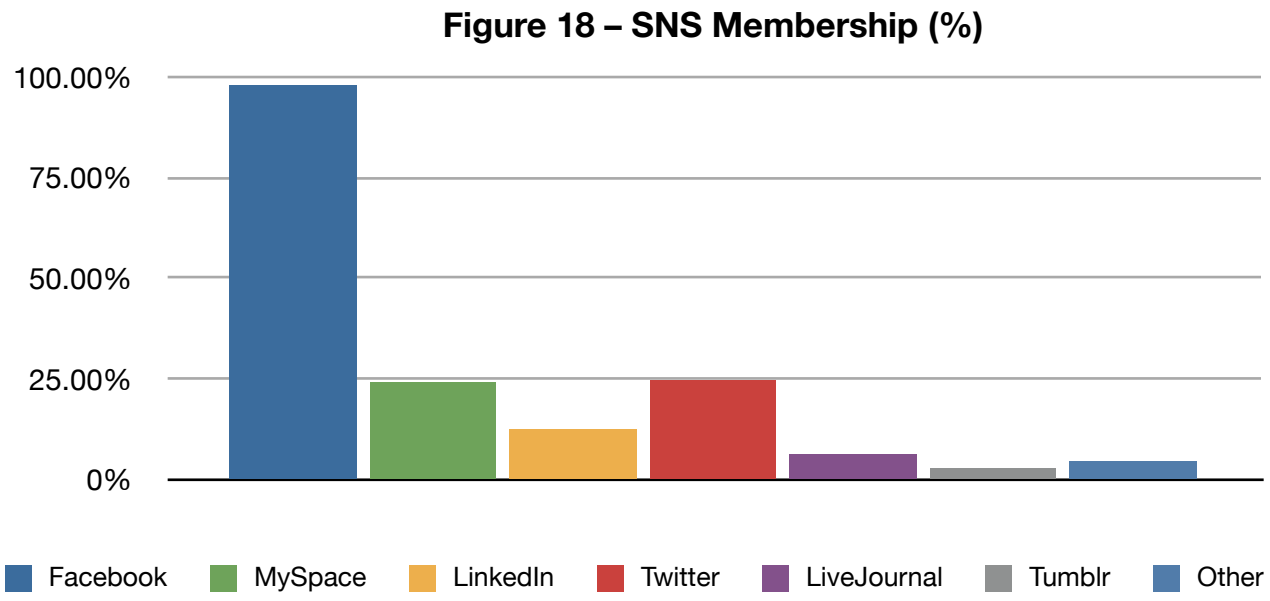
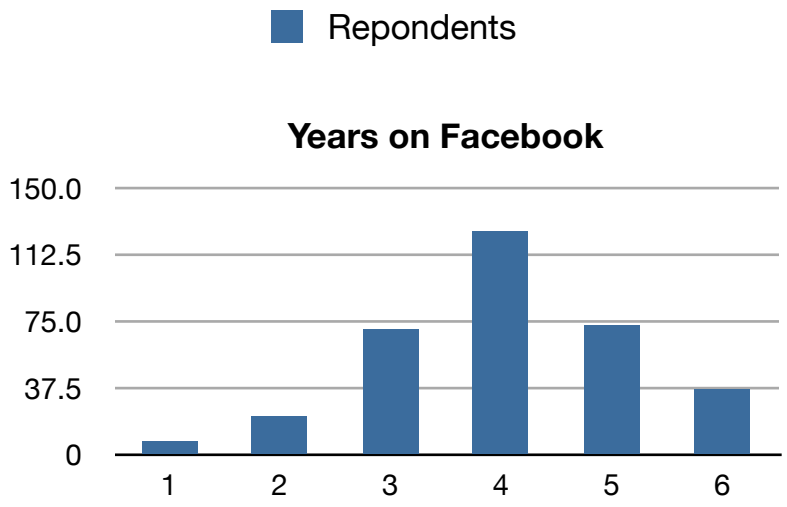


Table 52 – SNS Membership

	Facebook	MySpace	LinkedIn	Twitter	LiveJournal	Tumblr	Other
Percent	98%	24.2%	12.7%	24.8%	6.3%	2.9%	4.6%
Count	340	84	44	86	22	10	16

The mean and median user has four years' experience on Facebook (see Figure 19 below), which correlates with the mass adoption of the service in 2005 and 2006 among college and then high school students – the vast majority were high school students during this period, with the exception of some current seniors who were then college freshmen.

Figure 19 – Facebook Experience



For all of these students, Facebook has been ubiquitous for their entire college careers, as demonstrated by the adoption figures presented in previous research (Stutzman 2006) from fall 2005 investigations. Social life at college has meant life with and in Facebook, as one interviewee reported:

> JKD: And how long have you been a member?
>
> CB: I think about the middle of my senior year of high school I started that, and I'm a junior in college now, so that's... four years. Three and a half. But a lot has changed, I guess [laughs]
>
> JKD: But you never found it necessary to join any others because all your friends are there?

CB: Yeah. I think it does depend on where your friends are, so I don't really need anything else.

One student was interviewed during Lent, and reported that she had given up Facebook use during the month:

EM: I stopped using Facebook for Lent, last Wednesday and it's been interesting. I find myself with hours more time now, and it's kind of nice, I don't have to worry about the comments and status updates and everything. So, it's interesting.

JKD: So were you finding those comments and status updates to be something that took up your time, that became a burden?

EM: It started to become something that I did out of habit, the first thing that I'd do when I'd wake up, I'd get on Facebook and see if I had any notifications and if anybody had tagged me in any pictures. And it was just like I would get distracted really easily during like studying and working in the library, and I'd find myself on Facebook the entire time.

Respondents report a median of 600 friends, with a mean of 630, and report spending a mean of 86 minutes (mean of 60) on Facebook every week, as shown in Table 53, below.

Table 53 – Facebook Usage

	Facebook Friends	Minutes per week on Facebook
Mean	630	86
Median	600	60
Standard Deviation	365	140

While at first not a hugely impressive number (likely somewhat under-reported), this time spent on Facebook comes into focus when it is further explicated:

> JKD: How much time would you say every day that you're on Facebook?
>
> AR: It's never for just a chunk of time, but it'll be for a little bit in various breaks during the day. So I'd say if I had to aggregate that, maybe an hour or so? But it's usually for five minutes here, two minutes there, five minutes here, two minutes there. Just spread out whenever I have random breaks.

This centrality of Facebook is further confirmed through respondents' answers on the Facebook Intensity Scale (Ellison et al. 2006), where 86.8% and 83.8% either agreed or strongly agreed with, respectively, the statements "Facebook is part of my everyday activity" and "Facebook has become part of my daily routine." What that daily routine is, however, has shifted over time:

> JKD: So as you spend more time on these different services, do you find that that's more the model, where your use gets into a rut or do you find it shifts?
>
> CS: I think it depends, because at first it shifts because you're not really used to it, you don't really know. But then after a while - I mean I've had Facebook since I was a sophomore in HS - but then also I guess it changes, because when I first got on Facebook you couldn't add photos, you couldn't update your status. I can't even remember if you could post on people's walls. I have a very vague

> picture of what the first interface of Facebook looked like, it just changed so often and you get used to it so quickly that you forget what it was like before. Now I guess that Facebook's more established and the changes aren't as enormous, are little things like they move stuff around the page but it basically does the same things. I guess use of it has stagnated for me a little bit.

Many of the early papers on Facebook (e.g., Acquisti and Gross 2006, Ellison et al. 2006), focused on the early stages of SNS membership, in which network exploration and friend acquisition (or rather, location) is a major function. By contrast, the respondents to this survey are well-established users of Facebook, with large and mostly-stable friend networks. The Uses and Gratifications scales (see Table 54 below) confirm that impression, with the majority of elements related to and loading under the Social Communication factor with mean Likert scores of 5 or greater on a 7-point scale, while "Meeting new people" scored a mean of 2.83, with 83.7% of respondents saying that it was "Not at all Important," "Very Unimportant," or "Somewhat Unimportant."

Table 54 – Facebook Uses and Gratifications Factor 1

Factor 1: Social Communication	Item Mean	Standard Deviation	Loading
Keeping in touch with friends that aren't close by	5.88	1.274	*.737*
Communicating with friends	5.63	1.242	*.823*
Connecting to people	4.97	1.498	*.748*
Photos	5.19	1.297	*.683*
Seeing what my friends are up to	5.27	1.223	*.777*
Ease of use	5.19	1.206	*.762*
Event planning	5.02	1.422	*.564*
Reconnecting with old friends	5.23	1.277	*.747*
Communicating over distances	5.73	1.242	*.753*
Community	4.32	1.362	*.710*
Fun	5.06	1.311	*.772*
Birthday reminders	4.80	1.541	*.631*
Information Sharing	4.44	1.491	*.560*

Additionally, "Meeting new people" loaded as a factor with two other elements associated with behaviors more associated with a pattern of Facebook use involving more time spent within the site – Facebook Chat and Games (see Table 55, below). School year was a significant predictor for this factor, suggesting that while most students are now more familiar and experienced with Facebook, first-year students in a still-new social environment – who are still collectively and collaboratively forming their identities – may have a use pattern reminiscent of the earlier exploration and discovery phases of SNS usership.

