

**Using Outcome-Based Instructional Design Approach to
Enhance E-Learning with Social Software:
A Mixed Methods Case Study**

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ABSTRACT

This mixed-methods single case study explored how outcome-based instructional design can be used to incorporate social software into an existing e-learning course. Pre-service teachers enrolled in a teacher education program at a Canadian university volunteered to participate in a study where social software was incorporated into a foundations course to facilitate digital literacy development, social objects production, and reflection on how these experiences connect to future teaching practice. The instructional design process was guided by a conceptual framework and informed by *W(e)Learn*, a well-tested e-learning design and evaluation framework. The quantitative and qualitative data were collected from the instructional designer's journal, participant surveys, course records and interviews. Findings provided a comprehensive view of the effectiveness of outcome-based instructional design.

In general, participants achieved the expected learning outcomes for this study. There were also unexpected outcomes. For example, some learners created a virtual community of practice. Some learners had an influence on their in-service teacher's use of social software in teaching and learning. The findings supported the literature that states an outcome-based instructional design approach can facilitate learning. The findings also revealed why participants used social software in their teaching (e.g. awareness, usefulness, and school environment). In addition, these findings can inform school board policy with regard to supporting the use of social software in teaching and learning.

The integration of qualitative and quantitative findings revealed convergence and divergence between the two types of data. In addition the findings informed directions for further research, including the relationship between learners' satisfaction and learning experiences as well as the achievement of learning outcomes. The corroboration of data also identified specific effective and

imperfect areas of the instructional design strategies, which, in turn, informed the revision of the conceptual framework for outcome-based instructional design.

This study found *W(e)learn* to be effective in guiding outcome-based instructional design and analyzing the achievement of expected learning outcomes. The study also contributes to theory by recommending the inclusion of two new elements into *W(e)learn*. Painstakingly recording the instructional design process in a journal resulted in documented practical information and lessons learned that may guide and benefit instructional designers and educators who want to incorporate software into their learning activities.

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TABLE OF CONTENTS

CHAPTER 1 INTRODUCTION.....	1
Background	1
Problem Statement	3
Lack of practical studies on how to integrate social software into education.	3
Need for considerations of learning outcomes.	4
Need for guidelines on appropriate social software selection.....	4
Need for digital literacy development in digital natives.	5
Purpose of the Study	6
Research Questions	7
Rationale.....	7
Conceptual Framework	8
Assumptions by the Researcher	10
Definitions of Terms	10
Outline of the Remaining Chapters	13
CHAPTER 2 REVIEW OF LITERATURE.....	15
Constructivism	15
Constructivism and knowledge.	15
Constructivism and instructional practice	16
Social constructivism.	16
Pragmatic constructivism.	18
Connectivism as an emerging theory.	19
The <i>W(e)Learn</i> Framework.....	21
History of <i>W(e)Learn</i>	21
Application of <i>W(e)Learn</i>	23
Instructional design principles and <i>W(e)Learn</i>	23
Outcome-based instructional design and <i>W(e)Learn</i>	25
Learning Outcomes	26
Learning outcomes and learning objectives.	26
Expected and unexpected learning outcomes.....	27
Social objects as learning outcome.	28

Digital literacy as learning outcome.....	29
Reflection as evidence of learning outcome.	32
Digital Natives as Adult Learners	34
Characteristics of adult learners.	34
Prior knowledge and experience.	34
Self-directed learning.	35
Experiential learning	36
Digital natives are adult learners.	37
Pre-service teachers’ needs.	38
Social Software and Learning	39
Collaborative learning, constructivist pedagogy, and social software.	40
Collaborative editing	42
Social Bookmarking.....	43
Grassroots video sharing.	44
Challenges related to social software.	44
Summary of Literature Review	45
CHAPTER 3 METHODOLOGY	47
Introduction	47
Sequential Mixed Methods Single Case Study Design	49
Sequential mixed methods in a single case study.	49
Answering research questions.	50
Pragmatism as the paradigm of choice.....	50
Study Context	52
Participants	53
Response status.	53
Demographics.....	54
Interviewees.	55
The Research Procedure.....	57
Phase I: The outcome-based instructional design process.	58
Outcome identification.....	59
Learning activity identification.	60

Content development.....	61
Media – social software selection and testing	64
Service - technical instructions.	67
Enriched learning activities.	69
Feedback from other instructional designers.	70
Phase II: The course delivery	70
Recruiting participants.	71
Administrating pre-course survey.	72
Providing learner support.	72
Recording learner online participation.	72
Collecting learner reflections.	72
Administrating post-course survey.....	73
Phase III – Individual interviews.	73
Interviewee identification.....	73
First interview.	73
Second interview.	74
Instrumentation and Data Collection.....	74
Researcher journal.....	75
Pre-course survey.	75
Demographic survey.	75
SoAT survey.....	76
Post-course survey.....	76
W(e)Learn survey instrument.....	76
SoAT survey.....	76
Course records.....	77
Participants’ reflections.....	77
Interview transcripts.....	77
Data Analysis	78
Quantitative data analysis.....	78
Interviewee identification.....	78
Qualitative data analysis.....	79

Integration of quantitative and qualitative data	81
Strengths and Limitations of the Research Design	82
Strengths.....	82
Limitations.	83
Validity, Reliability, and Trustworthiness	84
Validity.....	84
Construct validity.	84
Internal validity.	84
External validity.	85
Reliability.	85
Trustworthiness.	86
Triangulation.	86
Rich data.....	86
Participant verification.	86
Searching for discrepant evidence.....	86
Inter-coder reliability.....	86
Auditing.....	87
Minimizing Researcher Bias	87
Ethical Considerations.....	88
Summary of Methodology	89
CHAPTER 4 FINDINGS	91
Introduction	91
I. Instructional Design Considerations	92
Unknown learner profiles and needs	92
Workload.....	92
Concept versus technology.....	93
Administrative factors	94
Technology compatibility and reliability	95
II. Quantitative Findings	98
Pre-course demographic survey	98
Experiences with and perceptions of informal online learning.....	98

Experiences with and perceptions of formal online learning	99
Experiences with and perceptions of collaborative learning experiences	105
Post-course <i>W(e)Learn</i> survey	107
Online participation.....	107
Pre- and post-SoAT comparison	111
Paired samples t-test on pre- and post-course SoAT.....	111
Individual pre- and post-SoAT changes	114
Factors affect SoAT outcome or not	116
Gender	116
Age group	117
Prior online course experience	118
Pre-course SoAT	119
Satisfaction	121
III. Qualitative Findings	123
Qualitative data themes	123
Structure	124
Learners' needs	125
Learners' preferences	126
Instructional design and learning	128
Learning social software in teacher education	132
Content	133
Depth	133
Authenticity.....	134
Media.....	136
GoogleDocs.....	136
Del.icio.us.....	138
TeacherTube/YouTube.....	139
Online delivery	141
Service.....	142
Accessibility	142
Peer support.....	142

Responsiveness.....	142
Outcomes.....	143
Meeting learning expectations.....	143
Attitude toward future use.....	144
Knowledge and skills	152
Application	156
Unexpected outcomes	158
Factors affecting application.	162
Awareness and willingness.	162
Usefulness.	163
Practicing teachers' adoption.	163
Student population.....	164
Technology readiness and accessibility.	164
Changes overtime.....	165
Summary of All Findings.....	168
CHAPTER 5 DISCUSSION, CONTRIBUTION AND CONCLUSION.....	177
Introduction	177
Interpretations of Learning Outcomes.....	179
Stage of adoption of technology (SoAT).	179
Reduced post-course SoAT for some participants	179
Convergence of post-course SoAT	180
Gender.	181
Satisfaction.....	182
Learners' needs.	184
Technology compatibility and reliability.	186
Workload.....	187
Online delivery.....	189
Attitude toward future use.....	190
Media.....	190
Attitude.....	192
Knowledge and skills.....	194

Appropriateness.....	196
Concept verses technology.....	199
Content.....	200
Unexpected learning outcomes.....	202
Application.....	203
Awareness and willingness.....	203
Usefulness.....	204
School environment.....	206
Changes overtime.....	207
Summary of interpretation of learning outcomes.....	209
Interpretation of Online Participation.....	210
Online participation.....	210
Implications to Outcome-Based Instructional Design.....	212
Outcomes.....	212
Content.....	213
Media.....	213
Social software selection.....	214
Online delivery.....	216
Service.....	217
Accessibility.....	217
Responsiveness.....	217
Peer support.....	217
Structure.....	218
Learner analysis.....	220
Social software applications.....	222
Constructivist pedagogical strategies.....	223
Summary of the implications to outcome-based instructional design.....	225
The <i>W(e)Learn</i> framework and outcome-based instructional design.....	226
Implication to School Board Policy.....	230
Personal Reflection.....	230
Contributions of the Study.....	230

Theoretical contribution.	232
Practical contribution.	233
Methodological contribution.	234
Strengths of the study	234
Limitations of the Study	235
Directions for Future Research.....	236
Satisfaction and learning outcomes.....	236
Knowledge production and learning outcomes.....	237
Long-term learning outcomes.	237
Outcome-based instructional design.	238
Conclusion.....	2399
References	240
Appendix A: Context of the Research Site	286
Appendix B: Letter of Informed Consent to the Participants.....	288
Appendix C: Distinctions between Instructional Objectives and Learning Outcomes	291
Appendix D: The Enriched Learning Activity Design.....	292
Appendix E: Demographic Questionnaire	296
Appendix F: SoAT Survey	299
Appendix G: <i>W(e)Learn</i> Instrument	300
Appendix H: Interview Questions.....	302
Appendix I: Researcher Journal Template	305
Appendix J: Questions for Course Video Production	306
Appendix K: The Researcher’s Bulletin Board Posting on October. 7th, 2010.....	308
Appendix L: Mixed-Methods Methodology Timeline.....	310
Appendix M: Data Collection Timeline in the Context of Teacher Education Program	314
Appendix N: Post-course <i>W(e)Learn</i> Survey Results on Participants’ Experiences in the Course (<i>N</i> = 25)	315
Appendix O: Female and Male Participants’ Pre-course Stages of Adoption of Technology (<i>N</i> = 25)	317

LIST OF TABLES

Table 3.1 Number of Participants in Each Data Collection Process of the Research	54
Table 3.2 Profile of the Identified Interviewees.....	56
Table 4.1 Support Provided to Participants during the Online Course Delivery	96
Table 4.2 Participants' Previous Participation in Informal Online Learning (N=25).....	99
Table 4.3 Participants' Perceptions of Past Formal Online Learning Experiences (N=25).....	104
106	
Table 4.4 Participants' Past Collaborative Learning Experiences (N=25).....	106
Table 4.5 Participants' Past Collaborative Learning Experiences in Formal Learning Settings (N=25).....	106
Table 4.6 Number and Type of Participant Online Postings and Exchanges by Unit	109
Table 4.7 Paired Samples Statistics on Pre- and Post-Course SoAT	114
Table 4.8 Paired Samples Test on Pre- and Post-Course Stages of Adoption of Technology (SoAT)	114
Table 4.9 Descriptive Statistics of SoAT Changes between Female and Male Participants (N=25)	117
Table 4.10 One-way ANOVA - SoAT Changes between Female and Male Participants	117
Table 4.11 Descriptive Statistics of SoAT Changes among Participants of Age 23 and Under, 24-29 and Above 30 (N=25).....	118
Table 4.12 One-way ANOVA - SoAT Changes among Participants of Age 18-23, 24-29 and Above 30.....	118
Table 4.13 Descriptive Statistics of SoAT Changes among Participants Who Had or Had Not Taken Online Course Before (N=25).....	119
Table 4.14 One-way ANOVA - Stages of Adoption of Technology (SoAT) Changes among Participants Who Had or Had Not Taken Online Course Before.....	119
Table 4.15 Descriptive Statistics of Stages of Adoption of Technology (SoAT) Changes among Participants Who Reported Different Pre-Course SoAT (N=25).....	120
Table 4.16 One-way ANOVA - SoAT Changes among Participants Who Reported Different Pre- Course Stages of Adoption of Technology (SoAT)	120

Table 4.17 Descriptive Statistics of Stages of Adoption of Technology (SoAT) Changes among Participants Who Did or Did not Enjoy the Course (N=25)	121
Table 4.18 One-way ANOVA - Stages of Adoption of Technology (SoAT) Changes among Participants Who Did or Did not Enjoy the Learning Experiences (N=25).....	122
Table 4.19 Participant Reflections: Attitude toward Future Use of Social Software	144
Table 4.20 Number of Text Units by Keyword in Participant Reflections and Interview Transcripts for Each Type of Social Software	152
Table 4.21 Participant Reflections: Knowledge and Skills of Learned in the Enriched Learning Activities	153
Table 4.22 Participant Reflections and Interviews: Application of Social Software beyond the Course.....	156
Table 4.23 Participant Interviews: Changes Overtime - Participant Opinions and Actions on Using Social Software in Teaching and Learning	166
Table 5.1 Collaborative Learning Matrix: Individual and Collective Learning Process and Outcomes (de Laat, 2006)	215
Table 5.2 Comparison of Original and Revised Outcome-based Instructional Design.	225

LIST OF FIGURES

Figure 1.1. Conceptual Framework for Outcome-Based Instructional Design (Version 1).....	9
Figure 2.1. The W(e)Learn framework (MacDonald, Stodel, Thompson, & Casimiro, 2009).	22
Figure 2.2. Outcome-based instructional design (Biggs, Kember, & Leung, 2001).....	26
Figure 3.1. Learning outcome data sources.....	48
Figure 3.2. Survey participant age distribution.	55
Figure 3.3. Outcome-based instructional design, production, delivery, and outcomes	58
Figure 3.4. Video clips uploaded online	63
Figure 3.5. Example video content page	64
Figure 3.6. Demo video instructions on using GoogleDocs in Unit 5	67
Figure 3.7. Step-by-step instructions on using Del.icio.us in Unit 7	68
Figure 3.8. Instructions on using TeacherTube or YouTube in Unit 12	68
Figure 4.1. Participants' use of traditional e-learning methods and tools in formal online learning settings.....	101
Figure 4.2. Participants' past use of social software as consumers.....	102
Figure 4.3. Participants' past use of social software as contributors.	102
Figure 4.4. Participants' past use of social software as creators.	103
Figure 4.5. Participants' past experiences with social software used in the course.	103
Figure 4.6. Pre-course Stages of Adoption of Technology (SoAT) distribution.	112
Figure 4.7. Post-course Stages of Adoption of Technology (SoAT) distribution.....	113
Figure 4.8. Pre- and post-course individual Stages of Adoption of Technology (SoAT) changes. .	115
Figure 4.9. Pre- and post-course Stages of Adoption of Technology (SoAT) trend lines.	115
Figure 4.10. Themes of qualitative data	124
Figure 5.1. Conceptual Framework: Outcome-Based Instructional Design	220

CHAPTER 1

INTRODUCTION

Background

Information and Communication Technology (ICT) has gone through an exponential development period in recent history. In less than two decades, the Internet has evolved from the first generation, Web 1.0 (posting content online, mostly one-way communication) to the second generation, Web 2.0, (many to many social network), and the Semantic Web 3.0 (a common web framework that allows data to be shared and reused across application, enterprise, and community boundaries) is already on the horizon (Kelly, 2007). Although skeptics and critics exist, many believe that the proliferation of emerging Web 2.0 applications, also referred to as social software, have changed and will continue to change teaching and learning (Amiel & Reeves, 2008; Franklin & van Harmelen, 2007; McLoughlin & Lee, 2007; Sreebny, 2007).

The rise of Web 2.0 requires a shift in how we conceive technology. When considering using Web 2.0, educators need to consider the complex interactions of human, social, and cultural factors, as well as the technical aspects (Amiel & Reeves, 2008). Web 2.0 means many things to different people. For instance Davis (2006) described Web 2.0 as an attitude not a technology while Lévy (1994) noted that technology encourages collective intelligence through grassroots participation. O'Reilly (2005) stated that collective intelligence can be intuitively facilitated by Web 2.0 tools however Johnson (2001) believes that Web 2.0 is a philosophy that supports online collaboration.

Prensky (2001a, 2001b, 2004, & 2009) argues that today many postsecondary learners are comfortable with the diverse resources available on the Internet and use technology for learning and socializing. These learners include busy working adults who have full-time jobs and family responsibilities, distance learners engaged in online education programs, or “digital natives” who

are the generation of learners who have never known life without computers and the Internet (MacDonald, 2008; Oblinger, Barone, & Hawkins, 2001; Oblinger & Hawkins, 2005; Prensky; Ryerson, 2002).

Today's learners think and communicate differently from earlier generations who did not grow up with computer access (Prensky, 2001b, 2009). They tend to seek active engagement in their own learning, thus researchers point out the need to consider pedagogical strategies that promote active participation, rather than passive consumption of content. In short, learning should be a participatory, social process that supports personal goals and needs (Anderson, 2005; Beldarrain, 2006; McLoughlin & Lee, 2007; Prensky; Williams & Chinn, 2009).

