A Study of Students’ Perceptions of the Use of Web 2.0 Applications in Higher Education

by

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A thesis submitted in partial fulfilment of the requirements for the degree of

Doctor of Education

in

The Faculty of Graduate and Postdoctoral Studies

(Educational Leadership and Policy)

The University of British Columbia

(Vancouver)

January, 2014

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Abstract

The study documented in this dissertation explores the views of adult learners in online university programs with respect to their relationships with interactive, web-based technologies in their learning, personal and work environments. These tools are more interactive than previous incarnations of web-based tools and, as a result, have become known collectively as Web 2.0. Simultaneously, students are using Web 2.0 in all aspects of their lives while pundits claim these same students are demanding the use of Web 2.0 in their learning environments. This confluence of trends is placing pressure on universities to include more Web 2.0 applications in learning environments. The challenge is that there is little evidence to support the notion that learners are demanding these tools. Moreover, it is increasingly clear that faculty and learners are not always prepared for the pedagogical and policy implications associated with the use of Web 2.0 in higher education.

To address these apparent contradictions, this study was designed to better understand the use of Web 2.0 in the learning process from the learners’ perspective. A mixed methods approach was used with stage one employing an online questionnaire consisting of 30 questions and stage two consisting of a 30-minute follow-up interview. The results of the study revealed that the adult learners studied are not demanding the use of Web 2.0 in their learning environments. Moreover, they show a distinct preference for the use of Web 2.0 in only one aspect of their lives. In other words, if learners use Web 2.0 in their personal lives they will then not be as likely to embrace it in their working or learning lives. Similarly, learners who use Web 2.0 in their learning environments will not be as likely to embrace it in their personal and professional lives. However, learners also recognise the value of Web 2.0 and feel the same pressures as faculty. As a result there is a marked fear of being left behind
if the learners do not embrace Web 2.0. And so adult learners come to Web 2.0 often reluctantly.
Preface

This study received approval from The University of British Columbia Behavioural Research Ethics Board on July 14, 2011. The certificate number is H11-00082. In addition, The Royal Roads University Research Ethics Board approved this study on June 1, 2011. Copies of these approval forms are in Appendices E and F.
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I would like to thank and acknowledge my committee members, Dr. Thomas J. Sork (Supervisor), Dr. Kjell Rubenson, and Dr. David Vogt, for their thoughtful guidance through the dissertation process. I would also like to thank the reviewers of this dissertation. The careful thought and feedback that the reviewers provided was very helpful to me. In particular, I would like to thank Dr. Sork for his helpful advice and responses to my many questions throughout this process.

I would also like to thank my fellow students in the 2007 cohort of the Ed.D. Program at UBC who have graciously given their support and have become friends and wonderful colleagues.

To the participants of this study I am forever grateful. The generous donation of your time and keen insights into the world of Web 2.0 made this study possible.

I would also like to dedicate this to the memory of my parents, George and Bernadette, who always encouraged me to pursue higher education, even with little formal education of their own.

Most importantly I would like to thank my family. My wife, Ining Chao, and my daughters, Emilyn and Chantal. Without their support and understanding I would not have been able to succeed.
Chapter One – Introduction

Defining Web 2.0

Web 2.0 is a concept that grows in popularity even as a precise definition of what it is becomes less clear. The term Web 2.0 is commonly used to refer to groups of web-based applications that are more communicative in nature than were earlier incarnations of the web. Whereas Web 1.0 was dominated by “pull” technologies like web pages, audio and video clips and animations, Web 2.0 is dominated by push/pull applications like Facebook, blogs and other social media. As early as the 1970s authors like Alvin Toffler (1970) were predicting similar trends in media whereby the media “model” would evolve from professional producers of content and passive consumers of content to more interactive producers and consumers (prosumers) of content. Specifically, Toffler predicted that the roles of producers and consumers of content would blur and merge into what he referred to as a producer/consumer or “prosumer”. In this fashion users would create and consume content equally. This model was difficult to imagine in the broadcast television and radio era, but is common with the advent of Web 2.0 technologies and applications. These ideas were later taken up by Tim Berners Lee, the inventor of the World Wide Web as we now know it, when he stated that, “I have always imagined the information space as something to which everyone has immediate and intuitive access, and not just to browse, but to create” (Berners-Lee, 2000, p. 69). In this context Web 2.0 applications refer to a class of Internet-based applications defined by how they are used as much as the technologies themselves. Web 2.0 applications like social media, blogs or podcasts, for example, centre on the idea that the content contained within is produced and consumed by the users. These applications, as Toffler predicted, break from the notion that one group produces content, while a wholly
separate group consumes content. With Web 2.0, content is produced and consumed by the same people. In this sense, Web 2.0 participants are engaging in the co-creation of content and can be said to be co-creators. This is exciting as it represents the first time in modern history where average people can both contribute to and consume content. Examples of technologies that are used as Web 2.0 applications include well known sites like Facebook or LinkedIn but also social book marking sites like Diigo, blogs like WordPress and podcasts.

There is some debate about what should be included within the Web 2.0 sphere. Learning management systems, for example, are arguably examples of Web 2.0 applications because they can utilise the producer/consumer model described above. However, such systems are so complex that they include many different types of applications all in one package and so, one could equally argue; they are not examples of Web 2.0 applications. For the purposes of this study any web-based application which is based upon an interactive, producer/consumer notion of content can be deemed to be within the Web 2.0 sphere.

**Defining My Practice**

This dissertation describes a study conducted as part of my Doctor of Education degree (Ed.D.) at the University of British Columbia (UBC). The Ed.D. is unique in its focus on educational practice and theory as opposed to only educational theory. As outlined in the program description: “The program is grounded in the belief that it is important for participants to engage in scholarly discourse about understanding, critiquing, and improving practice in educational settings” (UBC, 2012). It has also been described by Dr. Thomas Sork, Associate Dean of Education at the University of British Columbia, thus “the goal of the Ed.D, as it is conceived at UBC, is to go from practice to theory and return to practice” (T. Sork, personal communication, 2007). This basic premise is true of most Ed.D. programs,
however, the Ed.D. program at UBC takes this several steps further by framing the program around five key concepts – research, education, leadership, policy and ethics – with which students can examine their practice (UBC, 2012).

My educational practice has been wide ranging but has primarily focussed on the development and teaching of online courses for adult learners. These courses have employed a mix of face to face and online learning modes which has been both challenging and satisfying in my practice. My current practice centres around my own consultancy, Avant Learning, and is focussed on helping clients develop online learning courses and workshops as well as facilitating these same educational events. Most recently the majority of my practice, while still managed through Avant Learning, has been centred at Royal Roads University, a small primarily distance university located in Victoria, Canada, where I have been developing and teaching a variety of courses.

During the time of this study my primary role was to teach courses in the Royal Roads’ Justice Studies Department. My portfolio, however, has since expanded to include a new program in interdisciplinary study for international students. In addition to my work at Royal Roads I also teach a distance course in research methods for the United Nations High Commission for Refugees. As a result of this varied experience I have been fortunate to see the world of online education from the vantage points of faculty, designer, administrator, teacher and student.

My interest in the perceived value of educational technologies predates the educational practice described above by more than a decade beginning in the late 1980s when I was teaching in rural Zimbabwe. At this time there were funds made available through international aid agencies like the World Bank and the Canadian International Development
Agency (CIDA) to place information and communication technologies (ICTs) into Zimbabwean schools. I was hired to do research for such a project. During this study I felt that these projects were not thought through. I observed that decisions were made that seemed to run counter to what would have been considered good educational technology practice at the time. For example, basic questions like whether the target schools had electricity were often overlooked and so there were schools in rural Zimbabwe with the latest in computer technology but no electricity.

As my own education progressed I realised there were other challenges overlooked including how the ICTs would be used in these schools; assuming they could get them into schools with electricity. What training would be provided to the teachers and students? Who would support the technology when it inevitably broke down or needed updating? Perhaps most importantly, how would ICTs be used to support the learning goals of the schools and the communities in which the schools existed?

On returning to Canada and beginning my work in instructional design and management, I surprisingly found similar patterns of ICT use in Canadian schools. While we did not usually have the barriers typically found in Zimbabwe like a lack of electricity, as an instructional designer, I recognised that we did have similar patterns of overlooking the pedagogical value of using ICTs in education. We had been focusing on demonstrating that ICTs improve access to learning for people who might not otherwise have access to higher education. This is a powerful result in its own right and, I believe, makes using ICTs worthwhile. However, the evidence-based answer to the question of whether ICTs can help improve learning has dogged me for many years.
It was while considering these questions that I began to develop and teach online courses in various African countries on behalf of the Commonwealth of Learning as well as online courses at Royal Roads University. Early in this process I discovered that my students at Royal Roads in particular were surprisingly resistant to more advanced technologies being used in their learning environments. This baffled me since my students, while not usually of the stereotypical “net” generation, were very comfortable with using technology of all sorts. Moreover these were precisely the learners that benefitted the most from technologies as the vast majority of them would not be able to attend higher education were it not for online learning. To try to understand what was happening, I conducted a pilot study with my learners and I discovered that their resistance was deliberate and well thought out. Their resistance was not a neo-luddite response to new technologies. They were not lazy about learning new things. On the contrary, their resistance to using new technologies was a result of their belief that these newer technologies would not further their “real” learning and professional goals. That pilot study as well as my experiences and reflections as a faculty member, administrator and instructional designer, led directly to this study.

**Web 2.0 in My Practice**

Not wanting to miss current trends, faculty and instructional designers alike are under increasing pressure to incorporate Web 2.0 tools into their classes; especially online classes. The theory is that Web 2.0 “speaks to” educational principles that suggest learning outcomes are improved when teaching techniques and technologies allow for improved interactions.

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1 For the purposes of this document the words “class” and “classroom” will be used to denote all formal learning environments in higher education including face to face, online or blended environments.
between actors (Garrison & Anderson, 2007). Actors, in this case, refer to learner-learner interactions as well as learner-instructor interactions. Recent research by Bernard et al. (2009) add to this principle by noting that learner-content interactions are larger indicators of success in online learning environments than learner-instructor or learner-learner interactions (Bernard et al., 2009). It is precisely these types of interactions for which Web 2.0 applications were designed and one might assume that learning outcomes should improve through the deliberate use of these technologies. There is a growing body of evidence to suggest that this might be the case as a recent report produced by the US Department of Education attests (Means, Toyama, Murphy, Bakia, & Jones, 2009). More popular writers such as Marc Prensky have created a sort of “moral panic” in higher education circles claiming that we must immediately change our teaching and learning practices to meet the demands of the so-called net-generation (Prensky, 2001).

The bulk of the literature at the time of beginning this study had focussed on either barriers to incorporating Web 2.0 in the classroom or on the best ways in which to use these technologies in the classroom. The first category, barriers, focuses mostly on what are known as deficit arguments against using Web 2.0 in the classroom. Lack of resources and technophobia are cited most often as reasons for not using Web 2.0 (Tan, 2009). The second category, design implications and suggestions, comes mostly from the literature on instructional design and consists of case studies with suggestions for best practices² (Collis & Moonen, 2008; Moller, Foshay, & Huett, 2008; Snyder, 2009). There is also a growing body

² There were over 40,000 such publications in peer reviewed journals between 2009 and 2010 alone.
of literature prescribing theoretical frameworks for learning in Web 2.0 environments like connectivism (Siemens, 2008; Siemens, 2005) and frameworks for mobile learning.

**Research Gaps**

What is missing from this body of literature is evidence about whether we should be using these technologies in the classroom in the first place. Critical theorists have recently recommended caution about uncritically incorporating technology into the classroom (Feenberg, 2008; Warschauer, 2007). Both Feenberg and Warschauer argue that technology, while useful in promoting certain kinds of literacy, has the detrimental effect of reproducing existing power relations in society. In other words, technologies tend to be more accessible to those who are already literate and wealthy and so the information generated from technology literacy potentially places their users in a greater position of power. Feenberg takes this argument a step further comparing current trends in technological education with Marxian notions of the “impersonal domination” (Feenberg, 2008, p. 1) of education. Feenberg further argues that technology reproduces the rule of the few over the many because a technocracy will have efficiency as the sole determinant for success. Further, he worries that technology de-skills labour and then requires managers to oversee the process in the same way that genomics potentially reduces farmers to technical actors producing a form of technical imperialism. In the online world there are hints of this in the very language used: Students and learners become users, clients, or even terminal subjects, for example. In other words students are now decontextualized persons.

What is also often missing is the students’ perspective. While it might be possible to show that we *can* incorporate learning technologies in the classroom, this does not mean we *should*. Moreover, while it may be possible to show that learning outcomes are somehow
better by incorporating online learning and technologies in the classroom, this does not mean learners will embrace the new techniques or benefit from the new technologies. We don’t yet know in any systematic way how learners view using technologies in the classroom.

In many ways this study was inspired by a PhD dissertation completed in 2009 by Jennifer Tan which showed that high school learners are actually resistant to using these technologies in their learning environments. This was a surprising result given that these high school learners were precisely the demographic Prensky predicted would embrace modern technologies. What Tan found was that the learners resisted Web 2.0 technologies in particular for three broad reasons:

1. That they resisted technologies being used in their learning environments if they were already being used in their personal environments
2. That they would resist technologies if it was seen to not tie directly into their learning goals. In other words, if it was not obvious to them that using Web 2.0 would help them get a good grade then they resisted.
3. That they resisted using technologies that their peers were not using for fear of being “outed” as “geeky”.

While not a replication of Tan’s study, this study was certainly influenced by Tan and the ways in which common understandings of how learners use and adopt technologies might not always reflect reality leaving a gap in our understanding of key technological and pedagogical issues.

**Purpose of the Study**

As noted earlier, there is pressure on the education sector to introduce more technologies into the classroom with a particular emphasis on Web 2.0 applications. The
pressure comes mostly from two sources. The first is the notion that students use these tools in their lives outside of school and we, as faculty, have a duty to incorporate the tools in the classroom as well (Prensky, 2001). The second is premised on the idea that learning is a social process (Vygotsky, 1978) and so tools that support this process will necessarily improve learning outcomes. Further, it is posited that Web 2.0 tools are, by their very nature, social. Hence, using Web 2.0 tools in learning environments will improve learning outcomes because they are also social. There is some evidence to suggest that these technologies and modalities help improve learner outcomes (Means, Toyama, Murphy, Bakia, & Jones, 2009). The literature suggests that these improvements come about through increased access to materials and improved interactions with content and people. It has also been suggested that Web 2.0 technologies provide increased opportunities for deeper reflection about content (Bernard et al., 2009; Garrison & Anderson, 2007; Means et al., 2009; Siemens, 2005).

However, little is known about how students are reacting to the increasing use of Web 2.0 applications and how they are using Web 2.0 for education. The primary purpose of this study, then, was to develop an understanding of Web 2.0 in learning environments from students’ points of view. Quite simply, did students find these tools useful in learning environments? Or were they seen as a distraction from their actual learning goals? Or, worse, did the use of Web 2.0 applications actually hinder students' ability to achieve their learning goals? The study, then, was designed to inform my practice and will result in recommendations for practitioners such as instructional designers, course developers, instructors and policy developers.
The overall purpose of the study, then, was to develop an understanding of Web 2.0 in learning environments from students’ perspective. To explore this main purpose, I further asked:

1. What are adult learners’ Web 2.0 usage patterns in their learning environments? How do these patterns compare to their work and recreation environments?
2. From adult learners’ perspective, what is the pedagogical value in using Web 2.0?
3. How does adult learners’ motivation to pursue higher education affect Web 2.0 use?
4. How does peer influence affect adult learners’ Web 2.0 use?
5. How does freedom to use Web 2.0 outside the classroom affect adult learners use of Web 2.0 in classroom learning?
Chapter Two – Review of the Literature

Amid all the discussion about advances in technology over the last decade, there seem to be a number of trends converging in higher education that make using Web 2.0 in the classroom an attractive option. These trends tend to fall into one of three categories: (i) globalisation and the knowledge economy, (ii) learning models and preferences, and (iii) demographic changes. These trends influence the way people perceive many aspects of their lives from the way they work to the way they socialise to the way they learn. In this section I provide a review of the relevant literature on these trends as well as an overview of the literature on the diffusion of innovation. Literature on the diffusion of innovation is included in this section since the inclusion of Web 2.0 tools is seen by many as the latest in a series of web-based innovations in higher education (McLoughlin & Lee, 2008). Diffusion of innovation, both as a theory and in practice, is a useful lens through which to examine technological diffusion generally and web-based innovation in particular. Similarly, research on students’ perceptions with respect to technology and education informed my study and so this section will also highlight the latest findings in this area and connect these results to my study.

Trends

The Knowledge Economy and Globalisation

[Technology] allows distance educators to play an important role in the fulfillment of the promise of the right to universal education. At little or no cost, universities can make their content available to millions. This content has the potential to substantially improve the
quality of life of learners around the world. (Caswell, Henson, Jensen, & Wiley, 2008, p. 1)

This quote provides a glimpse into one of the more common arguments in the literature about why we should embrace emerging technologies. Technology, it is posited, will form a large part of the solution of how to educate millions of potentially disenfranchised people and, like much of the literature on using technology in education; the quote carries some urgency with it. The presumption is that if we do not embrace emerging technologies quickly and completely we will simultaneously do a disservice to learners and the world will pass us by leaving us in its digital dust. At its heart this is an economic and globalisation argument that suggests that we are missing an economic opportunity as well as denying economic opportunities to our students by not embracing modern technologies.

Traditionally education systems have focussed on fostering the development of citizens so they could participate in national and regional communities of living and working. In other words, the goal of education was to create citizens who were healthy and civically engaged. With the advent of information and communications technologies (ICTs) (and modern efficient postal services decades earlier) the prospect of creating international communities of living and working developed. Regional education systems continue to thrive, however, as noted below in the section on globalisation, they are influenced more by international pressures than ever before. Information crosses borders seamlessly now to the extent that we are not always sure where the information originated. This gives rise to notions like knowledge economy and globalisation.

**Knowledge economy.** The terms “knowledge economy” and “knowledge society” are often used interchangeably but they have different meanings. For the purposes of this
study the term “knowledge economy” refers to an extension of an information society as originally set out by writers like Peter Drucker (2008). In this case information, or knowledge, is an economic product and the use of this knowledge generates economic benefit. Knowledge societies are much broader but often include knowledge economies and, like knowledge economies, are seen as extensions of knowledge societies. Knowledge societies, in this sense, simply refer to communities that are knowledge based. These societies are not new and would include ancient societies such as Freemasons and weaving guilds from centuries ago. These are societies in the sense that they include a body of institutions and relationships within which people live and work. What is new is that they are no longer encumbered by geography or time in the exchange of knowledge (Peters, 2001).

Current discourses about international learning focus mostly on knowledge economies rather than knowledge societies. Traditional models of economics have focussed on the accumulation of capital which traditionally has meant labour and property. Capital now includes the acquisition of knowledge and the combination of knowledge and skills are now seen as one of the only sources of comparative advantage organisations, individuals and nations have over each other (Peters, 2001). This power struggle leads certain organisations to use their comparative advantage over others for national and economic gain. Recognising this relationship between knowledge, skills and power there has been an increased emphasis on education and the generation of new knowledge as a vital part of the economy. This has caused a restructuring between education, business and government where the emphasis is now on using education to create new wealth, new credentials and new technologies (Peters, 2001). This becomes obvious with a cursory look at a number of educational plans around
the world which now refer to providing greater choice in education as well as an emphasis on skills-based learning and knowledge management (World Bank, 2009).

As outlined by Peters (2001, p. 4), conceptions of the knowledge economy consist of numerous discourses including those of management and economics. He argues that teamwork, just in time production, continuous improvement, benchmarking and total quality management are all terms used equally in education as well as management models. High skill, high trust and increased employee involvement in the world of management translates to behavioural and cognitive-based learning in higher education. What a person knows is less important in the knowledge economy than knowledge know-how and know-who (Peters, 2001).

**Globalisation.** Much of the discourse about technology use in the classroom focuses on what amounts to educational reform (Daniel, 1996; Garrison & Anderson, 2007; Prensky, 2001). There was a time when educational reform was steeped in language about “philosophical and cultural origins of national education systems” (Carnoy & Rhoten, 2002, p. 1). More recently, such reform has been seen through the language of economic and social change including political economies, neo-colonialism and development. These were the beginnings of the economic view of education referred to earlier. These ideas have coalesced around a more global idea; that of globalisation, and many of the policy issues surrounding technology and education are concerned with the perceived or real effects of globalisation on world societies.

The use of the term ‘globalisation’ has become a flash point for people of vastly different philosophies. Interpretations range from those who believe globalisation is simply the increased connectedness between peoples across the globe to those who believe
globalisation is “the direct consequence of the expansion of European cultures across the world via settlement, colonialisation and cultural mimesis” (Waters, 1995, p. 3).

One idea that both sides of the globalisation debate do seem to agree on is that knowledge and information are drivers of globalisation. What is less clear is whether the opposite is also true. Does globalisation inform or transmit knowledge and information? Carnoy and Rhoten push this question further by asking “To what degree does educational change represent regional, national or local responses to global economic restructuring, and to what degree do these changes represent international agencies’ intentions regarding these responses?” (Carnoy & Rhoten, 2002, p. 2). One would think that it should be the case that educational change, in this case educational technological change, should have changed with global change. This assumption is a result of the link some authors have made between globalisation and education (Yang, 2003). Writers like Sir John Daniel, recently retired from The Commonwealth of Learning, have argued that it is not the case. Sir John argues that globalisation and technology have changed little in education even in nations most closely associated with the global economy (Daniel, 2006). However, Carnoy and Rhoten (2002) point out that this only tells part of the story. In fact, globalisation does affect the classroom in more subtle ways through things like standardised testing, privatisation, choice, accountability and prior learning assessment. It is difficult for me to comment on these arguments as all of these issues regarding education reform and change existed long before globalisation entered the common consciousness. Hence, I am not convinced that Carnoy and Rhoten have identified globalisation issues or even globalised education issues so much as they have identified education issues.
The aspect of globalisation that people are most familiar with and the one that garners the most attention and the most fear is economic globalisation.³ It is clear that, for good or bad, economic globalisation has a profound effect on education. Writers like Yang (2003) argue that globalisation is almost certainly a negative force with respect to higher education and social institutions generally. He argues that the rapid expansion of the global higher education market is motivated by economics and greed rather than policy. This has resulted in a renewed view of higher education; one that is economic and standards-based that emphasises government and industry partnerships. This new view of education examines both the business of the university and the university as a business. In other words, education has become an economic activity. This view of education as an economic activity seems to reflect a long-standing debate in education about whether education is primarily a public or private good. Yang further argues that, as public perception has moved along a continuum from viewing higher education primarily as public to private, public policy (and the funding that goes along with it) has moved as well. Yang (2003, p. 279) further argues that public policy has moved to the private good side of the continuum resulting in a corresponding loss of public funding for higher education generally.

The result of this move to the private end of the continuum is that educational institutions have come under pressure to generate revenues and they have seen international expansion as the main route to survival in the globalised environment. Many Canadian universities have taken this a step further by envisioning global higher education networks (often through technology-mediated education) that will generate larger numbers of students

³ See The Council of Canadians website for more on this http://www.canadians.org/
(and revenue) without incurring comparable costs since students would not physically be on their campuses. Technology is often seen as a means to an end in this bid to compete economically and globally. The challenge with this view is that it presupposes that the primary, or only, motivation for education generally and higher education in particular is that of enhancing the economy. In other words, the assumption underlying these arguments is that the main reason people pursue higher education is to prepare themselves for the workplace, to get a better job, or to make more money. On the part of the institutions and governments that support them there is the assumption that the primary benefit of higher education will be scientific and technological innovation; which can then be parlayed into economic gain. Economic gain as a motivation for higher education is a completely valid and valuable goal. However, it only speaks to part of the picture. It ignores other motivations like citizenship, democracy, critical thinking and, above all else, happiness, the good life, or as the Ancient Greeks would have called it, eudemonia (Aristotle, 1987).

**Learning Models and Preferences**

A second trend that is influencing the use of Web 2.0 technologies in the classroom is the evolution of different models of learning. Until relatively recently our belief systems around knowledge creation and education centred on positivist and behaviourist models. Positivism is a philosophy of knowledge based on the view that in the social as well as natural sciences, information derived from measurement, and mathematical treatments of such information, represent the exclusive source of all authentic knowledge. In some ways this view of knowledge is both basic and obvious. We can make statements like \( E=MC^2 \), or that William Shakespeare wrote Romeo and Juliet or that it is raining outside my office right now. Typically these types of “truths” are not disputed and the idea that there is a “truth” out
there that can be understood by people has its origins at least as far back as the Sophist philosophers who pre-date Socrates. To the Sophists, this was not a simple idea. In fact, it was revolutionary as this was the first time (at least in the West) when human kind began to explore the notion that they could understand the world around them without ascribing it to God or Gods (Van Doren, 1991). More recently these ideas have been espoused by philosophers like Thomas Hobbes and J.S. Mill as well as scientists like Francis Bacon, Galileo and Newton, who took Plato’s notion of an objective reality further to include the idea that one could predict future realities using human senses combined with reason (Rorty, 1982; Van Doren, 1991). In this way positivists argue that their philosophical approach provides access to a pre-existing reality. The challenge that some philosophers have with positivist views of the nature of knowledge is that these views are often based on assumptions people make about the world (Rorty, 1982). In fact it is these very assumptions, Rorty argues, that make some people want to calculate and measure the world.

For curriculum and instructional designers this view of knowledge creation and transmission resulted in the development of models of instructional design based on behavioural learning theory (Jonassen, 1997). The underlying philosophy of behaviourist instructional models is that all learning is predicated on changes in behaviour. Using this philosophy, learning quadratic equations, like learning how to fix a flat tire, is a series of behavioural changes that can be taught in sequential steps. This behavioural method of instructional design was earlier espoused and popularised by noted instructional designers like Dick and Carey (1996) and Leshin, Pollock, and Reigeluth (1992). This has also been referred to as the Cartesian view of knowledge and learning which assumes that knowledge is a commodity to be transferred from teacher to student (Brown & Adler, 2008).
Constructivists, unlike positivists or behaviourists, maintain that our knowledge of the world is not “discovered” as a pre-existing reality but is, in fact, created by those people who study knowledge (Kinetchoe, 2005). Constructivism and now social constructivism, by contrast, posits that knowledge is collaboratively constructed and changes across time and context. Whereas in the positivist tradition the teacher aimed to transmit knowledge to the learner, in the constructivist tradition a teacher almost ceases to teach in favour of a more facilitative role. In this sense, knowledge and learning are co-constructed between learners and facilitators (Willis, 2009; Wilson, 1996). Implied in this interpretation is that what we learn is now less important than how we learn and can be summarised as “We participate, therefore we are” (Brown & Adler, 2008, p. 3).

This trend of education moving towards a socially constructed paradigm of teaching and learning forms the basis for the second argument about why emerging technologies should be embraced by the academy. This argument is that the very nature of teaching and learning is changing from a behaviourist ontological view of education to a more constructivist ontology. What this implies is that there is a trend to move from the idea that knowledge is “out there”, waiting to be disseminated by teachers and consumed by learners, to one where knowledge is seen as more socially co-constructed. It is this socially constructed view of knowledge and education that causes current writers like Terry Anderson, John Seeley Brown and Sir John Daniel to suggest that using technology, especially social media, is fundamentally at the heart of whether we will be able to exploit these new learning epistemologies (Anderson, 2005; Brown & Adler, 2008; Daniel, 1996). By using social networking technologies, faculty and instructional designers, it is argued, will be both emulating the social processes they want their students to learn as well as
providing a more stimulating learning environment. By way of analogy, it is like teaching someone to swim in a pool of water rather than in a classroom. By practicing social networking in our classrooms we are embodying the outcomes we would like to see in our learners. However, there is actually little evidence to support the view that embracing Web 2.0 in the classroom improves learner outcomes. Moreover, there is some evidence to suggest that a mismatch between administrative procedures (enrolment processes, grading and assessment policies etc.) and the use of Web 2.0-like technologies actually results in poorer learning outcomes and near hostility on the part of all users – teachers and students alike (Chao, Butler & Ryan, 2003; Caruso, Kvavk & Morgan, 2005; and Lohnes & Kinzer, 2007).