Table 55 – Facebook Uses and Gratifications Factor 2

Factor 2: Facebook Exploration	Item Mean (SD)	Standard Deviation	Loading
Meeting new people	2.83	1.593	*.501*
Facebook Chat	3.63	1.811	*.527*
Games	2.51	1.735	*.764*

Interviewees were aware of the presence of non-peers on Facebook, often mediating those relationships through use of privacy settings. There was a range of opinion on friending professors with some students vehemently opposed and others more open to the possibility:

JKD: Not friends with any of your professors on Facebook.

CA: No. I think that's weird... And I also thought that it was against the rules, but I know that people have been friends with their [professors]... I don't know what the point is though, of being your professor's friend on Facebook. Maybe after you had the class and you wanted to maintain a personal relationship, okay, that makes sense, but during the class, if you didn't know them going in? I think it's almost inappropriate to be their friend or buddy because they're grading you.

...

JKD: Do you find yourself adding professors as friends, or not?

CS: Not usually while I'm in the class.

JKD: But after?

CS: Sometimes. I don't know why, it's not like I'm trying to hide anything, it's just a strange relationship, especially now that I'm really into my major, professors I have I'm gonna have again.
...
JKD: So could you see yourself in the future being friends with your current professors when you're no longer a student?

CW: Yeah. It's kind of interesting, my fiancé taught for several years and now his students are starting to graduate from college and so they're friending him on Facebook and I know he has student-specific privacy settings for his former students. Yeah, I could see myself doing that a couple years down the line when we're not really connected in this teacher-student relationship which it's authority, and you know, I'm under that authority.

Across the board, respondents and interviewees were keenly aware of the practical consequences of mediated sociability, digital publics and especially the ongoing context collapse resulting from the appearance of parents, relatives and professors on Facebook, hub of their social interactions. As evidenced above, many reported either drawing bright lines (or at least contingent lines) for when to allow these (usually older) others into their social context, and how to manage those relationships in a way that protected them and also allowed for continued sociability with friends inside the charmed circle. This often involved setting their profile to “limited” for those outsiders.

Many respondents reported anticipating that they would present themselves differently when they had graduated and were in the working world; one student who had returned for a nursing degree after previously completing a bachelor's degree described some of the tensions present in that dynamic:

> CW: I did my undergrad and graduated and then worked [for three years] and now I'm back in school. And we started using Facebook as a business tool, I worked in publishing and so it became a good publicity and marketing outlet. And my boss was my friend, but I didn't feel comfortable using my Facebook account for work purposes so I didn't do anything through my personal Facebook account for work. And we actually had a couple meetings where I said I was willing to create a work-specific account but I didn't want to let those two cross.
>
> JKD: So are you still friends with your former boss on Facebook?
>
> CW: I am! Yeah, and actually I mean, I haven't talked to him at all via email, Facebook or phone since I quit in, when was it, January I quit. Although he's messaged, you know, he's posted a couple things on my Wall. But yeah, we're still friends, I still see what he's doing, what he's posting with regard to work, and I was friends with some of my co-workers as well, but with them it was more, I'm friends with them in real life, too - I mean we go out to dinner, you know, get drinks or actually hang out as friends. But with my boss it was, it was *weird* when I got that Facebook request but I couldn't say no, you know? Gosh, it was a weird moment when I started to realize how Facebook was really starting to penetrate the professional world too - and coming at that as a student when it was entirely social, I never used it for anything but messages - it was very odd.

This exchange highlights the very real and delicate interpersonal and power dynamics involved in the mass context collapse incited by the expansion of Facebook from campus-based and -bounded

social space to borderless recreation of all of our life ties: social, professional, familial and academic. It is an open question whether the latter situation is tenable over the long term. As Goffman discusses in *The Presentation of Self in Everyday Life*, there is a strong human need for a "backstage" environment where individuals can drop the more carefully composed and maintained aspects of everyday identity among a trusted audience of peers, and explicitly out of public view. More than simply being an observed behavior, this is normatively desirable, which makes the recent comments of Facebook CEO Mark Zuckerberg, taken with further changes to Facebook's default privacy settings, even more troubling. Offering that people have become "more comfortable" sharing more and more information, Zuckerberg's comments were followed with changes that no longer allow users to keep private their location and associations.

It seems unlikely to me that the period of 2004-2010 has been unique in human history in extinguishing human desire for privacy. My findings in these and other investigations (Stutzman and Kramer-Duffield 2008 and 2010) have supported the idea that students take seriously maintaining their privacy, and take affirmative actions to do so – especially after having their privacy violated in one way or another. One student speculated on the direction of privacy:

> AR: I think we're heading in a direction where nobody has any privacy anymore and everything is accessible to anyone on the Internet, down to every minute detail, and I think that nobody's really ready for that yet. This is the first time that this has happened, the social atmosphere of the world hasn't had this kind of access or connectivity ever... Is my online persona flawless? Probably not. Is

> anyone's online persona flawless? I don't think so. So I guess what I'd like to see is I think you're going to see that loss of privacy but at the same time I think - not initially, right now it's not happening - let's say 50 more years of this, I think people's standards will relax a bit as people realize that *everybody* has, you know, some things

Mediated sociability has provided exciting opportunities both for individuals to expand their networks of casual friendships and be in ever closer contact with their closest friends, and for researchers to observe and analyze patterns of socialization in real time and in large numbers with low cost and great convenience. But it has not changed human nature (of which hubris is obviously a part). These recent missteps by Facebook underline the importance of observing behaviors within their context in a way that will make sense when that context changes or disappears entirely.

7.2.2.2 – Facebook and Tagging

Keeping things where they should be – and keeping the right eyes on them – was a central theme of many interviewees' discussion of Facebook's present and its future, and their use of it. This applied not only to management of friend ties on Facebook, and segregation of close friends, acquaintances, family and professors into different views of their online persona and activity, but also to management of what information is available about them online. Specifically, most students reported having untagged themselves from photos (87.6%) and even asking friends to remove some photos entirely (50.1%), as shown in Table 56, below:

Table 56 – Photo Privacy

	Untagged self from a photo	Asked someone to completely remove a photo containing your image	Asked someone to make private a photo containing your image
Yes	87.60%	50.10%	20.70%
No	11.24%	48.41%	77.23%
Don't know	1.15%	1.44%	2.02%

One student who had previously earned a bachelor's degree and was now completing a second bachelor's in nursing explained some of the reasons for these behaviors:

> JKD: Have you ever found yourself untagging yourself from photos on Facebook?
>
> CW: Oh yeah! [laughs] Oh yeah. I mean when I was in college I was pretty keenly aware of the ramifications that having an unflattering photo could result... I'm aware of the person that other people view me as and so I didn't really feel comfortable if I had a picture of me drunk out at a bar, or just even like a not-good picture that I didn't like. I didn't like that somebody else could put that up there and make me visible before I could even say no. So I've definitely untagged pictures, mostly of ones that I just thought were really... you know, waking up in the morning, or just unflattering pictures. And then when I started my job I made my profile such that my boss could not see my pictures, any of them... it wasn't that I'd be out at a bar with a pint of beer in my hands, 'cause that's fine, but I just didn't really want him rifling through my personal life like that. So I altered my privacy settings for him and him alone, he's the only person I've ever done that for.

The above is an extreme example of segregating audiences – restricting content for a single person and only a single person – but likely not entirely unusual. Especially when faced with the

consequences for information making its way to unwanted audiences, this kind of restriction is one of the chief tools students have at their disposal to maintain their identities.

Tagging is also a way by which students collectively curate their online identities and sometimes massive online photo albums.

> EM:. ..if I didn't have Facebook I wouldn't have as many pictures as I do. That's one of the reasons I won't delete it because I'm in tagged in like 1500 pictures or something like that, some ridiculous number. It's just so many pictures that I want to print out and keep with me, and I feel if I deleted my Facebook I would almost be deleting some of the memories, 'cause there's just so much stuff that Facebook helps with tagging.