With an emphasis on active participation, connectivity, collaboration, and the sharing of knowledge and ideas among users, social software is seen to hold considerable pedagogical potential for:

- addressing the needs of today's diverse learners (Anderson; Beldarrain; Collins & Halverson, 2010; McLoughlin & Lee; Mejias, 2005; Williams & Chinn);
- enhancing e-learning by facilitating collaborative learning online (MacDonald, 2008; Palloff & Pratt, 2005);
- having an impact on learning outcomes and relevant skill development in the workplace (Bisoux, 2008; Williams & Chinn).

In order to provide an online learning environment that is conducive to collaboration, existing e-learning courses must support the use of alternative forms of knowledge representation and authentic assessment (Holmes & Gardner, 2006; Jonassen, 2002). Online courses need to take advantage of Web 2.0 technologies to improve the cooperative and interactive aspects of the online environment.

Problem Statement

Learning with technology involves the integration of emerging technologies, such as mobile computing, and personal web tools [including social software] into the curriculum (Clendinneng, 2010). Social software supports a social constructivist approach to e-learning by providing learners with tools that facilitate engagement and collaboration (Dalsgaard, 2006). Creating social learning environments can be complex as it often requires the combination of different technologies (Anderson, 2005). To further complicate the issue, the types of technology available for the teaching-learning process has quickly outpaced most educators' knowledge regarding how it might best be used (Garrison, Cleveland-Innes, Koole, & Kappelman, 2006; Pachler & Daly, 2009; Pawan, Paulus, Yalcin, & Chang, 2003). This gap in understanding between what social software is available and how to effectively integrate it into educational programming needs to be bridged if educators are to develop and deliver effective e-learning. In addition, educators need to become proactive in the development and use of technology in the teaching process (MacDonald, 2008; Pachler & Daly).

Lack of practical studies on how to integrate social software into education. Due to the recent acknowledgement of the instructional potential of social software, there are many recent applications in higher education (Bennett, Bishop, Dalgarno, Waycott, & Kennedy, 2012). Despite this high level of social software integration activity there is limited empirical evidence and few critical accounts that reveal the effectiveness of these implementations (Carmichael & Burchmore, 2010; Hung & Yuen, 2010; Schroeder, Minocha, & Schneider, 2010).

While researchers have focused intensively on the online exchange as learning outcomes, there has been a lack of examination of the challenges and options with which educators and instructional designers are confronted when designing tasks for their learners (O'Dowd & Waire, 2009). Moreover, the actual process of task design is rarely referred to in the literature therefore

there is a lack of evidence on the factors that determine why certain tasks and task-based schemes of work are chosen by educators and how these are put into practice (O'Dowd & Waire).

Need for considerations of learning outcomes. Researchers have indicated that the use of collaborative pedagogies could encourage learners to actively participate in meaningful collaborations and achieve desired learning outcomes (Borsheim, Merritt, & Reed, 2008; Chernay, 2008; Graffam, 2007). However, much of the research on collaborative and active learning using social software has focused on attitudinal reactions (e.g., learners' satisfaction) but learning outcomes, such as cognitive and behavioral outcomes, have received scant attention (Michel, Cater, & Varela, 2009). Adding further complexity, outcome-oriented curriculum design is sometimes seen as counter constructivism (Dalsgaard, 2006) and is rarely studied (Pang, Ho, & Man, 2009).

Need for guidelines on appropriate social software selection. While social software offers alternative ways to conceptualize and structure collaborative learning experiences, the use of social software in educational settings may not be always pedagogically sound or effective (Dron, 2007) and further research is warranted (MacDonald, 2008). Guidelines for the selection and use of social software for education are hard to find. Some have argued that a discussion of the educational value of different tools should start from a pedagogical standpoint (Anderson, 2005; Dalsgaard, 2006).

No matter what kinds of cutting-edge technologies are available, instructors should keep students' learning in mind. Fein and Logan (2003) state that "Bells and whistles are nice, but successful student interaction through reliable servers with near 100 percent uptime, easy-to-use applications, and fluid course navigation are much more important" (p.47). Therefore, meaningful use of technology for pedagogical purposes needs to be stressed in instructional design. Further research is needed to understand how technologies can best be incorporated into online learning to enhance instruction and learning outcomes (Beldarrain, 2006; Stodel, Thompson, & MacDonald, 2006).

Need for digital literacy development in digital natives. There are two notable schools of thought on digital natives' willingness and readiness to learn with social software in higher education settings.

Oblinger and Oblinger (2005) declared that digital natives, the first generations to grow up surrounded by digital media, have reached the age of enrolment in higher education in many Organisation for Economic Co-operation and Development (OECD) countries. Most of them carry a cellular phone, an MP3 player, have a personal computer connected to the Internet, and spend more time on the Internet than watching television or reading books (Oblinger & Oblinger; Tapscott, 1999). These young peoples' brains and thought processes develop differently when compared to the adults of previous generations (Prensky, 2001a, 2001b). They prefer to receive information quickly, are adept at processing information rapidly in a non-linear way and they often multitask. They have a low tolerance for lectures, prefer active rather than passive learning, and rely heavily on communication technologies to carry out social, educational and professional interactions (Frاند, 2000; Oblinger, 2003; Prensky, 2001b). Because digital natives have been immersed in technology in their daily lives, they are willing and ready to learn with technology in higher education settings (Prensky, 2009; Tapscott). On the contrary, some researchers are concerned about the ubiquitous use of the Internet and its impact on learning. They argued that based on the theory of neuroplasticity, people's brain is trained to deal with constant attention shifts/disruptions on the Internet today, therefore becomes lack of the concentration that is required for deep learning (Carr, 2010).

In recent years, the concept of digital natives has been under scrutiny by many researchers (e.g. Arinto, 2013; Bennett, Maton, & Kervin, 2008; Brown & Czerniewicz, 2010; Helsper & Eynon, 2010; Kennedy, Judd, Churchward, Gray, & Krause, 2008). For instance, these researchers argue that there is no empirical evidence to suggest that the brain structure is different between

adults and those who use the Internet and other technologies frequently. These researchers also assert that it is not appropriate to uniformly describe young people of today as the Net Generation. Rather, young people should be identified more individualistically by considering factors such as the availability of technology and breadth of use, prior experience, self-efficacy and education.

To demonstrate misconceptions that all of today's learners are confident users of Web 2.0, recent studies have consistently shown that higher education students do not actively engage in content creation with social software tools such as creating websites, keeping blogs or contributing to wikis (Bennett & Maton, 2010; Jones, Ramanau, Cross, & Healing, 2010; Kennedy et al., 2008, Ng, 2012). These researchers discovered that while the majority of students in the study were familiar with these tools, many have not used them for educational purposes to produce content online, and most lack the skills and strategies to use them for learning. For these reasons educators should not assume digital natives are competent with these technologies because in most cases they should be taught digital literacy (Ng).

In short, although it is evident that educators need their finger on the pulse of the growing number of social software applications in order to design and deliver effective e-learning (Goodyear, 2001; Jonassen, 2000, 2003; MacDonald & Thompson, 2005; Tham & Werner, 2005), there remains little formal research to assist educators on the integration of multiple social software tools in higher education (Laru, Näykki, & Järvelä, 2012; Uzunboylu, Bicen, & Cavus, 2011; Wheeler, 2009). Crook (2008) and Meyer (2010) promote the need for more empirical research on the educational use of social software, its adoption and its impact.

Purpose of the Study

The purpose of this study is to investigate how social software can be used to enrich an e-learning course using outcome-based instructional design (Biggs, Kember, & Leung, 2001; Brandt, 1993; Pang et al., 2009; Towers, 1994). There are three key aspects to the research, the first is to

explore how social software can be used to enrich e-learning activities that are informed by expected learning outcomes and the second is to understand learners' level of participation in and experiences with, social software enriched learning activities. The third aspect is to understand how learning outcomes are impacted by the use of social software and the instructional intent (e.g., digital literacy development).

Research Questions

1. In what ways can outcome-based instructional design be used to incorporate social software in e-learning?
2. In what ways does the use of social software affect learners' level of participation?
3. How does outcome-based instructional design impact learners' learning outcomes?
 - 3.1. To what extent do the learners' reactions to the learning experiences of enriched learning activities coincide with the instructional intent?
 - 3.2. To what extent do the learners' newly acquired knowledge and skills coincide with the instructional intent?
 - 3.3. What unexpected or unique learning outcomes do learners experience?
 - 3.4. How, if at all, are the learners (pre-service teachers) able to apply new knowledge and skills to their teaching practice?
 - 3.5. In what ways does the use of social software impact the learners' achievement of the learning outcomes?

Rationale

The aim of this research is to provide a tested instructional design model informed by theory, practical guidelines, and research findings on the pedagogical use of social software. The end goal is to extend the tools that educators and instructional designers have available to help them integrate social software in higher education programming.

Instructional strategies should facilitate the achievement of learning outcomes (Siber & Foshay, 2010). The researcher is of the view that collaborative learning supported by social software may be useful to explore insights into the relationship among instructional design strategies, social software assisted activities, learning experiences, and learning outcomes.

Outcome-based instructional design, derived from outcome-oriented curriculum design is a process of ensuring that content, delivery, activities, and assessments are aligned to help learners achieve the intended learning outcomes (Biggs, Kember, & Leung, 2001; Brandt, 1993; Pang et al., 2009; Towers, 1994). This study on an outcome-based instructional approach provides an opportunity to test the effectiveness and reveal some directions to further our understanding in the pedagogical use of social software.

In addition, high quality online activities that foster meaningful interactions and learning outcomes are desirable in higher education (Benard et al., 2009). As such outcome-based instructional design should be guided by established e-learning design and evaluation theories to ensure the validity and reliability of the study. The *W(e)Learn* framework (MacDonald et al., 2009) is deemed appropriate to guide the outcome-based instructional design process. It is a quality standard that evaluates the process and outcomes of an e-learning intervention, identifying stakeholders' (e.g., learners and design team) experiences and perspectives with the process, and the lessons learned. Results provide recommendations for future e-Learning initiatives.

Ultimately, it is expected that learners will benefit from the outcome-based instructional design by collaborating in high quality activities using social software and engaging in learning tasks that facilitate their learning.

Conceptual Framework

A conceptual framework (Figure 1.1) is used to explore in what ways the outcome-based instructional design can be used to incorporate social software in e-learning. This framework

comprises a number of key elements.

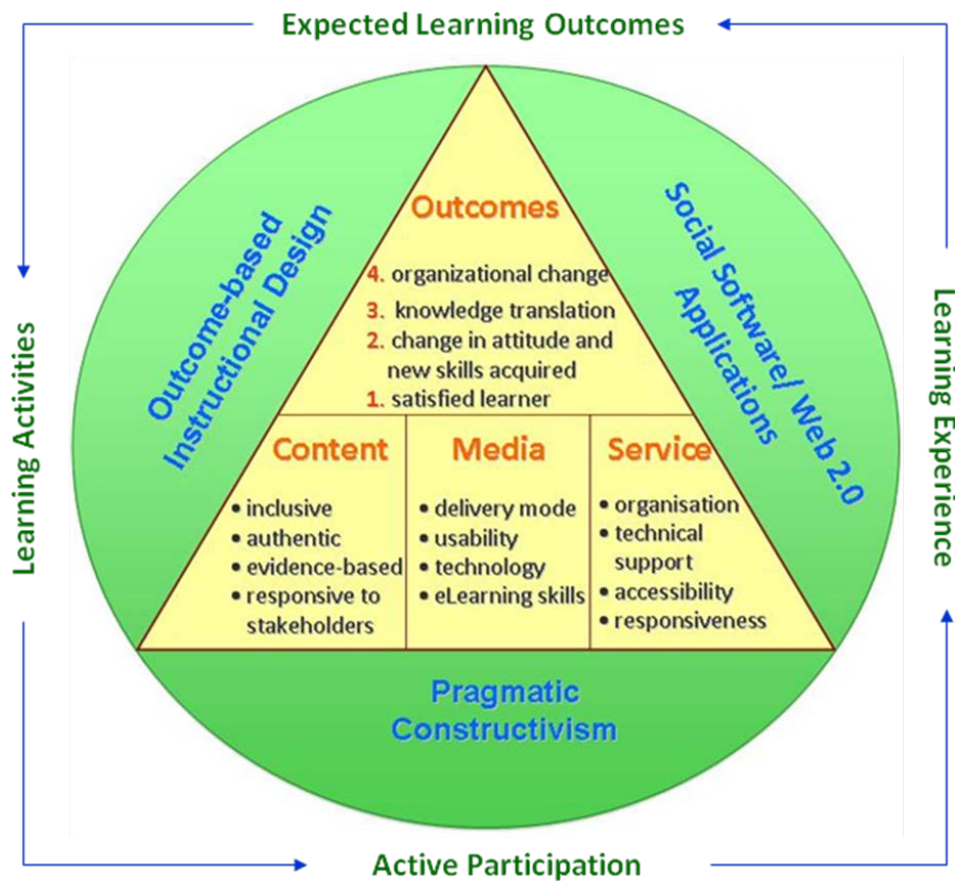


Figure 1.1. *Conceptual Framework for Outcome-Based Instructional Design (Version 1)*

The centre triangle illustrates the four constructs of the *W(e)Learn* framework (MacDonald et al., 2009), content, media, service, and outcomes that guide e-learning instructional design. In the circle, pragmatic constructivism approach is the epistemological basis of outcome-based instructional design, and social software is used to facilitate the achievement of the learning outcomes. Around the border, the expected learning outcomes inform the design of learning activities that encourage and are conducive to learners' active participation. Learners' experiences through their participation in the learning activities will contribute to the achievement of the expected learning outcomes.

The expected learning outcomes are at the heart of the outcome-based instructional design.

Technology varies and may change therefore it is an enabling factor that needs to be adjusted to serve the purpose of the instructional design.

The conceptual framework is design dependent and reflects the theoretical foundation as well as the research questions that are being explored through this study. Therefore the framework is being tested and may be subject to adjustments informed by the research results.

Assumptions by the Researcher

A number of assumptions are made in this study. First, the *W(e)Learn* framework is considered relevant to outcome-based instructional design and will be used to guide the enhancement and evaluation of the e-learning course in this study. Second, the creation and sharing of social objects contributes to social interaction that can lead to the achievement of learning outcomes. Third, it is assumed that learners will have different levels of information and technology literacy and varied perceptions about teaching and learning. This variability may provide the researcher with the insight of learning outcomes achieved by learners with different profiles. Fourth, in this study, it is assumed that the learners' reflections on using social software represent their true thoughts and learning. Finally, since the learners in this study are pre-service teachers, they will be able to assess the pedagogical value of using social software in their future teaching informed by their own experiences in the course.

Definitions of Terms

Collaborative editing. Google Docs is a service that allows individuals to create, store, and share files on a Google server to facilitate collaboration among users. Files can be edited online by up to 10 users at a time. A file is only visible to the owner if the owner shares it with a select group of people. Google Docs can be easily used by anyone who understands desktop applications (Gerber, 2010).

Instructional design. Instructional design is historically grounded in cognitive and behavioural psychology and is “a system of procedures for developing education and training programs in a consistent and reliable fashion. Instructional design is a complex process that is creative, active and interactive” (Gustafson & Branch, 2002, p.17). The instructional design process covers “the various aspects of sequencing and organizing the content, specifying learning activities, and deciding how to deliver the content and activities” (Dick, Carey, & Carey, 2001, p.184).

Instructional designer. An instructional designer is the person who “has the primary responsibility of ensuring that the instruction is designed, developed, and produced in a systematic manner that will consistently produce efficient and effective learning” (Morrison, Ross, & Kemp, 2004, p.344). In e-learning context, an instructional designer incorporates educational technology and “approaches learning from a collaborative approach, provides learners opportunities to actively practice what they are learning” (Archibald, 2011, p.15).

Learning experience – Learning experiences have two dimensions: process and outcome. In a quality learning experience, learners are actively engaged in their own learning process with high levels of energy and interact with the learning environment. The process leads to outcomes that have significant and lasting change and will, potentially, have an impact on the value of learners’ lives (Feuerstei & Feuerstei, 1999; Fink, 2003). Specifically, in this study, five interrelated dimensions are seen to contribute to a high quality e-learning experience: structure, content, media, service, and outcomes (MacDonald et al., 2009).

Learning outcomes – Learning outcomes are an instructor’s expectation for what all learners should know, be able to do, or value upon completing an educational experience (Acharya 2003; Boettcher, 2007; Littlewood, 2009). Learning outcomes are learning intentions closely linked to the learning and assessment process and can be regarded as changes demonstrated by a person as

a result of an education experience (Harden, 2002; UK Quality Assurance Agency for Higher Education 2007; Watson, 2002).

Mixed methods research. “Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative view points, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration”. (Johnson, Onwuegbuzie, & Truner, 2007, p.123)

Online collaborative learning – Distance learners who previously have had little contact with other learners can now take part in discussion forums and group activities. Course management systems such as Blackboard Vista incorporate tools for synchronous and asynchronous online communication and learner presentations (Roberts, 2004). In recent years, social software applications have been more frequently used by educators to enhance online collaboration.