**Co-creators of learning.** A related, theoretical, trend is the idea that learners are now (or should be) becoming producers rather than merely consumers of knowledge. This trend was originally predicted in general terms by Alvin Toffler in his book, Future Shock (Toffler, 1970). Toffler predicted that society would move away from an information model where one group of persons would create knowledge and media and a separate group would consume said knowledge and media. This idea has been adapted and expanded by writers from various disciplines including journalism (Ruiz, Domingo, Micó, Dfaz-Noci, Meso & Masip, 2011), cyber-security (Fuchs, 2011), sociology (Comor, 2010), economics (Ritzer, Dean & Jurgensen, 2012) and education (Martin et al, 2011). Some authors argued that perhaps the predictions of the producer/consumer (or prosumer) movement are premature in the sense that it is an attractive concept and will probably occur someday, but, that as a society we are not currently acting in prosumerist ways (Ritzer, Dean & Jurgensen, 2012, p. 380). Ritzer et al equally point out that the concept of a prosumer may, in fact, be very old dating back to at least Marshall McLuhan and possibly to Karl Marx (Ritzer, Dean &
Jurgensen, 2012, p. 379). In fact, as Ritzer et al further argue, the concept of a prosumer might even be ancient as hunter-gatherer societies were predicated on a prosumer model (Ritzer, Dean & Jurgensen, 2012, p. 380). If you follow this line of argument then it is only since the time of the industrial revolution that we have thought of ourselves as a split society with one part producing and the other part consuming. In light of the broad history of human kind, then, this represents merely a blip in time.

In the case of social endeavours like education there does appear to be a trend towards a changing role of users. Users seem to be becoming more deeply involved in the process of production of knowledge and information generally such that the roles between producers and consumers of information are beginning to blur (Pascu et al, 2008, p. 39). As noted earlier this idea of individuals both producing and consuming information seems to be completely in line with the described potential of Web 2.0. As McLoughlin and Lee (2008) point out “In what has been called a culture of participation, the line separating consumers and producers of content is becoming blurred and we are witnessing a new wave of “prosumers,” very often learners, who are actively creating and sharing content and ideas” (McLoughlin & Lee, 2008, p. 10). Having said that there are some within the education field that feel the prosumer term has overly emphasised the economic side of producing and consuming content. To that end, writers like McLoughlin and Lee have adopted the term “co-creators” of learning or even or “Pedagogy 2.0” to better describe what actually takes place within the learning context (McLoughlin & Lee, 2008).

The example of Encyclopedia Britannica versus Wikipedia might be illustrative. Encyclopedia Britannica is an expert driven, traditionally- published encyclopedia with a long history of excellence and is well-known for its accuracy and validity of knowledge.
Wikipedia, by contrast, is a relatively new source of information developed using a prosumer model, allowing the users of the information contained therein to also create and edit content. One might assume that Encyclopedia Britannica, given its reliance on expert research and its long history, would be more accurate than a prosumer driven repository like Wikipedia. However, an investigation by Giles (2005) for Nature showed, in fact, that, at least for scientific topics, Encyclopedia Britannica and Wikipedia are similarly accurate. This has broad implications for the idea of a knowledge co-creation culture within education. It indicates that, given the right set of circumstances, it can work. The broader question is whether learning is improved using an approach to knowledge that uses co-creation and whether, Web 2.0 can be used to facilitate this knowledge creation model.

**Demographic Changes**

In 2001, Marc Prensky wrote his ground breaking paper “Digital Natives, Digital Immigrants”. This paper was among the first to explore the notion that the generation of young learners moving into higher education early in this century were fundamentally different from the generations of learners before them…different in the way they perceive the world, different in the way they interact with the world and those around them and, most notably, different in the ways in which they interact with technology. According to Prensky, the generation of learners entering higher education in the early years of the 21st century (and those that follow) are known as the “net generation” or “digital natives” as he characterised them. This characterisation arose from the observation that these young learners have always
had access to information and communications technologies (ICTs) and the Internet in the
same way that earlier generations had access to radio, television and newspapers. This
generation is digital while earlier generations are analog. Prensky further argued that this
distinction between the generations was significant in many facets of life, but most notably in
education. This created something of a generational gap, Prensky claimed, in so far as he
referred to a tension between digital natives and digital immigrants – those growing up
digitally being the natives and the rest of us being digital immigrants; having only started
using the technology later in life.

For Prensky, the educational implications of this generational phenomenon were
obvious. Educators needed to begin embracing emerging technology in their classrooms
immediately or risk alienating an entire generation of learners. This notion has been
supported by other authors including Anderson who argued (2005) that social software would
be the next “killer app” – implying that Web 2.0 would revolutionise distance learning in the
way that computer spreadsheets revolutionised accounting and finance in the 1970s. Oliver
and Goerke (2007) further explored this idea by claiming that the net generation’s “digital
backpacks” contained numerous tools designed to “keep the multi-tasking Net Generation
connected and ‘always on’” (p. 1). They further claim that

Unlike most of those who teach them, university students today are often
more comfortable working on a keyboard than writing in a spiral

For the purposes of this study, the terms ‘technology’, ‘ICTs’, ‘social software’, and ‘Web 2.0’ will
be used interchangeably to refer to a class of technologies that are web-based and allow interaction between
users.
notebook, and are happier reading from a computer screen than from paper in hand. Consequently, it is often the more interactive Web 2.0 applications enabled by these devices that younger users find more attractive. (p. 2)

Interestingly, many of the attributes of Web 2.0 are consistent with social constructivist ideas. Brown and Adler, for example, note that:

… the web offers innumerable opportunities for students to find and join niche communities where they can benefit from the opportunities for distributed cognitive apprenticeship. Finding and joining a community that ignites a student’s passion can set the stage for the student to acquire both deep knowledge about a subject (“learning about”) and the ability to participate in the practice of a field through productive inquiry and peer-based learning (“learning to be”). These communities are harbingers of the emergence of a new form of technology-enhanced learning — Learning 2.0 — which goes beyond providing free access to traditional course materials and educational tools and creates a participatory architecture for supporting communities of learners. (Brown & Adler, 2008, p. 13)

Brown and Adler push this notion further stating that, as educators, we must now speak not only of Web 2.0, which includes the kinds of knowledge co-creation tools described earlier, but also Learning 2.0 which is an as-yet not well-defined term that tries to describe how these Web 2.0 tools can be used pedagogically (Brown & Adler, 2008, p. 14).

And yet in some ways there is nothing new with these observations. Calls for increased use of technology in the classroom go back at least as far as John Dewey in the
1920s. Bijker, for example, notes that “Already in the 1920s, Dewey argued for radical changes in democratic institutions to accommodate them to what he called “the machine age” (Bijker, 2005, p. 18; Dewey, 1991, pp. 15-16).

And while it is certainly true that both digital natives and digital immigrants are using more technology and using it in a greater variety of ways it isn’t clear whether they are able to use these technologies in educational environments. Equally unclear is whether the “digital natives” are demanding that technologies be used in all aspects of their lives especially, for the purposes of this study, their educational lives. It is equally unclear whether digital natives or digital immigrants are even able to use these technologies in their educational lives.

**Critique of Current Trends**

To summarise, popular and peer-reviewed literature in the broad area of Web 2.0 technologies suggest that we need to embrace these technologies so we do not miss the “digital boat”. The reasons for this tend to follow three arguments:

- **Economic** – failure to embrace these technologies could result in an economic disadvantage for our students. Conversely, if we get a head start on using these technologies we will be in a position of economic advantage as will our students.

- **Empirical** – that Web 2.0 technologies fit like a hand in a glove to current learning models; notably constructivism and connectivism.

- **Demographic** – that the current generation of learners, the ‘net generation’, demands the use of Web 2.0 in all aspects of their lives including education.

The challenge is that none of these arguments has yet stood up to empirical testing as outlined below.
**Economic critique.** Economically, there is as yet no clear relationship between people’s ability to use Web 2.0 tools and any economic comparative advantage. In fact, recent studies like Anderson’s (2010) research with park rangers in the United States are actually showing the opposite trend that employers are looking more for people who can function outside the technology. So-called “prairie dogging” when employees physically get up from their desks to talk to people rather than sending emails to their colleagues across the hall is seen as a waning skill in today’s economy (Anderson, 2010). To be fair, Anderson’s article continues that this prairie dogging phenomenon is becoming increasingly virtual as our personal and professional networks expand globally. But the point remains that there is a concern among some employers that employees are increasingly unable or unwilling to work together without some technology mediation. The concern, from an economic perspective, is that this technological mediation will decrease productivity as people take longer to solve problems and complete tasks (Weatherbee, 2010). Anecdotally we have all experienced long email trails that could have been truncated and simplified with a single phone call or meeting.

**Empirical critique.** Empirically, there is little evidence to show that the use of Web 2.0 tools, at least in their current instructional and curricular designs, have any advantage in terms of learning outcomes over other technologies nor over no technology at all. In fact, this line of argument has been dismissed in many studies over the years and has been summed up as the “No Significant Difference” phenomenon (Russell, 2001). What Russell’s publication shows is that in hundreds of empirical studies comparing various technologies (or absence of technologies) there has been no consistent evidence to show there are any differences in learning outcomes. Having said that there is increasing evidence to show that what can produce significantly better learning outcomes is to use a variety of technological and non-
technological approaches (Bernard et al., 2009; Means et al., 2009). This is best summarised by Kennedy who argues “Emerging technologies afford a range of learning activities that can improve student learning processes, outcomes, and assessment practices” (Kennedy et al., 2009, p. 5).

Writers like Marc Prensky and Don Tapscott further assert that our current teaching models and theories are neither supportive nor sympathetic with the needs of today’s learners. Tapscott writes “There is growing appreciation that the old approach [of didactic teaching] is ill-suited to the intellectual, social, motivational, and emotional needs of our new generation” (Tapscott, 1998, p. 131). This was echoed by Prensky when he wrote “Our students have changed radically. Today’s students are no longer the people our educational system was designed to teach” (Prensky, 2001, p. 1). In a study of Australian undergraduates, however, Kennedy et al. (2009) note that while aligning learning style with technology is helpful, it does not go far enough and is no guarantee of successful learning outcomes. They note that “simply matching a learning design (e.g. collaborative writing) with a technology (e.g. a wiki) is unlikely to guarantee student engagement” (Kennedy et al., 2009, p. 6). Moreover, according to the same study conducted by Kennedy, it was clear that typical classrooms contain a lot of diversity in terms of a persons’ comfort-level with technology and their preferences for technology in the classroom. They further note that it “cannot be assumed that incoming university students are broadly technologically literate, just as it cannot be assumed that university staff are broadly technologically backward” (Kennedy et al., 2009, p. 5). This view corroborates an earlier study by Bennett, Maton and Kervin which found that only 21% of the net generation of learners actively engaged in co-
creator-style interactions. In other words their styles of interaction did not support a constructivist, social networking kind of learning (Bennett et al., 2008, p. 778).

Moreover, it appears that in terms of learning preferences, there is as much or more variation within the net generation as there is between the net generation and other demographic groups. The danger in making such broad demographic statements as Prensky has done is that in designing instruction or policy we might leave out significant numbers of students by making broad assumptions about their technological prowess; positively or negatively. If we assume students know technology well then we risk disenfranchising those who are not comfortable with technology. If we assume students know little technology then we risk alienating those who want more technology. However, the greatest danger in accepting these views about the net generation without criticism is that it tends to shut down debate about the needs and desires of students.

A final note about learning styles generally. Learning styles and their associated theories are neither static nor generalizable. Students will prefer technology in certain contexts and certain environments and prefer to avoid technologies in other contexts. This varies according to subject matter, level of learning, learning goals, etc… but is not something that can be assumed based on current learning theory (Bennett et al., 2008, p. 780). And as this dissertation will show, learners are keenly aware of the variations within and between these contexts and are able to exploit them at will. This presents instructors and designers with a sort of “instructor-beware” environment where Web 2.0 is to be encouraged but with some caution.

**Demographic critique.** Demographically, as Kennedy et al. note in their critique of Prensky’s work, “The rhetoric that university students are Digital Natives and university staff
are Digital Immigrants is not supported” (Kennedy et al., 2009, p. 5). They note that the current evidence shows that, while the current generation of young learners are enthusiastic users of web-based technologies, they are not enthusiastic users of Web 2.0 technologies, particularly in the classroom (Kennedy et al., 2009, p. 5). This observation is supported and extended by other studies (Caruso, Kvavk & Morgan, 2005; Lohnes & Kinzer, 2007; and Väljataga & Fiedler, 2009; ) that show the current generation of learners does not seem to be willing or able to engage in the levels of autonomous learning that Web 2.0 requires. In other words, Web 2.0 technologies, like blogs for example, require a level of motivation and independence that not all learners possess. Anyone who has tried to regularly maintain a blog knows how difficult this is. Väljataga and Fiedler (2009) conducted a study as part of a larger European Union project where they collected data using participant observation and self-reporting questionnaires. The authors note that while learners have access to and make use of a wide variety of technologies in their everyday lives, they are not able or willing to use these technologies in their learning environments. The authors conclude that it is more the case that the learners are not ready for the independence and maturity required to use social networking in their classrooms than it is that they cannot technically use the tools. The authors noted that “It was obvious that most students were not ready to take initiative and responsibility for their own learning. The main reason seemed to be a lack of experiences and rationale in this regard” (Väljataga & Fiedler, 2009, p. 64). The Väljataga and Fiedler results support the earlier findings of a 2005 Educause Center for Applied Research (ECAR) study which concluded that “these young people can make technology work but cannot place these technologies in the service of academic work” (Caruso, Kvavik, & Morgan, 2005, p. 7). In other words, most students knew which buttons to click to get the desired technical outcome.
but were unwilling to use the tools in any pedagogically meaningful way.

What is less clear is whether learners cannot use technology in the classroom or simply do not want to integrate technology into the classroom? Some studies (Chao, Butler, & Ryan, 2003) showed that students were simply unable to use web-based technologies in learning environments. While students were able to surf the web, do simple searches and use email and text chat, they nevertheless required intensive training on how to use similar tools in educational environments including the suite of tools collectively known as Web 2.0. By way of contrast, a 2007 study of liberal arts students, Lohnes and Kinzer (2007) found that learners were quite capable of using technology in the classroom when required to do so. However, they found a culture of technology resistance in the classroom among participants. In fact, the one learner who frequently used technology as part of his studies was considered an outcast by his peers (Lohnes & Kinzer, 2007).

**Diffusion of Innovation**

At the heart of the use of technology in the classroom is the question of how innovations are adopted by teachers, learners and administrators. Diffusion is defined as “the process by which an innovation is adopted and gains acceptance by members of a certain community” (Surrey, 1997, p. 1). Four major factors are involved in determining the rate at which a given innovation will be adopted and, hence, diffused within a given population. These are: (i) the innovation itself, (ii) how knowledge about the innovation is exchanged, (iii) time and (iv) factors associated with the community in which the innovation is to be adopted. According to Surrey (1997), there are three main reasons why understanding this process with respect to instructional technologies is important. These are that:
most instructional technologists do not understand why their products are adopted (or not),

- instructional technology is itself innovative

- understanding the diffusion process might lead to prescriptive models that could lead the development of further innovation (p.2).

There has been much written on the subject of how innovations are adopted by users extending back to a 1943 study by Ryan and Gross (1943) where they conducted a sociological study in agriculture to determine factors related to the adoption of innovations (Surrey, 1997, p. 2). Arguably, the most complete work on the diffusion of innovation was done by E.M. Rogers (Rogers, 1995) which also explored the ways in which innovations were adopted and diffused in the agricultural sector. Professionals from a variety of disciplines have used Rogers’ theories to explain, describe and predict how innovations will be adopted (or not) by specific segments of a given population. These fields have included agriculture (Rogers, 1995), marketing (Meade & Islam, 2006) and instructional technology (Surrey, 1997). Three core concepts emerge from these studies: invention, innovation and diffusion while distinct, can be seen as a continuum. That is to say that the invention of some product or process usually comes first, followed by the innovation of this product or process to make it usable, finishing with the adoption and diffusion of the product or process to the greater community. The likelihood that a given invention will move from one stage to the next is predicated on a number of factors including both economic (cost/benefit) and social (usefulness and acceptability) issues (Rogers, 1995). Clearly not all inventions will be seen as innovations and not all innovations will become diffused within the greater community. Some inventions remain on the “laboratory bench” for decades before being seen as an
innovation or before becoming widely diffused. The laser is a notable example of an invention that languished for years as a curiosity before being used in so many everyday products. The laser was humorously known as “a solution looking for a problem” (Townes, 2003, p. 107).

Rogers demonstrated that, in the case of the adoption of technological innovations, the likelihood of a given innovation being diffused depends on a decision process that evolves through time, usually from (i) learning about a given innovation, (ii) forming a positive or negative opinion of it, (iii) making a decision to adopt or reject it, (iv) operationalizing or using the innovation, and (v) seeking others to adopt the innovation (Rogers, 1995). Based on this work “diffusion of technological innovation” can be understood as “the process by which an innovation is adopted and gains acceptance by members of a certain community” (Surrey, 1997, p. 1).

Early Adopters

Since Rogers’ ground-breaking work a number of models have emerged to describe how technologies specifically are adopted and diffused in various contexts. The earliest of these, and perhaps best known, is called the early adopter model, a model which was developed by Rogers. In this model, a given technology is adopted as a gradual process by different segments of the population based on their level of “innovativeness” (Rogers, 1995, p. 252). This is a measure of how early an individual adopts a given innovation compared with the rest of the members of a group. This measure forms a continuum from those who thrive on innovation, whom Rogers calls “innovators,” through to the last people to adopt a technology, whom Rogers calls “laggards”. The continuum is then broken into discrete (albeit artificial) categories based on the number of standard deviations from the mean time
of adoption. So, for example, if the average time for a population to adopt a new product is 10 years with a standard deviation of 3 years\(^5\) we can expect the following adoption times:

- Innovators representing 2.5% of the population – within four years of the invention of the product
- Early adopters representing 13.5% of the population – between four and seven years of the invention of the product
- Early majority representing 34% of the population – between nine and 10 years
- Late majority representing 34% of the population – between 11 and 13 years
- Laggards representing 16% of the population – more than 13 years

This pattern is represented diagrammatically in Figure 2.1.

![Figure 2.1: Adopter categorization based on innovativeness.](image)

This graph is based on data from (Rogers, 1995, p. 262).

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\(^5\) These numbers are for illustrative purposes only
Technology Acceptance Model (TAM)

Predicated on Rogers’ early work on the diffusion of innovation, Davis (1989) developed a simple and widely used adoption model known as the technological acceptance model or TAM. This model, illustrated in Figure 2.2, proposes that there are only two major factors influencing the adoption and diffusion of technologies. These factors are behavioural in orientation as they refer primarily to perceived ease of use and perceived usefulness but say little about the actual context of the technology adoption.

Figure 2.2: Technology Acceptance Model (TAM)
This diagram is based on work by Davis (1989)

The degree to which potential users of the technology believe that its use will be free of effort is considered a measure of its perceived ease of use (Davis, 1989; Tan, 2009, p. 64). Rogers (1995) included this in his early adopters model stating that potential adopters evaluate a given innovation in terms of its complexity and the diffusion of the innovation generally increases when complexity is reduced. In other words, the easier it is to use a given innovation, the more likely it will be used by a given population. Similarly, Rogers (1995) showed that the rate of adoption and diffusion of a given technology increases if there is a perception among users that a given technology provides a relative advantage over existing
technology. This, of course, presupposes that the technology is used correctly with a corresponding change in behaviour. For example, in my early experiences as a technology support person at a large Canadian university, email was originally seen as a negative disruptive technology because it was not used correctly. Our users tried to use email to replace hand written memos and so emails were printed out and stored in filing cabinets. Used in this way, email, as a technology, did not provide an advantage over older technologies and was, therefore, relatively slow to diffuse through the university population. Once users realised there were more efficient methods of using email its diffusion rate increased dramatically.

The simplicity of the TAM model has left it open to criticism by some authors (Lee, Kozar, & Larsen, 2003; Legris, 2003). However, while simple, the TAM model has been shown to be robust and valid in predicting individual acceptance of various innovations (Chang & Tung, 2008, p. 74). Some researchers have argued that the TAM framework would not be applicable for web-based innovations because of its simplicity (Selim, 2003, p. 345), however, the introduction of an additional factor has been shown to resolve this challenge; the additional factor being that of computer self-efficacy. In other words, once researchers were able to account for users’ basic computing abilities before assessing the diffusion of new innovations (Chang & Tung, 2008; Selim, 2003, p. 345), TAM could be used to gauge the diffusion of a given web-based innovation. Moreover, TAM has since been validated in a variety of contexts including web-related technologies (Morris & Dillon, 1997), online course websites (Chang & Tung, 2008; Selim, 2003) and web-based learning systems (Lou, Luo, & Strong, 2000).
Educational Innovation

One of the main frameworks for this study was the diffusion of technologies in learning environments. As noted earlier there is a wide-variety of literature on the diffusion of technologies including models of how people adopt technologies in different ways given different contexts. What this has amounted to in the context of this study is a question of educational innovation. In terms of my own practice, using Web 2.0 in a learning environment is an innovation on the leading edge of educational technology. This does not mean, however, that this innovation will necessarily result in positive outcomes.

Innovation in education is not a new phenomenon particularly with respect to the use of educational technology over the last 40 years. In fact some argue educational innovation can be traced back from the “Elder Sophists of the fifth century B.C., to the medieval scholars who taught in the monastic or cathedral schools, to the reformers of 1700-1900, to the psychologists of the 20th century” (Saettler, 1968, p.1). In the 1950s and 1960s educational television, it was predicted, would change the face of education worldwide. Teachers would no longer be needed as learners would simply sit in front of the television and passively absorb all the knowledge they would need (Saetller, 1968). Similar predictions have been made for various computer-based technologies and, later, web-based technologies (Reiser, 2001). The predictions have changed only in their intensity (people rarely claim technologies will replace teachers anymore) and the type of language used to describe the predictions. As with much of “futurology”, the language of educational innovation and prediction is now steeped mostly in economic language much as Yang (2003) predicted nearly 10 years ago. This language rallies around demands for the need for new skills for a new economy and, as Levin notes, “there is a strong private sector and economic component”
(Levin, 2010, p. 2) that is driving educational innovation without enough input from the public sector or government.

By contrast, educational innovation has been shown to improve all aspects of society. I don’t think there is much serious debate on this point. The literature on social determinants of health, for example, outlines in very specific and measurable ways how improvements in educational attainment and outcomes significantly improve all aspects of a person’s physical, social and mental health (Schuller, Preston, Hammond, Brasset-Grundy, & Bynner, 2004; Picot, Saunders & Sweetman, 2007).

What some of the literature does suggest, however, is that innovation should not be done without proper attention paid to public policy that focuses specifically on learning outcomes versus resource implications (Yang, 2003; Warschauer, 2007; Levin, 2010). As Levin notes, Canadian schools that face recurrent budget shortfalls can ill-afford to embrace expensive innovations without evidence showing that the innovations will produce better learning outcomes; or at least better research or administrative outcomes.

James March (1991) offers some ideas originally from the world of business that might be applicable in the case of technological innovation in higher education. To begin, March makes a distinction between exploration (innovation) and exploitation (improvement) that I think is useful here. While March was referring to large scale businesses and not universities I think the analogy might apply; especially given the push towards treating universities as businesses over the last 20 years. March notes that an organisation that does not innovate will die. However, he also states that too much innovation can have negative outcomes. The real benefits, according to March, do not come from the innovation itself, but, from the application of the innovations towards the improvement of the organisation. In
March’s case he was referring to profits, but, this applies equally well to the improvement of learning outcomes. Rather than continuing to fulfill the need to explore and innovate, March argues, we should now use what evidence we have collected to move forward with exploitation. As noted before, what works will equate to what improves our goals primarily in terms of learning but also in terms of research and administration. As March puts it:

> Adaptive systems that engage in exploration to the exclusion of exploitation are likely to find that they suffer the costs of experimentation without gaining many of its benefits. They exhibit too many underdeveloped new ideas and too little distinctive competence. (March, 1991, p.71)

As applied to technological innovation, we should now determine what works in terms of Web 2.0, what does not work and in what contexts. Levin (2010) argues that it is a lack of distinctive competence that has characterised educational systems for the last several decades – “endless new ideas and not enough distinctive competence” (Levin, 2010, p.4). Evolutionarily it is probable that most innovations will fail either through lack of effect, requisition of too many resources or both and there has been little evidence to show that educational innovations have been any different (Cuban, 2001; Ungerleider & Burns, 2002). Most of the cases discussed in Cuban, 2001; Ungerleider and Burns, 2002 have focussed on K-12 educational systems and may not be directly applicable to higher education. However, I argue that it is similar with the single exception that higher education systems have the mandate to innovate that K-12 systems do not. Hence, there is an implied impetus for those working within the higher education system to innovate with respect to education but not at any cost and not to the detriment of our learners.
The above discussion should not necessarily imply that we should evaluate every innovation before proceeding. That level of constant evaluation would have the contrary effect of paralysing innovation. So there needs to be a balance between using evidence to make decisions about the ways in which we use Web 2.0 in higher education and not stifling innovation through unreasonable evaluative requirements. What is that balance? Clearly the balance will vary from context to context. What counts as evidence in a large undergraduate face to face class in sociology might be radically different from what counts as evidence in an online course that employs educational technology. In any context we need to start with what we know about an innovation. I suggest we refer to the work done by Tamim, Bernard, Borokhovski, Abrami, and Schmid (2011) which uses meta-analyses to explore trends and successes in the exploitation of various technologies in higher learning. The Tamim study attempted to answer the question “does computer technology use affect student achievement in formal face-to-face classrooms as compared to classrooms that do not use technology?” (Tamim et al., 2011, p.1). The study found that there were moderate effects in learning outcomes attributed to the use of educational technology. The next step would be to begin “digging” deeper to explore the types of applications, contexts and innovations that had an impact and use those to model, in this case, the use of Web 2.0 in higher education.

**Challenges**

One of the challenges associated with these frameworks, especially those of Rogers or the TAM model, for my study is the fact that these models were all targeted at the person or persons who would actually be responsible for making the decisions with respect to technological adoption. Rogers notes that “one of the most distinctive problems in the diffusion of innovations is that the participants are usually quite heterophilous” (Rogers,
1995, p. 19). In other words there is usually a diversity of skills, aptitudes and power balances within any group. Rogers goes on to say that “in fact, when two individuals are identical regarding their technical grasp of an innovation, no diffusion can occur as there is no new information to exchange” (Rogers, 1995, p.19). Hence, for diffusion to occur there must be some variability within groups on one or more factors such as power, education, social status etc… In my study, I focus on the students who usually have little or no say in the choice of technology as these decisions are typically made either by the faculty or institutional administration. In the case of my own practice Moodle has been chosen as the institutional learning management system (LMS) and Elluminate as the institutional synchronous discussion tool. While there are no rules preventing participants from using different tools, the structure of the university would make it difficult to change. Replacing Moodle or Elluminate in my practice runs the risk of disenfranchising myself and my students from the greater university community especially given that most of our programs use a cohort model. In other words, to ask students to use tools that are not supported by the university nor used in any other classes or programs runs a very high risk of failure.

There are a few exceptions to this pattern of technological decision being made for the students. Courses where students are encouraged to choose and use their own technologies have been implemented at the University of British Columbia (UBC) (D. Vogt, personal communication, February 5, 2010), the University of Manitoba and Athabasca University (Fini, 2009) to name three examples. Fini found limited success in this approach to student choice with respect to technology due to a reticence on the part of students to experiment and take “ownership” of the chosen technologies. Moreover, Fini found that
students tended to default to teacher-chosen technologies, however, he did not offer reasons why this might be the case.