This particular set of uses for Facebook was echoed by most of the interviewees, and is apparent in the survey data reflecting the use of Facebook as the main photo-uploading and tagging site for undergraduates, as shown in Table 57, below:

Table 57 – Photo Posting Sites

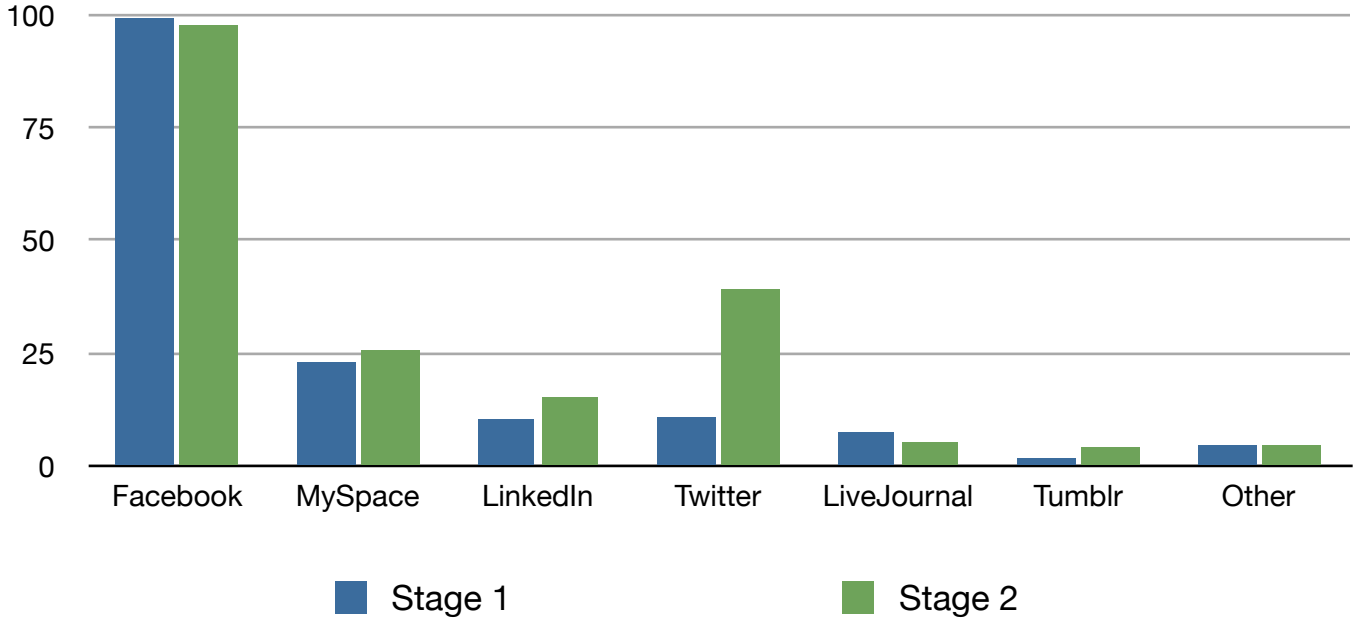
	Facebook	MySpace	Picasa	Flickr	Webshots	Photobucket	Other
Responses	321	116	44	35	28	73	14
Percent	92.20%	33.10%	12.70%	10.10%	7.80%	2.10%	4%

The implications of this centrality will be discussed further in following sections; below follows a discussion of alternate SNS used by survey respondents.

7.2.2.3 – Other SNS

Of respondents to this survey, only 24.2% report membership in the once-dominant MySpace, a sharp decline from previous studies (Dwyer 2007) and emblematic of the educational and class divide between MySpace and Facebook (boyd 2008). Conversely, 24.8% report membership in Twitter, which likely greatly understates the true figure – it was not listed as an option in Stage 1 of the survey, and despite this fact 10.9% reported it as an "Other" option. When included as a top-line option in in Stage 2 of the survey, 39% of respondents reported membership in Twitter, as shown in Figure 20, below:

Figure 20 – SNS Membership (%) by Stage



The Stage 2 number is likely closer to the true figure, which I would expect to increase substantially for the Fall of 2010, both in the entering Class of 2014 and among the current student body, supported by some of the commentary from interviewees.

> JKD: You mentioned Facebook - are there any other SNS that you're a member of?
>
> EM: I deleted my MySpace because I just felt like it was too childish. I have a Twitter, I don't use it though, I haven't really gotten into that quite yet but I'm pretty sure that'll probably change quite soon.

Especially among particular segments of the student body where Twitter is particularly useful, it is already universal, as one of my interviews revealed:

> JKD: So, for Twitter, who are most of the people who you follow or who follow you?
>
> CS: I follow a lot of news sources, I do follow like friends and classmates and stuff like that, especially classmates because in the journalism school you basically have to have a Twitter.
>
> JKD: Really?
>
> CS: [laughs] Pretty much. Everyone does. So I follow a lot of news sources, I use that as a way of finding what news is important, you know what I mean? So I'll follow NPR and the NYT and LA Times and stuff like that, they have part of the headline and a link to the story

so I can go through to the ones that I think are interesting or think are important, I'll click on. I follow a few bands and stuff like that, and a few celebrities which is just silly and more for entertainment. But yeah, I'd say a big bulk of it is news sources

Twitter does not function as a rival to Facebook entirely, but rather as what I would term a *publicity affordance* of students' social lives, increasingly centered and mediated as they are by cell phones and text messaging. It is also used as a way to segregate audiences – since "everyone" is not on Twitter yet, students can be more assured of the kind of anonymity by obscurity that was prevalent on Facebook prior to the massive context collapse of the last several years' expansion beyond university campuses. One female junior described further her use of Twitter as such:

CS: I have my group of friends from home, we have our own list, too, so if I'm wondering what they're up to - 'cause we all go to different schools - I click on that list and I can see all of their most recent updates... With Twitter I get notifications to my phone, I don't get any news sources with that, I just get those close friends and a few other things like Texts from Last night, because they're funny and they don't put them up that much. So with that, we were talking about it recently, it's like we all get them to our phones, so when I Tweet it's like I'm texting all of them at once, you know what I mean? So it's like since we've all gotten on Twitter and done that we know what's going on in each other's lives a lot easier.

Twitter was conceived originally as a primarily phone- and text-message-based circumvention of other aspects of the social web, and with may be emerging as just that – or as a parallel social ecosystem – with its increased popularity and the centrality of phones and text messaging to students' lives. This is

another area in which the contrasting and conflicting elements of different communicative genres can come into play, as one interviewee reported:

> JKD: Do you have your Twitter posts linked with your Facebook status updates, or are those two different?
>
> CS: Noooo. Yeah I separate those just because I don't like to update my Facebook that much, like I'll update my Facebook status maybe once or twice a week whereas my Twitter I'll do once or twice or three times a day. I just feel like that'd be so much more.
>
> JKD: Again, different worlds.
>
> CS: Yeah, and I think that's partially just because Facebook was around first and didn't update your Facebook like that and if you did I thought it was annoying... Whereas with Twitter it's meant to be updated several times a day.

This again underlines the necessity of couching survey and Big Data within the examined practices of users. While the basic functions of Twitter and Facebook Status Updates are nearly identical, the interviewee highlights the importance of communicative genres in understanding the different sets of user practices expected of each. This divergence appears repeatedly in the survey data, with very different habits attached to email and SNS messages despite their largely similar sets of functions. The larger implications of these contrasts are examined in greater detail below.

7.2.2.4 – SNS Synthesis

Much of the initial research into SNS focused heavily on those behaviors which individuals displayed most prominently in their earliest interactions: self-disclosure and friend acquisition. These behaviors are among the easiest to quantify and track changes – User A has 100 friends and 12 favorite movies listed at Time 1; 223 friends, 16 favorite movies and three quotes at Time 2; etc. – and easily aggregated across a sample. Long-term use patterns are more difficult to track for a variety of reasons, chief among them the barriers to access of data. While most of the major SNS (Friendster, MySpace, Facebook) were initially relatively open and easy to "crawl" for data, this situation soon changed. Friendster suffered a disastrous decline; MySpace altered protocols for access to data and many users began restricting profiles to "friends-only"; and Facebook both ceased granting researcher access to user log data and restricted greatly the ability of third parties to access user information using its Apps.

Longitudinal data must therefore be collected in a far more time-consuming manner, involving either repeated interviews or users opting in to monitoring of their usage. The former limits sample size severely given limited researcher time, and the latter creates significant questions about generalizability given the self-selecting nature of the sample.