Outcome-based instructional design. Outcome-based instructional design is a process concerned with curriculum design that ensures that the content, delivery, activities, and assessments align to help learners achieve the intended learning outcomes (Pang, et al., 2009).

Pedagogy. Pedagogy refers to the profession, art, science, theory, principles, or methods of education, instruction, and teaching.

Social bookmarking. Social bookmarking is a method for Internet users to store, organize, search, and manage bookmarks of Web pages on the Internet with the help of metadata or tagging. In a social bookmarking/networking system (e.g., Facebook, Digg, Del.icio.us, Furl), users save links to Web pages that they want to remember and/or share.

Social objects. Social objects refer to objects created by an individual or a group of individuals that are shared on a social network (e.g., a group project put online, a video clip uploaded to YouTube, a portfolio shared on a social networking site). In this study, the term refers

to learning products that are collaboratively produced by the learners.

Social Software. Social software are Web 2.0 applications that allow individuals to interact and collaborate with each other online (Anderson, 2005; Beldarrain, 2006; Mejias, 2006). A few of the more common examples of social software include social-networking sites (e.g., Facebook, LinkedIn), wikis (e.g., Wikipedia, PB Wiki), blogs (e.g., Wordpress, Blogger), social bookmarking (e.g., Del.icio.us, Furl), grassroots video sharing (e.g., YouTube, TeacherTube), and microblogging (e.g., Twitter, Tumbler).

W(e)Learn framework. *W(e)Learn* is an e-learning framework that outlines four critical dimensions of online education—structure, content, media, and service—and is grounded in socioconstructivist theories and interprofessionalism. *W(e)Learn* is intended to elicit four levels of outcomes: Level 1: learners have a positive reaction to the learning experience; Level 2: learners modify their attitudes and perceptions with regards to learning and/or learners acquire new knowledge and skills; Level 3: learners experience a behavioural change that involves the application of newly acquired knowledge and skills in their practice; and Level 4: organizational change occurs as a result of learners' application and transfer of knowledge in professional settings (Macdonald et al., 2009).

Outline of the Remaining Chapters

Chapter 2 Literature Review. Literature Review contains the review of instructional design frameworks, characteristics of higher education learners, learning outcomes, social software and their collaborative features.

Chapter 3 Methodology. In this chapter, the methodology, justification, procedure and considerations for a sequential explanatory mixed methods case study are outlined. The justification includes a discussion on the pragmatism paradigm as it relates to a mixed methods approach.

Procedures and instruments used for data collection are outlined, including a detailed description of

the outcome-based instructional design process. Qualitative and quantitative data analysis and integration are discussed. Considerations of the ethics, minimizing researcher bias, and the validity, reliability and trustworthiness concluded the chapter.

Chapter 4 Findings. In this chapter, findings from the researcher journal about the challenges during the instructional design process are outlined. Quantitative data on learners' demographics, reactions to their learning experiences such as satisfaction, and overall learning outcomes are presented. Qualitative findings on learners' knowledge, skills, attitude, and application related to social software are also described with the participants' voice. Finally, the integrated qualitative and quantitative data answer the research question.

Chapter 5 Discussion, Implication, and Conclusion. In this final chapter, confirmation and discrepancies of instructional intent and the actually achieved learning outcomes informed by both quantitative and qualitative data are discussed. Revisions to the outcome-based instructional design strategies are proposed. A revised conceptual framework is presented that applies the results of this study. Finally, contributions, strengths, limitations, and directions for future studies conclude the dissertation.

CHAPTER 2

REVIEW OF LITERATURE

The review of literature contains five sections. Section one is a philosophical discussion about constructivism as a theoretical approach for outcome-based instructional design. Section two describes *W(e)Learn* (MacDonald et al., 2009), a framework to guide the instructional design of e-learning and its evaluation. Section three is a review of learning outcomes followed by section four, a synopsis of digital natives as adult learners. Section five, first presents an overview of Web 2.0 tools, and then concludes the review of literature by suggesting how social software can facilitate collaborative learning.

Constructivism

Constructivism and knowledge. Constructivism implies that knowledge is the perception and meaning an individual establishes through interactions within their milieu and as a result of active collaboration with others through intellectual engagement, inquiry, and authentic problem-solving (Abdal-Haqq, 1998; Brookfield, 1995). Within the constructivist paradigm there is no single reality (Grenfell, 2006; Merriam, Cafarella, & Baumgartner, 2007; Palincsar, 1998). Knowledge is dependent on context and perspective and is fundamentally an unordered web of connections that are both plural and local. Guba and Lincoln (2005) wrote that truth is not universally known but is determined by the members of the learning community who may come to agree on truth through negotiation. Truth is not fixed but is subject to historical conditions and community values. For meaning to be generated, individuals draw from what is already learned when they engage with new ideas, events and activities (Dewey, 1916; Pickford & Dixon, 2004; Schön, 1983). Knowledge is seen to be contextualized, particular, temporal, relational, multiple, and plural (Clendinneng, 2010; Dewey, 1900; Grenfell, 2006). These fundamental beliefs hold true across social and pragmatic constructivism.

Constructivism and instructional practice. Constructivism is at once a philosophy of education, an orientation toward curricular design, a pedagogical strategy, and a description of how individual psychology operates (O'Donnell, 2011). Constructivism emphasizes learners' active engagement in the generation of knowledge; as such many authors consider the use of social software applications in line with constructivist theory (Grenfell, 2006; Marsh & Ketterer, 2005; Minocha, 2009; O'Donnell). Learners are encouraged and supported to think critically and reflectively on knowledge they perceive to be useful and actionable (Guba & Lincoln, 2005; Honebein, 1996; Klages, 2001; Marsh & Ketterer; Simpson, Leonard, Ballenger, & Coleman, 2010).

Research has shown that taking a constructivist approach to online learning and educational technology is valuable because of the potential to enhance the experience for both learner and educator (Huang, 2002; Petraglia, 1998). Through online mechanisms learners can search for and then construct their own knowledge; therefore the Web becomes a common tool for constructivist learning (Huang). The implications of constructivism for instructional practice include the use of authentic, meaningful tasks, the engagement in social participation with discourse mediating the relationship between the individual and the social context, the availability of scaffolding, and the use of tools to support cognitively complex activity (O'Donnell, 2011).

Social constructivism. Social constructivists view social interaction as a key mechanism for learning and believe that collaborative learning can generate more learning success than individuals studying alone (Green & Gredler, 2002; Mayer, 1996; Moshman, 1982; O'Donnell, 2011; Palincsar, 1998). Some constructivists also see social constructivism as a variation of dialectical constructivism (O'Donnell) which perceives that knowledge has a social component and is acquired through an interactive process based on dialogue with self, others, and text.

Within the broad continuum of constructivist learning theory, social constructivism is considered most closely associated with Vygotsky who introduced the social aspect of constructivist

theory by suggesting that learners create meaning through interactions with each other and their environment (Loyens, Rikers, & Schmidt, 2006). It is believed that simply explaining one's thinking to another can lead to deeper cognitive processing and learning. Vygotsky (1978) described actual and potential levels of individual development that are essential to social constructivism. The "actual level" is the development level that has already been achieved by the learner who is capable of independent problem solving. The "potential level", according to Vygotsky, is the zone of proximal development (ZPD) where actual learning occurs. At this level the learner is capable of solving problems and understanding material through social interactions (guidance, collaboration and so on) with teachers or more advanced learners. The learner "internalizes" these social interactions overtime and becomes capable of solving the problem independently without external assistance (Loyens et al., 2006; Tan, Amin, & Khoo, 2007).

Vygotsky (1978) proposed that social interaction takes place in a learning context where knowledge is socially constructed and is tied to a specific time and place. The goal of social interaction is to construct and reconstruct meaning, knowledge, and context through discourse communities (Green & Gredler, 2002). Grenfell (2006), Tan and Hung (2002), and Wenger (1999) echoed the importance of social interaction in learning and introduced the concept of communities of practice. Brooks and Brooks (1999) added that constructivism celebrates multiplicity, variation, alternatives, and difference, all qualities that are inherent in collaborative learning.

The social constructivist view of learning involves developing knowledge, contrasting understanding with others' understanding, and refining knowledge as new understanding is gained. Knowledge is not absolute but is contextually situated and constructed through previous knowledge and experience (Guba & Lincoln, 2005). As such a social constructivist instructional approach is characterized by encouraging and facilitating learner interactions with the environment, self-directed learning stimulated through cognitive conflict, knowledge formed through social

negotiation, and reflection on and evaluation of the viability of individual understandings (Archibald, 2011).

Pragmatic constructivism. Pragmatic constructivism, a derivation of social constructivism, was introduced for the purpose of incorporating web 2.0 technologies into instruction (Karagiorgi & Symeou, 2005). Pragmatic constructivists share social constructivists' view that meaning is socially constructed, that social interactions play an essential role in constructing knowledge, and that knowledge is unique to each learner as a result of these interactions (Bandura, 1977; Bruner, 1996; Jonassen, Marra, & Palmer, 2002; Kirshner & Whitson, 1997; Lave & Wenger, 1991; MacDonald et al., 2009; Von Glasersfeld, 2003; Vygotsky, 1978).

Karagiorgi and Symeou (2005) described three basic tenets of pragmatic constructivism: (1) learners construct meaning by active intellectual engagement, inquiry, and problem-solving in collaboration with others, (2) moderate constructivist assumptions are more compatible with instructional design practices for flexible application, and (3) rich constructivist environments can be facilitated by emerging social technologies. Together, these three principles form the pragmatic constructivism perspective that acknowledges individual knowledge construction and social collaboration while allowing the application of pedagogical strategies and technologies to respond to the social learning requirements in the 2.0 era. From this perspective, the collaborative environment is seen to foster relevant and meaningful learning. Individual learners are recognized and supported, multiple perspectives are shared, and misconceptions are diagnosed. Pedagogical strategies and technologies can support the development of such a learning environment—where the activities serve as a means to an end (i.e., knowledge, skill, and attitude development) (Cho, 2002; Garrison, 2003; Garrison & Archer, 2000; Grabinger & Dunlap, 2002; Kanuka & Garrison, 2004; MacDonald & Thompson, 2005; Peters & Gray, 2005). Moreover, measures to guide such knowledge construction are supplied (Karagiorgi & Symeou; Savery & Duffy, 1996).

Currently, there is an ongoing debate surrounding the compatibility of constructivism and the use of pre-defined learning outcomes in instructional design. With the constructivist view that knowledge is individually constructed, some have argued that learning outcomes cannot be predicted. Instead, they argue that learning outcomes should be negotiated and learners gain naturally from being engaged in authentic tasks (Bang & Dalsgaard, 2006; Jonassen, 1994; Jonassen, Peck, & Wilson, 1999; Killen, 2000). Further, it has been argued that guiding learners in their knowledge construction, rather than exerting overly emphasized control, will make learning more effective (O'Donnell, 2000; Perkins, 1999). Conversely, pragmatic constructivism recognizes the need for better defined learning outcomes prior to learning and takes the emergence of collaborative learning environments and social technologies into consideration to facilitate more effective construction of knowledge (Karagiorgi & Symeou, 2005).

Connectivism as an emerging theory. Siemens (2004) put forward a theory termed connectivism, which addresses a number of issues such as organizational learning and technology support for learning and knowledge. Siemens (2005, 2007) and Downes (2007) argued that learning is the process of building networks of information, contacts, and resources that are applied to real problems. Connectivism assumes the ubiquity of networked connections between people, digital artifacts, and content (Anderson & Dron, 2011).

There are many notable similarities and differences between connectivism and constructivism. For example, Siemens (2005) stated that learning is now happening “through communities of practice, personal networks, and through completion of work-related tasks” in an environment in which “know-how and know-what is being supplemented with know-where (the understanding of where to find knowledge needed)” (p. 4). This shares the philosophy of social constructivism that suggests knowledge is constructed through social interactions that take place in communities of practice. Both constructivists and connectivists adopt the view that social software

can facilitate learning. Constructivists maintain flexibility in the degree to which social software is used in learning whereas connectivists depend on networked technologies to enable learning. Constructivism relies on semi-structured negotiation and mediation to scaffold the learner from one state of knowledge to the next (Anderson & Dron, 2011), whereas connectivism promotes openness and self-organization (de Waard et al., 2011) - a learning structure that is not optimal for achieving learning goals (Anderson & Dron). According to constructivism, while learning involves social interaction within an external context, learning resides in human beings. However, connectivism suggests that learning may reside in both the human being and non-human appliance, such as a server on the Internet (Siemens, 2005).

A recent phenomenon of Massive Open Online Courses (MOOCs) has brought its underpinning theory, connectivism, in to the spotlight. A MOOC is an online course offered with free and open registration, a publicly-shared curriculum, and open-ended outcomes; enabled by social networking, and accessible online resources; facilitated by leading practitioners; and participated in by a large volume of learners who organize their own participation (McAuley, Stewart, Siemens, & Cormier, 2010). This open model of participation challenges traditional notions of the ways in which value is created in the education system (McAuley et al.). Emergent technologies provide different models and structures to support learning thus disrupting the notion that learning should be controlled by educators and educational institutions (Kop, Fournier, & Mak, 2011).

While connectivism has gained attention recently, its distributed nature and inherent fuzziness of learning outcomes, beginnings, and endings often fit poorly within a context in which students are taking more formal and traditional courses (Anderson & Dron, 2011; Carr, 2010; Surowiecki, 2005). In addition, Siemens (2011) acknowledged the lack of accreditation in MOOCs using the connectivist approach. The underlying trust mechanism in formal education systems on

which accreditation is based cannot yet be duplicated in open spaces.

In summary, for the purpose of this study, using social software to enhance e-learning is better supported by pragmatic constructivism, as it shares social constructivist instructional practices of integrating social technologies to learning process, and recognizes the need for better defined learning outcome to facilitate more effective construction of knowledge (Karagiorgi & Symeou, 2005).

The *W(e)Learn* Framework

The *W(e)Learn* framework (MacDonald et al., 2009) outlines four critical dimensions of online education: structure, content, media, and service and is grounded in socioconstructivist theories and interprofessionalism (see Figure 2.1). *W(e)Learn* draws on the knowledge and experience of educators, academics, professionals, and industry and reflects expertise in curriculum design, psychopedagogy, e-learning, and evaluation methods.

History of *W(e)Learn*. The *W(e)Learn* framework was originated from the Demand Driven Learning Model (DDLIM) (MacDonald, Stodel, Farres, Breithaupt, & Gabriel, 2001) and the DDLIM companion evaluation tool (MacDonald, Breithaupt, Stodel, Farres, & Gabriel, 2002) as a quality standard to evaluate the process and outcomes of a program, gain an understanding of stakeholders' (e.g., learners, designers) experiences and perspectives with the process, and identify the lessons learned in order to provide recommendations for future e-learning initiatives.

DDLIM demonstrates that carefully designed educational programs with the appropriate blend of factors can help achieve desired outcomes and act as a mechanism for managing complex social systems (McDonald & Kay, 2006).

W(e)Learn is intended to elicit four levels of outcome: Level 1: learners have a positive reaction to the learning experience; Level 2: learners modify their attitudes and perceptions with regards to learning and/or learners acquire new knowledge and skills; Level 3: learners experience a

behavioural change that involves the application of newly acquired knowledge and skills in their practice; and Level 4: organizational change occurs as a result of learners' application and transfer of knowledge in professional settings. MacDonald et al. (2009) evaluate educational outcomes in *W(e)Learn* in accordance with a framework advanced by Barr et al. (2005) whose work builds on that of Kirkpatrick (1967).