**Studies of Students Preference and Perception**

Earlier in this dissertation I noted that there was a lack of studies about Web 2.0 from a students’ perspective. This appears to be changing as more researchers and universities are showing a new (or renewed) interest in students’ points of view with respect to many aspects of higher education but especially educational technology. A recent report from the Educause Center for Applied Research noted “undergraduate student behaviours and opinions of today can inform the technology needs of undergraduate students of tomorrow” (Dahlstrom, 2012, p.4). While focussing on undergraduate students, the study, which surveyed over 100,000 students at 195 institutions, notes a clear technological trend that applies to students at all levels as well as faculty and staff. The findings of the ECAR study indicate that students are passionate about technology but cautious about the ways in which it is used in their educational institutions. Students recognise the value in blended learning opportunities where a mix of technology and face to face learning seems to provide the best learning experience (Dahlstrom, 2012). This result is supported by other studies by Bernard et al (2009) and Means et al. (2009). The Dahlstrom study shows that students are cautious about technology citing that “students report that *basic* [emphasis added] technologies have the greatest impact on their success” (Dahlstrom, 2012, p.5) and that “technology training and skill development for students is more important than new, more, or “better” technology” (Dahlstrom, 2012, p.5). Further, students in the ECAR study report that they want multiple communications options, but “they prefer different modes for different purposes and audiences” (Dahlstrom, 2012, p.5). With respect to Web 2.0 applications, Dahlstrom’s study found that students use
these applications for socialising more than for academic uses and academic success is still viewed as being a result of “older” web-based technologies like email and learning management systems or by face to face interactions (Dahlstrom, 2012, p.5). Supporting these findings, older studies by Tan (2009), Sadler (2008) and Fini (2009) have argued that the implications of using Web 2.0 in the classroom are not as obvious as theorists and practitioners have suggested.

It should be noted that studies on student perception of Web 2.0-like technologies actually predate the use of Web 2.0 as a term. In the late 1990s, Zane Berge (1998), a well-known writer in the field of technology as applied to e-learning, conducted a study examining the barriers to online learning in post-secondary environments. While dated, the results of his survey-based study are nonetheless illuminating. Some of the barriers identified in Berge’s study include inability for users to “dial in” to a modem pool for example (p.7). In his paper, Berge identified broad classifications of barriers to online learning generally and “push/pull” technologies specifically. The categories included “situational, epistemological, philosophical, psychological, pedagogical, technical, social and/or cultural” (Berge, 1998, p. 2). The vast majority of these barriers are what Tan (2009) refers to as deficit barriers and include lack of funding, poor training, administrative barriers and lack of technical support. However, Berge also identifies other barriers including a mismatch between technologies used and assessment protocols as well as a lack of institutional plans and policies and leadership. Curiously these continue to be challenges more than a decade later and are in some ways compounded by the attempted introductions of Web 2.0 into the classroom. Berge continues with a focus on barriers that are similar to those identified by Tan (2009) and those that I examined. These include “faculty or student resistance to innovation; resistance to
online teaching methods; difficulty recruiting faculty or students; lack of understanding of distance education and what works at a distance” (Berge, 1998, p. 7).

A study conducted in 2008 by Chris Sadler and Tarmo Kalvet was a critical examination of an information society course designed for the EU-funded Network for Teaching Information Society (NETIS) (Sadler & Kalvet, 2008). From the NETIS website their goal was to “increase knowledge and competence of students on Information Society, and also broaden and deepen their understanding on the topic, by introducing a course on Information Society in tertiary education institutions” (Information Society Research Institute, n.d., para. 1). The goal of the study was to formatively evaluate all aspects of the course including technology, pedagogy and content. Early in the development of the program the designers identified a need to develop all aspects of the course in such a way that the learners could become knowledge creators as well as knowledge users. They argued that the course should emulate this learning goal by using technologies and pedagogies that would encourage faculty and students alike to contribute new knowledge to the course as well as critically consume knowledge that was constructed or co-constructed by their peers (Sadler & Kalvet, 2008). This is similar to the “co-creation” pedagogy referred to at the beginning of this dissertation. Sadler and Kalvet (2008) expected faculty to be lukewarm to the idea of using push and pull technologies and pedagogies, however, they equally expected most learners to embrace these ideas. However, learners showed no enthusiasm for Web 2.0 technologies and were, in some cases, highly resistant to the pedagogies associated with these technologies (Sadler & Kalvet, 2008, p. 761). The online materials were seen as useful and convenient but there were surprising complaints questioning the materials’ currency. “I don’t think it is reliable” (p.761) was a common theme. The course was structured in such a
way that some technologies (or parts thereof) were mandatory and others voluntary. Students in the Sadler and Kalvet (2008) study used only those technologies which were either required or designed in such a way that it provided them with significant advantage over other methods.

The Sadler and Kalvet (2008) results were consistent with the results from preliminary surveys which showed that students were heavy users of Web 2.0 technologies in their personal lives, but showed a distinct preference for Web 1.0 technologies in the classroom (Sadler & Kalvet, 2008). For example, students were asked to identify their most useful sources of information resulting in 53% identifying the Internet as their first or second choice but none identifying Web 2.0 technologies. In this case Web 2.0 was defined as Web-based applications where users are able to contribute information as well as consume it. Curiously, only 32% identified their instructors as useful sources of information (Sadler & Kalvet, 2008, p. 760). One of the challenges identified by their survey was that the students showed difficulty with making choices. In the course, students were given choices with respect to technologies and content structure. The results indicated that students were not easily able to process choice. What the study did not demonstrate was why this was the case. Was it simply resistance to choice? Was it that students were not given clear guidelines about the choices they had? Were the students impatient and wanting to simply “get through” the course as efficiently as possible? Or were there other reasons? Curiously, it was the students who were most resistant to technology at the beginning of the course who were most active in the Web 2.0 parts of the course (p. 764). The researchers noted further that while the learners appeared to be highly engaged they were not interested in sharing. This contradicts
Web 2.0 practice which is almost entirely predicated on a cycle of producing knowledge, sharing it and using this process to create new knowledge.

In 2009, Jennifer Pei-Ling Tan wrote what appears to be the most comprehensive study to date about learner attitudes to Web 2.0 in the classroom. This study was entitled “Digital kids, analogue students: A mixed methods study of students engagement with a school-based Web 2.0 learning innovation” (Tan, 2009). In her study of an elite Australian high school she noted that students were highly resistant to the use of Web 2.0 in the classroom. Traditional explanations for the resistance including a deficit of resources, training, and time were unable to satisfactorily explain the resistance in this case, especially as the school was very well resourced in all areas and the Web 2.0 program had the full support of all the stakeholders including parents, faculty and administration.

That there should have been any resistance was a paradox given the expert advice faculty and administrators received from knowledgeable experts in the field as noted throughout this dissertation. Perhaps more difficult to explain was the resistance in light of popular and academic literature showing how students (especially younger students of the digital age) embrace such technologies outside the classroom. As noted earlier, writers like Prensky (2001), claim that people born after the late 1970s, when digital technologies began to be used more commonly in everyday life, are “digital natives” as opposed to previous generations who are known as “digital migrants”. For writers like Prensky, this generational distinction is important because it marks the point at which digital technologies became a “natural” part of many people’s lives. This contrasts to older generations that have typically examined technologies in a cynical way or even resisted them altogether.
Yet there was significant resistance on the part of the students as evidenced by their lack of use of the technologies in the classroom, this, in spite of the fact that the project was well-resourced and fully supported by the school administration and faculty and the students’ families. As described earlier, Tan was studying an elite school with many Internet-ready machines available to students and, in fact, students typically had access to multiple computers (as well as mobile phones and other technologies) in their homes. So the students’ school and homes were well-resourced with technology and the school also had invested resources in ensuring the teachers were equipped both in terms of the technology and the knowledge of how to use it – pedagogically and technically. Surveys also showed that students in Tan’s study were well-versed in Web 2.0 technologies (as were the teachers) and, in fact, used them frequently outside the classroom. Tan concluded that student resistance emanated from three sources:

1. Peer influence – the social-reputational barrier whereby learners will not embrace these technologies without generous peer support both for fear of appearing “geeky” and out of a fear of failure (Tan, 2009, p. 214).

2. Performance versus learning – the institutional-pedagogical barrier whereby anything that is perceived as acting counter to the final goal of getting an ‘A’ grade and finishing high school will be immediately rejected. In this case, Tan noted that students concluded early in the study that the use of Web 2.0 technologies not only would not help them on their final assignments and exams, but, further, it would be a distraction and have a negative consequence (Tan, 2009, p. 214).
3. Power and freedom – perhaps a more psycho-social barrier, but, in this case, Tan found that students did, in fact, embrace Web 2.0 outside the classroom because of the perceived freedom it gave them to write, read, think and communicate according to their own needs and desires. Hence, any uses of Web 2.0 that held the possibility of restricting these freedoms were rejected (Tan, 2009, pp. 162-163).

As noted throughout Tan’s study, similar cases of learner resistance to Web 2.0 technologies have been noted elsewhere in the literature (Clark, Logan, Luckin, Mee, & Oliver, 2009; Collis & Moonen, 2008; Fini, 2009; Warschauer, 2007). Fini, in particular, conducted a study of an open course offered through various institutions, but based at Athabasca University. This course, offered at a distance and using a variety of user-determined technologies, was available for credit or as an audit-only course. The results were similar to those found by Tan in that learners embraced the Web 1.0 technologies like email and even discussion boards but resisted (actually ignored completely) most other technologies. Fini does not explain why this is the case. Anecdotally, I have noted in my own teaching that students are highly resistant when I try to introduce Web 2.0 technologies and accompanying teaching and learning techniques. Typically what I hear from the students is: “Please just give us the notes or the Power Point slides, don’t make us do group work and let us get on with the tasks at hand.” Until reading these studies, and in particular Tan’s study, I concluded that either I was not using the technology correctly or that I had particularly contrary or lazy students. These may all be true but I was intrigued enough to investigate this aspect of my practice a little deeper via this study.
Summary

This chapter provided a summary of the literature in the fields of economic and pedagogical trends with respect to technology and the diffusion of innovation with respect to technology. To that end the chapter has created the context for a study exploring student perceptions around the use of learning technologies in general and Web 2.0 in particular. In terms of my own practice this chapter has confirmed the critical importance of using evidence to align my use of technology with current educational practice. The literature also revealed that, as the pace of technological innovation increases, the education sector is under pressure to critically appraise these changes with respect to our own pedagogical practices.

Further, the literature in this chapter has identified a number of critical research problems and gaps facing educators, researchers and learners today; that is the mixed messages being communicated about the need for the use of Web 2.0 in learning environments. Based on this literature review and theoretical background, the next chapter sets out the specific research purposes of this study and discusses the design and methodology chosen to operationalize the key questions contained therein.
Chapter Three – Methodology

This chapter provides an overview of the research purpose, the questions and context for the study, as well as the methodological approach used. A brief overview of the research design and methods of data collection and analysis are provided as well as a rationale for the choice of these methods in order to investigate the research questions. The research instruments (questionnaire and interview questions) are provided as Appendices A and B.

Overview of Research Purpose

The purpose of this study is to develop an understanding of Web 2.0 in learning environments from students’ perspectives. As a follow up activity, it was hoped that the study would provide base line data to use to formulate recommendations for my own practice and for practitioners in the field.

A review of the relevant literature suggests an inconsistency between the common wisdom as described by authors like Prensky (2001) and actual empirical results as identified by researchers like Dahlstrom (2012) and Tan (2009). As noted earlier my study was in some ways inspired by Jennifer Tan’s 2009 doctoral dissertation entitled “Digital Kids, Analogue Students: A mixed methods study of students’ engagement with a school-based Web 2.0 learning innovation” (Tan, 2009). I suspected that the challenges associated with using Web 2.0 in the classroom go far beyond the traditional deficit arguments as set out by authors like Berge (1998). This study focussed primarily on three challenges or barriers that Tan identified in her study which are:

1. Peer influence – the social-reputational barrier
2. Performance versus learning – the institutional-pedagogical barrier
3. Power and freedom issues
Research Questions

The overall purpose of the study was to develop an understanding of Web 2.0 in learning environments from students’ perspective.

To explore this main purpose, I further asked:

1. What are adult learners’ Web 2.0 usage patterns in their learning environments? How do these patterns compare to their work and recreation environments?
2. From adult learners’ perspective, what is the pedagogical value in using Web 2.0?
3. How does adult learners’ motivation to pursue higher education affect Web 2.0 use?
4. How does peer influence affect adult learners’ Web 2.0 use?
5. How does freedom to use Web 2.0 outside the classroom affect adult learners use of Web 2.0 in classroom learning?

Study Participants

As indicated above, the purpose of the study was to develop an understanding of Web 2.0 in learning environments from students’ points of view. To narrow the study I chose to focus exclusively on my own practice for investigation. As described earlier my practice focusses on mid-career professionals at a small, mostly online, university based in Victoria, Canada. This focus has advantages and disadvantages when used in a study like this. On the one hand these types of convenience samples in research are notoriously problematic providing challenges with respect to validation and generalisation of results. On the other hand, with the focus turned away from generalisation and towards my own practice this convenience sample allowed me to glean a relatively deep understanding of learners within my own practice with respect to their perception of Web 2.0 in their own learning processes.
As noted earlier I also included students from UBC’s Masters in Educational Technology (MET) program in my invitation to participate in the study. While I am not intimately familiar with the characteristics of this program nor the students I decided to include these learners as they fit the basic profile that interested me. Being a Master’s Degree programme the average MET student is an adult learner with some work experience looking to expand their knowledge and education. Given that participants were exclusively mature, mid-career learners allowed me to make relatively precise statements about Web 2.0 within my own practice. Some might view this focus as problematic in that it produces relatively rarified results but, I find it both satisfying and exciting as it provides me with deeper insights into my own practice which was, after all, the goal of the Ed.D program.

In terms of a research procedure, the study was conducted according to the following stages:

- Participants were invited to complete an online questionnaire to gauge their use of Web 2.0 applications both in and outside the classroom and also determine their attitudes toward these technologies. This survey also included demographic and socio-economic questions.

- A limited number of interviews (20) were conducted with survey participant volunteers to follow up on the results of the questionnaires. This provided me with more in-depth information and allowed me to tease out what some of the barriers (or motivations) were with respect to Web 2.0 technologies. All respondents but one reported having used Web 2.0 in their learning environment at least once.
Research Setting

In keeping with the general philosophy around the use of Web 2.0 tools, the setting for this study was entirely virtual. Participants were invited to participate via two university-based mailing lists. These included a mailing list for the entire student body at Royal Roads University (approximately 5000 students) and the mailing list for the University of British Columbia’s Master of Educational Technology program comprising 378 persons.

Prior to launching the survey, the data collection tools (survey and interview) were pilot tested with five participants. These five participants consisted of three post-secondary learners located in British Columbia (2), Alberta (1), an expert in research methods (1) and an instructional designer familiar with survey and interview research methods (1). While small, the pilot study participants were able to give me both the expert advice I needed as well as insights into how “real” participants would view the experience. The results of this pilot were incorporated into the final versions of the data collection instruments as shown in Appendices A and B.

There were two stages to the data collection. Stage one was the completion of an online survey. The survey portion of the study covered the following broad categories: demographics, education level, and familiarity with general technology or Web 2.0 technology; including specific questions about how they have experienced Web 2.0 tools in the classroom. Part of the survey asked participants if they were willing to engage further in the study by participating in one on one interviews which probed more deeply their use of and thoughts about Web 2.0. A sample of the survey is included in Appendix A. The interview stage of the study was designed to probe users’ thoughts about perceived or actual issues with respect to using Web 2.0 in their courses. The focus of the interview included
issues associated with peer influence, issues associated with relationships between course assessment and Web 2.0 use and, finally, questions about power and freedom with respect to using Web 2.0 tools in the classroom versus using them at work or in one’s private life. The goal of the interview was not to create new data so much as it was meant to corroborate data resulting from the survey stage of the study. By corroborate I mean that the interviews were meant to help me confirm and clarify the results of the survey rather than generate completely new information. Having said that, as noted below, the interviews did uncover very interesting results that would not have been revealed by the survey alone. These results merit further research.

**Design of the Study**

The design of this study employed both surveys and interviews that were designed to work together in tandem. The idea was that the interview stage would provide more in depth information about the results from the survey stage. Some authors (Creswell, 2003) suggest that these kinds of two-part studies are better classified as mixed methods studies rather than strictly quantitative studies. Creswell notes that the use of these mixed methods approaches are particularly powerful when investigating one’s own practice. However, these sorts of “backyard” research settings where researchers investigate their own practices or organisations carry with them extra ethical, design and analysis challenges including making it more difficult for the researcher to reveal specific data or data sources as well as creating power issues within the organisational or research environment. The solution to this, according to researchers like Creswell (2009), is to use “multiple strategies of validity” (Creswell, 2009, p. 212) like mixed methods. In this way the results of the study are more valid because they have been reinforced through multiple data collection methods. The
power of these types of studies, according to Creswell, is when the researcher wants to use “two different methods in an attempt to confirm, cross-validate, or corroborate findings within a single study” (Creswell, 2009, p. 248). I discovered during the pilot phase of the study that the interviews were useful not just in corroborating what had been found in the surveys but also for uncovering new and more qualitative results that warrant further study. Hence, while this study places emphasis on quantitative data at all stages of data collection and analysis, it should be seen more as a mixed methods approach rather than either a quantitative or qualitative study.

As implied earlier, the strategy deemed most appropriate for the quantitative stage of the study was a survey while the interviews were used to corroborate the survey results. The use of surveys or questionnaires in educational research is part of a broader class of research known as survey research. This is to distinguish it from other classes of research like experimental research. Survey research, while sometimes used to refer to any kind of descriptive research, actually has a more precise meaning. According to Leedy and Omrod (2010), survey research “involves acquiring information about one or more groups of people…by asking them questions and tabulating their answers. The ultimate goal is to learn about a large population by surveying a sample of that population…” (p. 187). Survey research typically involves using either questionnaires or interviews or both. These kinds of tools are particularly useful when trying to answer *what* and, to a lesser extent, *why* questions. Survey research is also powerful in describing what is happening in a given situation at a given time. It is akin to taking a picture of a given scenario and describing what is happening at that time. In the case of this study I was curious to know what was occurring
with respect to the use of Web 2.0 in higher education online classrooms and examining why the Web 2.0 approach may or may not be working.

There has been criticism in the literature suggesting an over reliance on survey research particularly in the area of distance education and especially research done by graduate students (Davies, Howell, & Petrie, 2010; Lohnes & Kinzer, 2007). The concern seems to be less about survey research being useful or valid but more about survey research taking precedence over other kinds of research like ethnographic studies or experimental analysis. Davies et al. further note that “Validating the concern of many distance education scholars, there was a lack of graduate student research aimed at developing a theory base in distance education” (Davies et al., 2010, p. 1). This conclusion was based on a review of distance education and educational technology studies in North America between 1998 and 2007. However, the authors also note that there is a trend away from such studies and the hope is that a bigger, more theoretical picture can be arrived at through a variety of approaches. In particular, survey research is not particularly useful at developing theory or predicting future trends. However, that was not the intention for my study. Having said that, I believe the data collected will help inform future uses of Web 2.0 applications in terms of policy and design as the first part of a longer term study that will look at more prescriptive uses for technology in higher education.

**Research Stages**

The rationale for choosing the survey method for my study was simply that I felt that if I want to know what students are thinking I should ask them. The first stage involved simply finding out what people were doing with respect to Web 2.0 in various environments, learning, personal and professional environments. I wanted to be able to answer questions
like how Web 2.0 was being used in these environments and how often? I also wanted to
glean information regarding participants’ demographic and socio-economic profiles. A third
area for exploration in stage one was to discern participants’ learning motivations generally
as well as for the course(s) that used Web 2.0 in particular. In other words why were
participants taking courses in the first place? Was it to complete a degree, to get a job, or just
for fun? And I also wanted to get a sense from participants what their general view of
education was – as a route to finding a job, improve citizenship, to develop more as a critical
thinker? In this sense stage one was purely descriptive and consisted of an online
questionnaire circulated using Lime Survey – a popular online survey tool – via my own
website – http://www.avantlearning.com

Stage two of the study, the interview, was designed to provide deeper insights into
participants’ perceptions of the Web 2.0 experience by shifting the emphasis from what
happened, to participants’ perceptions about the relative successes and failures of Web 2.0
usage and why. The second stage required more analysis on the part of the participants (and
researcher) in that participants were asked to reflect and examine their Web 2.0 experiences
and why the use of Web 2.0 tools were or were not successful.

Question 30 of the survey asked participants whether they would be willing to
participate in a follow up interview. To indicate a willingness to participate, participants from
the survey were asked to provide an email address where they could be contacted. Twenty
people indicated a willingness to participate in the interview stage of the study and all were
contacted for interviews either via Skype or regular telephone with the exception of one
participant who lived in Victoria and wanted to be interviewed face to face. Each interview
lasted approximately 30 minutes and followed a strict script as shown in Appendix B. Little
probing outside the design of the script was conducted out of a concern for confounding the resulting data. However, where answers were unclear or where participants made reference to technologies that did not appear to be Web 2.0 probing questions were asked to give the participants the opportunity to clarify their ideas. As can be seen in Appendix B, participants in stage two were asked questions in an attempt to explore factors that might influence the success of the use of Web 2.0 tools in learning environments. Participants were also asked for suggestions about how the use of Web 2.0 tools could have been put to other use or improved within a higher education environment.

The results of the interviews were professionally transcribed and a sample transcript can be seen in Appendix D. The data from these transcripts were analysed using a grounded theory approach (Gubrium, Holstein, Marvasti, & McKinney, 2012). A grounded theory approach to qualitative data analysis is characterised by a scenario whereby “researchers subject their inductive data to rigorous comparative analysis that successively moves from concrete realties to rendering a conceptual understanding from these data” (Gubrium, Holstein, Marvasti, & McKinney, 2012, p. 347). In this way the data analysis takes an iterative approach to create an understanding of the reality arising from the data. Like the constructivism learning model this study is based on, grounded theory has constructivism as one of its three main variants. These are constructivist, objectivist, and postpositivist grounded theories (Gubrium, Holstein, Marvasti, & McKinney, 2012) and, also in keeping with the constructivist theme of this study, constructivist grounded theory “places priority on the studied phenomenon and sees both data and analysis as created from shared experiences and relationships with participants” (Gubrium, Holstein, Marvasti, & McKinney, 2012, p.
In the case of my study this means oscillating between the quantitative and qualitative data to determine meaning within the concept of Web 2.0 in educational environments.

**Data Analysis**

This study produced two separate data sets. Both data sets were analysed quantitatively using descriptive statistics to describe participants’ responses. Inferential statistics, notably Fisher’s Exact Test, were also used to examine correlations between various responses in all stages of the study. For example, I used inferential statistics to examine whether there were statistical correlations between participants’ learning preferences generally and their preference for Web 2.0 applications. The interview data was recorded and then professionally transcribed into a Word document. This greatly facilitated later analysis where I searched for themes identified in the survey. The results of this analysis are reported in Chapters Four and Five.

**Statistical Correlations**

As noted earlier, I framed this study with the purpose of developing an understanding of the use of Web 2.0 applications in higher education learning environments from students’ points of view. To gain this understanding three sub-themes were used to explore specific correlations between the use of Web 2.0 applications and (i) peer influence (ii) learner motivation and (iii) power relationships. Since the data collected was from a relatively small number of participants (n=154) and comprised of categorical data, Fisher’s Exact Test was used rather than an approximate fit test like the Chi-squared test. Exact tests, as the name implies, are more precise for determining statistical associations but are difficult to calculate. In fact, until relatively recently, it was not even possible to use Fisher’s Exact Test in any meaningful way because computing power was expensive and not robust enough to handle
the calculations (M. Charnell, personal communication, June 6, 2012). As a result, researchers use the Chi-squared test as a reasonable approximation to the exact test as it is easier to calculate and will usually give similar results.

In the case of this study, the Chi-squared test was not deemed prudent to determine statistical associations between these relationships for a variety of reasons. First, a Chi-squared test assumes that there is a large dataset and calculates F-values based on this assumption. The idea behind these tests is that relatively large data sets approach a mathematical limit of infinity and, as the populations approach infinite size, relatively precise statements can be made about the data. Second, Chi-squared tests require that each entry in the distribution table be greater than five. When this is not possible, rows or columns of the distribution table are combined to produce the desired data entries. Unfortunately this process results in a loss of data which would have been detrimental to this study given the small sample size. As a result, I opted for the Fisher’s Exact Test giving a precise, conservative result.

**Fisher’s Exact Test.** As noted above, Fisher’s Exact Test is normally used when the number of statistical observations is small and it is one of a class of “exact” tests that attempt to calculate the F-value precisely rather than relying on an approximation that approaches “exactness” as the sample size approaches infinity (Bower, 2003). These sorts of tests are often seen as a compromise between approximate randomization and permutation tests which rely on large sample sizes but are sometimes unrealistic in social science research.

As noted earlier, from a calculation point of view, this makes exact tests much more difficult to assess and there is a tendency for these tests to have a rejection rate below a nominal significance level. What that means in practice is that the test is conservative,
rejecting significant correlations as insignificant when they are actually significant (D'Agostino, Chase & Belanger, 1988). Because of the conservative nature of exact tests I made the decision to examine the results of the test at a more liberal p=0.1 level rather than p=0.05 threshold usually used in educational research.

In addition to the conservative nature of exact tests it should be noted that establishing causality between data sets was not a purpose of this study. The purpose was to simply examine students’ perspectives about Web 2.0 in learning environments and whether there were correlations between their perspectives and their practices. So, for the purposes of this study, there was no need to subject the data to the relatively stringent conditions required to show causality.

**Limitations of the Design – Validity and Reliability**

**Validity.** The questions used in both stages of the study were pilot tested with the target audience and some questions were used in other studies. The results of the questions were both expected and consistent with findings in these other studies (Caruso et al., 2005; Sadler & Kalvet, 2008; Tan, 2009) and so can be considered valid at least for the target population of students from my own practice. While satisfying to me in terms of my own practice the findings from the study, in fact, reveal a limitation on the design of the study. The limitation being the way in which the sample population was chosen. Ideally, one would want the results of such a study to be generalizable to a much broader population. In this case a more powerful result would have been to have been able to generalise these results to the broader adult higher education learning population in Canada. However, the data from this study is unlikely to be broadly generalizable over time or to any broader populations because the sample population was drawn from such a narrow pool of adult learners – namely adult
learners at Royal Roads University and within the Masters in Educational Technology Program at UBC. In some ways I view this study as a pilot for a larger study that would include a larger and more representative Canadian population and then expanding again to an international audience. That study would require more time and resources than I have available right now.

In general there are a number of limitations inherent in any survey research project. Some of these can be controlled either through the corroboration of data collection (as I attempted to do with the mixed methods approach) or through statistical methods. This study is potentially open to many of these limitations. I must admit that I have two related concerns in any survey research. The first is that such surveys tend to attract participants who feel passionately about the subject – either positively or negatively – and so the resulting data can be skewed. A related concern is that the questionnaires and interviews are subjective and so there is always a concern, even mistrust, on my part that the participants are not always entirely truthful when answering questions. The reasons for this are related to simple human nature in that some participants will tell the interviewer or researcher whatever they think the person wants to hear. In conducting the interviews I never got the sense that the participants were being anything other than completely honest. And the wide range of opinion and experience the data reveals seems to support that. But I have joked with colleagues before that the first question on any and all surveys should be “Do you lie on surveys?”

Questions of honesty and integrity aside it also occurred to me that the heavy reliance on Likert scales in this study is another limitation. Likert scales require participants to rate themselves on various items; in this case participants rated themselves on their experience and skill on various technologies. But these ratings were not defined and so one participant
might rate themselves relatively low on a particular skill because their own peers are extremely skillful and they seem like novices by comparison. However, as compared to the general population these participants might be quite skillful. In fact this happens to me regularly as I travel between peers in the IT world who are far superior to me technically and the general academic world where I am known as “the tech guy”.

**Generalizability.** In addition to the above there are a number of challenges associated with this study with respect to its generalizability. The first challenge concerns the very nature of survey research. While a powerful tool for discerning information about what is happening at a given time in a given situation, survey research can provide only a snapshot of the situation within a given time frame. The danger in claiming that survey data is generalizable across time (or populations) is that such conclusions do not account for the fact that scenarios change. This is particularly true in an area as dynamic as technology. The rate at which Web 2.0 tools are changing and the rapidity with which such technologies are being diffused into the general population means that extrapolating the results of this study into the future is, as Leedy and Omrod note, at best, “a conjecture, and sometimes a hazardous one at that” (Leedy & Omrod, 2010, pp. 187-188).

An additional consideration with survey research with respect to this study is that I relied primarily on self-report data where people reported to me either what they believed to have been true or what they thought I wanted to hear. This type of data collection is always problematic given people’s penchant for “mis-remembering” at best and actual distortions of reality at worst (Leedy & Omrod, 2010). These challenges were particularly acute in stage two of the study where participants may not have ever thought about the issues around Web 2.0. I was concerned that participants would never have considered, for example, that there
might be power issues with respect to Web 2.0 that influence their views about the technology. Nor would they have been likely to have considered the idea that satisfaction with the use of Web 2.0 tools might be tied to assessments used in the course. To try to mitigate these challenges in stage two, the interview questions and rationale for asking such questions was circulated prior to the interview as a sort of advanced organiser.