The early studies of SNS do also focus heavily on the usage patterns of early adopters, but in each context what this means – and the implications for further study of late-adopters – are quite

different. Friendster's early adopters most clearly fit the profile of early adopters generally: tech-savvy and in-the-know, most were Silicon Valley professionals and members of the creative class, largely in the Bay Area in California. Disproportionately represented in online discourse, their enthusiasm for Friendster greatly amplified the early growth of the service, and Friendster's initial invite-only structure helped build buzz and perceptions of exclusivity and coolness. The sword cut both ways however, and when the early adopters became dissatisfied and frustrated with Friendster's management decisions, their departure and negative commentary hastened its decline. Given the sharp pitch of the angle on both ascent and decline of Friendster, and the relative lack of long-term data available (and researchers who focused on it, during its heyday), it is difficult to make generalizations about contrasts in early- and late-adopter behavior in that context.

MySpace followed a slightly different pattern with its early adopters, positioning itself as a more open alternative to Friendster, and focusing recruitment among musicians, aspiring musicians and the bartender/barista class. This strategy was greatly successful and, despite MySpace's current decline relative to Facebook, this social group still constitutes a large core audience, with persistent differences to Facebook's more college-focused (both present, future and past) alignment. Late adopters to MySpace found a mediated social context already well established and demonstrated what Perkel (2006) identifies as “cut-and-paste literacy”: within the context of MySpace, literally copying the stylesheets of established users as expressions both of conformity (I know how to do it!) and self-expression (this particular stylesheet says X about me).

Facebook is the clearest example of a late-adopter population which differs significantly from its early-adopter population, but in this case those populations were chosen explicitly by Facebook. At its inception, Facebook was purely a creature of Harvard University; it then expanded to the other Ivy League schools and, as buzz spread among high school friends dispersed across other college campuses, users began to clamor for its wider rollout. There was even at this point a form and set of procedures whereby individuals could request that Facebook begin serving their campus. Facebook managed this buzz incredibly effectively, and in nearly all cases (from available statistics of both researchers and Facebook) adoption on a given university campus quickly became nearly universal, with 80-90% or more of students signing up.

Facebook continued to build buzz by selectively rolling out availability to high schools, then to businesses and organizations, and finally to the general public, though many of the traditional early-adopter class had already signed up (often using their university alumni e-mail addresses, as Facebook initially required a .edu address for membership). This last expansion has been and continues to be a great success, and its use as a punchline ("don't let your parents add you on Facebook") speaks to its cultural touchstone status. This structure of limited-context-universal-adoption has also created rich areas for research, which have been explored with varying depth by scholars to this point, and are presented below:

- *Examination of non-adopters:* While most campuses boast adoption Facebook adoption rates robust enough to comprise essentially the campus population, the ~10-20% who do not adopt likewise comprise a sample of varying behavior. Little research has examined this population; Tufekci (2008) in one of the few studies found that non-adopters, perhaps unsurprisingly, express overwhelmingly negative and cynical attitudes both about Facebook users and their behaviors. This is an area in need of greater investigation.
- *Comparison of individual differences and behaviors across SNS contexts:* Several studies (Dwyer 2007) have begun to examine the differences between populations and behaviors between especially Facebook and MySpace. Facebook is found, unsurprisingly given its deployment, to be more college-oriented, with more present, past and future college students among its population, while MySpace users are less likely to be current, past or future college students (though a majority still are). Differences are also found in disclosure of information, especially personally-identifiable information, with Facebook users disclosing far more in the way of, e.g., address, phone number, etc.
- *Adoption of privacy behaviors over time*: One dynamic explored in many investigations of SNS usage concerns privacy behaviors, and the combination of multiple investigations (Gross and Acquisti 2005; Acquisti and Gross 2006; Ellison et al. 2007) and correlations of privacy behaviors with experience (Stutzman and Kramer-Duffield 2008) allow us to observe in general i) greater adoption of privacy behaviors over time, and ii) greater adoption of privacy behaviors with greater experience online.

This last finding points toward a significant contrast in user experience for current late-adopters to Facebook. Whereas new users were formerly greeted with a relatively wide-open area for exploration, they now find many profiles limited to "friends-only"; this may lead new users to become less inquisitive, less willing to explore and make friends online beyond their already-existent offline friendships, or generally less enthusiastic about the friend-acquisition phase of SNS membership (typically the highest-use period for any SNS user).

Early Facebook adopters could be assured that their profile would *only* be viewed by members of their immediate college or university community. This led to great disclosure of personally-identifiable information, including dorm room numbers, phone numbers, etc. (which at any rate, were available in campus directories), with most profiles fully viewable within that context. New Facebook users are now typically older, non-college students, and most profiles are viewable only in part or not at all to non-friends. Additionally, Facebook has introduced a friend suggestion feature to help new users find friends who are already signed up, either automatically (via an algorithm and analysis of friend links) or by suggestions of those friends. This dynamic also has the effect of curtailing the friend-acquisition process, though clearly the calculation that Facebook has made is that users with full networks of friends will now spend *more* rather than less time on the site.

This may very well be true (there are some indications that use time among longtime users may

be increasing following a period of decline), but little data exists on this issue. Or rather, little in the way of publicly-available data: Facebook knows very well exactly how much time all its users are doing everything, but they're not sharing. This presents a challenge for researcher of long-term dynamics of mediated sociability, and again introduces the limitations in data collection discussed above.

Some researchers (Stutzman and Hartzog 2009) have begun more explicitly examining the behaviors of late adopters to Facebook, especially among older demographic groups not typically studied by Internet researchers. Identification of behaviors and motivations among this group is especially important given their general absence from sites of mediated sociability thus far. What are the implications for a mediated sociability where face-to-face interactions are recreated and continued not merely between friends and classmates but also co-workers and family members across multiple generations? This is a question that flows many ways – it is not merely a factor of young people not wanting parents and bosses to see party pictures but the behavioral violations that these late-adopter populations can engage in. How to deal with the articles posted by your dearly-beloved-but-homophobic great uncle? Requests to play a silly game from a respected older colleague who wrote you a recommendation for your last job? As mediated sociability becomes further integrated with and indistinguishable from "regular" social interaction, it also becomes messier; these and similar questions are key areas for exploration for researchers going forward.

7.3 – Digital/Life in 2010

Given the focus of the previous several sections and sub-sections on the very particular use patterns of digital technologies and implications thereof, it is also worth zooming out to a broader picture of how these technologies flow together in a general portrait of digital life for undergraduates in 2010. Below, I review several aspects of how these technologies and uses interact.

7.3.1 - Mobile Digital/Life

Students are highly centered on their cell phones for social communication, especially on the text messaging capabilities of cell phones. One interviewee described the place of cell phones in the hierarchy of communications:

> JKD: Well if you're going to get in touch with one of your friends what would be the first way you would do that?
>
> AR: I'd say text message or Facebook message are most accessible... everyone always has their phone on them, everyone has text messages these days and they usually respond very quickly. Whereas if you call them they may not be able to pick up the phone, Facebook, they may not be at their computer, but *everybody* has a cell phone with text messaging. You don't have deep heart-to-heart conversations over text messaging, that just doesn't work, but if by primary you mean easiest of access, text messaging.

In addition to enumerating the hierarchy, students are also thoughtful about why these different uses exist:

> CS: I just recently got a BlackBerry, two months ago I guess. At first I was sort of overwhelmed by the amount of ways I could be contacted on this one device. Theoretically someone could write me a Facebook message, send me a text message, BBM me, text me, email me, Tweet at me, and call me all at one time all on this one device and it's just like [laughs] it's a little overwhelming when you think about it, it's just like you can always be contacted. They all have their individual uses, and sometimes I think about why I choose to use one instead of the other... When you Tweet something it's completely public, [but] that doesn't bother me, I feel like that's what Twitter's for, a public thing. But then on Facebook most of the features I use aren't public, things on my Wall and stuff like that, especially when I'm exchanging words. If I have something short I want to say, maybe I would send a text message. If it was longer, it would be a Facebook message. And then email is just sort of separate - more like my academic career sort of thing, I wouldn't send my friend an email, I'd send her a Facebook message.

These differences emerge from students' own intuitive senses of how to use a given communicative medium, from their experiences with it, and from the culture embedded already within any medium when an individual begins using it. Additionally, students are aware of not only the benefits but also the drawbacks of an always-on life:

> JKD: Would you say that there's a downside to all that multitasking, to always being on and connected?
>
> AR: Yeah - it's that it's hard to pull the plug sometimes. Sometimes you just want to completely shut it down, and you really can't because... I'm still required to have an e-mail address by the

> University, I'm still required to use Blackboard, and even if I completely delete my Facebook, a lot of the records will still remain there...
> On a day-to-day basis I don't really see that as much, but there are some times when I'm just like, I wish you could just disappear from all of it for a week and then come back. And you can't really do that.