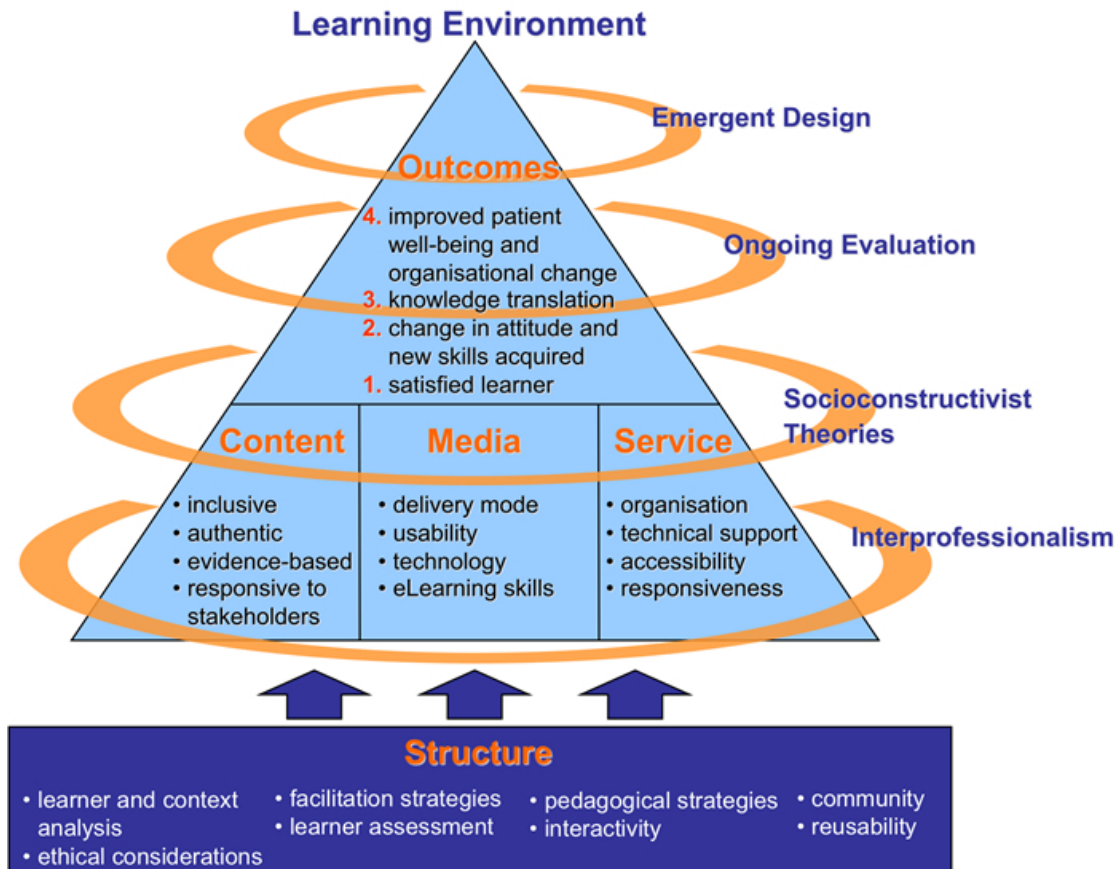


Figure 2.1. *The W(e)Learn framework (MacDonald, Stodel, Thompson, & Casimiro, 2009).*

Since publication, *W(e)Learn* has been used in numerous studies (Archibald, MacDonald, & Trumpower, 2011, July; Halabisky et al., 2010; Kellam, MacDonald, Archibald, & Puddester, in press; MacDonald, Archibald, Trumpower, Casimiro, Cragg, & Jelley, 2010; Puddester, MacDonald, Archibald, Sun, & Stodel, 2010; Pullen, 2012). The *W(e)Learn* framework and tools have been used to develop and evaluate numerous programs. For example, in Canada, they have been used in provincial-level e-learning programs including ePhysician Health (<http://ephysicianhealth.com>) and

eWorkplace Health (<http://eworkplacehealth.com>). In the United States, a team at the University of North Carolina at Chapel Hill has used the *W(e)Learn* toolkit over four sequential terms to implement an e-learning program on patient safety as part of the Agency for Healthcare Research and Quality (AHRQ) TeamSTEPPS initiative (<http://teamstepps.ahrq.gov>) (Pullen, 2012).

Application of *W(e)Learn*. The *W(e)Learn* framework supports collaborative online and blended learning. The “(e)” in brackets suggests that web technologies can potentially bridge approaches that integrate a strong focus on both collaboration and effective learning experiences. It acknowledges that different blends of factors (i.e., delivery modes, theories, pedagogical approaches, media, environments, and communication strategies) are necessary to meet the needs of various learners. Designed to be applicable regardless of the blend of these factors, *W(e)Learn*'s deliberate versatility makes it useful for developing online, blended, or face-to-face learning programs (Pullen, 2012).

Teaching and learning in *W(e)Learn* is grounded in a community orientation. Learning communities and communities of practice are two types of communities supported within *W(e)Learn*. In a virtual learning community, a group of learners comes together for a set period of time. It is marked by joint learning tasks and a sense of ‘we are in this together to accomplish something’. Through online interactions it is possible for an online learning community to become a community of practice – a group of people who learn together, have a common orientation to work (context, profession, skills and knowledge) and want to stay connected (MacDonald et al., 2009).

Constructivist learning theory is well-aligned with the principles of and evolving practices in e-learning design. Best practices in e-learning design can be supported by instructional design models and frameworks. The *W(e)Learn* Framework is one such instructional design tool that has been shown to support e-learning program implementation (Pullen, 2012).

Instructional design principles and *W(e)Learn*. Silber and Foshay (2010) assert that

instructional design is about principles, not frameworks or procedures. The authors are of the view that principles of instructional design free instructional design teams to implement learning solutions for students independent of a particular framework. The authors also outline a series of principles of instructional design that should be applied pragmatically, including:

- Clear goal must exist on what learners are expected to learn,
- Congruency must exist between learning goals, learning activities and assessments,
- Design decisions should be based on research and theory,
- Take time to analyze the learners who will take the course,
- Design lessons based on the principles of Attention Relevance Confidence and Satisfaction (ARCS),
- Activate the learner's prior knowledge on the subject and create authentic learning experiences that learners can translate to their work or professional lives,
- Include worked examples and guided practice for novice learners as well as support resources for more experienced learners (Clark & Mayer, 2010), and
- Assessments should evaluate learners' problem-solving skills and their ability to apply what they learned to authentic situations.

The principles resemble underpinnings of many instructional design frameworks or modules that aim to form a basis for instruction that promotes learning. As such, instructional design principles, frameworks and models should not be mutually exclusive and educators should recognize "there is no single best way to design instruction" (Morrison et al., 2004, p.13). Molenda (2010) asserted that instructional design processes provide the best option for the development and delivery of the highest quality educational solutions. Incorporating the principles into an instructional design process allows for the development of effective online programs while utilizing instructional resources to facilitate the achievement of expected learning outcomes for students

(Silber & Foshay, 2010). The *W(e)Learn* framework is sufficiently flexible to allow for incorporation of the above mentioned principles during the instructional design process.

Outcome-based instructional design and *W(e)Learn*. Outcome-based instructional design (see Figure 2.2) is concerned with curriculum design and ensuring that the content, delivery, activities, and assessments of an educational experience are all aligned to help learners achieve the intended learning outcomes (Biggs, Kember, & Leung, 2001; Pang et al., 2009). With this approach, learning outcomes are explicitly defined at the outset of the instructional design process and the learning experiences are specifically designed to support and assess these outcomes (Acharya 2003; Boettcher, 2007; Littlewood, 2009; Killen, 2000). Some have criticized this approach because the teaching is constrained by the desired outcomes (Killen). However, well-defined learning outcomes, learning activities, and learners' learning experiences have been found to be positively linked (Chan, Chew, & Cheung, 2004; Harmon & Lambrinos, 2007; Korkofingas & Macri, 2008; Palloff & Pratt, 2001; Pang et al.; Saadé, He, & Kira, 2007). Learning outcomes do not have to constrain learning and learning does not have to end when the learning outcomes are achieved. Instead, learning outcomes can provide direction for active participation in learning and the learners are encouraged to achieve and exceed predefined requirements (Killen).

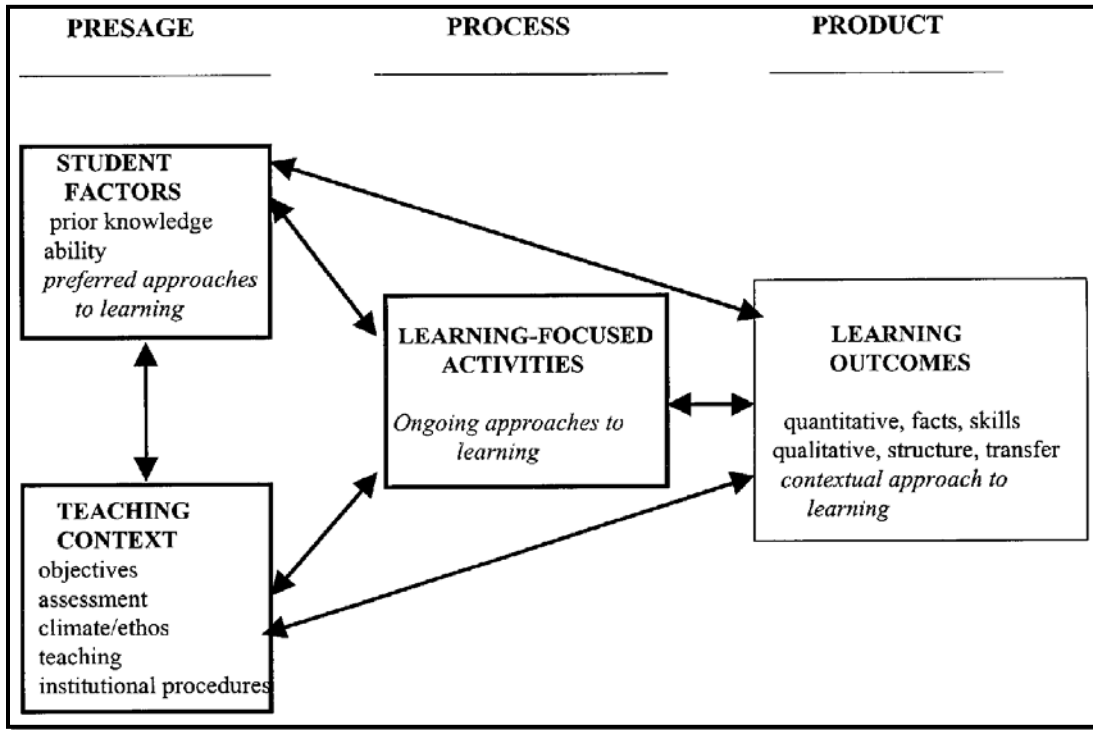


Figure 2.2. Outcome-based instructional design (Biggs, Kember, & Leung, 2001)

Since the outcome-based instructional design not only defines learning outcomes, but also requires tangible instructional components to align with the outcomes, further development on implementing the outcome-based instructional design approach is needed (Pang et al., 2009). The *W(e)Learn* Framework is grounded in social constructivist learning theories and has sophisticated and tested guidelines to support instructional design. The framework also provides well defined learning outcomes and their connection to instructional components. In addition, the *W(e)Learn* framework has embedded flexibility to guide the design and evaluation of learning programs (Pullen, 2012). The robust *W(e)Learn* framework was adopted to guide the outcome-based instructional design, development, delivery and evaluation in this study.

Learning Outcomes

Learning outcomes and learning objectives. There has been much discussion surrounding the differences between learning outcomes and learning objectives. Some have declared that learning outcomes should be precise statements that can be objectively assessed and used to specify

the minimum standard of performance acceptable (Hussey & Smith, 2002). Others have argued that learning outcomes are broad statements about what will be achieved and assessed at the end of a course of study, whereas learning objectives are specific statements indicating the intended achievements following a learning experience (Harden, 2002; Watson, 2002). Learning outcomes can be described as instructors' expectations for what all learners should know, be able to do, or value upon completing an educational experience (Acharya 2003; Boettcher, 2007; Littlewood, 2009). Learners should understand what they are expected to learn and apply themselves conscientiously to completing the educational experience (Academic Quality Initiative, 2008; Fabry, 2009; Killen, 2000). Goals and expected outcomes are unique to each context or activity (Farres & MacDonald, 2006). The degree to which individual learners achieve these outcomes will vary according to their ability and effort (Academic Quality Initiative). A detailed comparison of the differences between learning outcomes and learning objectives can be found in Appendix C.

While differences between the two terms exist, both "learning objectives" and "learning outcomes" describe educational intentions and the product of the educational endeavour. Learning outcomes are learning intentions closely linked to the learning and assessment process and can be regarded as the changes demonstrated by a person as a result of an educational experience (Harden, 2002; UK Quality Assurance Agency for Higher Education, 2007; Watson, 2002). In this light, the term "learning outcome" will be used in this study as it is aligned with the notion of outcome-based instructional design.

Expected and unexpected learning outcomes. Learning outcomes may be expected or unexpected. Expected learning outcomes describe knowledge, abilities, or values that learners should possess upon completing an educational experience (Academic Quality Initiative, 2008). Unexpected learning outcomes are usually not anticipated and hold unique meaning to individual learners (Academic Quality Initiative; Killen, 2000). Studies examining unexpected learning

outcomes are rare. Capturing unexpected learning outcomes may help educators acquire a better understanding of this phenomenon.

Social objects as learning outcome. Researchers have argued that learners should be actively creating rather than consuming knowledge (Collis & Moonen, 2001; Grabinger & Dunlap, 2002). Positive experiences are gained when learners take on tasks of creating learning portals and learning objects with each other (Anderson & Wark, 2004; Palloff & Pratt, 1999).

“Social object” is a relatively new term in the Web 2.0 phenomena. It refers to an object created by an individual or a collaborative effort that is shared on a social network. User-focused principles such as user-generated content and the architecture of participation are core to Web2.0 (O’Reilly, 2005). Researchers have recognized that “artifacts” collaboratively created by learners embody knowledge and learning (Anderson, 2007; Anderson & Dron, 2011; Simons, 2011). These artifacts share commonalities with social objects.

Engeström (1999, 2005) deemed the notion of bringing people together via social networks as an inadequate interpretation of the core principles of Web 2.0. Our cognition is not confined within, rather it involves the processing of information that occurs from our interactions with the environment and the artifacts within it (Hutchins, 1995; Siemens, 2009). In this respect, our cognition is distributed between us and the digital environment, as well as the emerging technological tools associated with it (Perkins, 1993; Salomon, 1993). Engeström advocated approaching social networking based on the notion of shared objects that mediate the connection between people on a social network.

Collis and Moonen (2001) suggested that a pedagogy that enables learners to collaboratively create and share projects and ideas would allow learners to collaborate in an e-learning context and contribute to the content of the course. In this way, a collection of learners’ work can be used as a repository of knowledge by new learners. This approach is aligned with the notion of collective

intelligence (Hofstadter, 1979; Lévy, 1994; O'Reilly, 2005). Creating online resources (e.g., social objects) as learning activities provides a richer and more connected model of learning that often permits learners to stay connected to a community even after completing a course or program (Siemens & Tittenberger, 2009).

Requirements for participants to produce online resources and share opinions represent a stance of participative pedagogy that facilitates a process- rather than product -based model for learning (McAuley et al., 2010). Some have argued that the value of a social object or an artifact lies not only with the object itself, but also with the conversations that happen around it, as well as the value and the unspoken effort that comes with it (Anderson, 2007; Anderson & Dron, 2011; Conole et al., 2008; Simons, 2011). Social objects as learning outcomes therefore not only provide tangible learning products but may also provide insight into the learning process itself and the non-tangible learning outcomes that are associated with it.

Digital literacy as learning outcome. In the era of Web 2.0, individuals require new skills and mindsets to participate in an information-rich and participative environment. The information acquisition is seen as less important than people's capacity to learn (Siemens, 2009). A United Nations Educational, Scientific and Cultural Organization (UNESCO) report pointed out that digital literacy is an important aspect of learning capacity (Catts & Lau, 2008). Lorenzo and Dziuban (2006) argued that sound digital skills would assist learners to effectively find, evaluate, and create information.

Literacy in association with new technology in education has been similarly marked by terminological shifts: 'electronic literacy' (Warschauer, 1999), 'silicon literacy' (Snyder, 2002), 'e-literacy' (Martin 2003) and 'techno-literacy' (Lankshear, Snyder, & Green, 2000). Most recently the literature has converged on 'digital' (Gillen & Barton, 2010; Lankshear & Knobel, 2008; Martin, 2008; Martin & Madigan, 2006; Martin & Grudziecki, 2007), which is actually a predecessor term

in this field (Goodfellow, 2011).

The definition of digital literacy has been under debate. Martin and Grudziecki (2007) introduced a digital literacy system which included three levels. Level one is digital competence that encompasses skill levels from basic visual recognition and manual skills to more critical, evaluative and conceptual approaches, and also includes attitudes and awareness (Martin & Grudziecki, 2007). The second level is that of digital usage. Individuals apply digital competence within specific professional or domain contexts and become part of the culture of communities of practice (Wenger, Trayner, & de Laat, 2011). The third level, digital transformation is achieved when the digital usages which have been developed enable innovation and creativity, and stimulate significant change within the professional or knowledge domain. This change could happen at the individual level, or at that of the group or organisation. Goodfellow (2011) argued that Martin and Grudziecki's digital literacy focuses on a convergence of competencies in the individual learner whereas the roles of the communities of practice are obscure.

Balshaw (2012) introduced a digital literacy with a broader scope: Literacy involves the mastery of simple cognitive and practical skills. To be 'literate' is only meaningful within a social context and involves having access to the cultural, economic and political structures of a society. The New London Group (2000) also argued that literacy is embedded in and develops out of the social practices of a culture. In addition to providing the means and skills to deal with written texts, literacies bring about a transformation in human thinking capacities. This intellectual empowerment happens as a result of new cognitive tools (e.g. writing) or technical instruments (e.g. digital technologies). A narrower definition indicates that "Digital literacy is the ability to effectively and critically navigate, evaluate and create information using a range of digital technologies" (Wikipedia, 2013). This ability is believed to be associated with learning how to effectively find, use, summarize, evaluate, create, and communicate information while using digital technologies.