Models of technological innovation. One of the problems, as noted earlier, is that standard models of technological innovation are usually based on the idea that the user has little or no control over the choice of technology. Typically these models assume that the choice of technological adoption is made by someone other than the end user. This presents a limitation in the design of my study because, for the vast majority of participants there was little or no opportunity to choose which technologies, in particular Web 2.0 technologies, were used in their courses. This presented a challenge to me in terms of interpreting the results with respect to the adoption of technologies models as conceived by Rogers and Davis. As noted earlier in this dissertation Rogers indicates that these imbalances are, in fact, required for diffusion to occur (Rogers, 1995). Participants in my study often did get to choose the ways in which technologies were used in their learning environment. For example, with complex learning management systems like Moodle, students were able to choose to use only certain tools within the system like discussion boards but choose to not use other tools at all, like chat rooms. The study helped reveal the kinds of decisions students make about how they adopt and use educational technology in general and Web 2.0 applications in particular within the greater technological framework that is typically dictated to them either by the institution or their instructors.
Chapter Four – Findings

Overview

This chapter presents the findings of the study beginning with basic demographic information about the participants. The data were collected during the Fall of 2011. As indicated earlier the questionnaires were completed online using Lime Survey, a popular online survey tool, and the interviews were conducted via telephone with the exception of one interview that was conducted face to face in Victoria, Canada. The chapter is divided into two sections: A section outlining results from the questions on Web 2.0 usage patterns and the questions related to pedagogical values from students’ perspective. It reports primarily on the quantitative data, however, some qualitative data is presented in this section to reinforce quantitative findings. In addition to descriptive findings, the second section of this chapter reports on statistical associations between learner views of Web 2.0 in higher education and any (i) learner motivation, (ii) peer influence and/or (iii) power influences. Additional insights from the interviews are also presented later in the chapter and are used to reinforce findings from the surveys.

Study Participant Profile

Within the two target populations, Royal Roads University and the Masters in Educational Technology Program (MET) at the University of British Columbia, the survey results showed that participants (n=154) had taken an average of 9.7 courses that used Web 2.0 applications in some way with some participants reporting more than 20 courses that used Web 2.0.

Table 4.1 presents the demographic data of the respondents. As noted earlier the survey was sent out to approximately 5000 participants and the questionnaire was completed
partly or wholly by 154 respondents which represents approximately 3% of the total target population at Royal Roads University and UBC’s Masters in Educational Technology Program. As noted earlier I was unable to disaggregate the data between UBC and Royal Roads as participants were not asked to identify their school. Of these 154 respondents, 136 completed the entire 30 question survey.

Table 4.1 Demographic Profile of Study Participants

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Home Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 to 29</td>
<td>Male –</td>
<td>Rural – 15%</td>
</tr>
<tr>
<td>30 to 39</td>
<td>Female</td>
<td>Urban – 61%</td>
</tr>
<tr>
<td>40 to 49</td>
<td>No answer</td>
<td>Sub-urban – 22%</td>
</tr>
<tr>
<td>50 to 59</td>
<td>Other</td>
<td>2%</td>
</tr>
<tr>
<td>60 plus</td>
<td>No Answer</td>
<td>1%</td>
</tr>
</tbody>
</table>

Table 4.1 shows that respondents were mostly female (70%) and were living in urban and sub-urban areas (83%). This gender distribution is in contrast to the larger population gender balance of 60% female at Royal Roads University and 54% in the UBC MET program. Gender distribution was not a focus of the study and so it is not clear why the participants would be a majority of females. The age distribution of respondents is nearly balanced between older learners and younger learners (nearly 50% over the age of 40) which is in line with the Royal Roads average age of 45 years during the time the study was conducted. This is slightly higher than for the average age at the UBC MET program (43.1% are in the 30-39 age range) but still within the results found in this survey and also within the
target audience for Royal Roads University generally. This presents an interesting, albeit accidental, case for the study since authors like Marc Prensky (2001) have suggested that older learners are less inclined to use advanced technologies like Web 2.0. The demographics of this study suggest that this might not be the case.

Tables C.7 and C.8 in Appendix C show participants’ highest level of education completed and major course of study. There was a slightly higher percentage of Masters Degrees completed than Bachelors only (36% versus 33%). Given that Royal Roads University is a mostly graduate-level university and a Master’s program was targeted at UBC this result was expected. The single largest reported subject major reported was social sciences (20%), however, a larger proportion (25%) reported “other” as their major. When asked to comment on their choice of “other”, participants listed a variety of subject areas, most of which could be classified under the given categories. One respondent, for example, chose “other” but listed her major as English literature, an arts subject. However, there were some majors that did fall outside the choices given to participants. These included topics like leadership, library science, interdisciplinary studies, executive coaching, law, tourism and public administration. Participants with backgrounds in education represented 18% of respondents while 12% of respondents reported having backgrounds in science and engineering and another 18% of respondents reported backgrounds in business.

**Usage Pattern**

**Technological preferences and general technological skill.** The study provided a variety of data to create both a baseline and profile of participants which is used later in the dissertation to examine trends and relationships between perceptions and use about Web 2.0 and other aspects of participants’ personal, educational and professional lives. To begin,
participants were asked to self-identify their preferences in Table C9, Appendix C, with respect to Web 2.0 in learning, work and recreational environments. By combining participants in Table C9, Appendix C, who responded “I prefer using a moderate amount of Web 2.0 applications (55%)” and “I prefer using Web 2.0 applications extensively (22%)” one can see that a majority of respondents (77%) indicated that they prefer learning with moderate to extensive use of Web 2.0. Similarly, by combining participants who responded “I prefer using no Web 2.0 applications (3%)” and “I prefer using limited Web 2.0 applications (18%)” one can see that 21% of respondents indicated they prefer minimal or no Web 2.0 in their learning environments. These results are summarised in Appendix C in Table C.9. This is contrary to results that Tan found in her 2009 study where nearly than 60% of study participants identified themselves as low to non-users in learning environments (Tan, 2009). However, it should be noted that Tan’s study focussed on teenaged face to face learners being measured on an unfamiliar Web 2.0 application. By contrast, this study focussed exclusively on adults who primarily were studying at a distance most of whom had used Web 2.0 in some aspect of their lives. By similarly combining results from Table C9, Appendix C, we see that 62% of respondents report moderate to extensive use of Web 2.0 at work and 63% reported moderate to extensive use of Web 2.0 for recreation. The result for recreation should not be surprising given the proliferation of Web 2.0 applications designed for the recreational market like Face Book, Google + and You Tube. Thirty-one percent of respondents preferred little to no use of Web 2.0 at work while 33% preferred to not use Web 2.0 for recreation. It is surprising that the highest context of resistance to Web 2.0 is not in the learning or work environments but in the recreation context. This runs counter to common notions of how Web 2.0 is being used and equally runs counter to Tan’s findings.
that learners use Web 2.0 extensively in their personal lives and, as a result, resist Web 2.0 in learning environments.

Table C.10 in Appendix C shows how participants responded when asked to comment on their preferences for interaction with fellow learners and with instructors. Participants indicated that interaction with instructors is slightly more important than interaction with other learners (83% versus 71%) but virtually all participants agreed that they prefer to have some interaction with both fellow learners and instructors. Similarly, participants were also asked to identify their outlook toward new technologies (Table C.11) and how they like to use various categories of technologies in their learning environments (Table C.12). Specifically participants were asked to identify how best to describe themselves in terms of their outlook on new technologies and how they like to learn given certain categories of technology. These categories included text-based learning or conversations, gaming, websites, web quests, audiovisual consumption and audiovisual creation. A majority (89%) of respondents self-reported being on or ahead of the curve when it comes to new technologies by reporting that they like new technologies and usually use them before friends and colleagues do or they love new technologies and are usually the first to try them. This is supported in the interviews when participants were asked whether they and their peers mutually supported each other regarding the use of Web 2.0. The vast majority of interview participants indicated that they feel they are “just ahead of the curve” as compared to their peers in technology adoption. One participant noted: “I’d say that I am a bit of a catalyst with my colleagues. Because I’m the one telling them, hey, you guys should try this” (Participant B interview, September 23, 2011). Similarly, another participant reported that she feels like she is “breaking the ground for them and pushing them to come
along with [her]” (Participant H interview, September 28, 2011). Several respondents reported that they frequently adopt various technologies just before their colleagues and often influence their peers with respect to both technology choice and adoption. In other words, interview respondents reported that their choice of a particular application often influenced their peers’ choices. This is self-evident in the case of most Web 2.0 applications as they are, by their very nature, social and require peer to peer interaction to function.

The survey data (Table C.12) showed that a majority of respondents (51%) disagreed with the statement that they liked to produce audiovisual materials as part of their learning experience. By contrast, 87% of respondents agreed with the statement that they do enjoy consuming audiovisual materials. More germane to the study, a majority of participants agreed with the statement that they do enjoy learning through contributing to websites, blogs and wikis (72%) and text-based conversations (75%) but a smaller percentage agreed with the statement that they enjoy gaming as part of their learning experience (49%); still a large percentage. Similarly the vast majority of respondents (93%) indicated that they agreed with the statement that they enjoy using the web to search for information. These searches would include Web 2.0 environments like wikis and blogs, however, they would not necessarily include contributing to these environments. What this implies is that learners enjoy contributing to “simpler” Web 2.0 applications like text blogs, wikis and websites but prefer to avoid more complex Web 2.0 applications like audiovisual production. This may not be a surprising result given the volume of work usually associated with creating audiovisual materials and most learners perceive this as much work for little benefit. However, this might equally be the result of reluctance on the part of learners to be seen creating or co-creating course content. Referring to Web 2.0 specifically, one participant indicated that he wanted
the technology to be “just clean, simple, have it say, here’s your assignments, here’s the required readings and nothing else” (Participant A interview, September 23, 2011). Part of the challenge is that participants see Web 2.0 almost exclusively as a tool for communication or a repository of information rather than as a tool for creating knowledge. As one participant noted: “when you [were] back at school 20 years ago, you had to figure out the catalogue system…So it’s just another system that I think a lot of them are trying to figure out…Right now they’re just using it as a tool” (Participant O, September 24, 2011). This was a common theme throughout the study that Web 2.0 is seen primarily as a communications tool, less often as a means by which one can make knowledge more accessible and rarely as a medium for creating knowledge. This theme will be addressed more completely in the discussion section.

**Use and skill level of Web 2.0 (learning, work, recreation).** In the survey, participants were asked six questions about their use and skill level of various Web 2.0 technologies in three environments – learning, work and recreation. Tables C.13 to C.19 in Appendix C provide summaries of participant responses. The results indicate a range of uses and skill levels. However, there is a general trend towards the use of Web 2.0 technologies for learning activities and away from Web 2.0 for work and recreation. For example, 59% of participants indicated they used wikis up to nine hours per week for learning activities but only 48% indicated they used wikis for either work or recreation (Table C.13). By way of contrast, only 19% of participants indicated that they never use wikis for learning whereas respondents indicated a higher rate of never using wikis for work or recreation (34% and 40% respectively).
The results are similar for blogs (Table C.14) although a slightly higher proportion (62%) indicated that they use blogs for recreation. The use of social networking is more evenly split along the learning, work and recreation lines (Table C.15). Twenty-six percent of participants report using social networking for learning at least some of the time while 23% and 29% indicated using social networking for work or recreation at least some of the time. Thirty two percent of participants correspondingly reported that they never use blogs in learning while 41% reported they never use blogs for work and 27% never use them for recreation.

Table C.16 in Appendix C shows that social bookmarking is seldom used in learning, work or recreation environments. Twenty-six percent of participants reported using social bookmarking for learning at least some of the time. Similarly, 23% reported using social bookmarking in their work at least some of the time and 29% report using social bookmarking recreationally at least some of the time. Similar results were found for micro blogging (Table C.17), online virtual worlds (Table C.18) and content sharing (Table C.19). What all of those results show is relatively high usage and skill patterns across most Web 2.0 technologies with a tendency to use them extensively for learning but less so in other environments not directly related to learning.

**Web 2.0 in learning environments.** Participants were asked about their perceptions as to how effectively Web 2.0 was used in their learning environments; the results are presented in Table C.21. When asked about their awareness of policies or rules surrounding the use of Web 2.0 in the classroom before they began their class the vast majority of participants indicated that they either did not know or were not made aware of any such rules. Table 4.2 below shows that only 31% of respondents reported that they were made
aware of rules surrounding the use of Web 2.0 in their learning environment. Twenty eight percent of respondents were not sure if there were specific policies or rules, and two percent of respondents did not answer the question.

Table 4.2 Participant Awareness of Web 2.0 Policies

**Q:** Before you began your class(es), were you made aware of any policies or rules regarding Web 2.0 technologies?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>41</td>
<td>31%</td>
</tr>
<tr>
<td>No</td>
<td>51</td>
<td>39%</td>
</tr>
<tr>
<td>Not Sure</td>
<td>37</td>
<td>28%</td>
</tr>
<tr>
<td>No answer</td>
<td>3</td>
<td>2%</td>
</tr>
<tr>
<td>N</td>
<td>132</td>
<td>100%</td>
</tr>
</tbody>
</table>

Similarly, Table C.20 in Appendix C shows that training for Web 2.0 was provided in 34% of the courses implying relatively low attention paid to pre-course skills and training. By contrast, participants indicated that their instructors appeared skilled in the use of Web 2.0 more than 85% of the time indicating a high degree of attention to the technical and pedagogical ability to use these new applications. While not explicitly asked in the interviews a number of participants did comment on the lack of available training for Web 2.0. One respondent reported challenges with Web 2.0 in part because there was no indication of what technologies would be required until after the course started. She indicated that:

Maybe a third of my cohort was familiar with RSS feeds and thought it was passé. .. two thirds of our cohort hadn’t ever used RSS feeds at
this point. And so there was a big gap between those who already
knew what it was and had stopped using it because they thought it was
irrelevant and those who were brand new to it and were trying to catch
up…the course assumed that many people were very good at
technology and…I found myself quite apprehensive because I cannot
even set up my computer right and I consider myself pretty tech savvy
in terms of that. (Participant M interview, October 1, 2011)

The challenge here is that there seems to be an assumption that learners either did not
need training or that there was no consideration given at all to how learners would learn to
use Web 2.0 tools. Given that participants reported a wide variety of skill levels with respect
to various Web 2.0 technologies (See Tables C.13 to C.19 in Appendix C) this presents a
policy challenge to both the faculty and the institutions. What it suggests is that there is more
variability within groups with respect to skill level than there is between groups. This is, in
fact, supported by the literature (Kennedy et al., 2009) and implies that training has the
potential to be an issue with respect to Web 2.0. In any case there are strong implications
here for instructional design policy which will be further addressed in the Chapter Five.

Pedagogical Value from Student’s Perspective

As noted earlier, the data reported in Table C.10 shows that, from the students’
perspectives, there were two points that spoke to pedagogical value. The first was that
students valued interactions with instructors more than with fellow students. This was not to
say that they did not valued student-student interaction but that they valued interaction with
instructors more in the sense that they felt their learning goals were more likely to be met
through interactions with their instructors than with other students. The second point that
spoke to pedagogy was that participants in this study tended to view Web 2.0 more as a tool for communication than as a tool for co-creating knowledge (Table C.27). The implied assumption here is that Web 2.0 is not a valuable tool for creating knowledge in participants’ contexts.

When asked about how effectively instructors used Web 2.0 applications in their learning environment respondents were generally positive. Only 8% of respondents felt that the use of Web 2.0 was completely ineffective while the remainder reported that the use of Web 2.0 was effective at least some of the time. In contrast, the interview data revealed much criticism on this point. Some participants felt that instructors had the right idea about using specific Web 2.0 applications for a given learning situation or environment, but, chose the wrong application either because they chose applications that were immature or inappropriate or applications with which learners were not familiar. As one participant noted:

To be honest with you, a lot of times when we have group work to do, we won’t use the professor’s prescribed Web 2.0 app…because we are more familiar with [the other applications] and to be honest with you a lot of time, like, Facebook is, you know, it’s run by professionals. It’s going to be better software than whatever they have, like the writing education kind of stuff. (Participant A interview, September 23, 2011)

The participant went on to say that “I think the biggest message I would want to send is that everybody’s got Facebook. If the professor is trying to use all these new things, just use what students know ‘cause it’s more effective” (Participant A interview, September 23, 2011).
In contrast to those who expressed some misgivings as to the effectiveness of Web 2.0 in their experience, participants reported in the survey that they felt the use of Web 2.0 in their learning environments had helped them achieve their learning goals and helped create a better learning environment. Table C.21 in Appendix C shows that fully 90% of respondents felt that Web 2.0 either helped them achieve their learning goals and/or helped create a better learning environment.

In discussions about Web 2.0 and learning environments or learning goals in the interview section of this study, participants remained positive but less so than in the questionnaire portion. Further investigations in the interviews revealed that they were positive about Web 2.0 within very specific parameters including where Web 2.0 is used primarily as a communications medium and/or where it is tied specifically to a graded exercise. In other words, interview participants revealed a need to know that there was a good reason for using Web 2.0 before viewing it positively or negatively. See Table C.22 in Appendix C for the data results.

To follow up on the questions on learning goals and environments, participants were asked to identify whether the use of Web 2.0 was tied to a specific graded assignment. Fifty-nine percent of respondents indicated that Web 2.0 was tied to a graded activity. Some of the comments from participants on this matter included: “It didn't help learning, it just gave me an excuse to take a nap or do some other work” (Participant R survey, ND) or “they were not used properly and did not get much traction from students other than the graded submission in forums” (Participant S survey, ND). One interview participant commented that “it would also depend on where they tested from, because… the minute I find out that they don’t test
from Facebook and whatnot, and I can get all the information from the textbook, I won’t go there” (Participant Q interview, June 1, 2011). Another interview participant indicated that

It's pretty much useless in class if it's even used. Unless they're grading on it, I would never bother using it. And if they started using Web 2.0, I wouldn't be very happy because I currently don't see how they can use it effectively. It would just be an extra thing to have to do for a course when I'm already really busy. (Participant R interview, October 4, 2011)

Statistical Analysis

The study also explored specific relationships between Web 2.0 use and (i) peer influence (ii) learner motivation and (iii) power and freedom. This section provides the descriptive data pertaining to these associations as well as outlines the results of a number of statistical tests that were run to explore these associations. As noted in the methodology section, since the data collected was from a relatively small number of participants (n=154) and comprised of categorical data I opted to not use a Chi-squared test to determine statistical associations.

Peer influence. Peer influence has been identified as a key factor in determining one’s use, adoption and skill level with respect to Web 2.0 (Tan, 2009, Kennedy et al., 2009). To explore this within my study, participants were asked to identify the degree to which they thought that their peers had an influence on their use of Web 2.0 technologies. Table C.23 in Appendix C summarises the results which show that participants were nearly evenly split in terms of the degree to which their peers influence their decisions about Web 2.0; 47% reporting that they are influenced in contrast to 51% reporting that they are rarely influenced.
This contrasted with the results from the interviews where virtually all respondents indicated peers influence their decisions about Web 2.0 to varying degrees. One participant indicated that “cause if I was using Facebook and I was the only user, it really wouldn’t have any point for existence” (Participant A interview, September 23, 2011). There was not universal agreement on how the influence manifested itself, however. Some interview respondents indicated that likes tend to attract likes. Others believe that peers influence each other, but, not in their particular case. In other words some participants believe that they are immune to peer influence as one participant quipped “I suspect it’s probably true of the majority of people. It is not true of me” (Participant G interview, October 5, 2011). In general, however, most people recognised that Web 2.0, by definition, is a social environment and so it would be difficult to imagine not being influenced by your peers.

One of the purposes of this study was to investigate what relations, if any, exist between peer influence and learner preference for Web 2.0 in learning, work and recreational environments. Fisher’s Exact Test was used to examine potential associations between peer influence and other questions contained within the survey. Clearly running large numbers of correlational tests would result in some statistically significant results just by chance. To avoid this I opted to run 12 correlational tests targeting specifically whether there were relationships between the factors I identified earlier including peer influence, motivation for pursuing education, usage patterns of Web 2.0 and freedom of use of Web 2.0. The tests did reveal that there was a strong correlation between how frequently participants’ friends or colleagues’ use of Web 2.0 influence their use of Web 2.0 and how participants describe their comfort level with adoption of new technologies. It was also frequently reported in the follow up interviews how peers would coach each other through the use of the latest Web 2.0
applications. As noted in a number of interviews, peers’ use of Web 2.0 does seem to be
directly tied to their use of Web 2.0 simply because it is a social medium. One participant
noted that “if I’m somebody who uses it and thinks it’s absolutely great and wonderful, I’m
more apt to show you how it works and try to connect with you using that” (Participant J
interview, September 30, 2011). One of the themes that emerged from this line of
questioning is that the reason why peers do influence the use of Web 2.0 is out of a fear of
being left out. This theme was revealed in almost every interview and can be summarised
with the following quote: “I notice that just in society today that if your friends are all on
these things, you tend to join them just because you don’t want to be left out” (Participant N
interview, October 5, 2011). Table 4.3 summarises this result.
Table 4.3 Peer Influence Versus Technology Adoption

<table>
<thead>
<tr>
<th>How frequently do your friends or colleagues’ use of Web 2.0 influence your use of Web 2.0?</th>
<th>Almost always</th>
<th>Often</th>
<th>Seldom</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>0</td>
<td>2%</td>
<td>4%</td>
<td>3%</td>
</tr>
</tbody>
</table>

In this table, the calculated F-value is presented as 27.318 which corresponds to a significance p-value of 0.002 which is less than p=0.1. For the purposes of this test, there were only 135 valid cases used out of a possible total of N=154 cases. The remaining cases were discarded due to insufficient or incomplete raw data.

According to this data, there was a significant correlation between peer influence and the ways in which participants like to learn using Web 2.0 technology. The implication is that peer influence with respect to technology reaches beyond casual use of Web 2.0 into the learning environment. This demonstrates that learners’ Web 2.0 preferences are both positively and negatively influenced by their peers. What this means is that if one’s peers are
positive or enthusiastic about using technologies in certain contexts they will be as well. See Table 4.4 for the precise result.

Table 4.4 Peer Influence Versus Web 2.0 Adoption in Learning Environments

<table>
<thead>
<tr>
<th>How frequently do your friends or colleagues’ use of Web 2.0 influence your use of Web 2.0?</th>
<th>I like to learn through:</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly Disagree</td>
<td>Disagree</td>
</tr>
<tr>
<td>Almost always</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Often</td>
<td>1%</td>
<td>4%</td>
</tr>
<tr>
<td>Seldom</td>
<td>2%</td>
<td>9%</td>
</tr>
<tr>
<td>Never</td>
<td>2%</td>
<td>4%</td>
</tr>
</tbody>
</table>

N=127
Fisher’s Exact F-Value = 13.680
p<0.095

There were no significant associations found between peer influence and learners’ achievement of learning goals, the creation of better learning environments or interaction between peers or with instructors. This implies that peer influence is very focussed in its influence on the technology adoption used in various environments but not so much on other factors.

Motivation. Motivation has been identified in the literature as an indicator with respect to using various technologies (Rogers, 1995; Tan, 2009; Warschauer, 2007). As a result, participants were asked to comment on their general motivations for attending higher education which was contrasted with their technological motivations. Table C.24 in Appendix C summarises the results. The largest response (40%) reported their primary motivation for attending higher education was related to employment. This meant getting a
job, getting a better job (or getting a monetary promotion in an existing job). This came as no surprise given the population from which participants were chosen; graduate-level professional development programs. The second most cited motivation was to enrich life’s experiences (31%). However, combining participants’ primary and secondary motivations showed that the most important motivation overall for attending higher education was not related to employment but to enriching one’s life experiences. This implies that participants were primarily motivated by economic reasons but are keenly aware of the larger picture with respect to their lives.

Within the context of Web 2.0 it was noted earlier that the goal of a graded assignment (and presumably doing well on the assignment) was a key motivator in deciding whether to view Web 2.0 positively or negatively. One participant questioned the relative value of Web 2.0 on how easily she could transfer those skills to her work environment which happened to be a K-12 classroom. “I’m using Web 2.0 applications in my university work, but when I go to the classroom, how much of that is transferable to what I can do with my kids in the classroom?” (Participant F interview, September 16, 2011). The theme that emerged from these responses is that Web 2.0 must be tied directly to either the learning goals or course grades or both for it to be seen as motivating to participants. Some were concerned that an over-emphasis on Web 2.0 tools might actually be “a hindrance to those who decide to go beyond a master’s program, let’s say into [a] PhD [program] at a different institution where practically, you know, Web 2.0 applications are very limited in their applications” (Participant M interview, October 1, 2011). Employability, as a motivation, was certainly a factor as shown by the following quote: “If it had been enhanced enough… I think that it would have been a match for the 21st century learning skills that I think they [her
colleagues] are going to need for employability in the future” (Participant P interview, October 12, 2011). The prevailing feeling about the motivations for using Web 2.0 are summarised by the following comment:

Academically, I use it because it’s part of a course and I happen to think it’s beneficial. I happen to think it’s useful. And it also has 20 percent of my mark so there’s a, you know, so class participation has now just been substituted with discussion group participation. So, again, at the master’s level you can’t just all sit there like lemmings. So, again, I would use it… it’s valuable, so from a peer group and educational environment, I think it’s valuable and I use it. (Participant G interview, October 5, 2011)

Other motivations cited from within the survey included the ideas that higher education was out of a love of learning, for prestige, for better health, to give back to society, to set an example for children, for networking and one person admitted that her motivation for higher education was to win a bet with her kids to see who would finish their MA first.

For this study, participants’ reasons for pursuing higher education were used as a proxy for motivation. The data was analysed to examine any significant correlations between motivation and other variables including:

i. use of technology

ii. learning preferences

iii. preference for contact within a learning environment with peers and instructors
iv. degree to which Web 2.0 helped respondents achieve their learning goals and create a better learning environment and

v. openness to new technologies

The only significant correlation found between these variables was participant motivation for pursuing higher education and the use of Web 2.0 technologies. However, the correlations between participant motivation for pursuing higher education and the use of Web 2.0 technologies were inconsistent among different Web 2.0 technologies. It is not clear from the data why this might be the case, however, based on these results one cannot conclude anything at this point. It might be a statistical anomaly that could be cleared up with future research and/or a larger sample size. Where present, as in the case of the correlation between participant motivation and use of blogs, it may imply simply that the more open people are to further education the more open they are also to technologies in a very general way. Table 4.5 outlines a typical example of this correlation for Blogs.
Table 4.5 Association Between Motivation for Higher Education and Use of Blogs

[For work] [Scale 1] Using the dropdown menus, please indicate the frequency with which you use Blogs (audio/video/text) for learning (school), for work, or for recreation. Using the other drop down menu, please indicate your skill level with using Blog Total

<table>
<thead>
<tr>
<th>Frequency with which you use Blogs</th>
<th>Never</th>
<th>less than 5 hrs a week</th>
<th>between 5-9 hrs a week</th>
<th>between 10-15 hrs a week</th>
<th>more than 15 hrs a week</th>
</tr>
</thead>
<tbody>
<tr>
<td>to get a job</td>
<td>21%</td>
<td>16%</td>
<td>2%</td>
<td>2%</td>
<td>0</td>
</tr>
<tr>
<td>to become a better person</td>
<td>5%</td>
<td>7%</td>
<td>1%</td>
<td>1%</td>
<td>0</td>
</tr>
<tr>
<td>to enrich life experiences</td>
<td>11%</td>
<td>11%</td>
<td>6%</td>
<td>0</td>
<td>1%</td>
</tr>
<tr>
<td>to become a better citizen</td>
<td>3%</td>
<td>0</td>
<td>2%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
<td>4%</td>
<td>3%</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

N=132
Fisher’s Exact F-Value = 22.829
p<0.065

Moving away from general technological use I then examined relationships between participant motivations and their technological preferences within learning, work and recreational environments. Significant correlations were found when comparing learner motivation and technological preferences with respect to recreational and work environments but not technological preferences with respect to learning environments. While this does not necessarily show a resistance to using technologies in learning environments it does show a relative lack of enthusiasm for such technologies when compared to using the same
technologies in either work or recreational environments. See Tables C.25 and C.26 in Appendix C for the statistical result for the recreation case. Similar to the case above for motivations versus the use of technology, this is an avenue for further study as the results are unclear at this time.