This tension exists for all of us in different ways. For older adults who have lived most of their lives using different forms of communicative technologies, new tools and methods may seem alternately magical, bewildering and threatening. For these students, who are still in the process of forming a sense of self and figuring out how to relate to the world, change is inevitable because it is all they have known. New technologies are not some great threat: they simply are. For these students, there is no "before" to hearken back to, no time when they were anything like adults in the world and it wasn't an always-on net of pervasive electronic communications. For their younger siblings and children, this effect will be even more dramatic.

7.3.2 – Digital/Life and Legacy Technologies

Though they primarily focus their social communications through cell phones and social network sites, these students do still use more mature technologies as part of their communicative ecology. The median survey respondent in this research has seven years' experience with email, and is 20 years old. As Lenhart and Madden (2007) discuss, usage of communications technologies and especially tools for

mediated sociability changes dramatically between adolescence, the teenage years and young adulthood (or at least has done so in roughly the population under examination currently). Younger teens use communications technologies less, in a less intense manner, and more tentatively (especially regarding representation of self online). Email was already a mature technology when these users began using it, as part of early exploration of sociability and technology. Other modes of communication that are more central in students' lives include several modes of more recent vintage. I do not believe this is an accident, and will develop further the ways that these results suggest the kinds of cultures and uses that exist around any given communicative medium.

Landline phones are used as a secondary or tertiary communications method, perhaps as a way of not using precious cell phone minutes to call home, or as a medium for use of phone cards or collect calls so that students can cost-shift onto parents' bills. The basic story of landline phone usage at home is a simple one – kids start answering the phone when they can talk and understand how to go get their parents. A more interesting question is what happens in households – like those that these current students will begin to put together themselves – where a phone number is not for a residence but for a person.

Students are now well-experienced users of cell phones and Facebook as the core elements of their social and technological lives, but this is still a fairly recent development – only within the past four years for most. And while the well-established medium of email is not a central element of their

social communications, it is utilized for communications with professors and in other aspects of students' "professional" or "official" identities. Given the prominence of email in the business and working world, it seems likely to continue to serve a central communicative function for the forseeable future, though it is possible that the segregation of audiences by channel will only be accelerated by such a dynamic.

7.3.3 – Digital/Life and Identity

The maintenance of multiple personas for varying audiences is not a novel development. As discussed earlier in my review of foundational literature on the formation and maintenance of identity (see Section 2.1), scholars such as Goffman were dealing with the "presentation of self" decades ago. Therefore, it is worth revisiting several concepts raised in that review in light of my findings.

Berger et al. discussed the concept of "cognitive turbulence," which I argued is being re-introduced to contemporary life by the breakdown of these structured life-worlds as facilitated by "context collapse" in mediated social environments. Cognitive turbulence can be understood on both the macro level – individuals dealing with their shifting role in a changing society – and on the micro level – the imposition of ever more blinking lights, icons and gadgets demanding our attention. Johnson presented a similar idea in discussing "conceptual turbulence," which he defines as "the sense of the world accelerating around you, pulling you in a thousand directions at once." He offers that these technologies

provide a unique opportunity to address this turbulence, saying, "What differentiates our own historical moment is that a symbolic form has arisen designed precisely to counteract that tendency, to battle fragmentation and overload with synthesis and sense-making. The interface is a way of seeing the whole. Or, at the very least, a way of seeing its shadow, illuminated by the bright phosphor of the screen" (Johnson 1997, p. 238). The interface, in short – the central element of our techno-cultural moment – is a device to reduce cognitive load, reduce the pounding insistence of electronic culture.

One possible interpretation of my findings regarding the segregation of audiences by channel – and utilization of the interface as operating metaphor and symbol – is that students (either explicitly or implicitly) understand the cognitive demands of immediacy-based technologies such as text messaging. The importance of socialization and social communication is underlined time and again in their responses to each section of this dissertation research, and so in this reading, students' prioritization of friends and social goals is enacted by including them – and excluding other audiences and goals – from those most demanding and immediate modes of communication. This particular speculation is very worthy of further investigation, and opens several potential avenues of investigation regarding the particular ways in which students may be structuring their hierarchy of communications technology usage.

Berger et al. also offered the concept of "multi-relational synchronization," which they define as meaning that "the individual must keep organized in his mind not only a multiplicity of social relations

but also a plurality of careers that are relevant to his own life" (Berger et al. 1973, p. 71). Following on my findings, it is even more clear that SNS are a method of multi-relational synchronization, with the use of filters, tagging and untagging as affordances for users to both keep organized a range of social relations and present both professional and social selves to various audiences. While it is not possible for students to keep every single one of their (on average) 600 friends at hand and in mind at any given moment, through use of both the interface of Facebook and the affordance of tagging, it is possible for technology to serve as a reminder of those contexts not immediately relevant. De Kerckhove uses the analogy of a phantom limb when discussing these technological affordances, something "never quite integrated into our body or mind functions, but never really out of our psychological make-up, either," and it is an apt one.

De Kerkhove also discusses the transition of technologies from the new to the banal, saying, "It seems as if every major technology, before achieving saturation levels in the cultures has had to go through two basic stages: first to be in stark evidence; second to be interiorized to the point of invisibility" (De Kerckhove 1995, p. 97). To young people, online identity is entirely unremarkable, invisible as an "other" thing. They suffer little in the way of externally demanded cognitive load, as the actions and representations are to them automatic and implicit. The tools for interfacing with online identity, too, are becoming more and more interiorized – before long perhaps literally in a physical sense, as wearable and implantable computing becomes feasible – and the youth of tomorrow will find

socialization without technological mediation as unfathomable as the technologies themselves would be to their grandparents.

7.3.4 – Digital/Life Future Developments

For students graduating college, entering the workforce and beginning their professional lives, navigating the boundaries between work and professional identities and communications is a fraught process. Context collapse is not a potential occurrence but a lived-with reality; the formerly exclusive social domain of Facebook is awash in parents, aunts, uncles and potential and current employers. There remains, however, the necessity of maintaining safe and exclusive spaces where young people can socialize and develop their personal (not professional) relationships. If Facebook's recent moves to restrict users' ability to maintain these boundaries are sustained, then young people will find different ways and spaces to interact.

The reliance on mobile phones as a hub for socialization points in a probable direction for these processes. Unlike SNS where users' profiles are publicly accessible both within the service and on the public web generally, communicative access on phones is still controlled by the end-user both technically and in terms of social norms. There are no public listings of cell phone numbers, and social conventions still dictate a warranted degree of skepticism from recipients of phone calls from unknown

parties: if you didn't give someone your phone number, they either won't have it or you can ask how they got it. Reliance on such a medium for social interactions returns a degree of control and privacy to individuals that many prognosticators and technologists have recently ballyhooed as being dead. Absent the rise of forums for mediated sociability which can duplicate this dynamic, expect continued increasing reliance on mobile telephony for the segregation of audiences and intents.

One area of considerable discussion and some worry over the last several years with regard to mediated sociability has been the disclosure of large amounts of personal information online, often via SNS. While users have been and are aware of the permanence of this data (as my investigations again underlined), it has also been an excellent opportunity for researchers to access certain aspects of the performance of identity. This data, however, is most useful when it is examined in concert with more thorough investigations of user perception and behavior, via not simply data scraping but also interviews and surveys. And while the particular data disclosed by users on SNS will have a level of permanence both publicly and on the SNS providers' servers, user behavior and identity expression shift so rapidly that it is of some question how valuable this data will be either economically or academically in several years' time. This is especially true if users move on to other media for their social interactions, and the particular medium of cell phones presents a challenge for those researchers who have come to rely on large data sets of publicly available data. Cell phone and text message logs are not publicly available, and assessing the kinds of communications performed there will require researchers to move back towards more ethnographic and qualitative research methods. Even failing a wholesale move of

sociability, this increased focus on contextualizing behaviors would be a desirable development in the study of mediated sociability. The next and final section will focus on reviewing the findings of this dissertation and suggesting possible future areas and directions for research in mediated sociability generally and in my academic career more specifically.

8 - Conclusion and Future Research Directions

The goal of this research was to investigate uses and perceptions of tagging among undergraduate students. While there has been much research into and enthusiasm surrounding tagging and folksonomies in recent years, and substantial research into the uses of technology and mediated sociability among undergraduates, little research has addressed both in concert. This dissertation research found that, supporting my hypotheses, undergraduate students are generally unfamiliar with the information-organization aspects of tagging and do not extensively use those sites and services focused around that aspect of tagging. Rather, undergraduates are familiar with and use tagging almost exclusively within the context of Facebook photo tagging, which they use primarily as a tool for social communication and recognition. However, information organization is a subsidiary use of Facebook photo tagging, in the collective curation of online photo albums, and this suggests that while most students do not currently use tagging and folksonomy-based approaches to organizing their information, there is a "way in" for educators and developers seeking to implement systems with tagging components.