Since early 2000's, some educators and advocates have been claiming that the incoming post-secondary learners are "digital natives" representing the "Net Generation" who are "raised on and immersed in new technologies" (Tapscott, 1999, p.11), they think differently and learn differently, they are naturally digital savvy and readily use the technologies at hand for learning and information creation, therefore they need to be taught differently (Kennedy et al., 2008; Prensky, 2001a, 2001b, 2009; Tapscott, 2008). However, recent studies examining how postsecondary learners use the Internet and social software reveal that only a small percentage of postsecondary learners generate information online and not all are ready to use these technologies for academic learning (Fitzgerald et al., 2009; Jones et al., 2010; Jones & Shao, 2011; Selwyn, 2008). The findings suggest there is a discrepancy between some educators' assumptions and the digital literacy levels in postsecondary learners.

For the current generation of students, a lot of their digital capabilities, in particular the use of social media, have been gained informally when they explore these technologies themselves or with peers. There is a role for educators to expand their horizon in the use of digital technologies for educational purposes in formal settings (Ng, 2012). Effective use of Web 2.0 might also be considered a required competence for the contemporary world, and a 'lifelong, life-wide' set of skills that weaken boundaries between formal and informal learning (Dohn, 2009; Bennett et al., 2012). Individuals who have the intention and competency in using these applications can benefit from Web 2.0 (Greenhow, Robelia, & Hughes, 2009; Huang, Hood, & Yoo, 2013).

Despite the increasing importance of digital literacy as one of the key skills in every discipline and profession, training in such skills and techniques is rare in any discipline, and especially rare in teacher education programs. As educators begin to realize that they are limiting their learners by not helping them develop and use digital literacy skills across the curriculum, the lack of formal training is being offset by professional development and informal learning. However,

we are far from seeing digital literacy as a formally defined learning outcome and, as technology continues to evolve, digital literacy must be less about the tools and more about ways of thinking and seeing (The New Media Consortium, 2010).

A collaborative learning environment enables learners to build tolerance, strong problem-solving and communication skills, networking capacity, leadership abilities, and initiative; all skills that are desired in the modern workplace and in community life (Alen & Duch, 1998; Barker, Niemi, & Chung, 2008; Smith & MacGregor, 1992). In the Web 2.0 era, the development of these skills is inevitably linked to the use of social software. Bisoux (2008) suggested that learners should be encouraged to recognize that their prior experiences with social software can contribute to their academic learning and future professional lives. Further, educators should provide opportunities for learners to use social software for academic learning.

The ability to work with current digital tools to connect fragmented, diffuse, and distributed knowledge nodes, and develop and present one's personal knowledge through a coherent reflection or contribution, represents a high-level of digital literacy (McAuley et al., 2010). In applying Sweller's (1988, 2005) cognitive load theory for learning, a high level of digital literacy can help alleviate cognitive load that is often associated with the use of technology, hence freeing the working memory of the mind to focus on the tasks at hand and content to be learnt rather than on the technology (Ng, 2012).

Without a doubt, teamwork, community-building, problem-solving, communication, and leadership skills are valuable learning outcomes (Smith & MacGregor; Uden & Beaumont, 2006). In the same way, digital literacy skills are also legitimate learning outcomes. To make learning relevant, the development of digital literacy should be embedded within subject matter learning.

Reflection as evidence of learning outcome. Reflection employs learners' higher level cognitive skills to frame learning experiences into usable real-life applications (Loughran, 2002;

Wills & Clerkin, 2009). Reflection was introduced by Schön (1991, 1996) as a two-staged pedagogy that includes reflection-in-action, which occurs while an event is in process, and reflection-on-action, which occurs after an event is consciously undertaken. In education practice, reflection is commonly used as a means for teachers to establish relevant connections between concept and practice (Amundsen & Wilson, 2012; Oner & Adadan, 2011).

Critical reflection features strongly in professional development and adult education literature (Brookfield 1987; Mezirow 1981; Smith, 2011) where the approach is to encourage individuals to take a critical attitude to their own work and to position themselves in relation to the ideas and practices they encounter (Leach, Neutze, & Zepke, 2001; Smith). Meaningful experience leading to personal growth is dependent on the ability to critically analyze the consequences of actions taken with the intention of improving future performance (Clendinneng, 2010; Fanning & Gaba, 2007). Development occurs when the learner reflects on personal experience, finds it to be inadequate in some way, mediates personal values, beliefs, and assumptions resulting in a new perspective; one that is more open, inclusive and discriminating (Clendinneng; Merriam, 2004; Sutinen, 2007). In a learning environment that uses social software, assessment of learning development combines reflections, critical comments, learning objects and resources, and other digital artifacts of knowledge creation, dissemination, and problem solving (Anderson & Dron, 2011).

Today, many social activities are not formally or directly graded in higher education settings. However, instructors could find evidence of students' learning progress by reviewing their reflections on what they have gained through networked learning (Chen & Bryer, 2012). While continuing development of social networking and other collaborative tools and increased opportunities for interaction will require new ways to measure academic progress in real time, reflection can still be used as evidence of learning outcomes in the current attempts of incorporating

social software into learning (Chen & Bryer).

Digital Natives as Adult Learners

Currently, there are popular claims that the learners entering higher education institutions are digital natives who use social software on a daily basis, and have brains “wired” differently and subsequently they learn differently from previous generations (Prensky, 2001). Other researchers argue that such claims lack empirical evidence, and believe that university learners share common characteristics as adult learners (Bennett et al., 2012; Pedró, 2009).

Characteristics of adult learners. There is no unified theory of adult learning but a number of researchers and theories attempt to identify the unique attributes of adult learners and describe the many dimensions of learning in adulthood (Merriam, Cafarella, & Baumgartner, 2007). Characteristics that have been summarized are that adult learners have a wealth of life experience to draw upon, are self-directed, and learn better from experiences, including action-oriented problem solving and critical reflection (Keenan, 2002; Merriam et al.; Palincsar, 1998; Reid, 1999). This understanding of adult learning characteristics allows for a focused look at higher education learners, including pre-service teachers, and their learning needs.

Prior knowledge and experience. Adults have accumulated a great deal of experience and knowledge by the time they reach adulthood. Adults normally have not only procedural knowledge about how to do things, but also declarative knowledge of facts and concepts particularly in their areas of work and social interaction (Reid, 1999). Kidd (1973) states that adults have different types of experiences and amongst adults, experiences and knowledge can be very diverse due to culture, gender, ethnicity, race, life experience, education, and learning styles.

Adults’ previous experience and knowledge can assist in meaningful and easier ways to acquire and retain new knowledge (Leflore, 2000). Gardiner (1988) described the “generation effect” which shows that items that an adult generates are better remembered than items he or she reads.

Therefore, useful instruction builds on what the learner already knows and bridges the proficiency gap between what the learner now knows and the desired standard (Ausubel, Novak, & Hanesian, 1978). Taba (1962) states that adult learners develop new concepts by reorganizing existing concepts that interact with new experiences. Activating adults' previous knowledge while learning a new experience is based on the concept that individuals learn better if new information is meaningful to them (Leflore, 2000). Theorists corroborate that individuals learn more effectively when the information is meaningful (Ausubel et al., 1978; Bower & Clapper, 1989; Mayer, 1996). For instance, an adults' previous experiences may create a desire to learn specific skills or knowledge that will be immediately useful (Reid, 1999), so it stands to reason that instructors of adults want their learning connected to the here and now, to integrate it into their daily duties, and to have it make sense and have meaning for them (Lawler & King, 2003). They need to connect their existing concepts to new needs and challenges to affect relevant learning.

Self-directed learning. Typical adult learners engage in five self-directed learning projects per year, spending an average of one hundred hours on each project (Tough, 1979). Many self-directed learners are attempting to gain new skills, knowledge and attitudes to improve their work performance or simply increase their intellectual capital (Lowry, 1989).

Some adult education authors estimate that seventy percent of adult learning is self-directed (Tough, 1979; Cross, 1981). Self-directed learning has been defined as a process in which individuals take the initiative, with or without the help of others, to diagnose their learning needs, formulate learning goals, identify resources for learning, select and implement learning strategies, and evaluate learning outcomes (Knowles, 1975). Self-directed learning is a cornerstone of Knowles' (1980) andragogy, that is, the art and science of helping adults learn.

Lowry (1989) states that self-directedness does not depend on the subject matter to be learned or the instructional methods used. Instead, self-directedness depends on who is in charge

(Reid, 1999). Who decides what should be learned, who should learn it, what methods and resources should be used, and how the learning outcome should be measured are the criteria for identifying self-directed learning (Reid). Learning is considered self-directed when adult learners are involved in the decision-making process, such as negotiating objectives and evaluation, learning from communication with facilitator and peer groups instead of solely from instructors, and participating at a convenient time and location with minimum supervision, and when all types of relevant learning resources are provided (Brookfield, 1986; Lowry; Reid).

Adult educators need to be aware that there are degrees of self-directed learning and not all adult learners are capable of or prefer this method (Brookfield, 1985). Brookfield states that when adult learners lack independence, confidence, or resources, they are less likely to direct their own learning. Learning outcomes are usually measured by adult learners' fulfillment of institutional or organizational standards or expected learning outcomes, so that even those who practice self-directed learning also engage in instructor-directed learning (Leflore, 2000). This suggests that when instructors of adults integrate technology into their instruction, they need to provide learners with necessary resources and guide them toward a certain degree of self-directedness.

Experiential learning. Based on Dewey's theory, Kolb (1984) states that experience is the foundation of learning and learning is a process in which experience is transformed into knowledge, skill, attitudes, values, and emotions. Each individual has a unique mental structure which allows them to derive meaning from their experiences (Von Glaserfeld, 1989) such as social interaction, discussion, problem-solving, role-playing, case studies, or cooperative learning. These methods are much more effective educational tools than lectures or reading text (Knowles, 1980).

Social interaction during the learning process is a means of transforming experience into knowledge, because it provides an opportunity for communication among individuals and mediated interpretations of experiences (Vygotsky, 1981). Professional who are interested in practice issues,

benefit from interaction with others with common professional concerns (Brookfield 1987). In an e-learning context this interaction is supported through a variety of technologies, in both synchronous and asynchronous formats (Garrison, 2003). Adult learners can compare, interact and exchange experiences and ideas so that a commonality of understanding can be achieved for a given concept (Leflore, 2000).

A means of transforming experience into knowledge in experiential learning is problem-solving. Adult learners must address “real-world” problems in order for meaningful learning to occur (Duffy & Jonassen, 1991). When adult learners deal with authentic problems, they construct highly-developed schemata that contribute to an increased ability to solve problems, although they gain experience and address problems in different ways (Bednar, Cunningham, Duffy, & Perry, 1992; Brown, 2001; Leflore, 2000).

Kolb (1984) believes that reflection is thinking about strategies to achieve a goal which is a means of transforming experience into knowledge. An important form of reflection that adds to adult learners’ experiences occurs when adult learners compare their ideas to those of their mentor or their peers (Reid, 1999). Adult learners should be encouraged and committed to reexamine their basic meaning structures and reflect critically on the assumptions and attitudes that underlie their knowledge (Reid). Adult learners who critically reflect on their experiential learning from the external environment can create new, in-depth knowledge through internal re-conceptualization of the experience. The underpinning of experiential learning is based on the premise that adults learn effectively from “doing”. Educators can actively engage adult learners and help them transform experience into knowledge by the following means: social interaction, problem-solving and critical reflection, all characteristics of constructivist theory (Leflore, 2000).

Digital natives are adult learners. Since the early 2000’s, the incoming post-secondary learners are deemed “digital natives” (Prensky, 2001, p.1) who are “raised on and immersed in new

technologies” (Tapscott, 1999, p.11). Some educators are of the view that digital natives should be taught differently because they think and learn differently. By analyzing empirical studies of learners in higher education recently conducted in post-secondary institutions across continents, Jones and Shao (2011) found that there is no evidence suggesting learners have natural or consistent demand for pedagogical change in higher education.

The same study reports that when educators thoughtfully integrate technology into teaching, students respond positively to new learning strategies that are well conceived, well explained and properly embedded into courses and degree programmes (Jones & Shao, 2011). Despite the diversity of the adult population they have commonality as adult learners. Digital natives, as self-directed adult learners, adopt social software for learning using their previous experience and knowledge of technology demonstrating that they have the capacity to change and grow effectively (Lawler & King, 2003). Therefore, understanding the digital natives’ learning needs and motivations (Brookfield, 1995) can assist educators and instructional designers in providing appropriate facilitation and support when designing and implementing social software for educational purposes.

Pre-service teachers’ needs. In a review of North-American research on teacher education, the American Educational Research Association (AERA) Panel on Research and Teacher Education (Cochran-Smith & Zeichner, 2005) concluded there is no convincing evidence that teacher education really makes a difference to practice. Contrasting studies show, however, that teacher education based on specific pedagogies does have the potential to influence teachers’ practices (Brouwer & Korthagen, 2005; Day, 1999). This means that, although at some institutions teacher education may be successful, new and promising views of learning and teaching, such as the integration of technology, may not as yet have reached all teacher education institutions (Korthagen, 2010).

A recent study responded to by 426 teacher education programs across the United States found notable discrepancies between in-service teachers' practices and what pre-service teacher educators offer on incorporating technology into teaching and learning (Ottenbreit-Leftwich et al., 2012). First, almost all in-service teachers use dynamic technologies such as blogs and email to support regular communication with students and parents; whereas pre-service teacher educators do not consider this an important topic to cover and only 60% of them discussed static forms of technology such as websites and newsletters, to support communication. Second, the technologies taught to pre-service teachers for analyzing student assessments are vastly different from how in-service teachers are using technology in the schools (e.g., clickers, portfolios). This was neither taught by many pre-service teacher educators nor used by many in-service teachers in schools. Third, many pre-service teacher educators consider technology for professional growth important and use electronic portfolios for reflection, whereas many in-service teachers participate in personalized learning networks (PLN) for networked professional growth. Finally, 70% of in-service teachers use technology weekly to facilitate higher order thinking skills in learning whereas only 37% pre-service teacher educators introduced this topic.

In the absence of similar Canadian studies, this researcher can only observe pre-service teachers' needs based on the gaps discovered in the above study. It appears that pre-service teachers need more exposure to relevant technology that reflects the current trends (social software and Web 2.0 technologies) for use in the teaching and learning domain.

Social Software and Learning

The term social software refers to a set of network tools designed specifically to support sharing, collaboration, socializing and results in the development of multiple forms of social capital (Anderson, Poellhuber, & McKerlich, 2010; Jones & Thomas, 2007). Social software tools include profiles, wikis, blogs, posting walls, artifact tagging, web conferencing, calendaring and other

network-based tools. These tools are used in formal or informal contexts to support team meetings, cooperative work and learning activities (Carroll, Jenkins, Woodward, Kop, & Jenkins, 2012; Poellhuber & Chomienne, 2007). Social software allows individuals to interact and collaborate with each other online, while promoting personal control over time, space, presence, activity, identity, and relationship (Anderson, 2005; Beldarrain, 2006; Hemmi, Bayne, & Land, 2009; Mejias, 2005; Watson & Harper, 2008). Dron (2007) also notes that an essential characteristic of social software is that it scales well and gains strength from large numbers of users thus making these technologies attractive and cost effective for use in open education contexts. The open, sharing, and collaborative nature of Web 2.0 shares a philosophy similar to that of collaborative learning (Tapscott, 2009).

Collaborative learning, constructivist pedagogy, and social software. Collaborative learning activities involve joint intellectual effort among learners (Du & Wagner, 2007; Smith & MacGregor, 1992). Typically, learners work in groups of two or more, mutually searching for understanding, solutions, or meanings, or creating a product (Brookfield, 1995; Chernay, 2008; Graffam, 2007; Ronteltrap & Eurelings, 2002; Smith & MacGregor). The integration of newly acquired information with prior knowledge in the creation of something new is an intellectual process that allows learners to construct meaning (Ronteltrap & Eurelings; Smith & MacGregor). Researchers have found that active participation in the learning process requires learners to use higher order thinking skills, such as analysis, synthesis, and evaluation (Bonwell & Eison, 1991; Chernay; Graffam).

Shedroff (2009) argued that in current educational design, the main focus should be to encourage relationships and connecting individuals. In addition to social learning, many theorists cite active participation as a major component of effective learning environments (Ferdig, 2007). It is not enough to introduce tools to create a network environment; designers must use strategies for building connections and collaborations between resources and people. In a learning environment

characterized by change, the tools and applications it recommends to learners and the connections it facilitates for stakeholders are vitally important for creating learning experiences (Kop et al., 2011).

Dalsgaard (2006) considers the underlying pedagogy for the use of social software tools. He argues that these devices support a constructivist approach to e-learning by providing students with personal tools, engaging them in social networks, and allowing them to direct their own problem-solving process. Constructivist pedagogy emphasizes the importance of learners being actively involved in the learning process. This is a departure from traditional educational viewpoints where the responsibility rests with the teacher to deliver knowledge while the learner passively receives it (Minocha, 2009).