While not an explicit purpose of the study, I expected to see a correlation between motivation and learner preference for interaction with other learners and with instructors. This expectation was a result of “common wisdom” among instructional designers that interaction is key to educational success. In fact the analysis showed there was no significant correlation between motivation and a desire for learner-learner contact or a desire for learner-instructor interaction. This does not necessarily imply that participants do not value interaction with their peers and instructors. Moreover, the descriptive and interview results of this study indicate a preference for learner-instructor interaction (See Table C.10 in Appendix C). What this does suggest is that participants do not associate their motivation for pursuing higher education with interaction. That is to say that the value of interaction, from the participants’ perspective, is not intrinsic to the communication but as a means to an end – i.e. achieving the learning goals. This finding is reinforced by the lack of a significant correlation found between motivation and either the belief that Web 2.0 helped contribute to a better learning environment or improved learning goals. This is in contradiction to the high agreement participants indicated with respect to Web 2.0 improving learning goals and outcomes in the surveys (See Table C.21 in Appendix C). What this implies is that Web 2.0 is seen more as a convenient “bag of tools” for communication rather as a direct motivator for pursuing higher education.
Power and freedom. The study also investigated possible correlations between power and freedom and the use or adoption of Web 2.0. In this case power and freedom is measured in two ways:

i. the desire and utility of interaction between learners and classmates or between learners and instructors and their motivations to pursue higher education

ii. how the use of Web 2.0 in one environment (learning, for example) affects the use of 2.0 in another environment (recreation, for example).

The question is, then, were there statistical relationships between the ways in which Web 2.0 is used inside the learning environment versus the way it is used outside the learning environment? Specifically, what I wanted to learn was whether there were correlations between participants’ recreation preferences with respect to technology and their learning preferences with respect to technology. In other words, does a high degree of affinity for using Web 2.0 in one’s recreational life have any effect on one’s affinity for using Web 2.0 in one’s scholastic life? To answer this question I again turned to Fisher’s Exact Test and examined relationships between recreational preferences and learning preferences.

In the case of maintaining interactions with classmates, Table 4.6 shows that there was a significant correlation between peer interaction and the desire to pursue higher education.
Table 4.6 Peer Interaction Versus Motivation to Pursue Higher Education

Which best describes your learning preferences? Please comment on your choice using the comment box.

<table>
<thead>
<tr>
<th>Total</th>
<th>I prefer using Web 2.0 applications for learning.</th>
<th>I prefer using a moderate amount of applications for learning.</th>
<th>I prefer using limited Web 2.0 applications for learning.</th>
<th>I prefer using no Web 2.0 applications for learning.</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Rank 2]</td>
<td>to get a job</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Following are several reasons why people attend higher education.</td>
<td>0%</td>
<td>4%</td>
<td>8%</td>
<td>3%</td>
</tr>
<tr>
<td>Please rank the following purposes of education from most important (1) to least important (5).</td>
<td>14%</td>
<td>14%</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>to become a better person</td>
<td>0%</td>
<td>4%</td>
<td>20%</td>
<td>2%</td>
</tr>
<tr>
<td>to enrich life experiences</td>
<td>2%</td>
<td>7%</td>
<td>22%</td>
<td>11%</td>
</tr>
<tr>
<td>to become a better citizen</td>
<td>0%</td>
<td>2%</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>Other</td>
<td>1%</td>
<td>2%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>2%</td>
<td>19%</td>
<td>56%</td>
<td>23%</td>
<td>100%</td>
</tr>
<tr>
<td>F-Value</td>
<td>17.061</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>0.081</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td>17.061</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>133</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This implies that participants associate interaction with peers with their pursuing higher education. This is an interesting contrast to the earlier finding which showed that motivation was not associated with learning goals or with creating a positive learning environment. This implies that Web 2.0 is not seen as a key advantage by learners for either communication or achieving learning goals. Similarly, the analysis indicates a strong correlation between participant views about peer interactions and their contribution to Web
2.0 applications like blogs or wikis as shown in Table C.27 in Appendix C. The implication of this result is that participants see Web 2.0 more as a vehicle for communicating with peers about content than a vehicle for providing, supporting or creating the content itself. This was consistent with some of the results from the interviews where participants reported: “the one good thing about Web 2.0 is you can access the information anytime you want. But if the prof was to email all their notes and all their assignments it wouldn’t make much of a difference in my opinion compared to using, like, a portal” (Participant T survey, ND).

Another participant indicated that she was thinking back to her undergraduate degree and how many times I sat in the class and thought things but didn’t get them out, for whatever reason…but I think that the experience I have had so far with, you know, mandatory posts,… you are forced, in a way, to get your ideas out. (Participant E interview, September 18, 2011)

In the case of whether there were significant correlations between recreational preferences and learning preferences the results were mixed and unclear. For example there was a significant correlation between participants’ recreational preferences and their skill level with wikis but no other Web 2.0 technologies. This, again, was supported by the interviews where participants reported a reluctance to use Web 2.0 in more than one aspect of their lives. In the case of this study there seemed to be an enthusiasm for using Web 2.0 in learning environments coupled with a reluctance to use them in work or recreation environments. For example, one participant expressed concern about the security of using Web 2.0 in her personal or work life:

I think my biggest fear with using Web 2.0 is that I don’t know where
in… the cloud all of this information is being stored… let’s say I was
doing something that I wanted to refer to because I’m doing
professional development with my staff, and all of a sudden for
whatever reason, Prezi [an online presentation application] just
disappears off the face of the planet. And all my information is lost
out in cyberspace. So I think that’s one of the things that makes me
really reluctant to really, I guess, depend on Web 2.0 applications. I
have no idea, really, where the storage is happening and how secure
the information is once it’s stored there. (Participant F interview,
September 16, 2011)

**Interview Data**

This section presents some of the unique results from the interview part of the study.
Within the context of this study interviews were used to corroborate, support and provide
further insights into the survey results. This section presents interview data that provided new
and unexpected information not covered by the participant survey questionnaire. While all
150 survey participants were invited and eligible for the interview stage of the study only 20
responded and were, ultimately, interviewed. This gives a response rate of over 10% of the
sampled population. How representative this sub-sample was to the greater sample is difficult
to gauge, however, 12 of the 20 respondents were female corresponding to a percentage of
60% which is smaller than the 70% female response rate in the survey stage of the study.
Because it was not an explicit question in either the survey or the questionnaire I cannot
determine with any certainty what institution these participants were associated with. I am
able to say that eight of the 20 interview participants were based in British Columbia at the
time of the interview while the remaining 12 were from Alberta, Ontario, Nova Scotia, Florida and Switzerland. Given that these are all distance learners I am unable to draw a link between participant location and their program of study.

**Communication and interaction tools.** The results indicate that participants highly valued Web 2.0 applications as vehicles for communication and interaction. However, they did not value Web 2.0 as a vehicle for creating community nor as a vehicle for the creation of knowledge or content. The communications cited by study participants varied across peer to peer, peer to instructor and peer-content types of interactions. This suggests that participants in this study who liked to use Web 2.0 in learning environments at least some of the time has more to do with communication than the creation or even acquisition of content. Participants indicated in interviews that Web 2.0 did help their learning but more through the convenient communications it provided than through content creation. For example, one participant indicated that “it provides good advantages for me to communicate and to be very aware of my social surroundings” (Participant A Interview, September 23, 2011). Similarly when asked why Web 2.0 helped her to achieve her learning goals another participant indicated

> when I compare to thinking about sitting in a classroom with, you know, whatever, 30 people, and however many, the opportunity for discussion and the comfort level of some people wanting to put their hand up or to say something [is limited]…Now for me I think my voice became louder and stronger [using Web 2.0] and it also gave me opportunity to think about what I wanted to say before I actually said it. (Participant D Interview, September 26, 2011)
Motivation for pursuing higher education. One of my assumptions in conducting this study was that participants would be largely motivated to pursue higher learning out of a desire for improved employment opportunities. The implicit assumption in this was that participants view higher education pragmatically and would, by extension, see the use of Web 2.0 as merely a means to an end. If participants could see how using Web 2.0 would help them get a good mark, they would embrace it, but, if they could not see the connection between Web 2.0 and getting a good mark they would immediately resist its use. These assumptions turned out to be false. While employment opportunities ranked highest in terms of participants’ single primary motivation for attending higher education, it was not the most important motivator. Overall the most important motivation for attending higher education was enriching one’s life experiences. The implication here is that participants were interested in pursuing higher education for the experience of learning – a heartening result on its own. By extension, however, this further implies that participants were interested in learning about Web 2.0 as well as using Web 2.0 for its own sake, as opposed to valuing it merely as a tool for getting a good grade. This result was reflected in many of the interviews where participants indicated that they enjoyed learning about Web 2.0 even if it was neither tied to a specific assignment or grade nor helped them advance their learning goals. As one participant put it “it helped me to learn because I have to self-learn. Like, no one’s teaching me these tools…So it is a lot of self-discovery and self-teaching. And then you save it and keep it in a bank” (Participant B interview, September 23, 2011).

While positive about the Web 2.0 experience, participants clearly saw it as more about learning the tools than the expressed content of the course. When asked whether he would like to see more use of Web 2.0 in his own learning environment one participant
responded that “I’d probably think of it as an opportunity to become adept to the new set of tools” (Participant I interview, September 30, 2011). Similarly another participant reported that Web 2.0 “took away the distance that was between people” (Participant L Interview, October 4, 2011). So, for participants in this study, Web 2.0 was not seen solely as a means towards a better grade and improved employment opportunities but as a means towards better communications within their learning environments.

**Don’t leave me behind.** “[I] wanted to see what else was out there and just be a little bit more up on current kinds of practice and try to bring them into a school setting to kind of keep teachers mostly current” (Participant B Interview, September 23, 2011). This quote is reflective of a recurring and unexpected theme within the broader scope of peer influence which was the frequency with which participants noted the importance of Web 2.0 in preventing them from being left out. So while participants did not necessarily relate the use of Web 2.0 to being left in the “digital dust” as noted earlier they did express concern that they might be left out if they did not embrace Web 2.0 tools. This theme will be taken up again in the Discussion Chapter. The important part of this result is that the majority of participants recognised the influence of peer pressure but did not feel undue pressure from their peers to use Web 2.0 tools outside the learning environment.

In summary, this chapter has presented data that provide insight into the ways in which adult learners view Web 2.0 in their learning, work and personal environments. In the following chapter of this dissertation, the key findings that have emerged from the data are synthesised and discussed with respect to the core research questions specified in this study as well as the relevant literature. Implications for design, leadership, policy and practice are also discussed as well as opportunities for future research.
Chapter Five - Discussion

Introduction

This chapter relates the findings presented in the previous chapter to the original aims of the study as well as to the literature with respect to the use of Web 2.0 applications. As alluded to in Chapter Four there were a number of unexpected findings resulting from the study and these will be discussed here as well with respect to implications for my educational practice. Particular emphasis will be placed on implications for instructional designers, instructors and thoughts on avenues for future research.

As noted earlier my study was inspired by Jennifer Tan’s 2009 doctoral dissertation entitled “Digital Kids, Analogue Students: A mixed methods study of students’ engagement with a school-based Web 2.0 learning innovation” (Tan, 2009). Hence, the primary purpose of the study was to develop an understanding of the use of Web 2.0 applications in the learning process from the students’ perspective. A secondary goal of the study was to examine the relationship between students’ Web 2.0 use and learner motivation, peer influence and power and freedom issues all within the context of my practice. The results of the study showed statistical relationships between users’ perceptions and usage patterns with respect to Web 2.0. Moreover, these relationships were not always limited to learning environments; as opposed to work and recreational environments, which were also investigated.

One of the challenges associated with this study in particular is the small sample size in both absolute and relative terms. Using relatively conservative statistical analyses resolves some of these challenges, however, the fact remains that this study focusses exclusively on a sample of students in my own practice in a relatively small university. The small sample size
has the potential to introduce a number of errors in the final analysis. These errors typically fall into one of two categories: sampling errors and biases. In the case of sampling errors there is a possibility that, because my sample population is small when compared to the overall population, that my results are inaccurate. How inaccurate is impossible to measure without further study (Creswell, 2003). This type of error leads directly to the other challenge which is the biases that accompany most survey research. Survey research notoriously attracts what can only be referred to as extreme views – either positive or negative. What this means is that a voluntary survey research study can attract participants who have “an axe to grind” in the sense that they are either very unhappy about something and want to complain or they are very excited about something and are hoping to evangelise. The data sets for this study suggest that neither of those extremes happened in this study. Participants were quite measured in their responses.

In general, however, survey bias is a risk inherent in any survey research (Creswell, 2003) and the only real solution is to mitigate the risk through larger sample sizes and robust statistical techniques. Due to time and resource restrictions I was unable to increase my sample size and so I chose relatively conservative statistical tests for my analysis showing statistically significant associations in only extreme cases. A larger sample size or a less conservative battery of statistical tests might have revealed more significant associations than are reported in this dissertation.

**What is Web 2.0?**

One of the challenges with respect to this study was the very definition of Web 2.0. Web 2.0 is a term that is used casually and everyone seems to have a tacit understanding of what it is but few are able to define it and fewer are able to agree on a definition.
Complicating matters is similar confusion surrounding notions of Web 1.0 and the ever-emerging Web 3.0 which no one seems able to even describe let alone define. On a certain level this ambiguity is expected and is not unusual in academia or in the development of web applications. Even the notion of science can be ambiguous, for example. Most people have a fairly well developed notion of what science is but few would be able to agree on an exact definition. However, when trying to glean meaning from a study such as this the more agreement one can get on a precise definition, in this case Web 2.0, the more useful the results are likely to be. It was for this reason that I provided participants with a definition of Web 2.0, but, I left the interpretation to the participants. This allowed participants to include certain applications as examples of Web 2.0 that might not be universally accepted as part of Web 2.0 – learning management systems for example. The way I defined Web 2.0 used Alvin Toffler’s idea of the “prosumer” where users are both producers and consumers of content via media (Toffler, 1970). This has also come to be known as push/pull technologies and simply refers to web-based applications whereby the user can both produce and consume content. Almost by definition, this interplay of user and content implies both interactivity and communication.

As noted above, I recognised that ambiguity about the definition of Web 2.0 could cause challenges for both the design of the research and the interpretation of the data. However, I felt it was more important to permit some interpretation of the definition of Web 2.0 so as to allow for applications that might not have been originally conceived or used in a prosumer or knowledge co-creation way. This also left the study open to consider future applications. Leaving the definition open to interpretation in this way also allowed me the room to explore instructional design implications with respect to using Web 2.0. One result
from this study, then, was the wide-ranging opinions on what Web 2.0 is precisely. Indeed participants interpreted Web 2.0 widely to include applications like social media but also communications tools like Skype and learning management systems. From the participants’ points of view these were all applications where they could, at least in theory, produce and consume content.

During the interview stage of the study I did not challenge participants’ choices about whether a given application was or was not Web 2.0, however, I did ask participants to explain why they felt it was Web 2.0 if their examples were unusual. An example of this was RefWorks which I would not have normally considered to be a Web 2.0 application. In its original form, RefWorks was simply an application for writers to manage their references as well as create bibliographies. I did not initially see how this was an application that allowed participants to produce and consume information until a participant pointed out to me that, in later versions of the application, RefWorks allows users to share their bibliographies and edit them in much the same way one might build a wiki. This was a wonderful example of an application that began as a relatively simple Web 1.0 application that evolved to include Web 2.0 attributes. This evolution reaffirmed my decision to allow participants to define Web 2.0 to fit their own contexts.

The implications of this are far-reaching from both the learners’ perspective and for instructional designers as it shows that conceptions of Web 2.0 in learning environments are messy and evolving. This might not come as a huge surprise to technologists as everything associated with the web is fast-changing. However, for instructional designers this is a critical result because it means that designers must be equally dynamic when designing instruction that purports to use these tools. In fact the amount of variation described in the
study implied that the next step in the evolution of these applications might be away from the designation of specific tools within specific learning environments and more towards what are known as personal learning environments or PLEs (Siemens, 2005). What that means is that instead of faculty and designers determining that learners will use wikis to build information and blogs to write reports, for example, they might soon simply leave it to the learners to use the tools they deem most appropriate. By definition that is a personal learning environment and there has been some work done in this area by George Siemens and Stephen Downes, although with limited success (Fini, 2009). As a colleague noted, PLEs are very interesting but may not yet be ready for prime time (B. Hails, personal communication, January, 2012).

This process might be pushed to its logical limit by allowing learners to not just co-create course content but to co-create the courses themselves. Indeed this was attempted some years ago by a colleague at Royal Roads University whereby learners were provided a wiki and a course title and were then required to develop the course from the beginning much as an instructional designer might do (I. Chao, personal communication, March, 2012). Unfortunately this course was not successful and instructor illness prevented further investigation.

A similar, and more common, example is with graduate-level courses organised by individual graduate students. These courses are usually electives and are designed to fulfill a niche need of the student and are usually pursued in partnership with an individual professor. These courses are commonly known as reading courses or self-directed studies and are very useful to motivated and independent learners. It may very well be that the motivation and
independence (or lack thereof) is the key to the success of these types of courses. This is an area that warrants future research.

**Web 2.0 is a Learning and Communications Tool**

The quantitative results of the study suggest a high degree of openness and comfort on the part of participants to using a variety of tools including Web 2.0 in all aspects of their lives: learning environments, the work place and their personal lives. The results further showed a general preference for the use of Web 2.0 applications at least some of the time in learning environments over other aspects of their lives. This result contradicts the expected result according to Marc Prensky’s (2001) work favouring instead Kennedy’s (2009) assertion that there is more variation within groups than between groups. This is also in direct contrast to Tan’s (2009) results which showed a distinct learner preference for the personal use of Web 2.0 and a resistance to Web 2.0 use in learning environments. This study, however, showed a distinct preference for the use of Web 2.0 tools in learning environments over all other environments. In a personal communication with Tan, she expressed no surprise at this result given the fact that our research contexts were so different and not just across age, but also across expectations, aspirations and motivations. Tan also indicated that her study was about introducing Web 2.0 tools into a new environment which could have made a huge difference in results (J. P-L. Tan, personal communication, January, 20, 2012).

While the study revealed a wide variety of thinking about what Web 2.0 is, there seemed to be more consensus within this study about how Web 2.0 applications are best used. With few exceptions participants in this study focussed immediately on the idea that Web 2.0 is a learning tool as opposed to a tool for work or socialising. This is something of a troubling result as the media is replete with stories of how wide-spread social media like
Facebook are being used. In fact, at over 1 billion members, Facebook is now the third largest community on Earth after China and India. So why the contradiction between my results and this common knowledge? At first, I thought this might be either research bias or study bias as it was made clear to study participants that this was an educational study focussing on higher education. It also occurred to me that participants might view Web 2.0 applications as primarily learning tools because we as faculty and instructional designers believe Web 2.0 tools will help them learn. The interviews allayed my concern about researcher bias somewhat as participants revealed that they view Web 2.0 as primarily a learning tool and only secondarily as a tool for work or recreation. However, participants also cautioned that, while they generally enjoyed using the Web 2.0 tools and learning about them, they didn’t feel that Web 2.0 really helped them achieve their learning goals. Participants focussed on the idea that Web 2.0 makes both the content and communications related to their course work more accessible, especially in distance environments, but, they feel they could have achieved the same goals as effectively using other methods like email and/or learning management systems or even non-web-based technologies like video.

**A Preference for Single Environments**

The question, then, is whether this is an actual preference for using Web 2.0 tools in learning environments or is it a preference for using Web 2.0 in only one environment? In fact this is not a new discovery but an extension of older research around “social worlds”. A social world is a community of people who share activities and technology and communicate with each other and is usually associated with only one location like a school or home (Kazmer & Haythornthwaite, 2001). The power of examining communities using this approach is that it permits a greater understanding of the connections between these single
locations (Strauss, 1978). Research around social worlds has shown, for example, that as people become increasingly comfortable in one environment, they will often reduce or even reject participation in other environments. For example, a study in 2001 found that distance learners increased their skill and comfort level in online learning tools but “at the expense of offline communities and activities” (Kazmer & Haythornthwaite, 2001, p. 510). In other words participants in the Kazmer and Haythornthwaite study showed a distinct preference for single environments with respect to their communities and applications.

In the case of my own study the distinction of whether this is an actual preference for using Web 2.0 tools in learning environments or a preference for using Web 2.0 in only one environment is important. If participants really prefer to use Web 2.0 applications in learning environments it implies that they view Web 2.0 tools as learning tools and deem it inappropriate to use them in other contexts. The school textbook provides an interesting low-tech analogy in the sense that people typically associate textbooks with learning and so would be generally unlikely to read a textbook for recreation.

If, on the other hand, participants simply prefer the use of Web 2.0 in learning environments because that is the first place they experienced those applications then that implies a resistance to mixing technologies within the various aspects of their lives. This is, in fact, what Tan found in her study of high school learners; that learners who used Web 2.0 in their personal lives resisted the use of Web 2.0 in their scholastic lives because they saw it as an intrusion. Based on further analysis I conclude that the participants in this study showed a preference for using Web 2.0 tools in learning environments simply because they see Web 2.0 as learning tools only. It is not that they resist using Web 2.0 in other aspects of their lives. It is more they do not see the utility of Web 2.0 in their personal and professional lives.
because they do not need any more communications tools in those aspects of their lives. The reasons for this conclusion are based on response patterns in both the survey and interviews around the ideas of using Web 2.0 as a repository of knowledge or as a communications tool, as well as participants’ motivations for pursuing higher education and peer influence around the use of Web 2.0. This result, stemming from data in 2011, is likely to change quickly, as noted above, as some Web 2.0 applications grow at an exponential rate. Hence this is an area that should be followed up with further research, perhaps as a longitudinal study.

**Power/Peer Pressure**

One of the anticipated results of the study was that there would be associations between power and peer relationships and participants’ use of Web 2.0. That is to say that participants’ use of Web 2.0 would be affected in some way by their peers’ use of Web 2.0. While the study did not produce this anticipated result, participants did hint that there was a relationship between peer relationships and the use of Web 2.0 applications.

This relationship manifested itself most strongly in that participants seemed to find Web 2.0 cumbersome when it comes to their lives outside of learning. As one participant put it:

If I want to talk to someone I’ll pick up the phone or email them, you know. If I want to be in contact with them I will. I don’t need to know that so-and-so’s going on holiday for two weeks and really, should they be posting that on their Facebook anyway? (Participant O interview, September 24, 2011)

This finding is consistent with the earlier reported finding indicating that there was a relative preference for using Web 2.0 in learning environments over work and recreation.
environments. At first blush this appears to contradict Tan’s results but there are other ways to interpret this result. One possible interpretation might simply be due to the difference in populations under study. In this study the participants were mostly adult, working professionals who see learning more pragmatically in terms of learning being a means to an end – i.e. to get a job. However, I am inclined to reject this interpretation on two counts:

i. Data from this study showed that the overall most important motivation among participants was not economic, but, to overall enrich their lives

ii. Data from Tan’s study showed that her participants were, in fact, highly motivated by economics.

A different, and more likely, interpretation is that the relative preference or resistance to the use of Web 2.0 tools in this study is, in fact, consistent with Tan’s study in the sense that it may not be a question of whether participants prefer to use Web 2.0 in learning, work, or recreation environments, but, rather a question of whether participants prefer to use Web 2.0 in one environment only. In other words, if a given individual began using Web 2.0 in a learning environment, might there be a tendency to resist using Web 2.0 in other environments as is the case with my study participants? Whereas with Tan’s study, she found participants had used Web 2.0 in their recreation environments first and then resisted it in their learning environment in this study most participants had their first experiences with Web 2.0 in learning environments. If this is true it produces the result that participants will embrace to varying degrees Web 2.0 in the first environment in which it is introduced and then resist it in others. While not conclusive this does imply that participants prefer to keep technologies they use recreationally or professionally separate from those they use in
learning environments. This suggests a need for further study and a refinement of the measuring instruments.

Loneliness – Don’t Leave Me Behind

One of the unexpected themes that emerged throughout the study in both the interviews and the survey was the idea that participants were primarily motivated to use Web 2.0 out of a fear of being left behind. This fear manifests itself in different ways depending on how and where they were using the tools but the result was consistent across all participants. Perhaps this is a result of the popular rhetoric around web-based tools and technology generally. People hear the message from authors like Marc Prensky and Don Tapscott indicating that if they do not learn these tools and quickly they will be left in the digital dust. Usually this rhetoric is presented in economic terms as a sort of economic imperative, implying that people will be at an economic disadvantage or even unemployable unless they learn how to use these tools.

However, the results of this study suggest that there is more to it than simple rhetoric or employability. In some ways participants have already embraced the notion that they will be left behind professionally if they do not use these tools and their larger concern is that they will be left behind socially if they do not use the tools. This applied especially to social networking tools like Facebook. In the case of social networking, participants were very aware of their social surroundings in all environments; learning, work and personal, and were equally aware of how to exploit these surroundings to meet their needs. Participant A noted that “whether you’re trying to sell textbooks or you’re looking for a ride to Calgary…that’s the first place I’d go if I needed something right away” (Participant A interview, September 23, 2011). And yet many participants expressed concern that they might not be able to keep
up with it all. So participants seem to be playing a balancing act between what they believe is socially necessary within a Web 2.0 environment and what they can affectively achieve within limited time frames. A common refrain in the interview portion of the study was that participants expressly pursued certain courses or programs for the purpose of getting caught up with the technology – especially Web 2.0. Participant B noted that his interest in continuing higher education at the Masters level was “’cause I wanted to see what else was out there, you know, more than what I’m hearing from …our school board which wasn’t really giving us much” (Participant B interview, September 23, 2011). Some participants expressed a two-sided fear of being left behind; fear for themselves and fear for their students. As Participant F put it,

…if I am becoming proficient at the tools that are going to allow them to add information to the world and collaborate with others, all of those skills that, you know they’re saying the 21st century is going to require of our students, then I need to be able to participate in that kind of an environment in order to model it to my students. (Participant F interview, September 16, 2011)

Participant P put it most eloquently when she quipped that “I have always throughout my life decided that I was not going to be a dinosaur with anything” (Participant P interview, October 12, 2011). This same participant emphasised both the economic fear and social fear many participants expressed particularly in the interviews. As a semi-retired entrepreneur living very far from her home province this was not entirely surprising to me but she did not say anything new so much as she succeeded in summarising what so many of the other participants were saying. “You socialise with these people and, you know, they’re
going to you know, they’re going to talk about [a] particular thing, and you’re going to feel left out if you’re not amongst them” (Participant P interview, October 12, 2011). So for her, social media in particular was critical to maintaining her social networks. But she quickly returned to the economic imperative when she noted how schools and universities in particular would be left behind by private schools if they did not “enhance” their use of Web 2.0 tools in all aspects of their operations, but, especially in the classrooms. This made me wonder whether the economic imperative is in fact driving the social and pedagogical imperatives to using Web 2.0. Has society largely accepted only the economic arguments for educational technology generally and Web 2.0 specifically as Yang (2003) both feared and predicted? Has the idea of using technology as an economic imperative become so ingrained in us that we no longer question how these tools are used? The literature, lacking as it is in critical perspectives about the use of Web 2.0, suggests that perhaps we, as a society, have accepted the economic argument without proper debate. This is of concern from a policy and leadership perspective. Leaving pedagogical questions aside for the moment, if we are unable to count on scholarly literature to examine the economic and pedagogical assumptions with respect to Web 2.0 then I think we, as scholars, have done a disservice to the larger public.

Barriers

As noted earlier in this dissertation, much of the literature around Web 2.0 has focussed on barriers to accessing and using it. These barriers have included financial, social and education barriers. Participants in this study were not asked about financial or social barriers and so it is not clear what, if any, relationships there might have been between the use of Web 20 applications and financial or social issues. There were challenges associated with education and specifically training with respect to Web 2.0. The barriers were less about
whether participants had the technical abilities to use Web 2.0 and more about a lack of consideration given to how learners would learn to use Web 2.0 tools or an assumption that learners did not need training at all. According to writers like Prensky (2001), there should be a strong correlation between Web 2.0 ability and age; younger users demonstrating greater skill level on average and older users less skill level. However, this study revealed no statistical correlation between participants’ ability to use Web 2.0 tools and age or computer experience implying that being younger does not mean greater skill level in Web 2.0. The implication here is that there was likely greater variability within groups with respect to technological ability than there was between groups. Proving this would require further research but the result does support Kennedy’s notion that the idea of universal ability to use Web 2.0 tools; especially in learning environments, is false (Kennedy et al., 2009). That is to say that we cannot assume any knowledge with respect to learners’ ability to use web-based tools in learning environments.