As discussed earlier in this dissertation, there are three themes central to understanding this work and which have structured my investigation: *meaning*, *use*, and *experience*.

- *Meaning* concerns the basic (but fundamental) definitional issues concerning the practice(s) of tagging, and is not simply an issue of semantics. Understanding what students mean when they say, hear and think about (or not, as the case may be) tagging is crucial understanding its place in the spectrum of technology practice, and it is only by asking for these meanings explicitly that a fuller and richer context can emerge.

- *Use* follows in part from meaning but is also an independent variable for consideration, as perception and action are not always aligned – individuals do not perfectly know their own minds, or actions. Exploring the sets of uses and practices regarding tagging helps further contextualize it within the larger scope of technology practice, and can help explore possible re-use beyond intended uses.

- *Experience* is a further area for investigation in constructing a model for technology practice and understanding the whys and wherefores of tagging. Placing tagging in an ecosystem of behaviors requires investigating not only fixed but temporal elements, to determine how tagging is utilized by experts and novices alike (or if this is a distinction worth making).

Placing these investigations and findings within the context of the above themes has been of great use in structuring my thinking about the relevant issues, and in best identifying the relevant findings. With those factors in mind, below I review my research questions and hypotheses, and evaluate the degree to which they have been supported through my investigation.

8.1 – Hypothesis Testing

This section revisits the hypotheses offered to predict results, research questions which structured this investigation, and assesses the degree to which hypotheses have been confirmed or not, briefly discussing implications following from these results.

8.1.1 - Hypothesis Testing: H1

The central question of this research had to do with how tagging is perceived and used by undergraduate students. It was a motivating area of interest because despite the range of research studying undergraduate students' patterns of mediated sociability, and the many studies investigating tagging and folksonomies, there was not extensive research at the intersection of these literatures. Given these factors, my hypothesis could not be based on a rigorous theoretical model but rather on my initial research (Stutzman and Kramer-Duffield 2008 and 2010), anecdotal observations and awareness of the larger context of undergraduate information tools use. Thus it was proposed that:

H1: Tagging is generally viewed as a discursive social activity

From the results presented of this investigation, this hypothesis is well-supported. When asked directly, respondents were much more likely to view tagging as used for social purposes (43%) than academic

purposes (4%). In the Uses and Gratifications section, open-ended responses were overwhelmingly comprised of social uses, and the first two factors in the scale-based responses to the U&G section were social factors, as shown in Table 58 and 59, below.

Table 58 – Uses and Gratifications Factor 1

Factor 1: Social Photos	Item Mean	Standard Deviation	Loading
Sharing photos	5.13	1.30	.786
Being able to see my friends' pictures	5.08	1.24	.830
Laughing at funny pictures	4.77	1.40	.576
Reliving the memories	5.20	1.36	.753
Getting tagged	4.26	1.55	.542
Others get to see my pictures	4.47	1.50	.647
Letting people know they're in a picture	5.13	1.42	.634
Keeping in touch with friends	5.79	1.19	.681

Table 59 – Uses and Gratifications Factor 2

Factor 2: Social Recognition	Item Mean (SD)	Standard Deviation	Loading
Recognizing people	5.16	1.21	*.583*
Being able to recognize people in photos I don't know	4.38	1.53	*.761*
Identifying friends and groups of friends	4.67	1.50	*.809*
Linking people together	4.63	1.50	*.843*
Reliving the memories	5.20	1.36	*.753*
Acknowledging friendship with someone	4.37	1.58	*.726*

These results were further confirmed in the interviews, where students identified social uses of tagging – specifically, Facebook – as the main or only use of tagging with which they were familiar.

The research was structured around the central research question relating to the activity and population, namely:

RQ1: What does tagging mean to undergraduate students?

This research question followed from my work with the Bot2.0 team, investigations of mediated sociability more generally, and review of relevant literature in mediated sociability and tagging. As a sub-question within this line of research, I also determined to examine the differences in tagging perceptions based on use of different tagging systems:

RQ1a: What are the differing conceptions of tags and tagging for students based on experience with different social media interfaces (e.g., Facebook versus Flickr, Delicious, etc.)?

There was insufficient data for a meaningful answer, as use of tagging among this population is so concentrated within the context of Facebook that there is no useful way to compare across contexts.

8.1.2 – Hypothesis Testing: H2

The second area for research concentrated less on definitional issues and more on the particular uses of tagging among undergraduates. As with H1, the relevant data for offering a hypothesis on what

student uses of tagging may be flows largely from my own research and experience, and thus is was similarly offered that:

H2: Tagging is primarily used as a tool for social grooming and communication

The data is similarly unambiguous on this hypothesis: tagging, to the extent that it is used or thought about by undergraduate students, is in very large part or exclusively a tool for social grooming and communication (see again above Table 58 and 59, above pages). To the extent that information organization and categorization uses of tagging are employed, they are likewise done within this context, in the collective curation of digital photo albums on Facebook (as shown in Table 60, below).

Table 60 – Uses and Gratifications Factor 3

Factor 3: Personal Organization	**Item Mean**	**Standard Deviation**	**Loading**
Organization	4.49	1.55	*.804*
Ease of Use	5.14	1.38	*.783*
Being able to automatically find something I'm looking for easier	5.05	1.47	*.806*

Investigation of this hypothesis was structured around the question of activity:

RQ2: What are undergraduate student uses of tagging?

More specifically, I also explored the academic and social uses of tagging:

RQ2a: What are undergraduate student uses of tagging in their social lives?

RQ2b: What are undergraduate student users of tagging in their educational lives?

Academic uses of tagging among undergraduates were found to be basically nil. Social uses of tagging revolve around the two factors revealed in the Uses and Gratifications section of the survey, Social Photos and Social Recognition. Tagging is a way for students to let people know and remember – a "Tag, you're it" – and photos are the objects around which these practices revolve.

8.1.3 – Hypothesis Testing: H3

A third area for consideration identified at the outset of this investigation was the context of tagging behaviors – who tagged? It was proposed that

H3: Use of tagging and tagging systems for information organization goals is predicted by technological experience

The extent of tagging as behavior being located within the context of Facebook rendered this avenue of investigation largely irrelevant. Nearly all students reported tagging and untagging within Facebook, and few enough reported doing so outside of Facebook that no meaningful contrasts can be

drawn. For these undergraduate students, tagging *is* Facebook photo tagging, with 92% of students posting photos on Facebook, 33% posting on MySpace and only 13% posting on Picasa and 10% posting on Flickr. Of survey respondents, 95% reported posting photos online – meaning virtually all who posted online did so on Facebook – with 91% reporting adding descriptions to their photos online (and and 72% adding descriptions to friends photos), and 88% untagging themselves from photos online.

The research questions structuring this avenue of investigation were:

RQ3: What are the contributing variables predicting greater student use of tagging and tagging systems?

RQ3a: Does greater technology experience predict greater use of tagging and tagging systems?

RQ3b: Does greater SNS experience predict greater use of tagging and tagging systems?

While these avenues of investigation were not found relevant in this population, they should be kept in mind in further investigations of other populations.

In sum, H1 and H2 were supported well throughout the data in this investigation: tagging is viewed and used almost exclusively as a tool for social and communicative purposes, and not for academic purposes. H3 was found not to be a relevant hypothesis given the overwhelming centrality of Facebook in students‘ tagging behaviors and definitions. In the remainder of my dissertation, I will

discuss the implications of these findings for future research both in general and in my own future research directions.

8.2 – Limitations

This dissertation research was limited by the general known constraints of time and population size. The results hold for the particular population of UNC undergraduate students at this point in time, and may be an indicator of the undergraduate students across the nation, though less clear for the general populous. Even so, the results should not be generalized substantially.. The low response rate in general is also to be noted, as well as the especially low response rate from the male students in the population (though this tends to be true in general of similar populations).

Additionally, there is the issue of the particular term "tagging" and the degree to which student understanding and definitions of the term are merely or entirely artifacts of a particular interface and set of experiences – in this case, Facebook. Though exploratory questioning in the interviews revealed a fairly low level of consideration for issues of information organization and metadata usage among the students, it is also without question that for this student population "tagging" means "Facebook photo tagging," and so remains possible that some subsidiary usages of tagging-like information-organization strategies were lost in this conflation of terms. Subsequent investigations may counteract this conflation

by approaching the issue sideways – especially during interviews – by first asking broader questions about the uses to which tagging is put without necessarily using the term itself.