With constructivist pedagogy, learners are bound to generate personal meaning and create and confirm knowledge through collaboration (Garrison & Archer, 2000). From this perspective, learning must be authentic, relevant and meaningful, and learners construct knowledge from their own perspectives and based on existing knowledge. Learning processes, such as creating social objects or developing digital literacy using social software, are facilitated in a collaborative environment where individual learners are recognized and supported, multiple perspectives are shared, and misconceptions are diagnosed (Barrows, 1998; Cho, 2002; Grabinger & Dunlap, 2002; Garrison, 2003; Garrison & Archer, 2000; Garrison & Arbaugh, 2007; Kanuka & Garrison, 2004; Peters & Gray, 2005; MacDonald & Thompson, 2005). Constructivists argue that instructors' modeling of proficiency enables learners to develop expertise, not by assimilation, but through a process of knowledge construction supported by the learning community (Beldarrain, 2006; Bielaczyc & Collins, 1999; Ehrlich, 2002; Gerber & Scott, 2007).

With the rapid advancement of emerging technologies and their prevailing use by learners, e-learning designers and educators have more opportunities and tools to foster collaboration and interaction (Beldarrain, 2006; Sims & Jones, 2002). Distinguishing different variants of

collaborative learning may help educators conceptualize the nature of collaboration and select social software that supports collaborative learning activities and achieve the intended learning outcomes. The collaborative learning matrix (de Laat, 2006), which categorizes the learning process and intended outcomes of collaborative learning may serve as a framework to select suitable social software for collaborative learning activities. New pedagogical strategies will benefit from the purposeful and deliberate integration of technological tools that support and enhance learner interaction (Beldarrain; Dobrovolny, 2006; Hsu, 2007).

A key benefit of integrating technology into collaborative learning activities is a focus on meaningful, authentic problem-solving where learners learn with technologies, not about them, which results in improved confidence and technical skills (Albee, 2003; Doering, Hughes, & Huffman, 2003; Kay, 2006; Milbrath & Kinzie, 2000; Pope, Hare, & Howard, 2002). While these benefits exist, positive outcomes do not happen automatically. Careful consideration of how and when the technologies are used is critical.

Collaborative editing. Collaboration and cooperation have long been recognized as ingredients of effective pedagogy; and wikis and collaborative writing and editing tools such as Writeboard and GoogleDocs can be useful extensions to conventional writing approaches. Linked with this principle of collaborative production, there is the facility of sharing and publishing the social object produced as a result of the learning activity, and inviting feedback from peers. By publishing and presenting their work, learners benefit from the opportunity to appropriate new ideas, and transform their understanding through reflection (Williams & Jacobs, 2004).

Google Docs is a free Web-based word processing, presentation, and spreadsheet program that facilitates sharing and collaborative editing. Google Docs can be easily used by anyone who understands desktop applications (Gerber, 2010). Google Docs stores files on a Google server, which allows individuals to create or upload documents that anyone can update from their own

computer. Files are only visible to the owner unless shared with a selected group of individuals. Google Docs eliminates the need to email files, manage different file versions, and manually aggregate input from others. Up to 10 people can edit the same document simultaneously online through a Web browser. Edits and comments are instantly visible to the rest of the group (Google, 2013) and each version of the document is saved on the Google server for later access. The files can also be exported and downloaded to local computers. Educators and learners are using Google Docs for a variety of activities such as brainstorming, collaborative writing, lesson planning, study groups, notes sharing, and more (Gerber, 2010).

Social Bookmarking. Social bookmarking is a method for Internet users to store, organize, search, and manage bookmarks of Web pages with the help of metadata or tagging. In a social bookmarking/networking system (e.g., Facebook, Digg, Del.icio.us, Furl), users save links that they want to remember and/or share. Unlike bookmarks saved on computer browsers (e.g., Internet Explorer favourites), the saved bookmarks are accessible from anywhere at any time using the Internet. Social bookmarking allows learners to collaboratively generate an inventory of assets such as bookmarks and resources, to share and reuse, and to support social interactions (Churchill, Wong, Law, Slater, & Tai, 2009).

A typical social bookmarking system, such as Del.icio.us, allows online storage and management of bookmarks/resources that can be accessed anytime, anywhere, via any web browser, and on any Web enabled device (Churchill et al., 2009). Such systems enable bookmarks/resources to be tagged by user-selected key words, shared with others, and ranked based on certain criteria. An individual can locate relevant bookmarks and resources based on a personal collection and through collective tags and rankings by other users. Social bookmarking systems mobilize the collective intelligence of the community to locate useful resources. Using Really Simple Syndication (RSS), it is also possible to subscribe to another user's bookmarks and get notifications

when this user bookmarks a new page (Dalsgaard, 2006). In addition, such systems also effectively integrate across other Web 2.0 tools. It is possible to embed resources and forward feeds to other places, such as in blogs and wikis (Churchill et al.).

Grassroots video sharing. On a complimentary grassroots video sharing site such as YouTube or TeacherTube, anyone can capture, edit, and broadcast short video clips using inexpensive equipment and free software. Video clips can be made public or available only to select groups of people. News clips, tutorials, and informative videos are prevalent on video broadcasting sites such as YouTube, Google Video, and TeacherTube. Users can rate or comment on the published video clips. Sites such as the YouTube digital video repository attract millions of hits a day, while ordinary Internet users publish millions of video clips to this site and regularly comment upon, rank, tag and recommend these resources (Hardy, 2006). In an e-learning environment, videos can be used to share insights, provide information, and demonstrate procedures. Educators have been using YouTube and Teacher Tube extensively to share educational video clips so that learners can obtain access to the video and rate, comment, and reflect on the topic synchronously or asynchronously.

Challenges related to social software. Some have argued that social software brings new challenges to human interactions, such as information overload, online identity and multiple online presences, data theft, and inconsistent content quality (Dron, 2007; Huijser, 2008). Franklin and van Harmelen (2007) highlight several problems arising from the introduction of Web 2.0 into higher education, for example, choice of types of systems, external or institutional hosting, integration with institutional systems such as learning management systems and accessibility, visibility and privacy. Data creation poses other concerns such as data ownership, copyright for material created and modified by university members and external contributors, control over content, longevity of data, preservation, and information literacy. Educational issues include staff and student training and

appropriate teaching and assessment methods.

Barriers to the adoption of educational technology such as social software into higher education include: the lack of institutional support, technology skills, and insufficient time for development and implementation (Blanchette & Pinet, 2003; Chen & Bryer, 2012; Waycott, Bennett, & Kennedy, 2010).

Moreover, educators have limited resources to inform the integration of social software into teaching and learning due to limited research on how social media impacts students and, in particular, how it influences students' learning experience or changes in practice (Hew, 2011; Mix, 2010; Price & Kirkwood, 2013). The use of social media in teaching by instructors is even scarcer (Chen & Bryer, 2012).

Nonetheless, millions of people around the world currently visit Web 2.0 sites on a daily basis. These individuals develop new partnerships and discover knowledge from a pool of collective intelligence that exists in these environments (Churchill et al., 2009). Many of our cultural, social, and political interactions take place through highly convenient technological surrogates (Harden, 2013; Prestridge, Dunn, & Lang, 2006; Rosen, 2007). Social collaboration has been made increasingly convenient by a host of complementary developments in networking infrastructure, social networking tools, Web applications, and collaborative workspaces (EDUCAUSE, 2008). When social software is used appropriately the desired outcomes can be achieved (Dron, 2007).

Summary of Literature Review

This review of literature addressed constructivism, the *W(e)Learn* framework, learning outcomes, digital natives as adult learners, and the use of social software in education. A solid body of evidence exists that supports connections among social software, collaborative learning, and learning outcomes. Also, it is apparent that a constructivist approach can facilitate the achievement of learning outcomes through the use of social software. Learners actively participate in

collaborative learning by producing social objects, developing digital literacy skills, and critically reflecting on the connection between their learning experiences and professional practice, and develop higher order of thinking and meaning. Given the rapid advancement of Web 2.0 technologies and the active use of social software among diverse learner populations, there is a need for researchers to focus on conducting rigorous and relevant mixed-methods studies to explicate which technology applications work to facilitate learning (Prince & Kirkwood, 2013; Ross, Morrison, & Lowther 2010). This study employs a mixed methods research approach to investigate how social software can be used to enrich an e-learning course using outcome-based instructional design, as a response to the current needs for rigorous explanatory research in this area.

CHAPTER 3

METHODOLOGY

Introduction

The purpose of this mixed-methods explanatory case study was to explore how social software could be used to enrich an e-learning course using outcome-based instructional design.

This study was attempting to answer the following research questions:

1. In what ways can outcome-based instructional design be used to incorporate social software in e-learning?
2. In what ways does the use of social software affect learners' level of participation?
3. How does outcome-based instructional design impact learners' learning outcomes?

There were three phases in this study. The first phase of the study involved the design and development of social software enriched learning activities in an existing online course. The researcher kept a journal to document this process. The qualitative data in the researcher journal were coded and the challenges encountered by the researcher presented. The second phase of the study involved the delivery of social software enriched learning activities. Quantitative data were collected from 25 pairs of pre- and post-course surveys, as well as the course records of 37 participants. Qualitative data were collected from 27 participant reflections on using social software. Quantitative data analysis of the surveys and course records involved t-tests, ANOVAs, and descriptive statistics. The third phase of the study involved conducting two interviews. Seven participants were interviewed right before the completion of the online course and then five of these participants were interviewed again five months later. Qualitative data analysis of the interview transcripts and phase two learner reflections was conducted in two steps: First, deductively using the five constructs of the *W(e)Learn* framework and then inductively to identify sub-categories

under each *W(e)Learn* construct and new themes and sub-categories beyond the *W(e)Learn* constructs.

The three phases of the study were not discrete. Phases I and II overlapped; during the delivery of the social software enriched learning activities the researcher provided support to the participants on social software related requests. Phases II and III also overlapped; phase II survey data were used to purposefully identify interviewees. Further, the qualitative data collected in Phases II and III were combined during qualitative data analysis. Figure 3.1 illustrates how the research data were used to answer the research questions. As can be seen from the figure, the instructional intent (expected learning outcomes) drives all the learning outcomes. The outcomes were identified through Phase II and, in more detail, in Phase III. The red text indicates data generated for the qualitative analysis.

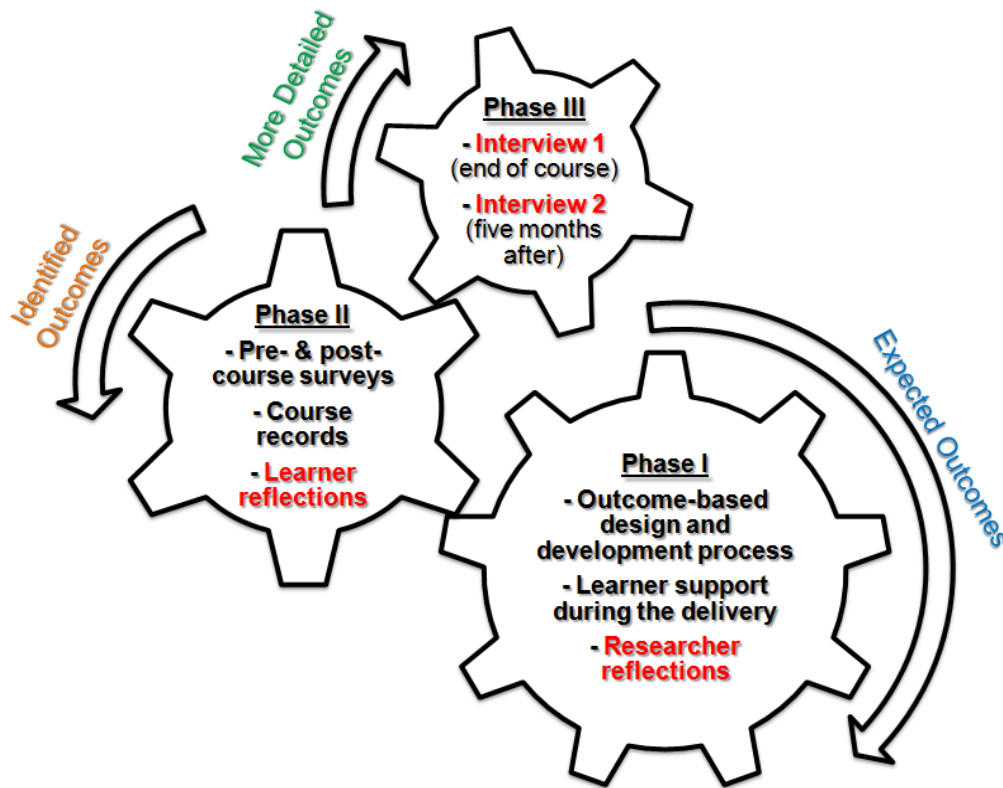


Figure 3.1. *Learning outcome data sources*

The following sections describe the research methodology of this study. Section one justifies the sequential mixed methods single case study design and includes a subsection that discusses pragmatism as the paradigm of choice. Section two outlines the procedure of this research and includes a sub-section that details the outcome-based instructional design process. In section three the participants of this study are presented. Instruments and data collection are discussed in section four and section five presents the data analysis approach. Finally, considerations on validity, reliability, trustworthiness, minimizing researcher bias, and ethics conclude the chapter.

Sequential Mixed Methods Single Case Study Design

A sequential mixed methods approach was used in this case study to assess and explain the connections between the expected learning outcomes, outcome-based instructional design using social software, and the achievement of learning outcomes.

Sequential mixed methods in a single case study. E-learning is complex in nature, so educational research methods used to investigate e-learning must reflect this complexity. A combination of quantitative and qualitative methods is an effective means to conduct e-learning research (Archibald, 2011). This technique is most commonly identified as mixed methods research (Collins, Onwuegbuzie, & Jiao, 2007; Teddlie & Tashakkori, 2011). A mixed methods approach can answer research questions that neither qualitative nor quantitative methods can address alone (Tashakkori & Teddlie, 2003; Teddlie & Tashakkori). Moreover, the combined data yield a complementary, holistic analysis (Borkan, 2004; Johnson, Onwuegbuzie, & Turner, 2007).

Case study research develops an in-depth analysis of a single case or of multiple cases (Flyvbjerg, 2011; Stake, 1995, 2005; Yin, 1984, 2006, 2009). In the single case study approach, researchers can collect data from a variety of sources including quantitative and qualitative data in order to understand a complex phenomenon and explain the connections among key factors

(Creswell, 2009; Merriam, Caffarella, & Baumgartner, 2007; Stake; Yin). Sequential mixed method designs combine quantitative and qualitative phases of study and the procedures of one phase inform or are dependent on the previous phase (Teddlie & Tashakkori, 2009, 2011) they can also occur simultaneously. A sequential mixed methods approach used in a single case study enables data triangulation and clear case study protocol (Creswell, 2009, 2011; Yin) thus increasing validity and reliability.

Answering research questions. Researchers argue the focus of mixed methods is to expand the research toolbox in order to answer research questions (Borkan, 2004; Teddlie & Tashakkori, 2009, 2011). Morse (1991) referred to the process of using qualitative and quantitative data to answer the same research question as data triangulation.

The research questions of this single case study sought to understand the complex relationship between outcome-based instructional design using social software, the expected learning outcomes and the actual achievement of learning outcomes. Data collected from the researcher journal, surveys, course records, learner reflections, and individual interviews captured what happened during the research process (Neale, Thapa, & Boyce, 2006; Stake, 2005) and allowed the researcher to explore the story behind the results. The sequential mixed-method data collection strategy helped the researcher explain the phenomenon, statistically validate results, and generate new theory with the inclusion of participants' voices (Bryman, 2006; Creswell & Plano Clark, 2007; Johnson et al., 2007; Teddlie & Tashakkori, 2003). By doing so, the research questions were effectively answered.

Pragmatism as the paradigm of choice. The paradigm of mixed methods research has long been debated. Researchers argue that the mixed methods movement seeks to deconstruct preconceived post-positivist hegemony and that mixed methods research needs an epistemological

position to reflect a holistic approach to research and to represent the best of both quantitative and qualitative worlds (Guba & Lincoln, 2005). Recently, some mixed methods researchers deemphasize the need for epistemological stands. They take the position that mixed methods research paradigm are shared beliefs about types of questions and methods of study among a community of scholars of a particular research field (Creswell, 2010; Denscombe, 2008; Morgan, 2007; Tashakkorit & Creswell, 2008; Teddlie & Tashakkori, 2011). Further, the community of scholars adopting shared beliefs of a research field can more accurately interpret the structure of scientific revolutions in that field (Denscombe; Morgan; Tashakkorit & Creswell).

Although these researchers argue against the continued focus on the paradigm of mixed methods research, nonetheless, pragmatism is often the paradigm of choice in this methodology (Teddlie & Tashakkori, 2011). Biesta (2010) emphasized that Dewey's argument against the epistemological dualism of subjectivity and objectivity is important to the field of mixed methods research. As such Deweyan pragmatism suggests that no methodological approach is intrinsically better than another in knowledge generation and the mixture of research methods is needed for problem-solving and action oriented inquiry processes (Biesta; Greene, 2007; Greene & Hall, 2010; Teddlie & Tashakkori).