Given the variability in technical ability within groups it is of some concern that, regardless of the Web 2.0 tools used, there was an assumption that either participants already knew how to use a given Web 2.0 application or that they would figure it out on their own quickly. And this assumption applied equally to both faculty and learners. Indeed it was true in some cases that training was not needed, but, some participants indicated that they felt left behind because they had to spend a lot of time learning the tools rather than using them for the course. As earlier quoted from one self-described “digital native,” “I have to self-learn. Like no one’s teaching me these tools…So it is a lot of self-discovery and self-teaching” (Participant A interview, September 23, 2011). Given the dynamic nature of Web 2.0 tools,
we must ask ourselves how much time we want our learners to spend learning the tools rather than using them to enhance their learning.

The issue of training raises a deeper issue which is what kind of training are we referring to? Usually technical training means learning how to use a given technology or software. This usually includes learning simply what icons to click or what buttons to press to get a desired result. This type of training is valuable, but, is only one part of the equation. The other part of the equation is training around how to use the tools effectively in learning environments. How, for example, can learners use Web 2.0 tools to co-create knowledge or learn how to think critically? This type of training I refer to as pedagogical or critical training. These two types of training are taken up in more detail in the Recommendations Section of Chapter Six.

**Repository of Knowledge**

The theory behind the use of Web 2.0 is that it allows learners to both produce and consume knowledge that will allow them to better achieve their learning goals. This theme is repeated throughout the literature as exemplified by Prensky (2001) but also espoused by Anderson (2005) and Moller et al. (2008). However, this study found that participants don’t see the value or utility in using Web 2.0 tools as knowledge creators but more as repositories of knowledge. As one participant noted: “So they’re giving us the information…Here’s the readings and such and then here’s the project. And a lot of those are the Web 2.0 tool” (Participant B interview, September 23, 2011). Clearly this participant is starting to make a connection between the way Web 2.0 is used in his particular learning context and how it could be used. But he remarks that, up to this point, Web 2.0 is being used more for access to knowledge rather than the creation of knowledge. From a faculty perspective there are strong
instructional design implications here which I will speak to in the next section. The same participant, and other participants too, extended this idea to include Web 2.0 as a bridge between different types and sources of knowledge. “It’s changing all the time, so there is an opportunity to bridge a bit…I don’t want to lose the idea of print ’cause everything isn’t … online” (Participant B interview, September 23, 2011).

**Collaborative Learning**

A number of participants reported attempts by their instructors and peers to use Web 2.0 as a collaborative tool. Given the nature of the tools, the definition I ascribed to Web 2.0 as a prosumer or knowledge co-creation application, and the literature and rhetoric surrounding Web 2.0, it seems obvious to use Web 2.0 as a collaboration tool. However, only a few participants reported using Web 2.0 in this way claiming that most of the tools did not live up to the rhetoric. Those that did use the Web 2.0 tools collaboratively frequently did so outside the confines of the course structure and even outside the confines of the class members. One participant noted that while Web 2.0 tools were not used collaboratively within his courses, he took it upon himself to use the tools to share information from the course with colleagues in his workplace – a K-12 school. “…we’re a pretty collaborative group…our association, our vice-principals and principals we are very collaborative…and if we come up with something that can be, you know, stimulating, for kids and it’s easy to maintain….of course we are going to share it” (Participant B interview, September 23, 2011). One wonders also whether this result is specific to the population under study. Participant B, for example, expressed no hesitation in using Web 2.0 as a collaborative tool within his work environment (which was also a school) but never considered it for collaboration within his own learning environment. This same participant, like most participants, expressed openness
to using Web 2.0 in a variety of environments and so it seems that the idea of using Web 2.0 for collaboration within his own learning environment either never occurred to him or never occurred to his instructors and colleagues or was dismissed for other reasons. The data from this study did not go far enough to discern the reasons why this might have been the case and further study will be needed to find out precisely what is behind this issue.

As an instructional designer I am able to see instructional design implications in the above result. If the learners are able to see the collaborative potential of Web 2.0 but are not actively exploiting this potential within their own learning environments then it begs the question why this is the case? What would it take to make Web 2.0 collaborative? Is collaborative learning not an explicit goal in these courses? Are the models for using Web 2.0 in collaborative ways within learning environments not available or not mature enough? Perhaps these models do not scale well or, ironically, do not work well in distance environments. There are many anecdotal examples of models instructional designers and instructors can use to make Web 2.0 more collaborative in learning environments. See for example Conole and Alevizou (2010) for an overview of ways in which Web 2.0 can be used in higher education generally, Downes (2009) for ways in which blogs can be used in higher education, Ramsden, (2009) for an account of ways micro blogging like Twitter can be used in higher education, Grosseck (2009) for social networking and Carr (2009) for ways immersive environments like “2nd Life” can be used collaboratively.

The challenge with all these examples and cases is that they are not widely practiced nor have they been widely evaluated in terms of their effect on learning outcomes and resource allocations. It is precisely this result that spurred me to develop this study in the first place. There is a wealth of anecdotal and case-based evidence for the use of these tools in
higher education and yet little of it is evaluated in terms of resource allocation and learning outcomes. As an innovation, then, I question its utility in learning environments where stakeholders are already financially, scholastically and emotionally stressed. The very simple question is: If these tools require significant human, technical and financial resources but do not significantly improve learning outcomes then is it worth the cost? The truth is that we still do not know the answer to this question. In any case what this study has shown, particularly with respect to Web 2.0 as a collaborative tool, is that these tools must be evaluated individually as to their resource requirements versus learning improvements. It simply is not reasonable anymore to ask instructors and learners to use the latest tools simply because they are the latest thing or that certain educational or technological gurus are telling us that we should. There must be either sound pedagogical or policy reasons for using these technologies. Otherwise they should be dismissed.

Design

The underlying instructional design challenge is less about whether we should use Web 2.0 in the classroom and more about the ways in which Web 2.0 is being used or could be used. Based on the results of this study, with this sample population, it appears that Web 2.0, for the moment at least, is used merely as an add-on and, therefore, the majority of participants are not yet able to fully appreciate the potential of Web 2.0 as a learning tool. This may be why participants default to the use of Web 2.0 tools as primarily communications tools rather than content sharing and creation tools. Without instructional and pedagogical guidance, participants might default to what is easiest and most meaningful for them and that is communicating about course materials rather than co-creating the materials themselves.
Why is there a lack of pedagogical and instructional design guidance? In fact this phenomenon is not new in the technology sphere. Early adopters of new technologies typically begin by seeing how the new technologies (or processes) can replace or enhance old processes. For example, I recall that the first automated bank machines were available only within the bank buildings and only during regular business hours. There were obvious good reasons for this practice (security) but it simply tried to emulate (poorly) the service that human bank tellers provided without either adding value to the process or changing the process. Similarly I recall the earliest days of training people to use email was fraught with attempts at replicating the old process of receiving and issuing printed memos. As mentioned earlier in this dissertation, one of my first jobs after completing my Master’s degree was at a large Canadian university where many of the faculty would receive emails, print them, write the responses to the emails in ink, have their secretaries respond to the emails and then file the printed email in filing cabinets. While this system “worked” it was a fundamental misuse of email as a medium. Perhaps more importantly it missed the value that email was able to provide the users in terms of convenience and efficiency. This misuse of the system continued for several years and I hope that no one uses email in this way anymore. Similarly with most educational technologies, faculty and instructional designers’ “default” position with respect to new technologies is to use them without changing the ways in which they do things. Hence, some learning management systems are used to replicate lectures to large numbers of learners, for example, without thinking of completely different and novel ways of using these systems for things like collaborative learning.

All of these are examples of how newer technologies began their existences as replacements for older technologies and processes. This study suggests that that is precisely
what is happening with Web 2.0 applications among my sample population. Designers and faculty are simply using Web 2.0 tools as add-ons rather than completely rethinking their teaching and learning process and using Web 2.0 tools to their advantage. As a designer I wonder if this step of using newer technologies to replace old processes is necessary. Perhaps, as human beings, it is necessary to gain comfort with newer technologies by using them in familiar ways before exploring new modes. Marshall McLuhan and others have written extensively on these ideas (McLuhan, 1964). As McLuhan himself notes this process may have been taking place in society long before the technological revolution of the 20th century. He notes that

Today when we want to get our bearings in our own culture, and have need to stand aside from the bias and pressure exerted by any technical form of human expression, we have only to visit a society where that particular form has not been felt, or a historical period in which it was unknown. (McLuhan, 1964, p. 33)

The preference for using these Web 2.0 applications as communications devices underlines the finding that my sample population is not yet using Web 2.0 applications to their full potential when the real potential value in Web 2.0 tools lies in the co-creation and consumption of knowledge. The value is in allowing learners to become co-creators of knowledge rather than passive consumers of knowledge. As yet there are few evaluated examples of precisely how this can be achieved which is likely because we are still in the infancy of Web 2.0.

The participants of this study were passionate about the idea that, as a new technology, faculty must be careful with Web 2.0. The basic message was that if faculty want
to use these tools they must use them correctly or they will “lose” their students. That is to say the learners will not be engaged and the effort will be wasted. Learners, because of their busy lives and focus on their learning, professional and personal goals, will default to the path of least resistance if they do not see the value in a particular activity or tool. Participant O summed up the reticence learners feel with:

I’ll use the wiki too if I need to do a note to my cohort, but I know that people will tend to default to email. And so it’s this constant trying to nudge people back into the other, because when our course started in the summer, people go to the path of least resistance and they would resort to email... You can’t have the email option. You almost just have to cut it off, the other option. ‘Cause otherwise people are too busy. If it’s not natural to them, they’re not going to put in the extra effort to figure out how to log in and use another environment. (Participant O interview, September 24, 2011)

And so many participants simply question whether it is worth the trouble because it is not always the most efficient way of doing things. Again this ties back to the idea that people are trying to use new tools to do old things.

If you build it, will they come? Or do you have to give them a grade? This question applies to Web 2.0 as to everything else in education. One clear and emphatic result from this study is that instructors must tie the activities and the tools used in their courses to a grade. As much as we would love our learners to attend class and learn for learning sake we cannot expect this from more than a minority of learners in a small number of cases. As revealed by the demographic data in this study, participants are older, busier and much more focussed
than the typical higher education learner of 20 years ago. As one participant put it
“…depending on how someone structures Web 2.0…if it is part of your mark, then it forces
you to participate in the discussions” (Participant D interview, September 26, 2011). Another
participant noted that her instructor attempted to use Web 2.0 in a sort of knowledge co-
creation way but it did not work:

you don’t get the detail in the content in there. You do get lots of images.
You get different, you know, you can put sound effects in it, you can do
all these marvelous things. But the actual content is very weak, I think,
compared to whether you’re to write an essay on a topic or something
like that. (Participant F interview, September 16, 2011)

Hence, some of the rules or best practices I believe will apply to Web 2.0 are the very
same as those that apply to good teaching practice like tying assignments and activities to a
grade. Participants agreed that with new technologies like Web 2.0 there is some “wiggle
room” around this rule. In other words, participants recognise that with new tools there has to
be a certain amount of time spent learning the tool itself and that this activity probably will
not be graded in and of itself. Participants also recognise that not every activity will be
pedagogically successful.

**Web 2.0 for Learning Only**

To summarise the above arguments then, participants in my study almost universally
did not see the utility of Web 2.0 in aspects of their lives not related to learning. This was in
spite of openness toward trying the tools in other aspects of their lives and an expressed
enjoyment in using the tools. Moreover, there was no implied or statistical association
between participants’ first experience with Web 2.0 and their preferred context for using
Web 2.0. In other words, while the majority of participants did first experience Web 2.0 in learning environments there was no association between this fact and the fact that they preferred using Web 2.0 in learning environments. By a process of elimination this leads me to the simple conclusion that participants view Web 2.0 tools as learning tools in the same way that they view textbooks as primarily tools for learning. However, a number of participants did make the argument that, unlike textbooks, this is likely an evolving process both for themselves and for the population generally. That is to say that they believed that within the short to medium term the use of Web 2.0 tools would become a larger part of their personal and work lives but, for the moment, they saw no need to expand their repertoire. Clearly this is something that will have to be both monitored and researched in the future and accounted for in instructional design and policy plans.
Chapter Six – Summary, Conclusions and Recommendations

Summary

The purpose of this study was to understand how Web 2.0 is used in the learning process from the adult learners’ perspective. To explore this main purpose, I further asked:

1. What are adult learners’ Web 2.0 usage patterns in their learning environments? How do these patterns compare to their work and recreation environments?
2. From adult learners’ perspectives, what is the pedagogical value in using Web 2.0?
3. How does adult learners’ motivation to pursue higher education affect Web 2.0 use?
4. How does peer influence affect adult learners’ Web 2.0 use?
5. How does freedom to use Web 2.0 outside the classroom affect adult learners’ use of Web 2.0 in classroom learning?

Based on the claims and exhortations found in the literature I especially wanted to understand what students from my own practice thought about using Web 2.0 in learning (and other) environments. I wanted to see if there was resistance to using Web 2.0 among students within my own practice. Based on an earlier pilot project, I posited that learners within my practice would resist Web 2.0 technologies for a variety of reasons. To explore this I devised a two-stage study whereby invited participants would complete an online questionnaire and then volunteers from the questionnaire participants would further participate in an interview. The questionnaire consisted of 30 items covering topics ranging from basic demographics to use of and skill level with Web 2.0 technologies in various environments. The questionnaire also inquired about participant views regarding motivations for pursuing higher learning and peer issues with respect to using Web 2.0 technology. Those who completed the questionnaire were asked to volunteer for an interview which consisted of
an additional 14 questions that probed their views about motivation and peer influence more deeply.

The results of the study were mixed. While there was caution about using Web 2.0 technologies among the participants in this study there was also openness to using them if the goals of their use were made clear and the technologies were used in appropriate ways. Further, participants saw the greatest value in using Web 2.0 as communications tools rather than as tools for the co-creation of knowledge or as repositories of knowledge. This suggests that there are still some gaps in our understanding of the ways instructional designers and faculty can use Web 2.0 to co-create knowledge with their students. Generally, participants in my study recognised the value in exploring new technologies and seeing whether using new technologies could create new learning opportunities either through improving their performance or enhancing what they already were learning. However, this openness also came with a caution that faculty members and instructional designers need to be clear about the reasons why they are using these technologies and what the potential advantages are for the learners in helping them achieve their learning goals. In other words, learners were willing to participate in some experimentation within their learning environments but not to the extent that the learning experiment (i.e. using Web 2.0) overwhelms the learning goals they set for themselves.

Conclusions

This section provides a brief overview of some of the conclusions resulting from the study. Most of the conclusions emanated directly from the research questions themselves while others were unexpected.
**What is Web 2.0?** One unexpected conclusion was in the very nature and definition of Web 2.0. Throughout the study I emphasised that Web 2.0 technologies were those web-based applications that could be used to both create and consume content. Beyond that basic definition I allowed participants to use their own interpretations of Web 2.0 as well as to choose examples of Web 2.0. In spite of the risk of using a vague definition of Web 2.0, participants in the study provided valuable examples and ideas about what Web 2.0 is. As noted in Chapter Five, one example of this was the way in which some participants identified applications that were not originally designed as Web 2.0 but have evolved to include the capacity for creating and consuming content. The example raised most frequently was RefWorks which was originally conceived of as a simple tool for tracking academic references and creating bibliographies. RefWorks has since evolved into an online tool that allows users to share and co-create bibliographies and research projects thus pushing the boundaries of what could be considered Web 2.0.

**Web 2.0 is a learning and communications tool.** While participants in the study did not always agree on what Web 2.0 was or what constituted Web 2.0 applications there was a remarkable amount of consensus on how they used Web 2.0. Participants were adamant that Web 2.0, for them, was a learning and communications tool as opposed to a tool for the co-creation of knowledge. Moreover, participants expressed resistance to using Web 2.0 tools in more than one environment. In other words participants who used Web 2.0 primarily for learning showed resistance to using it in their work and personal lives. In general, participants showed resistance to using Web 2.0 tools as applications for the co-creation of knowledge. It is not clear from the data why this might be the case. It could be because they were simply not trained in proper techniques for co-creating knowledge or this co-creation of
knowledge was not required of them within their learning environments. In other words, the participants may not have had a model for using Web 2.0 to co-create knowledge. The result was that they then defaulted to what they knew best which is to use these online tools for communication and knowledge acquisition.

**Barriers, peer pressure and loneliness.** Chapter Two notes a number of studies in the literature where resistance to new technologies is the result of various barriers. Often these barriers are financial (i.e. people cannot afford the technology) but they can equally be about access (i.e. high speed Internet is unavailable), language, gender or other psycho-social or physical barriers. This study did not set out to examine these types of barriers but did find that participants experienced some barriers with respect to their ability to use Web 2.0 technologies both from technical as well as critical consumption points of view. That is to say that some participants did not know how to technically use some of the Web 2.0 tools and received no training on how to use them. As a result they were left to learn these tools on their own. Other participants revealed a lack of confidence in using these tools to critically consume information. They would, for example, rely on applications like blogs for information about their topic without due attention paid to the validity of the information contained within the blog. The challenge with this is that blogs are typically not peer-reviewed and so the information can often not be verified as easily as with other sources of information like peer reviewed journals. There are techniques available for users to help validate information from sites that are not peer reviewed, however, the participants seemed unsure about what these techniques were or whether they had received any training on these skills.
Other participants noted that they were drawn to Web 2.0 tools out of a concern of being left behind or out of a fear of being lonely. This fear of being left behind has been noted by other authors including Prensky (2000) and was expressed by multiple participants who lamented that they were not especially interested in using Web 2.0 tools but that, if they did not, they would be left behind socially and professionally as the rest of their world embraced the tools.

While the results of this study might appear to be relatively anti-technology and specifically anti-Web 2.0, I am not suggesting that we abandon using technologies in education or innovating around technologies. In fact I remain enthusiastic about using technology in all its guises in education. I strongly believe that we have an obligation in higher education to innovate generally but especially with respect to technology and, done properly, everyone, especially our students, can and do benefit from these innovations. So this study was, in fact, painful for me as it attempted to take a critical view of what my practice has been for 20 years. My hope is that the critical lens through which I have viewed my practice will serve to improve my practice.

The participants in this study were almost universally positive about innovative uses of Web 2.0 in higher education. The discrepancy came with respect to the aims and goals of the use of these tools. When Web 2.0 was considered in the context of it being interesting and novel and a useful communications tool, participants were very positive. However, when considered in the context of whether Web 2.0 improved their learning or improved their final grade participants were less enthusiastic. What this speaks to is the fact that we have a wonderful opportunity to continue to innovate with respect to Web 2.0, but, more importantly, we have an opportunity to explore new ways of teaching and learning especially
in adult learning environments. Based on this I would make two specific research-related recommendations followed by a number of recommendations related to my own practice.

**Recommendations for Further Research**

First we need to conduct more studies like this one, but with two major changes. The first change is that the size of the studies must be much larger than 150 participants. The sample size should be large enough that divisions between contexts can be made within the study. These contexts would include institution-type and size as well as area of academic study. So the evidence would need to be able to show how technological innovation has the possibility of transforming learning within different adult education environments and subject areas as these are highly variable. A study by Tamim et al. (2011) gives some hints as to how this could be achieved using meta-analysis. The second major change in future studies is that we now need to focus on specific application types rather than broad swathes of technological classes – like Web 2.0. As an example, a study could be created that focused on blog-style applications while another study could focus on social networking-style applications. These types of studies would not have been possible even a few years ago as most of the Web 2.0 applications were not mature enough to be evaluated in that way. However, it is clear to me from my own study that both the applications themselves and the learners are now ready for these types of studies. There is a definite sense already of how these applications can be used in learning environments to improve learning outcomes – even if they are not yet consistently being used in that way.

The second recommendation is that the research around the implementation of technology in classrooms (face to face or virtual) should be more about investigating actual teaching and learning practices as opposed to investigating the tools themselves. As the
literature review showed, the vast majority of research in educational technology focuses on
the technologies themselves and how they can be used to good effect. However, few studies
look at the technologies from the learners’ perspective and even fewer attempt to gauge
learning outcomes or improvements in learning outcomes as a result of wide-scale
technological innovation. Without investigating our own teaching and learning practices in
conjunction with investigation of the technologies, what we are doing is committing the same
errors that the early banks committed by placing banking machines inside the banks available
only during regular business hours. We are committing the error of simply trying to use new
technology to emulate old practices. If we continue this then we will deserve the criticisms
levelled at universities in particular to the effect that we are the only part of society that has
not changed since the industrial revolution. Some faculty will argue that what I am proposing
is, in and of itself, a waste of resources. However, I would counter that tools like Web 2.0
applications give us a wonderful opportunity to investigate our teaching from the very basic
foundations. I don’t see a world where all knowledge seems to have been commoditised and
made available via Google as a threat but an opportunity.

We have the opportunity to shift resources away from the dissemination and
accumulation of knowledge towards learning activities that go deeper, facilitate critical
thinking and, to once again paraphrase Alvin Toffler, to teach learners how to learn (Toffler,
1970). This idea is critical as it has been postulated that learners’ current skill base has a half-
life of about 5 years (Canadian Broadcasting Corporation, 2012) which begs the question of
how we can use this opportunity to create what John Seeley Brown calls “entrepreneurial
learners” (Canadian Broadcasting Corporation, 2012). By entrepreneurial learners Brown
does not mean creating a class of entrepreneurs but creating environments where students can cultivate a disposition for learning and hence become lifelong learners.

The challenge to those of us in adult and higher education is that we are uniquely positioned to provide the leadership to create these lifelong learning conditions but we do not necessarily create those spaces deliberately. In other words, as this study showed, participants take it upon themselves to create these spaces and opportunities sometimes in spite of faculty. Whether it is engaging in conversations about content as students walk between classes or creating their own blogs or starting virtual study groups via Skype, learners create these spaces with or without faculty. I think that we need to be more deliberately involved in this process and this study has shown that it is possible through the creation of, for example, collaborative learning or mentoring opportunities be they peer-based or professionally-based. Earlier in this dissertation I suggested that this process could be pushed so that learners are not just co-creating content but are, in fact, co-creating the courses themselves from the very earliest framing of course learning outcomes. Web 2.0 in general, and social networking in particular, seem like obvious ways to achieve this.

Following from my earlier conclusion that we have an opportunity to improve our learning environments, Web 2.0 could be used as a way to continuously improve our learning environments. In this way, Web 2.0 becomes the core of a participative design process done in partnership with faculty, instructional designers and the students themselves. In some ways this is at the heart of what non-formal education has done for many years and we are now in a position to translate those ideas and lessons into our formal learning structures. Again, this is an area for future research. Most importantly, at the heart of this is the idea that we now
have an opportunity to use Web 2.0 to amplify the curiosity our learners already have to create that questing and questioning disposition.

**Recommendations for Professional Practice**

The results of this study raise interesting challenges for a variety of stakeholders with respect to Web 2.0 and adult learners. In particular, the results of the study have encouraged me to begin exploring ways in which Web 2.0 can be used to rethink my own teaching and learning in novel and positive ways. Except where otherwise noted the recommendations described in this section are targeted at both instructional designers and faculty. It should be noted that these are general recommendations and will require stakeholders to customise the recommendations to their own contexts and needs.

Keeping to my belief in constructivist learning I think that Web 2.0 applications can and should be used to fully exploit the co-creation of knowledge. In other words, as instructional designers, I believe we are now ready to begin exploring new ways of teaching and learning that might make the best use of Web 2.0 tools. The question, of course, is how can we do this? Like others, I assumed that by incorporating Web 2.0 into already existing curriculum learners would naturally gravitate to co-creating knowledge both with their instructors and each other. The results of this study and my experiences within my own practice suggest that this is not the case. Clearly more research and experimentation in this area needs to be conducted by instructional designers and faculty alike.

**Social anxiety.** An unexpected finding of the study was the idea that participants were drawn to Web 2.0 out of an anxiety about being left behind. This was, to me, arguably the most powerful result of the study and warrants future research. In this case the research should be multidisciplinary as it seems to strike at the heart of what it means to be a social
animal. I would recommend in this case that a research program be established to explore the social nature of Web 2.0 in learning environments and this research would necessarily have to include educational researchers as well as experts in culture and sociology. In the case of this study, the social anxiety manifested itself in different ways but was consistent in that participants expressed fear that they would be left behind socially within learning environments. There was some fear that they would also be left behind professionally but the greater fear was a social one. And so for many of the participants their primary motivation for using Web 2.0 was for the perceived social benefits they felt they would gain in the learning environments. It is not clear from this study what these perceived benefits were nor was it clear where the anxiety came from, however, I think this is an interesting avenue for further study.

**Training implications.** As indicated in Chapter Five, there were training challenges identified with respect to Web 2.0. Most of these challenges were in the form of questions concerning whether faculty and students should be provided training to use Web 2.0 tools. If they are provided training then do faculty and students receive the same training? Who should be responsible for providing the training? Should it be mandatory? What should be included in the training? Should it be simple technical training or should there also be training in how to find, consume and process knowledge? I know from my own professional experience that to provide training to resolve these challenges would be complex.

**Pedagogical or critical training.** My study found that participants’ comfort level with Web 2.0 varied widely and did not appear to be related to any factors like age, program of study or previous experience. This presents a serious training challenge that has previously been identified by authors like Kennedy et al. (2009) who argued that more than an inability
to use the tools was an inability to use the tools within a learning environment. In their study they found that even learners who technically knew how to use Web 2.0 tools were unable to use them in pedagogically sound ways. In other words, these learners knew where to click on the application to make certain things happen, but they were unable to critically produce and consume the information contained within the tool.

This leads to another recommendation which is that simple technical training is not enough for either learners or faculty. Faculty and academic departments should provide both Web 2.0 technical and literacy training. Based on the evidence I don’t believe faculty members and instructional designers can assume that their learners understand how to critically consume or co-create knowledge using Web 2.0 tools. Nor can we assume that they will learn these skills on their own.

Participants in this study indicated that the schools and their instructors need to take leadership on this issue, but not necessarily provide all the training themselves. That is to say that the training need not be provided in-house or be made a compulsory part of their courses or program. Adult education institutions, then, need to create policies such that if faculty are requiring learners to use Web 2.0 tools then they must be prepared to provide the training required to use them successfully. This does not mean that each individual instructor needs to offer lab-based classes to ensure everyone knows how to use the tool. There are alternatives. If the required training is divided into the two parts of technical skills and critical consumption skills then the challenge becomes easier to resolve. Many post-secondary libraries, for example, will offer workshops or individual coaching on how to critically consume and produce materials via the web. The librarians at my own university encourage faculty to refer students to them for advice and workshops on how to critically access
materials from a variety of sources. It would simply be a matter of customising and formalising this process so that learners can access the materials in a way that is meaningful and convenient for them.

As an example of how this could work, the University of British Columbia (UBC) has such a model in place with respect to research ethics. Before researchers under the auspices of UBC can conduct research they must complete an online research ethics tutorial. This tutorial is self-guided and self-paced but is graded and tracked. At the end of the process participants are able to print a certificate saying that they have successfully completed the tutorial. Only after having completed the tutorial are they able to conduct research. This model could easily work for the critical content piece of the training. Schools or faculties could create an online series of tutorials followed with checklists and a certificate at the end to cover the necessary information about critically producing and consuming web-based content. Given that the materials are already available and have been “road tested”, creating such a course should not be difficult. What would be difficult would be to find the leadership to enact policies around these issues. Unless faculties see the importance of mandating this kind of training it will not happen in any systematic way.

The technical training question is more difficult and may be left up to individual instructors to determine needs and provide resources as appropriate. Again this does not mean that instructors must personally provide technical training to all of their learners. There are many technical resources available to learners; usually within the web-based tools themselves via help files and tutorials. There are also many technical video materials available via YouTube as well as many organisations that provide free technical training on a wide-variety of Web-based tools. Some of these organisations, including UNESCO and the
European Union, also provide a certificate of completion at the end. So while I don’t believe it is necessarily the responsibility of the individual instructors or even the schools to “frog march” their students through a series of technical tutorials, it is up to them to determine training needs and investigate resources for their learners. Moreover, this sort of “forced” technical training is likely to be less meaningful within higher education for three reasons:

1. The technology is changing so fast that the specifics associated with technical training might literally be out of date before the students finish their program of study.