Tagging is itself a fairly new term in the context of social information-organization literature, raising the further question of just how to determine familiarity with the range of terms repurposed for description of activities in technologically-mediated spaces. "Surfing" the Web is a well-enough-established coinage that it can be assumed most computer users understand it, and understand it in more or less the same way (despite the basic inaptness of the metaphor). But "tagging" is almost certainly not at the same level of agreed familiarity, and if it is anywhere close that is due to the near-ubiquity of Facebook – where, as discussed at length in this dissertation, tagging has a particular, limited meaning that does not entirely map to the understanding of tagging in the information organization literature. My view is that these kinds of discrepancies are inevitable both with new phenomena generally and especially with activities and behaviors in technologically-mediated spaces. Lacking a physical location, these spaces necessitate metaphors (as Johnson so ably discusses in *Interface Culture*), which in turn insures that users will have (at least initially) varying interpretations of just what those metaphors mean, and thus what is constituted in certain behaviors. The solution is to perform further and more detailed ethnographic investigations to best detail the range of conceptions, especially of new behaviors and practices.

Despite noted limitations, the contributions of this dissertation are evident. This research provides a protocol and set of instrument for examining user perceptions on tagging, which will be of great use for researchers, designers and educators going forward. This research also provides data on beliefs and uses of tagging in an undergraduate population, which is a new contribution. Further research within this population at other undergraduate institutions is therefore suggested, as well as graduate student populations and non-student populations. These further studies would help to complete the picture of tagging practice in larger populations outside of the specialist communities of, e.g., Flickr and Delicious.

8.3 – SNS Research Directions

In addition to the central research questions regarding beliefs and uses of tagging, this dissertation research explored the shape of communications practice among undergraduates, and found a complex ecology of uses, with different technologies and channels used depending on audience, context and intent. While not the primary focus of this investigation, I believe these findings both help establish important context for understanding the main findings and suggest many fruitful avenues of future research, which will be explored in greater detail below.

In the course of this dissertation and my research generally, I have repeatedly focused on the benefits of a multi-disciplinary approach to investigating issues of mediated sociability. While I tend to

be skeptical of either techno-utopian or techno-dystopian views that present the Internet as either uniquely awesome or uniquely awful, I do believe that mediated sociability offers an unprecedented opportunity for researchers by presenting a context that is simultaneously technologically novel and fully human. The greatest take-away from my investigations of mediated sociability thus far is that it is an examination of, basically, people being people – in all the great and awful ways that people behave. The main opportunity for researchers investigating mediated sociability is the great mass of humanness on display. More than anything else, it is this focus on humanity that I hope to retain in my own research and promote in any research agenda: treating the subjects of research not as data points in a social graph or deterministic cogs of a social machine but as people, thinking, feeling and striving.

An open question remains: where will SNS research, or research into mediated sociability generally, live? Is there a particular field or group of researchers who will formulate a unified Internet Theory, and after whose lead others will follow? Or will research into the wide range of questions raised by mediated sociability be addressed independently by disciplines in the social sciences and humanities, each following its own theoretical and research traditions? The answer is most likely somewhere in between, but I would also offer that as a field, Library and Information Science is well-positioned to be the central hub of SNS research and cross- and multi-disciplinary research into social media: if we want it.

Library and Information Science (LIS) is particularly well-positioned as a hub for SNS research

for a number of reasons, beginning with the traditional focus on the users of information systems. Individuals are viewed not as components of deterministic systems either technological or social but rather as agents navigating both of these contexts and also advocating their own needs and desires, and this general conception of identity is the one I have formulated and endorsed in my own review of literature. By acknowledging the importance of both technological and social systems and being able to speak knowledgeably to these contexts, LIS can be an ideal site for collaboration between more technically-minded approaches (e.g., computer science, CMC) and more socially-oriented approaches (e.g., communication studies, media studies, anthropology, sociology).

Whether LIS or another discipline ultimately becomes the primary site of SNS research and/or collaboration, research into social media will most certainly continue and continue to grow across a wide range of other fields. Both computational and ethnographic approaches will be used, though it is worth investigating in greater detail just what these approaches may or will look like in the future, and both present and possible future limitations to these lines of research.

Unlike more established disciplines and sub-disciplines (e.g., CMC, social capital), there is less uniformity in both intellectual heritage and approaches to research in the early literature on SNS. Part of this is explained by the relative youth of the line of investigation, but it also owes to the varied backgrounds of researchers. Some hail from sociology, some from communications studies, others from anthropology, politics, computer science or technology entrepreneurship. Given my own background

and lack of self-identification with a particular academic research tradition, this is a context which seemed to make sense, and where I felt I could make a contribution. As I have become more properly established in and aware of various research traditions, this judgment has been reinforced by what I see as the appropriateness of a multi-disciplinary approach to SNS.

As researchers lack access to user-log data, longitudinal data on SNS use patterns must be collected in a fairly time-consuming manner, involving either repeated interviews or users opting in to monitoring of their usage. The former limits sample size severely given limited researcher time, and the latter creates significant questions about generalizability given the self-selecting nature of the sample. Given these limitations, two possible areas for future research are suggested:

1. *Examination of non-adopters:* While most campuses boast adoption Facebook adoption rates robust enough to comprise essentially the campus population, the small number (especially small in this study, though perhaps owing in part to the nature of the solicitation) who do not adopt likewise comprise a sample of varying behavior. Little research has examined this population; one of the few studies (Tufekci 2008) found that non-adopters, perhaps unsurprisingly, express overwhelmingly negative and cynical attitudes both about Facebook users and their behaviors. This is an area in need of greater investigation.
2. *Comparison of individual differences and behaviors across SNS contexts:* Several studies (Dwyer 2007) have begun to examine the differences between populations and behaviors between especially

Facebook and MySpace. Facebook is found, unsurprisingly given its deployment, to be more college-oriented, with more present, past and future college students among its population, while MySpace users are less likely to be current, past or future college students (though a majority still are). Differences are also found in disclosure of information, especially personally-identifiable information, with Facebook users disclosing far more in the way of, e.g., address, phone number, etc. My own investigation found a surprisingly large number of students using Twitter, and interviews confirming that norms of Twitter updates differed significantly from the similar-in-form Facebook Status Updates. Investigating in greater detail the divergences in behavior across contexts is worthy of greater focus.

It is important to note that what I see as a key benefit of SNS research – its contextualization – also functions as a key limitation, or at least caveat. Both this investigation and most of the research I have reviewed focuses on a given community of users in a given time and place, and both can and should not be generalized extensively beyond that. This highlights the need for both greater resources and coordination among SNS researchers, to better paint a wider and ongoing picture of practice among more users and across time, but that is a different discussion. Even given these limitations, however, a pattern and a story emerges from the body of SNS research conducted to date.

It seems likely that SNS research is at or nearing a turning point. As once-novice researchers themselves become established and the body of literature grows, both the benefits of credibility and the

dangers of calcification increase. The relatively unsettled and wide-open nature of SNS research to this point will fade as consensus emerges on certain points, but it ought not fade too far. While Facebook continues in both growth, popularity and stability with no apparent challenger, even a basic reading of technology and Internet history suggests that it is unlikely to remain the case in five or 10 years – forever in Internet time, but a short span in academic discourse. Indeed, recent changes in Facebook privacy policies have set off a wave of public recrimination and prominent Internet figures deleting their Facebook profiles, and while time will tell if this is merely a negative blip or the start of something bigger, it is possible to now imagine a world beyond Facebook in a way that was less conceivable even several months ago.

The positioning of the user and research subject in the general research program of a discipline or research approach is a key aspect of its applicability to mediated sociability. My dissertation research reflected this belief by focusing not simply on the basic and narrow questions of tagging behaviors but also the larger context of mediated sociability and the ecology of communications technologies used by undergraduates. And it is a good thing that I did so, because my initial hypotheses regarding undergraduate beliefs and uses of tagging were confirmed beyond even my suspicions. Tagging is a behavior that for most undergraduates takes place only within Facebook, and mostly for social and communicative purposes; thus, gathering data on their use of Facebook and more broadly on their communicative practices was necessary in order to understand the fuller context of tagging within their experience of mediated sociability. It is for these reasons I believe computational approaches are

insufficient for understanding the full context of SNS. By treating an SNS, its users and their connections and taste preferences simply as tokens for mass analysis, the *why?* is lost entirely; explaining x in terms of y does not tell the whole story, even if it is done within a 95% confidence interval.