Researchers' philosophical assumptions determine how data collection is designed and how inferences are drawn when using both qualitative and quantitative methods in a single study (Borkan, 2004; Creswell, 2011; Creswell & Plano Clark, 2007; Tashakkori & Creswell, 2008). Creswell and Plano Clark (2007) and Teddlie and Tashakkori, (2011) argue that the elements of qualitative and quantitative methodologies lie on different points along the same continuum and share common elements such as research intent or purpose, research literature, data collection and analysis, and validation of findings. Plus, combining inductive and deductive analyzes and using

complementary methodologies from qualitative and quantitative research can broaden and produce superior studies with strengthened inferences due to strong validity and the convergence and collaboration of findings (Borkan, 2004; Johnson et al., 2007).

The researcher adopted a pragmatic stance in this mixed methods case study with a belief that the value positions of two different methods can be embraced and their results understood in a practical way without excluding either. This allowed findings from elements of this study with different value positions to be interpreted in their own terms.

Study Context

Curriculum Design and Evaluation, is a teacher education course offered online by a Faculty of Education of a Canadian university. The learners are pre-service teachers, i.e. teachers in training. The course that served as the host to this study was offered in the fall semester from September to December 2010 and it was a mandatory course to all pre-service teachers enrolled in the program.

The course was delivered to different learner cohorts as independent and duplicated sections by a number of instructors during the fall semester. One instructor, who usually taught one section of the course and who had been an advocate and a successful e-learning practitioner and researcher, was willing to provide her section of the course (the course) as the base to expose the perspective teachers to social software.

The course had been offered online since 2007 and it was originally designed and developed by a team of experienced in-service teachers, instructional designers, programmers, and the instructor of the course. Since the inception of this interactive online course, the evaluations for the course had been consistently positive.

The pre-service teachers enrolled in the course went to their first practicum (school placement) for four weeks in November 2010. A few months after the course, they went to the

second practicum in April 2011. To better understand the research components in the study context, Appendix M provides a timeline of data collection for this study in parallel with the Teacher Education Program.

Participants

Participants in this study were pre-service teachers registered in a section of an online course, Curriculum Design and Evaluation, taught by an instructor who was willing to provide her section of the course as the base to expose the learners to social software.

Response status. Table 3.1 shows the number of learners who participated in each data collection process of this study. There were 43 learners registered to Section F of the online course in the fall 2010. Of 43 registered learners, 37 consented to participate in the study.

Out of the 37 consented learners, 28 learners completed the pre-course survey, and 27 learners completed the pos-course survey. Of the learners who completed surveys, 25 completed both pre- and post-course surveys. Survey data collected from these 25 learners were analyzed and presented in Chapter 4.

Of the 25 learners who completed both pre- and post- course online surveys, 10 were purposefully selected and invited to two interviews (see selection criteria on page 78). Of the 10 identified participants, seven partook in the first individual interview and five participants were interviewed the second time five months after course completion.

Table 3.1

Number of Participants in Each Data Collection Process of the Research

Total registered learners to the Course	43
Consent to participate (Authorizing the use of their course records)	37 (86%)
Pre-survey completed	28 (65%)
Post-survey completed	27 (60%)
Completed both surveys	25 (58%)
Interviewees invited	10 (23%)
Interviewees for interview #1	7 (16%)
Interviewees for interview #2	5 (12%)

Demographics. These participants were newly accepted to Bachelor of Education Teachers Education Program (the program) in the Faculty of Education of a Canadian university. Of the 25 participants who completed both pre- and post-course surveys, 16 (64%) were female and 9 (36%) were male. Thirteen (52%) participants had never taken online courses before, whereas 12 (48%) individuals had taken 1 to 6 online courses prior to enrolling into the course. Figure 3.2, shows learners age group. Eight (32%) learners were in the age group of 23 and under, 13 (52%) in age group 24-29, and 4 (16%) were thirty years and above.

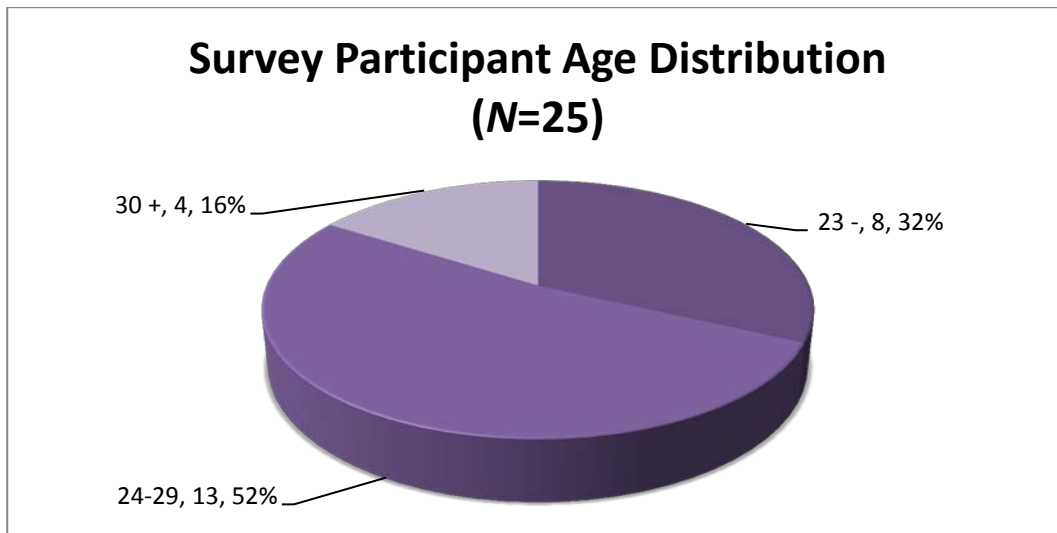


Figure 3.2. *Survey participant age distribution.*

Note: In the e-learning survey instruments referenced in this study, a 5-year interval is frequently used for identifying age groups.

Interviewees. Interviewees were purposefully identified by the researcher provided maximum representation of the diverse learner groups (see selection criteria on page 78). Table 3.2 shows the 10 identified interviewees, their pseudonym, gender, age group, past online learning experiences, attitude towards online activities, outcomes (changes of pre- and post-SoAT scores), and their status of participation in the two interviews.

Table 3.2

Profile of the Identified Interviewees

Pseudonym	Sex	Age Group	Experience	Attitude	Outcome	Pre-SoAT	Post-SoAT	Interview 1	Interview 2
Lisa	f	30 +	+	+	-	6	6	Y	Y
Arthur	m	23 -	+	-	-	1	1	Y	Y
Diane	f	24-29	-	-	-	4	4	Y	Y
Sam	m	30 +	-	+	-	3	3	Y	Y
Linda	f	24-29	-	+	-	5	4	N	N
Amy	f	23 -	+	-	+	2	4	Y	N
Charley	m	30 +	+	-	+	1	3	Y	N
Mary	f	24-29	+	+	+	1	2	N	N
Nancy	f	24-29	-	-	+	3	4	Y	Y
Joe	m	23 -	-	+	+	3	5	N	N

Note:

“+” Indicates the individual took online course(s) in the past (Experience), used technology frequently (Experience), was willing to participate in online activities (Attitude), or had improved SoAT after the course (Outcome).

“-” Indicates the individual had not taken online course in the past (Experience), used technology less frequently or no use (Experience), was not willing or had reservations to participate in online activities (Attitude), or had reduced or same SoAT after the course (Outcome).

“Y” Indicates that the individual was interviewed.

“N” Indicates that the individual did not respond to the interview invitation.

The overall gender ratio of all participants (female : male = 6.4 : 3.6) is close to that of the identified interviewees (female : male = 6.0 : 4.0). Since other factors were considered for interviewee identification (see selection criteria on page 78), gender ratio may not be consistent in different age groups.

The Research Procedure

The focus of this study was to explore how an e-learning course could be enriched by social software via outcome-based instructional design, and to examine the learning outcomes in comparison to the instructional intent. This was a single-case study using sequential mixed-methods research approach. There were three phases in this study and data were generated from a range of sources. During phase I the instructional design process, the researcher kept a journal that documented the instructional design process. During phase II the course delivery process, participants' demographic information, past experiences, online participation, learning outcomes, and reflections were captured. During phase III, the learners were purposefully selected to participate in two interviews, the first scheduled right before the end of the course and, the second, five months after. The researcher developed a logic model (see Figure 3.3) to demonstrate the research procedure to the study. The logic model illustrated the integration of the *W(e)Learn* framework constructs, the foundation of this study, into the outcome-based instructional design process with how this instructional design process led to the achievement of the expected learning outcomes.

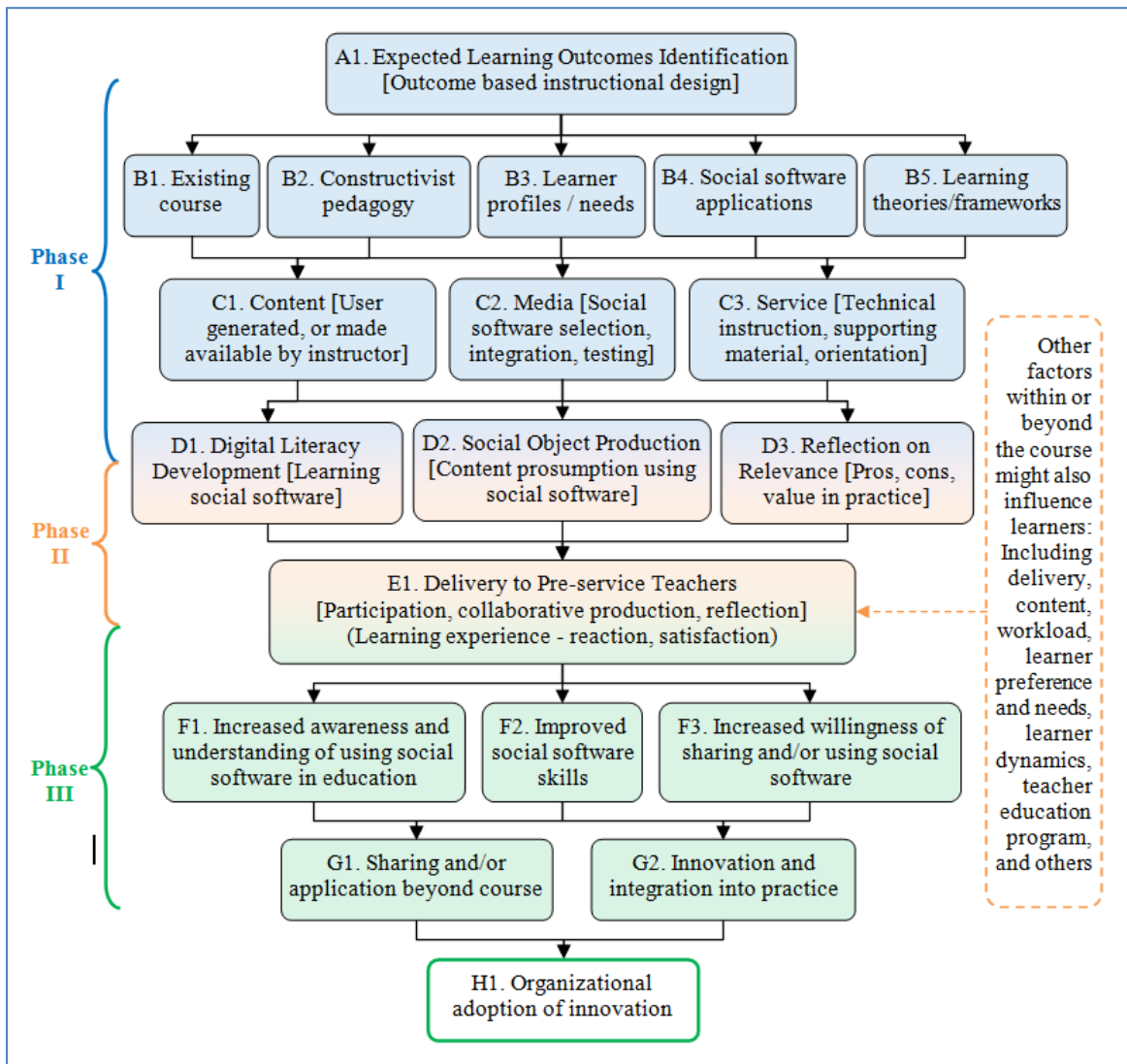


Figure 3.3. *Outcome-based instructional design, production, delivery, and outcomes*

Phase I: The outcome-based instructional design process. Prior to the delivery of the course, three learning activities of the existing online course were enriched by social software following an outcome-based instructional design process. The instructional design was completed by the researcher with support from an award-winning local instructional design team.

The process of outcome-based instructional design and development of social software enriched learning activities as documented by the researcher is presented in following sections. The logic model (Figure 3.3) assisted the explanation of the enriched learning activity design and

development process. This process was documented in the researcher's journal using a template (see Appendix I) that included logging of time, tasks and actions taken, as well as the researcher's reflection in and on action.

The outcome-based instructional design involved a number of tasks, including identifying the intended outcomes, selecting the appropriate social software, producing the educational video clips, and integrating all former mentioned into the enriched learning activities, and integrated into the Course. It was agreed with the course instructor that the integration of social software enrichment in the course would not change the overall organization and approach of the course. Learning activities of the course were being enriched using outcome-based instructional design to integrate social software with a goal of encouraging collaboration and facilitating learning outcomes. The enriched collaborative learning activities were incorporated into the online class as part of a regular course improvement and refinement process. The details of the enriched learning activities can be found in Appendix D.

Outcome identification. The identification of the expected learning outcome (Box A1 in Figure 3.3) was the starting point of each enriched learning activity design. The rationale for these learning outcomes was discussed in Chapter 1. Morrison, Ross and Kemp (2004) indicated that general instructional intents (expected learning outcomes) should address the products or outcomes of instruction with a focus on higher intellectual level. The following expected learning outcomes and the experiences were developed and presented as broad statements of instructional intent for all enriched learning activities:

- Improved digital literacy through the active use of social software in enriched learning activities
- Development of social objects (learning products) through collaborative content

contribution or creation using social software

- Connection to practice through reflection on the benefits and shortfalls of using social software in teaching and learning

Learning activity identification. Identification of existing learning activities for social software enrichment took the existing course (Box B1, Figure 3.3), pedagogical strategy (Box B2, Figure 3.3), learner profiles and needs (Box B3, Figure 3.3), available social software applications (Box B4, Figure 3.3), and learning theories and framework (Box B5, Figure 3.3) into consideration. The rationale for this identification was to find learning activities that involve collaborative learning content production, that could be transferred into social software without compromising course content, and that could be extended without adding excessive workload on the learners. As a result, the following three units were identified:

- Unit 5 -Lesson Plan Activity. The existing design required learners to develop a lesson plan, share it with group members and exchange feedback. The end product was an individual learner's lesson plan that reflected feedback and input from group members. This activity could be enriched by using collaborative editing applications to facilitate the lesson plan sharing and feedback exchange process. The end product would be the same as that of the original learning activity.
- Unit 7 - Resources collection activity. The existing design required learners to collect classroom management resources on a website that did not have sharing function. The end product was a list of resources on a web page only available to the individual. This activity could be enriched by using social bookmarking applications for collecting and sharing resources. The end product would be a collection of rated resources available online to individual learners, their classmates and other online users with similar

interests.

- Unit 12 - Assessment and evaluation discussion activity. The existing design required learners to discuss challenges and real life examples of assessment and evaluation. The end product was a discussion thread. This activity could be enriched by using grassroots video applications to deliver video resources to support discussion. The end product would include the original discussion thread and learner comments on the content of the video.

Content development. Content (Box C1, Figure 3.3) could be generated by learners or provided by the course instructors to support a learning activity. Enriched learning activities of units 5 and 7 would only require learner generated content. Enriched Unit 12 activity would not only require learners to generate content, it would also require video production to deliver the content that would support the unit discussion on assessment and evaluation.

The video content production involved the course instructor, subject matter experts (experienced teachers), and an instructional design team, all on a voluntary basis. Based on years of experiences in teaching pre-service teachers, the course instructor provided a list of questions that were commonly asked by novice teachers. The topics of these questions include assessment and evaluation, classroom management, dos and don'ts, tips and advice on teaching and practicum. These questions can be found in Appendix J. In an effort to include opinions from different teachers, the course instructor invited two experienced teachers who were teaching in elementary or secondary schools, to answer these questions by providing real classroom examples. Both teachers provided their consent to produce these videos. It would have been ideal to include more teachers' voices on these topics, however it was challenging to find willing and capable teachers within the tight timeline and with no budget.

The video was recorded in a professional audio and visual studio and directed by an experienced senior instructional designer and the researcher. The post recording editing was conducted by an audio visual expert. The researcher requested the audio visual expert to edit the video recording into short clips. Each video clip included both teachers' answers to a single question. For example, the video clip on "What are the most important things for a beginning teacher to know about assessment and evaluation?" was a two-minute long clip that contained answers from both teachers. Also, the researcher requested the audio visual expert to customize video background using the branding image of the university that offered the online course.