2. Most software and technology functions in basically the same way. So, for example, once learners know how to use one blog they should easily be able to figure out how to use all blogs.

3. This type of technical training is not what most courses on higher education will find valuable as learning goals. The value will be the ways in which the tools can be used to reach other learning goals whether these goals are knowledge based, skills-based or attitudinally-based.

**Reflection on My Practice**

It has been nearly two years since I began the design of this study. Since then my practice has evolved as has educational technology and Web 2.0. At the beginning of this study my practice consisted mostly of educational technology support and instructional design with limited teaching. Since then my practice has changed dramatically to be almost exclusively teaching adults in both face to face and online environments. Mentoring other faculty members remains a significant part of my practice as the largest part of my teaching
portfolio is in a new program at Royal Roads that, by coincidence, employs a large number of new teachers.

This change in my practice has provided me with a level of freedom to try things in real learning environments that was previously unavailable to me. As a result, I am better able to recognise the relevance of the results of my study. I expect that some of the results, were I to re-run the data collection today, would be different, but it is apparent to me that the recommendations and lessons contained therein are as valid today as they were when I first collected the data.

I have already begun to successfully implement a number of the recommendations contained within my study in my own practice. The first change to my practice was to create an undergraduate course at Royal Roads (which I teach) called Critical Reasoning and Information Analysis. This required course (at least in the program in which I teach) focusses on topics related to the critical development and consumption of knowledge. The course is currently in its third iteration and is receiving positive reviews from students, administrators and other faculty. Instructors teaching in our program seem to especially appreciate the course as it improves students’ performance in their courses which range from courses on English, Canadian Studies to technology and mathematics.

I have been able to use other results from this study throughout my practice as I work and consult with other faculty members both at Royal Roads and around the world. The lessons I learned from the study about how to approach Web 2.0 applications and the co-creation of knowledge, for instance, have influenced the way I conduct my training workshops. I now employ a more “gentle” approach with learners as I try to encourage them to build their own knowledge repositories in partnership with classmates and myself. The
ways I have done this have ranged from encouraging even face to face learners to use Web 2.0 tools in their regular classes to requiring learners to keep a learning journal via a blog. I have also tried to develop tools and policies targeted at those faculty members who, for a variety of reasons, do not want to use Web 2.0 tools in their learning environments. What I have done is to suggest the creation of team-based and/or interactive assignments within their learning environments and then give the learners the opportunity to use Web 2.0 if they so wish. This means that I need to be available throughout their classes to deal with any challenges they are having but it opens a swathe of opportunities for both the learners and the instructors without putting undue pressure on the faculty members to learn many new tools all at once. I have only recently started this experiment so it is not yet clear to me how successful it will be, however, one instructor has reported to me that he intends to continue offering Web 2.0 usage to his learners in coming courses.

So the results of my study have been wide ranging with respect to my own practice. It has allowed me to explore different teaching pedagogies within face to face and online learning environments as well as encourage other faculty members to experiment in relatively safe environments. My goal is to continue these experiments and I hope to revisit some of the specific results of my study in the new academic year.
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Dissertation. Queensland University of Technology, Queensland, Australia.


Appendix A – Recruitment Letter, Consent Form and Survey Questions

A.1 – Recruitment Letter and Consent Form

Project Title: Web 2.0 in the Classroom

Please read this recruitment and consent form carefully before signing.

Principal Investigator:

Dr. Tom Sork, PhD., Department of Educational Studies, University of British Columbia. (604) 822-5702

Co-Investigator(s):

Dr. Kjell Rubenson, PhD., Department of Educational Studies, University of British Columbia. (604) 822-4406
Dr. David Vogt, PhD., External Programs and Learning Technologies, University of British Columbia. (604) 822-4154

This research is in partial fulfillment for the EdD degree and constitutes the dissertation for Robert Aucoin, MA., Department of Educational Studies, University of British Columbia.

Purpose:

The purpose of this study is to examine student’s needs and attitudes towards the use of Web 2.0 in higher education. In this case, Web 2.0 refers to web-based applications that are interactive in nature. That is to say applications where users can both produce and consume content either in the form of text, graphics, audio, video or other media. Examples of such applications include well known tools like Facebook, wikis and blogs. We want to
discover your thoughts and opinions about how you use these applications in and outside the classroom, how useful they are to you and, in the case where you used these tools in the classroom, how your course(s) might have been improved.

**Study Procedures:**

By participating in this study you will be asked to complete an online questionnaire that consists of 31 simple questions. Completing the questionnaire should take no more than 30 minutes of your time. At the end of the questionnaire you will be asked if you wish to participate in an optional follow up interview which would be scheduled by phone at a time convenient for you. The follow up interview should take no more than an additional 30 minutes.

**Potential Benefits:**

By participating in this survey you will be helping to create models that will inform best practices with respect to Web 2.0 and course design in higher education. That is to say that by participating in this study you will help create better courses for you and your colleagues. The final results of the study, as well as the completed thesis, will be available at: http://www.avantlearning.com/web2summary and http://www.avantlearning.com/web2thesis

**Confidentiality:**

Please be assured that your identity will be kept strictly confidential by a coding system provided by the online survey system. Subjects will not be identified by name in any reports of the completed study. Any and all data records kept on the Principal Investigator’s computer hard disk will be password protected and accessed only by the PI. Please note that any and all quotes drawn from interviews for the purposes of publication and/or seeking further research funding will be kept anonymous by using pseudonyms. In addition to the
above protection, final reports and/or papers will be submitted to you for your review to ensure the protection of your identity.

**Remuneration/Compensation:**

Please note that there will be no remuneration or compensation for participation in this research project. However, you may optionally enter your email address for a chance to win a gift certificate.

**Contact for information about the study:**

If you have any questions or desire further information with respect to this study, you may contact Dr. Tom Sork at tom.sork@ubc.ca or on (604) 822-5702.

**Contact for concerns about the rights of research subjects:**

If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services at 604-822-8598 or if long distance e-mail to RSIL@ors.ubc.ca or toll free 1-877-822-8598.

**Consent:**

Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without jeopardy to your [for example, employment, class standing, access to further services from the community centre, day care, etc.].
Appendix A.2 – Survey Questions

Clicking the Begin Survey button below indicates that you consent to participate in this study.

1. In which year were you born? You must be 18 or over to complete this survey. Drop down menu with all birth years ranging from 1900 to 1993

2. To enter the draw for a prize, please enter your email address. Optional.

_____________________

3. For how long have you used a computer? Drop down menu with the following choices: Less than 1 year, 1-3 years, 4-6 years, 7-9 years, more than 10 years

4. Following is a list of common Web 2.0 applications. For each purpose choose from the drop down menus to indicate the frequency of use and your skill level for each application.
<table>
<thead>
<tr>
<th>Tool</th>
<th>Purpose</th>
<th>Frequency of use (drop down menu)</th>
<th>Skill level (Drop down menu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiki</td>
<td>For Learning</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am an expert.</td>
</tr>
<tr>
<td></td>
<td>For Work</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td></td>
<td>For Recreation</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td>Blog (audio/video/text)</td>
<td>For Learning</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td></td>
<td>For Work</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td></td>
<td>For Recreation</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td>Social bookmarking (Diigo, Delicious, Reddit)</td>
<td>For Learning</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td></td>
<td>For Work</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td>Tool</td>
<td>Purpose</td>
<td>Frequency of use (drop down menu)</td>
<td>Skill level (Drop down menu)</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------------------</td>
<td>-----------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Social bookmarking (Diigo, Delicious, Reddit) (continued)</td>
<td>For Recreation</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td>Social networking (Facebook, LinkedIn, Ning, My Space)</td>
<td>For Learning</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td></td>
<td>For Work</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
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<tr>
<td></td>
<td>For Recreation</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td>Micro blogging (Twitter)</td>
<td>For Learning</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td></td>
<td>For Work</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td></td>
<td>For Recreation</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
</tbody>
</table>

148
<table>
<thead>
<tr>
<th>Tool</th>
<th>Purpose</th>
<th>Frequency of use (drop down menu)</th>
<th>Skill level (Drop down menu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online virtual worlds (Second Life, World of Warcraft, etc...)</td>
<td>For Learning</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td></td>
<td>For Work</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td></td>
<td>For Recreation</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td>Content sharing – video/audio/images/text (YouTube, Flickr)</td>
<td>For Learning</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td></td>
<td>For Work</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td></td>
<td>For Recreation</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td>Other:</td>
<td>For Learning</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td></td>
<td>For Work</td>
<td>Never, less than 5 hrs a week, between 5-9 hrs a week, between 10-15 hrs a week, more than 15 hrs a week.</td>
<td>I am a novice, I know the basics, I am good at it, I am an expert.</td>
</tr>
<tr>
<td>Tool</td>
<td>Purpose</td>
<td>Frequency of use (drop down menu)</td>
<td>Skill level (Drop down menu)</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
<td>-----------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Other:</td>
<td>For Recreation</td>
<td>Never, less than 5 hrs a week,</td>
<td>I am a novice, I know the</td>
</tr>
<tr>
<td>(continued)</td>
<td></td>
<td>between 5-9 hrs a week, between</td>
<td>basics, I am good at it, I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10-15 hrs a week, more than 15 hrs</td>
<td>am an expert.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a week.</td>
<td></td>
</tr>
</tbody>
</table>

5. Which best describes your learning preferences? *Choose only one from the following list.*

I prefer using no Web 2.0 applications for learning.

I prefer using limited Web 2.0 applications for learning.

I prefer using a moderate amount of Web 2.0 applications for learning.

I prefer using Web 2.0 applications extensively for learning.

6. For Question 5, could you comment on why you made the choice that you did?

7. Which best describes your work preferences? *Choose only one from the following list.*

I prefer using no Web 2.0 applications for work.

I prefer using limited Web 2.0 applications for work.

I prefer using a moderate amount of Web 2.0 applications for work.

I prefer using Web 2.0 applications extensively for work.

8. For Question 7, could you comment on why you made the choice that you did?
9. Which best describes your recreational preferences? Choose only one from the following list.

I prefer using no Web 2.0 applications for recreation.

I prefer using limited Web 2.0 applications for recreation.

I prefer using a moderate amount of Web 2.0 applications for recreation.

I prefer using Web 2.0 applications extensively for recreation.

10. For Question 9, could you comment on the choice that you made?

11. While taking a class, how important is it to maintain contact with your classmates?

Choose only one from the following list

Not important at all

Somewhat important

Very important

Extremely important

12. While taking your class, how important is it to maintain contact with your instructor(s)? Choose only one from the following list

Not important at all

Somewhat important

Very important

Extremely important
13. How many classes have you taken that use Web 2.0? *Drop down list with numbers from 0 to 50* (If answer = 0, jump to Question 21)

14. For classes in which you used Web 2.0, in your opinion, how many of your classes/instructors:

<table>
<thead>
<tr>
<th></th>
<th>Number of classes out of the total</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Used Web 2.0 effectively</td>
<td></td>
</tr>
<tr>
<td>b) Provided students with adequate training for the Web 2.0 portion(s) of the courses</td>
<td></td>
</tr>
<tr>
<td>c) Have adequate Web 2.0 skills for carrying out course instruction</td>
<td></td>
</tr>
</tbody>
</table>

15. For the class(es) in which you used Web 2.0, how well did the use of Web 2.0 tools help you reach your learning goals?

   Not at all
   Somewhat
   Considerably
   Exceeded my expectations

16. Could you comment on your answer to Question 16?
17. For the class(es) in which you used Web 2.0, how well did the use of Web 2.0 tools help contribute to a better learning environment?
   - Not at all
   - Somewhat
   - Considerably
   - Exceeded my expectations

18. Could you comment on your answer to Question 18?

19. For the classes in which you used Web 2.0, was the use of Web 2.0 tools related to any graded assignment?
   - Yes
   - No

20. How frequently do your friends or colleagues’ use of Web 2.0 influence your use of Web 2.0?
   - Almost always
   - Often
   - Seldom
   - Never
21. Which of the following best describes you? *Please choose the one best answer.*

- I am sceptical of new technologies and use them only when I have to
- I am usually one of the last people to know about new technologies
- I usually use new technologies at about the same time as my friends and colleagues do
- I like new technologies and usually use them before friends and colleagues do
- I love new technologies and am usually the first to try them

22. I like to learn through:

<table>
<thead>
<tr>
<th>Method</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Text-based conversations via email or instant messaging</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Programs I can control, such as video games, simulations etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Contributing to websites, blogs, wikis etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Searching for information via the World Wide Web</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) Listening to audio or watching videos online</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) Creating audio or video content</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
23. Following are several reasons why people attend higher education. Please rank the following purposes of education from most important (1) to least important (5).

*Please rank your responses from 1 to 5*

to get a job

to become a better person

to enrich life experiences

to become a better citizen

others:_______________________

24. What is your highest level of education completed?

  Certificate

  Bachelors

  Masters

  Doctoral

  Other:___________
25. What are you majoring in? Check all that apply

- Social Sciences
- Humanities
- Fine Arts
- Life/Biological Sciences, including agriculture and health sciences
- Physical Sciences, including math
- Education, including physical education
- Engineering
- Business
- Other
- Undecided


27. In what country do you reside? Drop down menu or text box

28. How would you describe your home community? Drop down menu with Rural,
   Urban, Sub-urban, Other.

29. Is there anything you would like to tell us about your experience with Web 2.0 either in or outside of your courses?
30. Please enter your email address here if you would be willing to participate in a further 30 minute interview about this research.
Appendix B – Consent Form, Interview Script and Questions

Consent Form

Hello (Participant name):

This is Robert Aucoin calling. As part of my doctoral work I am conducting research on how students in higher education perceive the use of Web 2.0 applications in their school work, their personal lives and their regular work. In this case I am defining Web 2.0 as any web based application where users can both produce and consume content. So examples would include things like Facebook, wikis, Twitter and blogs. But probably would not include regular web pages. Via this research, I want to learn about your experiences in using Web 2.0 in all aspects of your life and get a sense of how you use Web 2.0.

Should you agree to participate, you will retain the right to withdraw from participating at any point in the project. If you do choose to withdrawal your participation, all of your input and feedback will be removed from the research data, based on your request.

You can verify the authenticity of this study by contacting the UBC Office of Research Services at 1-604-822-8598, by e-mail to RSIL@ors.ubc.ca or toll free at 1-877-822-8598.

If you have any questions or desire further information with respect to this study, you may contact Dr. Tom Sork at tom.sork@ubc.ca or on (604) 822-5702.

I expect that the interview will take approximately 30 minutes to complete.

Do you have any questions about the study at this time?

If you agree to participate, I will record the interview but all data gathered during this study will remain anonymous and confidential. I will share a copy of the transcript with you.
after the interview so that you have an opportunity to review it and make changes, additions or deletions.

A summary report based on the study will be prepared and shared via my website. As well, I am planning on presenting the findings at a conference and to publish the findings in a scholarly journal once the study is complete.

Would you be willing to participate in the study?

1. *If “yes”*: That’s great.

2. *If “no”*: Thanks for your time, anyway.

3. *If “I’ll need to think about it”*: May I send you further information about the study to help you decide whether to participate? What is a good time to contact you again?

**Interview Script and Questions**

Thank you for participating in this interview (*name*). The information you provide will directly influence the design of courses and programs with respect to the use of Web 2.0 in higher education. As I mentioned at the beginning of our conversation, what I am focussing on is how students in higher education perceive the use of Web 2.0 applications in their school work, their personal lives and their regular work. In this case I am defining Web 2.0 as any web based application where users can both produce and consume content. So examples would include things like Facebook, wikis, Twitter and blogs. But probably would not include regular web pages. Via this research, I want to learn about your experiences in using Web 2.0 in all aspects of your life and get a sense of how you use Web 2.0.
1. So my first question to you is whether you have taken a course that has used Web 2.0 applications in some way? **If Yes continue questions. If No skip to question 10**

2. Can you tell me a little bit about the course? What were you studying?

3. How was Web 2.0 used in the course?

4. What were some of the general activities in the course?

5. What were some of the Web 2.0-based activities?

6. How did you feel or how did you react when you first learned that you were going to use Web 2.0 applications in the class? Were you excited? Frightened? Annoyed? Confused?


8. If you had a choice would you take another class that uses Web 2.0?

9. Do you feel that using Web 2.0 in the class helped you to learn better? Why?

10. How would you feel if it was announced that Web 2.0 was going to be used extensively in your educational program? Why?

11. Do your friends/colleagues use Web 2.0? How do they use it?

12. Do you use Web 2.0 outside the classroom? Please describe.

13. Recent studies show that your peers’ use of Web 2.0 is likely to affect your use of Web 2.0. What do you think of that statement? Does that apply to you and your peers?

14. Do you and your peers help each other in using Web 2.0?
That concludes the questions I had for the interview. Do you have any questions for me? Is there anything you would like to add?

I would like to sincerely thank you for your time and the insightful responses you have provided me today. Please do not hesitate to contact me should you have any questions or concerns or would like to add something to your responses. Good bye.
Appendix C – Data Tables

This Appendix contains the data tables referred to in Chapter Four.

Table C.1: Demographic Profile of Study Participants

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Home Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 to 29</td>
<td>Male –</td>
<td>30% Rural – 15%</td>
</tr>
<tr>
<td>30 to 39</td>
<td>Female –</td>
<td>70% Urban – 61%</td>
</tr>
<tr>
<td>40 to 49</td>
<td>No answer –</td>
<td>1% Sub-urban – 22%</td>
</tr>
<tr>
<td>50 to 59</td>
<td>Other –</td>
<td>2%</td>
</tr>
<tr>
<td>60 plus</td>
<td>No Answer –</td>
<td>1%</td>
</tr>
</tbody>
</table>

| N           | 154 | 138 | 137 |

Table C.2: Participant Awareness of Web 2.0 Policies

Q: Before you began your class(es), were you made aware of any policies or rules regarding Web 2.0 technologies?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>41</td>
<td>31%</td>
</tr>
<tr>
<td>No</td>
<td>51</td>
<td>39%</td>
</tr>
<tr>
<td>Not Sure</td>
<td>37</td>
<td>28%</td>
</tr>
<tr>
<td>No Answer</td>
<td>3</td>
<td>2%</td>
</tr>
</tbody>
</table>

| N            | 132  |

162
Table C.3: Peer Influence Versus Technology Adoption

<table>
<thead>
<tr>
<th>Which of the following best describes you?</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am sceptical of new technologies and use them only when I have to</td>
<td>I am usually one of the last people to know about new technologies</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How frequently do your friends or colleagues’ use of Web 2.0 influence your use of Web 2.0?</th>
<th>Almost always</th>
<th>Often</th>
<th>Seldom</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 2% 4% 3% 2% 10%</td>
<td>0 1% 16% 16% 5% 38%</td>
<td>0 3% 21% 8% 7% 39%</td>
<td>4% 2% 5% 2% 1% 13%</td>
<td></td>
</tr>
</tbody>
</table>

N = 135  
Fisher’s Exact F-Value = 27.318 p<0.002
Table C.4: Peer Influence Versus Web 2.0 Adoption in Learning Environments

| How frequently do your friends or colleagues’ use of Web 2.0 influence your use of Web 2.0? | [Contributing to websites, blogs, wikis etc.] I like to learn through: | Total |
|---|---|---|---|---|---|
| | Strongly Disagree | Disagree | Agree | Strongly Agree |
| Almost always | 1% | 1% | 7% | 2% | 11% |
| Often | 1% | 4% | 21% | 13% | 39% |
| Seldom | 2% | 9% | 18% | 9% | 38% |
| Never | 2% | 4% | 3% | 3% | 13% |

N = 127
Fisher’s Exact F-Value = 13.680
p<0.095
Table C.5: Association Between Motivation for Higher Education and Blog Use

[For work] [Scale 1] Using the dropdown menus, please indicate the frequency with which you use Blogs (audio/video/text) for learning (school), for work, or for recreation. Using the other drop down menu, please indicate your skill level with using Blog.

<table>
<thead>
<tr>
<th>Total</th>
<th>Never</th>
<th>less than 5 hrs a week</th>
<th>between 5-9 hrs a week</th>
<th>between 10-15 hrs a week</th>
<th>more than 15 hrs a week.</th>
</tr>
</thead>
<tbody>
<tr>
<td>to get a job</td>
<td>21%</td>
<td>16%</td>
<td>2%</td>
<td>2%</td>
<td>0</td>
</tr>
<tr>
<td>to become a better person</td>
<td>5%</td>
<td>7%</td>
<td>1%</td>
<td>1%</td>
<td>0</td>
</tr>
<tr>
<td>to enrich life experiences</td>
<td>11%</td>
<td>11%</td>
<td>6%</td>
<td>0</td>
<td>1%</td>
</tr>
<tr>
<td>to become a better citizen</td>
<td>3%</td>
<td>0</td>
<td>2%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other – Please specify in the next question</td>
<td>5%</td>
<td>4%</td>
<td>3%</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

N = 132
Fisher’s Exact Test
F-Value = 22.829
p<0.065
Table C.6: Peer Interaction Versus Motivation to Pursue Higher Education

<table>
<thead>
<tr>
<th>Learning Preferences</th>
<th>I prefer using no Web 2.0 applications for learning</th>
<th>I prefer using limited Web 2.0 applications for learning</th>
<th>I prefer using a moderate amount of Web 2.0 applications for learning</th>
<th>I prefer using extensively Web 2.0 applications for learning</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which best describes your learning preferences? Please comment on your choice using the comment box.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Rank 2] Following are several reasons why people attend higher education. Please rank the following purposes of education from most important (1) to least important (5).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to get a job</td>
<td>0</td>
<td>4%</td>
<td>8%</td>
<td>3%</td>
<td>14%</td>
</tr>
<tr>
<td>to become a better person</td>
<td>0</td>
<td>4%</td>
<td>20%</td>
<td>2%</td>
<td>25%</td>
</tr>
<tr>
<td>to enrich life experiences</td>
<td>2%</td>
<td>7%</td>
<td>22%</td>
<td>11%</td>
<td>41%</td>
</tr>
<tr>
<td>to become a better citizen</td>
<td>0</td>
<td>2%</td>
<td>4%</td>
<td>5%</td>
<td>11%</td>
</tr>
<tr>
<td>Other</td>
<td>1%</td>
<td>2%</td>
<td>4%</td>
<td>2%</td>
<td>9%</td>
</tr>
</tbody>
</table>

N = 133
Fisher’s Exact F-Value = 17.061
p < 0.081
Table C.7: Educational Achievement

Q: *What is your highest level of education completed?*

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate</td>
<td>10%</td>
</tr>
<tr>
<td>Bachelors</td>
<td>33%</td>
</tr>
<tr>
<td>Masters</td>
<td>36%</td>
</tr>
<tr>
<td>Doctoral</td>
<td>2%</td>
</tr>
<tr>
<td>Other</td>
<td>19%</td>
</tr>
<tr>
<td>No answer</td>
<td>1%</td>
</tr>
<tr>
<td><strong>N=138</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table C.8: Major Course of Study

Q: *What are you majoring in?*

<table>
<thead>
<tr>
<th>Major</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Sciences</td>
<td>20%</td>
</tr>
<tr>
<td>Humanities</td>
<td>8%</td>
</tr>
<tr>
<td>Fine Arts</td>
<td>2%</td>
</tr>
<tr>
<td>Life / Biological Sciences (including agriculture and health sciences)</td>
<td>8%</td>
</tr>
<tr>
<td>Physical Sciences, including math</td>
<td>4%</td>
</tr>
<tr>
<td>Education, including physical education</td>
<td>18%</td>
</tr>
<tr>
<td>Engineering</td>
<td>1%</td>
</tr>
<tr>
<td>Major</td>
<td>Percentage</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
</tr>
<tr>
<td>Business</td>
<td>18%</td>
</tr>
<tr>
<td>Undecided</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>25%</td>
</tr>
<tr>
<td>N=163</td>
<td></td>
</tr>
</tbody>
</table>

Table C.9: Learning Preferences With Respect to Web 2.0

Q: *Which best describes your learning preferences?*

<table>
<thead>
<tr>
<th>Preference</th>
<th>Learning</th>
<th>Work</th>
<th>Recreation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I prefer using no Web 2.0 applications</td>
<td>3%</td>
<td>9%</td>
<td>6%</td>
</tr>
<tr>
<td>I prefer using limited Web 2.0 applications</td>
<td>18%</td>
<td>22%</td>
<td>27%</td>
</tr>
<tr>
<td>I prefer using a moderate amount of Web 2.0 applications</td>
<td>55%</td>
<td>44%</td>
<td>34%</td>
</tr>
<tr>
<td>I prefer using Web 2.0 applications extensively</td>
<td>22%</td>
<td>18%</td>
<td>29%</td>
</tr>
<tr>
<td>No answer</td>
<td>3%</td>
<td>6%</td>
<td>4%</td>
</tr>
</tbody>
</table>

N=143
Table C.10: Interaction Preferences

Q1: While taking a class, how important is it to maintain contact with your classmates?

Q2: While taking a class, how important is it to maintain contact with your instructor(s)?

<table>
<thead>
<tr>
<th>Contact Preference</th>
<th>Classmates</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not important at all</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Somewhat important</td>
<td>26%</td>
<td>15%</td>
</tr>
<tr>
<td>Very important</td>
<td>32%</td>
<td>37%</td>
</tr>
<tr>
<td>Extremely important</td>
<td>39%</td>
<td>46%</td>
</tr>
<tr>
<td>No answer</td>
<td>1%</td>
<td>2%</td>
</tr>
</tbody>
</table>

N=142
Table C.11 Outlook on New Technology

Q: *Which of the following best describes you?*

<table>
<thead>
<tr>
<th>Outlook</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am sceptical of new technologies and use them only when I have to</td>
<td>4%</td>
</tr>
<tr>
<td>I am usually one of the last people to know about new technologies</td>
<td>7%</td>
</tr>
<tr>
<td>I usually use new technologies at about the same time as my friends and colleagues do</td>
<td>46%</td>
</tr>
<tr>
<td>I like new technologies and usually use them before friends and colleagues do</td>
<td>29%</td>
</tr>
<tr>
<td>I love new technologies and am usually the first to try them</td>
<td>14%</td>
</tr>
<tr>
<td>No answer</td>
<td>1%</td>
</tr>
</tbody>
</table>

N=138
Table C.12: Learning Using Technology

Q: *I like to learn through...*

<table>
<thead>
<tr>
<th></th>
<th>Text conversation (email, instant messaging)</th>
<th>Computer-based gaming</th>
<th>Contributing to websites, blogs, wikis etc.</th>
<th>Searching for information via the web (Web quests)</th>
<th>Watching audiovisual materials</th>
<th>Producing audio/visual materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>8%</td>
<td>13%</td>
<td>5%</td>
<td>2%</td>
<td>4%</td>
<td>18%</td>
</tr>
<tr>
<td>Disagree</td>
<td>15%</td>
<td>28%</td>
<td>16%</td>
<td>3%</td>
<td>7%</td>
<td>33%</td>
</tr>
<tr>
<td>Agree</td>
<td>46%</td>
<td>36%</td>
<td>46%</td>
<td>28%</td>
<td>38%</td>
<td>25%</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>29%</td>
<td>13%</td>
<td>26%</td>
<td>65%</td>
<td>49%</td>
<td>14%</td>
</tr>
<tr>
<td>No answer</td>
<td>2%</td>
<td>9%</td>
<td>7%</td>
<td>2%</td>
<td>2%</td>
<td>9%</td>
</tr>
</tbody>
</table>

N=138
Table C.13: Wiki Use and Skill level

Q: Following is a list of common Web 2.0 applications. For each purpose choose from the drop down menus to indicate the frequency of use and your skill level for each application.