However, one potential avenue of large-scale computational research would be based on human coordination. If teams of researchers dispersed across the country in a set of representative (or something like it) locations could agree to a common set of research and survey questions to deploy either independent of or in concert with their other ongoing work – a distributed "General Social Software Survey" – the data aggregated together could potentially comprise an ongoing generalizable sample of SNS behavior. Through repeated administration of such a survey, this data could then be tracked over time, providing a critical (and to this point, nearly absent) element of longitudinal data to the study of SNS. The formulation of a common set of questions and coordination of a range of research teams would hold all the general dangers of cat-herding efforts, but if implemented would provide a real advance in the state of knowledge and research for all SNS researchers. As more and more sociability and interactions move to mobile devices where the interactions are not necessarily part of the public web, this coordination will only become more important.

Mediated sociability introduces many novel considerations and possibilities for ethnographic research. Widespread adoption of SNS and social media all but guarantees that future ethnographic

investigations will need to view the position of participant-observer in a substantially different light. And increased sophistication in computer programming introduces the possibility of computationalizing ethnography itself. Some initial investigations have been performed using a programming script for recruiting and interviewing users over ICQ. As interfaces improve and the CMC literature provides additional detail how users treat computers socially, it may become possible to perform semi-structured interviews in a mass and automated manner via an array of methods, including instant messenger interview and even audio dialogue, with a responsive script presented in a text-to-speech manner using VOIP phone interviews.

The continuing and self-reinforcing rise of subcultures (some would argue that there is already no unified culture, only a set of large subcultures) will also present problems and opportunities for future ethnography. Greater communication and ties between online affinity groups leads to more opportunities for investigation of contextualized belief and practice, just as the waning idea of a mass culture calls into question the idea of generalizability.

8.4 – Conclusion

I believe that future investigations of SNS ought to be conducted within the framework of a collaborative and multi-disciplinary approach that incorporates both ethnographic and computational

approaches. By each in turn informing the other, better, fuller, and more thoroughly contextualized research is possible. I expect that this approach will be adopted by some research teams (of which I hope to count myself) and not others.

Additionally, there are some questions that are both particular to given fields and not others, and which are better addressed using one methodology and not another. I would not expect computer science researchers to be concerned with a Foucaltian analysis of gender or sexuality self-presentation in SNS, not would I expect anthropologists to examine in detail the power-law dynamics of collaborative tagging. As further interest in research of social media develops, and as more research generally moves into a computer-mediated context, each field's interests and lines of inquiry will be explored in terms of mediated sociability.

My great concern is that the lines of inquiry become so diverse that the collective knowledge of Internet researchers is not transmitted or acknowledged across disciplinary boundaries. There is already some evidence of this tendency, documented and anecdotal – researchers unaware of previous work outside of their discipline in mediated sociability claiming that no work exists there, or being unaware of basic realities and constraints of online research (e.g., sociology researchers expecting user log access on Facebook). This lack of consensus, communication and awareness does a disservice to all, wasting the time of those researchers new to investigations of mediated sociability and failing to acknowledge the pioneering work of those who have been establishing the basics of conduct online.

There is no easy answer. I have said before and will say again that I believe research of mediated sociability is at something of a crossroads, and there are many potential directions from here. There will be no single answer or path, either, and even were I able to rule by diktat I would not presume to know the single right answer. What I endeavor to do in both my proposed dissertation research and my research career going forward is to implement and promote an approach that incorporates the best of many fields in their investigation of questions relating to identity and mediated sociability, and to work across disciplinary lines to institutionalize this approach and awareness to the greatest degree possible.

9 – References

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Appendix I – Survey 1 Questions

General Communications Technology Usage:

For these three questions, please rate each mode of communication from 1 to 5 in its frequency of use, with 1 being "never" and 5 being "every day"

How do you communicate with your friends
[* Email * Call on landline phone * cell phone * In-person * text message * IM * Messages through Facebook/MySpace]

How do you communicate with your family?
[* Email * Call on landline phone * cell phone * In-person * text message * IM * Messages through Facebook/MySpace]

How do you communicate with your instructors?
[* Email * Call on landline phone * cell phone * In-person * text message * IM * Messages through Facebook/MySpace]

[Matrix Question in Qualtrics]

Social Media Usage:

Which of the following social networking sites do you belong to? (check all that apply)?
[*Facebook *MySpace *Friendster *Orkut *Don't belong to any *Other (please indicate)]

About how many total Facebook friends do you have?
0 = 10 or less, 1 = 11–50, 2 = 51–100, 3 = 101–150, 4 = 151–200, 5 = 201–250, 6 = 251–300, 7 = 301–400, 8 = more than 400

In the past week, on average, approximately how many minutes per day have you spent on Facebook?
0 = less than 10 minutes, 1 = 10–30 minutes , 2 = 31–60 minutes, 3 = 1–2 hours, 4 = 2–3 hours, 5 = more than 3 hours

Please indicate how strongly you agree or disagree the following statements about Facebook
[1 = strongly disagree to 5 = strongly agree]

Facebook is part of my everyday activity

I am proud to tell people I'm on Facebook

Facebook has become part of my daily routine

I feel out of touch when I haven't logged onto Facebook for a while

I feel I am part of the Facebook community

I would be sorry if Facebook shut down

Tagging:

Have you ever posted photos on a web site such as Flickr, Webshots, Facebook, MySpace, or other?
[Y/N/DK]

If so, which site[s] have you used?
[*Flickr * Webshots *Facebook *MySpace *Other (please specify)]

Have you ever added descriptions to your photos online?
[Y/N/DK]

Have you ever added labels or descriptions to a friend's photos online?
[Y/N/DK]

Have you ever untagged yourself from a Facebook (or other) photo?
[Y/N/DK]

If so, how often have you done this? [*Once *2-4 times *5-10 times *10 or more times]

Have you ever asked someone to completely remove a Facebook (or other) photo containing your image?
[Y/N/DK]

If so, how often have you done this? [*Once *2-4 times *5-10 times *10 or more times]

Have you ever asked someone to make private a Facebook (or other) photo containing your image?
[Y/N/DK]

If so, how often have you done this? [*Once *2-4 times *5-10 times *10 or more times]

Have you ever used other software or websites that use "tags"?
[Y/N/DK]

If so, which software or website[s] have you used?
[*Flickr * Delicious *Connotea *CiteULike *Zotero *Other (please specify)]

Have you ever used the tagging features of these site[s]?

If so, how often to you use tagging?
[*Every time *Most of the time *Some of the time *Rarely *Never]

Do you in general view tagging as something you do in your social life?
[Y/N/DK]

Do you in general view tagging as something you do in your academic life?
[Y/N/DK]

Do you use tagging mainly for social activities or academic activities?
[*Social *Academic *Neither *Both equally]

Uses and Gratifications:

What is the first thing that comes to mind when you think about what you enjoy most when using Facebook?

What other words describe what you enjoy about using Facebook?

Using single, easy-to-understand terms, what do you use Facebook for?

What uses of Facebook are most important to you?

What is the first thing that comes to mind when you think about what you enjoy most when tagging?

What other words describe what you enjoy about tagging?

Using single, easy-to-understand terms, what do you use tagging for?

What uses of tagging are most important to you?

General Demographic:

Name
[First Last]

Sex
[M/F]

What is your age?
[numeric]

What is your ethnicity?
[Categories]

What year are you in school?
[Freshman, Sophomore, Junior, Senior]

Have you declared a major?
[Y/N]

If so, what?
[Free form]

Appendix II – Survey 2 Questions [Uses and Gratifications]

How important are the following uses of Facebook to you personally? Please answer from 1 (very unimportant) to 7 (very important)

Keeping in touch with friends
Keeping in touch with friends that aren't close by
Communicating with friends
Connecting to people
Photos
Seeing what my friends are up to
Ease of use
Event planning
Reconnecting with old friends
Communicating over distances
Community
Creeping
Fun
Meeting new people
Facebook Chat
Birthday reminders
Games
Information Sharing

How important are the following uses of tagging to you personally? Please answer from 1 (very unimportant) to 7 (very important)

Being able to see my friends' pictures
Sharing photos
Organization
Being able to see my pictures
Ease of use
Being able to automatically find something I'm looking for easier.
Laughing at funny pictures.
Letting people have access to photos that I've taken of them.
Recognizing people
Reliving the memories
Getting tagged.

Others get to see my pictures.
Being able to recognize people in photos I don't know.
Identifying friends and groups of friends.
Linking people together
Acknowledging friendship with someone
That only one person has to have a camera and everyone can see what photos they're in events
You can "stalk" someone via their tagged photos

Appendix III – Semi-Structured Interview Questions

General Technology Usage:

What kinds of technologies you use in school and personally, and what is relationship there?

Social Media Usage:

Are you a member of a social networking site? Which one(s)?

Do you use other kinds of social media applications – e.g., Flickr, Pandora? What for?

Tagging:

What's tagging?

What do you use tagging for?

Do you use tagging for organizing information? If so, how; if not, do you think you might?

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