<table>
<thead>
<tr>
<th>Frequency of Use</th>
<th>Skill Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours per week</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>&lt;5</td>
</tr>
<tr>
<td>&lt; 5</td>
<td>5 - 9</td>
</tr>
<tr>
<td>5 - 15</td>
<td>&gt; 15</td>
</tr>
<tr>
<td>No</td>
<td>Answer</td>
</tr>
<tr>
<td>Never</td>
<td>No Answer</td>
</tr>
<tr>
<td>Learning</td>
<td>Novice</td>
</tr>
<tr>
<td></td>
<td>Basics</td>
</tr>
<tr>
<td></td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Expert</td>
</tr>
<tr>
<td></td>
<td>No Answer</td>
</tr>
<tr>
<td>Learning</td>
<td>19%</td>
</tr>
<tr>
<td></td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>42%</td>
</tr>
<tr>
<td></td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>14%</td>
</tr>
<tr>
<td>Work</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>26%</td>
</tr>
<tr>
<td>Recreation</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>38%</td>
</tr>
<tr>
<td></td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>19%</td>
</tr>
<tr>
<td></td>
<td>31%</td>
</tr>
<tr>
<td></td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>31%</td>
</tr>
</tbody>
</table>

Table C.14: Blog Use and Skill Level

<table>
<thead>
<tr>
<th>Frequency of Use</th>
<th>Skill Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours per week</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>&lt;5</td>
</tr>
<tr>
<td>&lt; 5</td>
<td>5 - 9</td>
</tr>
<tr>
<td>5 - 15</td>
<td>&gt; 15</td>
</tr>
<tr>
<td>No</td>
<td>Answer</td>
</tr>
<tr>
<td>Never</td>
<td>No Answer</td>
</tr>
<tr>
<td>Learning</td>
<td>Novice</td>
</tr>
<tr>
<td></td>
<td>Basics</td>
</tr>
<tr>
<td></td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Expert</td>
</tr>
<tr>
<td></td>
<td>No Answer</td>
</tr>
<tr>
<td>Learning</td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>25%</td>
</tr>
<tr>
<td>Work</td>
<td>41%</td>
</tr>
<tr>
<td></td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>30%</td>
</tr>
<tr>
<td>Recreation</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>23%</td>
</tr>
</tbody>
</table>
Table C.15: Social Networking Use and Skill Level

<table>
<thead>
<tr>
<th>Hours per week</th>
<th>Frequency of Use</th>
<th>Skill Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Learning</td>
<td>68%</td>
<td>20%</td>
</tr>
<tr>
<td>Work</td>
<td>73%</td>
<td>19%</td>
</tr>
<tr>
<td>Recreation</td>
<td>66%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Table C.16: Social Bookmarking Use and Skill Level

<table>
<thead>
<tr>
<th>Hours per week</th>
<th>Frequency of Use</th>
<th>Skill Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Learning</td>
<td>29%</td>
<td>49%</td>
</tr>
<tr>
<td>Work</td>
<td>31%</td>
<td>44%</td>
</tr>
<tr>
<td>Recreation</td>
<td>8%</td>
<td>34%</td>
</tr>
</tbody>
</table>
### Table C.17: Micro-blogging Use and Skill Level

<table>
<thead>
<tr>
<th>Frequency of Use</th>
<th>Skill Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours per week</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Learning</td>
<td>67%</td>
</tr>
<tr>
<td>Work</td>
<td>60%</td>
</tr>
<tr>
<td>Recreation</td>
<td>53%</td>
</tr>
</tbody>
</table>

### Table C.18: Online Virtual Worlds Use and Skill Level

<table>
<thead>
<tr>
<th>Frequency of Use</th>
<th>Skill Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours per week</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Learning</td>
<td>92%</td>
</tr>
<tr>
<td>Work</td>
<td>92%</td>
</tr>
<tr>
<td>Recreation</td>
<td>87%</td>
</tr>
</tbody>
</table>
### Table C.19: Content Sharing Use and Skill Level

<table>
<thead>
<tr>
<th>Frequency of Use</th>
<th>Skill Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours per week</td>
</tr>
<tr>
<td></td>
<td>Never</td>
</tr>
<tr>
<td>Learning</td>
<td>22%</td>
</tr>
<tr>
<td>Work</td>
<td>30%</td>
</tr>
<tr>
<td>Recreation</td>
<td>9%</td>
</tr>
</tbody>
</table>

### Table C.20: Web 2.0 Training Offered to Participants

**Q:** Before you began your class(es), were you offered or provided any training for **Web 2.0 applications**?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>34%</td>
</tr>
<tr>
<td>No</td>
<td>45%</td>
</tr>
<tr>
<td>Not Sure</td>
<td>18%</td>
</tr>
<tr>
<td>No answer</td>
<td>3%</td>
</tr>
</tbody>
</table>

N=131
Table C.21: How Well Web 2.0 Facilitated Learning Goals and Learning Environment

Q1: *For the class(es) in which you used Web 2.0, how well did the use of Web 2.0 tools help you reach your learning goals?*

Q2: *For the class(es) in which you used Web 2.0, how well did the use of Web 2.0 tools help contribute to a better learning environment?*

<table>
<thead>
<tr>
<th></th>
<th>Learning Goals</th>
<th>Count / percentage</th>
<th>Learning Environment</th>
<th>Count / percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td></td>
<td>5%</td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td>Somewhat</td>
<td></td>
<td>29%</td>
<td></td>
<td>34%</td>
</tr>
<tr>
<td>Considerably</td>
<td></td>
<td>49%</td>
<td></td>
<td>46%</td>
</tr>
<tr>
<td>Exceeded my expectations</td>
<td></td>
<td>12%</td>
<td></td>
<td>11%</td>
</tr>
<tr>
<td>No answer</td>
<td></td>
<td>5%</td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td><strong>N=132</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table C.22: Was Web 2.0 Tied to a Graded Assignment?

Q: *For the classes in which you used Web 2.0, was the use of Web 2.0 tools related to any graded assignment?*

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>59%</td>
</tr>
<tr>
<td>No</td>
<td>31%</td>
</tr>
<tr>
<td>No answer</td>
<td>10%</td>
</tr>
<tr>
<td><strong>N=131</strong></td>
<td></td>
</tr>
</tbody>
</table>
Table C.23: Peer Influence vis-à-vis Web 2.0

<table>
<thead>
<tr>
<th>Question: How frequently do your friends' or colleagues' use of Web 2.0 influence your use of Web 2.0?</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost always</td>
<td>10%</td>
</tr>
<tr>
<td>Often</td>
<td>37%</td>
</tr>
<tr>
<td>Seldom</td>
<td>38%</td>
</tr>
<tr>
<td>Never</td>
<td>13%</td>
</tr>
<tr>
<td>No answer</td>
<td>2%</td>
</tr>
<tr>
<td>N= 138</td>
<td></td>
</tr>
</tbody>
</table>

Table C.24: Primary Motivation for Attending Higher Education

Q: Following are several reasons why people attend higher education. Please rank the following purposes of education from most important (1) to least important (5). Please rank your responses from 1 to 5

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Most Important Count</th>
<th>Second Most Important Count</th>
<th>Total Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>To get a job</td>
<td>40%</td>
<td>14%</td>
<td>54%</td>
</tr>
<tr>
<td>To become a better person</td>
<td>13%</td>
<td>25%</td>
<td>38%</td>
</tr>
<tr>
<td>To enrich life experiences</td>
<td>31%</td>
<td>41%</td>
<td>72%</td>
</tr>
<tr>
<td>To become a better citizen</td>
<td>5%</td>
<td>10%</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td>11%</td>
<td>9%</td>
<td>20%</td>
</tr>
<tr>
<td>N =</td>
<td>137</td>
<td>135</td>
<td></td>
</tr>
</tbody>
</table>
Table C.25: Associations Between Motivation and Technological Preferences at Work

<table>
<thead>
<tr>
<th>Work Preference</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I prefer using no Web 2.0 applications for work.</td>
<td>5%</td>
</tr>
<tr>
<td>I prefer using limited Web 2.0 applications for work.</td>
<td>13%</td>
</tr>
<tr>
<td>I prefer using a moderate amount of Web 2.0 applications for work.</td>
<td>15%</td>
</tr>
<tr>
<td>I prefer using Web 2.0 applications extensively for work.</td>
<td>8%</td>
</tr>
<tr>
<td>I prefer using Web 2.0 applications for work.</td>
<td>40%</td>
</tr>
</tbody>
</table>

Which best describes your work preferences? Please comment on your choice using the comment box.

[Rank 2]
Following are several reasons why people attend higher education. Please rank the following purposes of education from most important (1) to least important (5).

<table>
<thead>
<tr>
<th>Purpose</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>to get a job</td>
<td>5%</td>
<td>13%</td>
<td>15%</td>
<td>8%</td>
<td>40%</td>
</tr>
<tr>
<td>to become a better person</td>
<td>1%</td>
<td>4%</td>
<td>6%</td>
<td>2%</td>
<td>13%</td>
</tr>
<tr>
<td>to enrich life experiences</td>
<td>5%</td>
<td>5%</td>
<td>18%</td>
<td>2%</td>
<td>31%</td>
</tr>
<tr>
<td>to become a better citizen</td>
<td>0</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>5%</td>
</tr>
<tr>
<td>Other – Please specify in the next question</td>
<td>0</td>
<td>1%</td>
<td>6%</td>
<td>5%</td>
<td>11%</td>
</tr>
</tbody>
</table>

N = 131  
Fisher’s Exact F-Value = 19.311  
p < 0.047
Table C.26: Associations between Motivation and Technological Preferences in Recreation

<table>
<thead>
<tr>
<th>Response to Recreational Preferences</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I prefer using no Web 2.0 applications for recreation.</td>
<td>0</td>
</tr>
<tr>
<td>I prefer using limited Web 2.0 applications for recreation.</td>
<td>5%</td>
</tr>
<tr>
<td>I prefer using a moderate amount of Web 2.0 applications for recreation.</td>
<td>1%</td>
</tr>
<tr>
<td>I prefer using Web 2.0 applications extensively for recreation.</td>
<td>6%</td>
</tr>
</tbody>
</table>

Which best describes your recreational preferences? Please comment on your choice using the comment box.

[Rank 2] Following are several reasons why people attend higher education. Please rank the following purposes of education from most important (1) to least important (5).

<table>
<thead>
<tr>
<th>Purpose of Education</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>to get a job</td>
<td>0</td>
<td>5%</td>
<td>1%</td>
<td>6%</td>
<td>12%</td>
</tr>
<tr>
<td>to become a better person</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>to enrich life experiences</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>to become a better citizen</td>
<td>2%</td>
<td>11%</td>
<td>9%</td>
<td>2%</td>
<td>25%</td>
</tr>
<tr>
<td>Other – Please specify in the next question</td>
<td>4%</td>
<td>17%</td>
<td>23%</td>
<td>12%</td>
<td>57%</td>
</tr>
</tbody>
</table>

N = 81
Fisher’s Exact F-Value = 19.546
p<0.027
Table C.27: Peer Interaction versus Contributions to Websites, Blogs etc.

<table>
<thead>
<tr>
<th>While taking a class, how important is it to maintain contact with your classmates?</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not important at all</td>
<td>0</td>
<td>1%</td>
<td>0</td>
<td>0</td>
<td>1%</td>
</tr>
<tr>
<td>Somewhat important</td>
<td>3%</td>
<td>7%</td>
<td>11%</td>
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Fisher’s Exact F-Value = 14.955  
p<0.064

Table C.28: Demographic Profile of Interview Participants

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N = 20  
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Table C.29: Education Profile of Interview Participants

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<tr>
<td></td>
<td>Social Science – 5%</td>
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<td>Other – 10%</td>
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| N | 20 | 20 |
Appendix D – Sample Interview Transcript

ID#39 – Participant P

Q: My first question to you is quite simply whether you have taken a course that has used Web 2.0 applications in some way.

A: Well, the only experience I have was with the virtual learning environment of Moodle which enabled us to log in and ask questions, you know.

Q: Right. Could you tell me within Moodle if there were any kind of applications that you used that were sort of Web 2.0-- the way I described it, things that you would have interacted with?

A: Well, yeah, there was an application called Elluminate and what I found in that, Robert, it wasn’t very satisfactory, number one. And I did not feel that the staff really understood it. They steered away from it as a result of that. And they did take-- they took some videos and put it on Elluminate which were very ineffective, very ineffective. There was one guy only, he taught global issues, he used it very well. He traveled all around the world and they communicated with us once a week through Elluminate. Because I really do believe that students do like a face-to-face contact with staff, you know. It’s a personal element in study as far as I’m concerned and I do believe it matters to students.

Q: Right. So you have-- I’m going to step out of the study here for a second because one of the hats that I also wear is I’m an instructional designer. You had profs that were putting taped videos on Elluminate?

A: Yeah.

Q: Really, they shouldn’t be doing that. Okay, all right. I’m not here to judge, I’m just
saying they shouldn’t be doing that. I’m not against using taped videos, it’s fine. In fact, I use it all the time, but those should be going in Moodle, not in Elluminate.

A: Now I think, I can’t guarantee, but I think it was in Elluminate.

Q: Okay, ‘cause we have, you’re quite right, we’ve had problems with Elluminate and it actually has-- they were, again, this is outside my study, I’ll just tell you because you’re a Royal Roads student and I’m a prof there. The-- Elluminate was a company that was owned-- it was based in Calgary and about six months ago, I guess, they were bought out by Blackboard which is Moodle’s competitor. It’s another learning management system. They’re huge.

A: I understand, yes.

Q: And it’s gotten a lot worse. I mean, I’ve always had some problems with Elluminate. I’ve had some technical problems with it; I’ve used it quite it a lot and it’s-- I’ve got some issues with it and the university fights me on it. And now it’s worse. So I’m not [inaudible, voices overlap].

A: All I can say to you in one sentence, as a-- just a graduate, brand new graduate, if it does not show Royal Roads off.

Q: Yeah, no, I’m with you completely. It’s got some issue-- it’s a great-- the way I describe it is it’s a great idea. I think it would be wonderful if it worked better. But it’s got some hiccups and they need to work through those.

A: Yeah, absolutely.

Q: But they’re in denial so-- anyway, what can you do. I’ll keep fighting. So could you tell me a little bit about that course that you were talking about? You were saying it was a global issues course? Was that what it was?
A: Yes, I can’t remember the instructor’s name right off the top, but he was superb. He was superb. Global issues. And he-- I can’t tell you what it meant to me and the people in my team to have a face-to-face contact. When you have a face-to-face contact when you’re learning online, it really does help. I felt that-- I felt more inclined to ask him a question after the fact and it was just the personal element in the study. And as I just said, it really mattered to me particularly and I know to the-- to my teams, all of which were much younger so-- it just wasn’t my age, you know.

Q: Right. And I know you told me this already, but it’s kind of gone out of my head, you were studying a Bachelor of Commerce?

A: That’s right.

Q: Okay, good. So what were some of the other activities in that course that you did?

A: In that one global issues, you mean?

Q: Yeah, like, were you doing team work? I think you said you were doing team work, right.

A: Oh, yeah, we were certainly doing team work, and a lot of research. We were certainly doing a lot of research. We certainly didn’t get any major instruction on how to, you know, how to surf or how to-- I mean, we were told about it. I mean, we did discuss the fact, you know, Facebook and Twitter and, you know, all the different-- YouTube’s and everything else. As a matter of fact we’re even asked to put one of our, you know, in our entrepreneurial program, to put a little video of ourselves on YouTube. So, you know, all that was well and of itself, but this particular course I think, even though I felt it was the best one as far as Web 2.0 is concerned, I think we could have been provided with some classes or some
information about ways to, you know, even to-- a name [?] to enhance our creativity, I think is what I’m saying. And, you know, it-- I did not find that it was what me as a learner expected in 2011. Not to be immersed in social web technologies, you know, the [inaudible] communication and collaboration and participation and sharing, I felt.

Q: Okay, good. Now I haven’t actually analyzed any of the data from the surveys yet. As I said, I probably won’t do that until November. But I did have some questions around that, you know, were you prepared, did the university or you instructor prepare you. I hope you answered those questions and mentioned that because I can provide that feedback to [inaudible, voices overlap].

A: Uh, I think I did.

Q: Yeah, good. Good, I hope so. Now at some point you would have found out, I don’t know, you would have gotten an email or someone would have told you or whatever, that you were, in fact, going to be using these Web 2.0 applications in the class. I’m just curious to know how you felt when you first found out. Were you excited or did you have no idea what they were talking about or-- how did you feel?

A: Well, I felt-- because I’m not looking for a job after I graduate like most of the students, you know, I certainly felt proud that anything that Royal Roads would do about Web 2.0 training or learning, it would certainly be part of what my team members needed as far as 21st century employability skills, you know. So I was excited about that, for sure.

Q: Right. You kind of alluded to this next question but I’ll get you to be a little bit more direct. How would you describe-- in hindsight, how would you describe your experience using the Web 2.0? Positive or negative or kind of ambivalent?
A: Well, I have always throughout my life decided that I was not going to be a dinosaur with anything. And as a result of that, I’ve always engaged myself with the latest and the greatest and so to me, it’s very important. Part of lifelong learning. So you would have to be excited about that.

Q: Yeah, but did you think it was a good experience or did you think it could have been done better or--

A: Well, it certainly have been done better. I don’t think it was-- Royal Roads enhanced it enough. I believe there’s sort of a divide there which I think is going to have to change, because I think students today, like, the last-- my cohort, I think they were a group that sort of felt, well, it’s okay, you know, they haven’t caught up yet. But I don’t think-- I think the expectations of the students to come beyond us are-- it’s going to have to be-- Web 2.0 is going to have to be, certainly, a very important part of higher education.

Q: Interesting, very interesting. I want to get you to guess at this next question and I’ll warn you that some people don’t like this question ‘cause they don’t want to guess. Do you think that using Web 2.0 in this class or other classes for that matter, helped you to learn better? In other words if you had a choice-- if you could have done it with 2.0 or if you could have done it without 2.0, do you think you learned more or less using the Web 2.0?

A: I think-- I think probably more.

Q: Could you say why?

A: I wish we had been-- pardon?

Q: Could you explain why you think it might be more?
A: I think, you know, it continued to provide for development of our technical skills and I think Royal Roads, in particular, if they had shown it as more of a priority to all the students to, amongst other things, to search and locate and retrieve, especially critically-- critical information, you know, from appropriate sources, web-based and others. I think it would have been an appropriate medium. I don’t believe it was enhanced enough. If it had been, I think I would have felt, particularly as I mentioned before for my young team members, I think that it would have been a match for the 21st century learning skills that I think that they’re going to need for employability in the future so--

Q: Interesting. I’m going to get you to shift gears a little bit here. Do you use Web 2.0 outside the classroom? Do you use Facebook or blogs or--

A: Yeah, absolutely.

Q: Yeah. Could you describe a little bit the sorts of things you do? Or the sorts of [inaudible] you use?

A: Well, I have three businesses, two of them is in e-commerce and-- three of them are e-commerce, one of them is a BtoB and two of them are BtoC. So, you know, we sometimes find, even find, our-- the people who are interested in work through Facebook. Let me give you an example.

Q: Interesting.

A: We have an organization that does continuing education for well drillers. My husband is a licensed well driller, amongst other things. He used to work-- he used to teach at the university, too. But anyway, it’s-- we have a very exciting and very diversified lives. But anyway, this one particular business that we have we teach continuing
education to well drillers online. And so we communicate with well drillers. As soon as you put in “well drillers” on Facebook, you know, you get people say, wow, where is this? Where is this? So it-- to me, it’s certainly a good business tool. Other areas, YouTube I find is also interesting for that type of, what we call clients, and they look for things on YouTube that would interest them in well drilling, you know. What is the latest well drilling rig. What are some of the new applications in well drilling. So we put on videos on YouTube and particularly the younger generation who are getting into well drilling will look there. They don’t know any different. They think, well, if you’re not there, where are you, you know? So we try to try keep up so, yes, absolutely we do-- I have used it and continue to use it outside of the classroom.

Q: Interesting. And by well drilling, do you mean, like, oil wells or water wells or both?
A: No, actually it’s water-well drilling.

Q: It is water-well drilling, okay, interesting.
A: And, of course, here in Florida it’s very, very important.

Q: Yeah, I was actually think-- I also-- well, I always say I’m from Halifax; I’m actually from Cape Breton. And, boy, we could have used you guys a few years back. We had to go-- well, again, this has nothing to do with my study, we had to go down almost 200 feet to get water. And it wasn’t good. It was-- so I don’t think if there was a solution to it but-- anyway, it wasn’t good.
A: Interesting.

Q: So now my sister’s left dealing with it because she’s the only one that lives there now.
A: I see.
Q: So, yeah, anyway, so that’s good. That’s good that you’re doing that. But, yeah, you know, where I grew up there was a lot of gypsum mines and so on, not too far away. And so the water is very problematic and hard to get at. Hard to get at in any case and then when you do get it, it’s not that great so-- anyway, that’s neither here nor there. What about your friends and colleagues-- sorry, there’s my French accent coming in, your friends and colleagues-- do they use Web 2.0?

A: I would have to say yes. I have, you know, friends who I communicate with on Twitter and Facebook and blogs and all those sorts of things. Even though, you know, we are baby boomers, we certainly, I guess, are amongst people who are sort of of the digital age. So I guess in my case it is very much that. As a matter of fact, let me tell you, which is an exciting thing, one of my main reasons for entering the Bachelor of Commerce Entrepreneurial Management course was that I wanted to start yet even another business. And--

Q: You’re not [inaudible, voices overlap].

A: And-- pardon?

Q: I said you’re not busy enough.

A: Yeah, right. So we-- my capstone project, I wanted to be a, I really and truly, Robert, I wanted it so bad. I wanted it to be a-- sort of like Facebook but not really. It was called boomconnect.com. And I’m in the process now of-- but I wasn’t allowed to do it. My instructor would not allow me to do that for lots of reasons, but anyway, I wasn’t allowed to do it so I’ve had to go on my own. So what I’m working on now is trying to put together a boomconnect.com social site. And it is for baby boomers to connect with one another, I mean, there’s more baby boomers in the world than
anything else. And I felt that, you know, there’s social websites, for instance, for dog owners and, you know, and so I felt that there would certainly, I still feel, that there would be a lot of response from baby boomers. And I have several boomer investors so it’s something that I’m really excited about and whether or not it gets off the ground, I don’t know, but we’re working on it.

Q: Well, that’s disappointing they wouldn’t let you do that. Again, I’m going to jump outside my study here. I’m not sure how often you get back to Canada, but one of the things I’ve been noticing since the summer, I would say, is AARP, which is-- or no, sorry, CARP, it’s the Canadian Association of Retired Persons.

A: Yes, and the [inaudible] is American, yeah.

Q: Yeah, and--

A: Very familiar.

Q: Anyway, they’ve been advertising a lot, and they’re clearly targeting, well, I mean, their original mandate was for retired persons, but now their mandate seems to have expanded a little to include kind of anyone sort of my age and up. So, like, I’m in my 40’s and, you know, they’re showing people on their advertisements who are currently my age. Nowhere near retirement but thinking about it. So-- and I wonder if they’re doing social networking stuff. You might want to [inaudible, voices overlap].

A: That’s interesting; I’m glad you mentioned that to me, because I will certainly check into that. There might be some sort of a connect that we can have there.

Q: Um-hum, yeah, for sure. I think your idea’s a great one.

A: Yeah, I thought it was a good idea, too. I was disappointed, as was my team. We
ended up doing a project that none of us really could get our head around.

Q: Oh, that’s too bad, that’s [inaudible].

A: Yeah [inaudible].

Q: I guess my only question, and you don’t have to answer this ‘cause it’s none of my business, is what the business model would be around the website, right. Or are you thinking that it would generate revenue?

A: Well, yes, I mean, the business model would not come from the users; it would come from advertising. And, I mean, there’s-- advertising for baby boomers is unbelievable.

Q: Absolutely, yeah.

A: Particularly here in the U.S. where, you know, we have to pay for all of our medicines and operations and prescriptions and-- so there you go--

Q: Wow, I’d be interested in that. Do you have a website up already?

A: No, I don’t. You know, what it’s taking, what it’s going to take, is a lot of technical savvy and the guy I have working with me, he seems a little bit slower than I want. But he seems to know exactly what I’m talking about and how to go about it.

Anyway, we will see.

Q: Yeah, well, good luck on that. Yeah. I want to get your reaction to a statement. There haven’t been a lot of kind of peer-reviewed academic studies about Web 2.0. It’s pretty new and there’s a lot of challenges around it. So mine is going to be one of the first. In fact, mine’s probably going to be one of only about three or four that are looking at Web 2.0 from the learner’s point of view. So-- but there have been a couple of studies that show that your peers’ use of Web 2.0 is likely to affect your
own use of Web 2.0. And I’m just curious, what do you think of that statement? Do you think that applies to you and your peers?

A: Absolutely.

Q: Yeah?

A: Yeah, I mean, it seems to me that, you know, you socialize with these people and, you know, they’re going to talk about-- particular thing, and you’re going to feel left out if you’re not amongst them. So, sure, you’re going to try to find out as much as you can so that there’s a match, you know, between you and your peers so-- I think it’s definitely something that would enhance me to get involved.

Q: Interesting. And sort of an extension to that question, do you and your peers kind of deliberately help each other out using Web 2.0? Do you learn from each other [inaudible, voices overlap]?

A: Well, more particularly I suppose with John, my husband, and I and our peers, you know, they think that we’re so much further ahead of them and have asked many times. And we have contributed to their learning of this. And sometimes get them involved when they never thought they ever would, you know. So sure.

Q: Interesting, good. That actually concludes all the questions I had. Do you have any questions for me? Or is there something that [inaudible, voices overlap]?

A: No, I hope that your recommendation does encourage Royal Roads University, you know, to reach out and engage in Web 2.0 more than they have. I believe that, you know, placing Royal Roads students in-- on student blogs and virtual learning environments, I know Moodle is there but I don’t know whether or not that is really what students are looking for. I think they should provide services such as-- same
type of services, MySpace and Facebook and just probably integrate it into their existing database.

Q: Right.

A: I think that’s probably what students are going to be looking for in the future. And just to repeat that I think my cohort was tolerant, impatient, but tolerant about Web 2.0 not being totally integrated. Many even complained that there was no e-readers or tablets, you know, which is naturally the future textbook. I mean, I know there is an organization in Vancouver, Eminata, they have career colleges all across Canada.

Q: Yep.

A: And I know so much about them because my son is the vice-president. But they’re, you know, they’re getting ahead of universities, career colleges, private career colleges, private universities are getting ahead of college-- of universities like Royal Roads. Because they recognize that their students are coming in, you know, they’re technically savvy and this is all they’re used to and so they don’t even have books. They don’t have books in those schools and-- I think Royal Roads has to certainly get abreast of it.

Q: Yeah.

A: One other thing that you haven’t asked me about and that is making sure that the staff is completely trained in Web 2.0.

Q: Yep. No, I didn’t ask that about-- in the interview. I was hoping that would have come out in the survey. I tried hard to not ask questions twice ‘cause it just doesn’t [inaudible, voices overlap].

A: You had a wonderful survey. I enjoyed doing it, and I certainly wish you luck with
your thesis.

Q: Good.
Appendix E – The University of British Columbia Office of Research Services

Behavioural Research Ethics Board Approval Letter

*CERTIFICATE OF APPROVAL - FULL BOARD *

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INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT: N/A

CO-INVESTIGATOR(S): Kjell Rubenson, David Vogt

SPONSORING AGENCIES: N/A

PROJECT TITLE: Web 2.0 in the Classroom: A Study of Students’ Perceptions of the use of Web 2.0 Applications in Higher Education

REB MEETING DATE: May 26, 2011

CERTIFICATE EXPIRY DATE: May 26, 2012
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The application for ethical review and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.

This study has been approved either by the full Behavioural REB or by an authorized delegated reviewer.
Appendix F – Ethics Approval from Royal Roads University

ROYAL ROADS UNIVERSITY
***
Office of Research

01 June, 2011

Robert Aucoin
2845 Pickford Road,
Victoria, BC V9B 5M1

Re: Ethical Review – Robert Aucoin

Dear Robert,

Please accept this letter as confirmation that the Royal Roads Research Ethics Board has given clearance for your research on the project “Web 2.0 in the Classroom: Wave of the Future or Moral Panic?”

This letter is to confirm that final clearance was granted on the 21 February, 2011, pending any additional clearances required by the sponsoring organization or any other organization.

Should you require any additional information, please feel free to contact us.

Sincerely,

Colleen Hoppins
Research Ethics Coordinator
Office of Research
Royal Roads University
2005 Sooke Road
Victoria, BC Canada V9B 5Y2
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Website: www.royalroads.ca