The researcher reviewed and tested all the video clips until no more adjustments were identified. Subsequently, the researcher uploaded these video clips to the identified social software site (see Figure 3.4). Measures were taken to minimize over exposure. These videos were configured as semi private. This meant that the videos were not publically available or searchable. However the videos were accessible through special links generated by the grassroots video site. This was an attempt to minimize potential online traffic problems so that the learners' access to these videos would not be inferred.

<input type="checkbox"/>	title	Date Added	Views	status
<input type="checkbox"/>	Assessment and Evaluation: What I know now view - edit - delete - Make profile item	2010-08-26	486	Successful
<input type="checkbox"/>	Assessment and Evaluation: Important things view - edit - delete - Make profile item	2010-08-26	450	Successful
<input type="checkbox"/>	Assessment and Evaluation: Lessons Learned view - edit - delete - Make profile item	2010-08-26	618	Successful
<input type="checkbox"/>	Assessment and Evaluation: Tips view - edit - delete - Make profile item	2010-08-26	433	Successful
<input type="checkbox"/>	Assessment and Evaluation: Consistency & Fairness view - edit - delete - Make profile item	2010-08-26	635	Successful
<input type="checkbox"/>	Assessment and Evaluation view - edit - delete - Make profile item	2010-08-26	728	Successful

Pages : 1

TeacherTube
Teach the World

Advertise with Us | About us | Privacy Policy | Terms of Use | Help and FAQ | Copyright | Copyright Tips | Press Room | Contact Us

Videos | Playlist | Favorites | Inbox | RSS Video | RSS Audio | RSS photo

Figure 3.4. Video clips uploaded online

After the video production phase, the course web pages that presented these videos were produced. These video clips were grouped by subjects, such as assessment and evaluation, classroom management, and were embedded on different course web pages. Finally these web pages were hyperlinked to their respectful units. See Figure 3.5 for a course web page that presented videos.

For each enriched activity using videos, detailed activity instructions were provided at the top of the page. These were followed by video links to the experienced teachers' (both were principals of a school at the time of instructional design) self-introduction, so that the learners would know the credential of the presenters. Each video clip was embedded under a question commonly asked on the subject. Videos on classroom management were linked to Unit 7 as a resource, and no learner actions were required. The enriched Unit 12 activity required the learners


to not only watch the video, but also comment on the content of the video clips that were meant to facilitate their learning.


PED3103 Curriculum Design and Evaluation in Education
Unit 7: Building Your Classroom Community - Videos

Watch the following video clips in which two experienced teachers are discussing classroom management. Go to the discussion group called **Unit 7: Building Your Classroom Community**. As a triad, select one of the classroom scenarios posted in the discussion group. Using the course reading and videos for this unit and the learning objects within it, discuss with your triad how you might resolve the situation. Post a brief summary of your discussion in the unit 7 discussion group make sure you state which scenario you chose.


TeacherTube
Teach the World

Know Heather and Leslie

 [Click here to watch Heather's Self Introduction](#)

 [Click here to watch Leslie's Self Introduction](#)

1. What do you know now that would have helped you with classroom management during your practicum teaching experiences?



2. What are the most important things for a beginning teacher to know about classroom management?




Figure 3.5. Example video content page

Media – social software selection and testing. The social software selection (Box C2, Figure 3.3) was informed by literature. The selection criteria included: appropriate for facilitating learners' collaboration in the learning activity, used and positively reviewed by many users, easy to use or similar to other popular tools, sustainable, and reliable (Collis & Moonen, 2005; MacDonald

et al., 2009; Rudd, Sutch, & Facer, 2006; Smith, 2007). In addition, for social software applications to be considered, they had to be powered by a company that was offering sustainable and reliable services on a complimentary basis.

For the Unit 5 activity being enriched by collaborative editing, the following social software applications were considered. Commonly used Wikis, such as PB Wiki, WetPaint, and Wiki Space were considered. From functionality point of view, Wikis were deemed intuitive for collaborative processes with group or individual products. However, the end product of this learning activity was a lesson plan in Microsoft Word format. While Wikis would have provided flexible content creation functions, the learners would not have been able to work collaboratively and directly on their lesson documents. GoogleDocs was also considered for its capabilities of collaborative editing directly on a document and an interface comparable to desktop text editing software such as Microsoft Office. In addition, at the time of instructional design, more and more teachers and students were starting to experiment with GoogleDocs and there seemed to be a momentum for further exploring the use of this application in education. In addition, GoogleDocs offered real time interaction on the file and document versioning which were desirable functions for collaborations and in the workplace. As such, GoogleDocs was chosen for enriching the lesson plan for the collaborative editing activity in Unit 5.

For the Unit 7 activity being enriched by social bookmarking, three social software applications were considered. Digg and Slashdot had bookmarking functions, however were not considered for this study as Digg was mainly used for news and story sharing and Slashdot was a very technology-oriented information sharing site. Delicious was focused on social bookmarking and had already had a considerable pool of shared resources on various topics, and its content base was diverse. In addition, Del.icio.us had just introduced a new function that allowed users to

establish interest groups to share resources and get updates through real simple syndication (RSS). At the time of instructional design, Del.icio.us was one of the most popular social bookmarking sites with positive user ratings and it seemed to have the potential for community building among teachers. As such, Del.icio.us was chosen for enriching the classroom resource sharing activity in Unit 7.

For Unit 12 activity being enriched by grassroots videos, both YouTube and TeacherTube were considered. TeacherTube was a relatively new grassroots video site created by an experienced teaching professional. The content of the videos and multimedia resources on TeacherTube were focused on teaching and learning. All uploaded content would be reviewed by a teaching professional prior to being made accessible on the site. The interface and functionality of TeacherTube were almost identical to that of YouTube. For a then two-year-old social software site, TeacherTube had a relatively large, rapidly growing user group and reviews of the site were positive. At the time of the instructional design, the founder of the site had secured the funding source for sustained service provision. For these considerations, TeacherTube was chosen for enriching the discussion on assessment and evaluation in Unit 12. In addition, considering TeacherTube was a relatively new platform and the researcher had no prior experience with it, as an alternative measure, YouTube would be used if there was a need for an alternative approach.


A series of tests using the identified social software were conducted from different networks, using different computer systems, and through different Internet browsers by a few volunteers who were located in different geographic locations. A list of testing tasks was developed for each of the enriched activities. These tasks reflected what the learners would be asked to do. For example, signing in, uploading a file, inviting others to edit your file, commenting on a document at the same time, posting your rating of a web resource, tagging your bookmark with the keyword “classroom

management”, and posting your comment on this video clip, were several such tasks. The testing results came back with no issues. It was even discovered that TeacherTube was accessible from school networks that blocked YouTube.

Service - technical instructions. Technical instructions (Box C3, Figure 3.3) were developed for each enriched learning activity. In an effort to minimize potential technical issues to help the learners stay focused on learning, the researcher developed targeted resources to assist them in the use of social software. Three different types of instruction techniques were used, including demo video instructions on using GoogleDocs (see Figure 3.6), step-by-step instructions on using Del.icio.us (see Figure 3.7), and direct instructions on using TeacherTube described as part of the learning activity (see Figure 3.8). These were hyperlinked or included through the description of in each enriched learning activity. The researcher planned to offer an orientation at the beginning of the course for hands-on support.

Step-by-step Technical Instructions for Using Google Docs

- Sign in to Google Docs
 - Go to Google Docs <http://docs.google.com>
 - Sign in if you have already have an existing gmail/google account, OR
 - Sign up a gmail/google account if you do not have one
- Upload and share lesson plan (see video instructions, each clip takes less than one minute to watch)
 - Upload your lesson plan. See a one-minute video instruction on how Google docs works, including how to upload a file into Google docs



- Share your Google email address with your triad members. Add your triad members as editors to your lesson plan in Google docs. Also add the course gmail address ped3103ou@gmail.com into your lesson plan collaborator list. See a one-minute video instruction on sharing document in Google docs




Figure 3.6. *Demo video instructions on using GoogleDocs in Unit 5*

Steps:

- Go to <http://www.delicious.com> and sign in
 - Sign in your delicious account if you have already have one, OR
 - Join in delicious using your existing Yahoo account - click on the green "Join Now" button and following the on screen instructions
- Add new link
 - Save a new bookmark
 - Create public profile
 - Bulk edit
 - Browse these bookmarks BETA
 - Paste the link in the URL box
 - Rate and tag the resource.
 - Send your bookmark to the course Delicious account by adding "ped3103ou" into the text box marked "For". You can also send the resource to anyone who has a Twitter ID, Delicious account, or an email address.
 - Note 1:** Delicious consider a space the separator of the tags. If you are using two words as one tag, connect them with a "-", i.e. if you want to tag a resource for "classroom management", type "classroom-management" without quotation marks in the tag text box.
- Save the resource
 - Note 2:** To explore all the PED3103 resource collection, go to Delicious home page, click on "Explore Tag", type "PED3103", "PED3103-2010", or "classroom-management" in the tag text box. Click on the green arrow. The resource collection will show.

Should you have questions about using Delicious, please contact Rong Sun at rsun028@uottawa.ca.

Figure 3.7. Step-by-step instructions on using Del.icio.us in Unit 7

PED3103 Curriculum Design and Evaluation in Education
Unit 12: Assessment and Evaluation - Traditional Methods

If I were asked to enumerate ten educational stupidities, the giving of grades would head the list... If I can't give a child a better reason for studying than a grade on a report card, I ought to lock my desk and go home and stay there ~ Dorothy De Zouche

- Read it!
 - Read [Unit 12: Assessment and Evaluation - Traditional Methods](#) (found in the Read it! folder)
- Explore it!
 - Complete [Unit 12 Explore it!](#)
 - You can view and print the [Explore it! questions](#) as a Word document (found in Resources)
- Discuss it!
 - Watch the [YouTube](#) [YouTube](#) OR [TeacherTube](#) [TeacherTube](#) video clips in which two experienced teachers are discussing assessment and evaluation.
 - On YouTube /TeacherTube website, rate all the above listed videos and comment on at least one video clip. Scroll down to the bottom of the webpage, click on the comment text box, type and post. **Note:** You will need to log into YouTube/TeacherTube to post a comment - You can use your Google account to sign into YouTube / any existing email account for TeacherTube.
 - Having completed the Unit 12 Explore it! and reflected on your experience, actively discuss the following question in the discussion group called **Unit 12: Assessment and Evaluation - Traditional Methods**: Given the growing interest in online learning at the secondary level, what issues, if any, do you foresee with online testing?
 - In your [teaching snapshot](#), briefly (one paragraph) reflect on your experience using YouTube / TeacherTube videos (e.g., what were the highlights, pitfalls, advantages? How could you use it in future in your practice? Are there pros and cons of presenting YouTube / TeacherTube videos in Unit 5 vs. this unit? etc.)

Figure 3.8. Instructions on using TeacherTube or YouTube in Unit 12

Enriched learning activities. After the outcomes were identified, content was produced as necessary, social software was chosen and tested, and the technical instructions were developed. These components were assembled into three enriched learning activities. Each enriched learning activity contained four elements: expected learning outcomes (Box A1, Figure 3.3), digital literacy development (Box D1, Figure 3.3), social object production (Box D2, Figure 3.3), and reflection on relevance (Box D3, Figure 3.3).

For Unit 5, the learners had to learn how to use GoogleDocs, to collaboratively edit and exchange feedback on their individual lesson plans. They reflected on the pros and cons of using GoogleDocs in this activity and the potential value of using it in their future teaching. The elements were developed to facilitate the learning of the following outcomes – development of digital literacy skills using GoogleDocs, learning to support each other, creating a lesson plan that incorporated contribution from others, and making connections between using social software and future practice.

For Unit 7, the learners were to learn how to use Del.icio.us, to share the web resources on classroom management and to assess the quality of this resource. They had to contribute to, and reflect on the pros and cons of using Del.icio.us in this activity and determine the potential value of using it in their future teaching. The elements were developed to facilitate the achievement of the expected learning outcomes. These included– development of digital literacy skills using Del.icio.us and assessing the quality of web content which consisted of a collection of rated web resources related to classroom management that was available to them at all times. The final learning outcome was to make connections for using social software in future practice.

For Unit 12, the learners had to comment on TeacherTube videos. They used it to share their comments on the assessment and evaluation video content, to reflect on the pros and cons of using TeacherTube in this activity, and to determine the potential value of using it in their future teaching.

The elements were developed to facilitate the achievement of the expected learning outcomes – development of digital literacy skills by contributing to web content, commenting on the assessment and evaluation videos that would remain available to them all the time, and making connections between using social software and future practice.

Detailed instructional design of the enriched learning activities in comparison to the original activities can be found in Appendix D.

Feedback from other instructional designers. The enriched learning activities were reviewed by the course instructors and an experienced instructional designer from another university. Feedback suggested that the characteristic of social software applications chosen matched the types of collaboration and activity. A couple of questions came up. One question was why GoogleDocs was chosen over Wikis. The researcher explained the considerations of the social software selection process. It was agreed that the real time interaction and document versioning were better suited for the lesson plan activity. Another question was regarding TeacherTube's technical infrastructure. The researcher explained that no previous experience was available at that time, and that an alternative approach was available. The individual who raised question about TeacherTube considered this a reasonable approach. All developers were interested in being updated on the research results.

At the end of Phase I, the outcome-based instructional design process, three enriched learning activities were integrated into the online course.

Phase II: The course delivery. During this phase the enriched learning activities were implemented through the course delivery. First the participants were recruited. Then an online pre-course survey was administrated. Subsequently the learners' online participation during the course was captured in the course records and their reflections on the enriched learning activity were

collected after each activity. At the end of the course, a post-course survey was administered. In addition, learner support using social software was provided by the researcher and documented in the researcher journal.

Recruiting participants. Following research ethics approval, learners who were enrolled in the online course Curriculum Design and Evaluation delivered by the course instructor were invited to participate in this study. Since the online course had already started and the researcher needed to obtain the consent from the participants as soon as possible, an email invitation was sent to the learners for their consent so that the research could commence. The letter of introduction and informed consent form for the participants (see Appendix C) was attached to the invitation.

As part of the invitation, the researcher introduced herself and provided an introduction to the project. The researcher also specified the purpose of the study, indicated the role of the participants within the study, and informed the learners that the researcher would be reading their online postings and assignments should they agree to participate in the study.

The participants were informed that upon consent, they agreed to participate in completing surveys for this research study, and they agreed to be contacted for two possible interviews in the later part of the research should they be selected. The participants were also informed that the first survey link would be sent to them within 24 hours following their consent. The second survey link would be sent to them within 24 hours of their last class in the course. Participants were assured that their participation in the study was voluntary and they would be free to withdraw themselves and/or their data from the study at any time without any ramifications on their academic grades. Also, the participants were assured that the course instructors would have no knowledge of who was participating. A total of 37 participants provided their consent to participate in this study.

Administering pre-course survey. An online survey was administrated within 24 hours of the participants' consent. The survey incorporated a demographic survey and the self-reporting Stages of Adoption of Technology (SoAT) survey (Christensen, 1997; Russell, 1995). The pre-course survey provided information on learners' digital literacy so it could be determined whether there was the need for any adjustments to or additional support for the enriched collaborative learning activities.

Providing learner support. The researcher provided support to all students in the online course (both participants and non-participants), when they participated in the enriched learning activities during the course delivery. Due to the delay of research ethical approval at the beginning of the course, the researcher was not able to connect with the learners directly. As such the support prior to the ethical approval was provided by the researcher through the course instructors. The request time, unit of the course, nature of the questions, and action taken were documented in the researcher journal and are reported in Chapter 4.

Recording learner online participation. Learners' online participation throughout the course was recorded in the course records through the institution's learning management system. The course records included items such as the learners' online postings and comments. In addition, the participants' activities on the social software sites were also recorded. This included items such as documents shared, comments provided, and resources posted.

Collecting learner reflections. As part of an assignment requirement for all enriched learning activities, the participants submitted their written reflection after completing units 5, 7, and 12. They discussed their views about the advantages and disadvantages and their own experiences with the social software application. They also reflected on the potential use of social software in their future teaching and learning.

Administering post-course survey. An online survey was administered within 24 hours of last class completion. The post-course survey included the SoAT survey and the *W(e)Learn* survey instrument. The post-course survey provided information regarding change in the learners' digital literacy, attitude toward social software, level of participation, and learning outcomes (SoAT scores).

At the end of Phase II, the following participant data were recorded: demographic information, their previous online learning experiences and attitude, their level of online participation in the online course, and their reflections and learning outcome. Some of these data were used to inform the next phase of the study.

Phase III – Individual interviews. During this phase, the participants were purposefully selected (see selection criteria on page 78) for two interviews, one was conducted right before the end of the course and the other was five months after completion. An interview guide (see Appendix H) with a list of questions was used.

Interviewee identification. The identified participants were representative of the heterogeneity of the population in terms of age, gender, and ethnicity; previous experiences in e-learning and social software; attitude towards past e-learning experience; and status of learning outcome achievement. Ten participants selected for interviews were invited by the researcher via email. As suggested by the Research Ethics Board, consents from the selected interviewees were also collected. Written consent was obtained when the researcher met the interviewee on campus. Participants who were not available on campus agreed that their responses to the researcher's email invitation were documented as their consent.

First interview. The first series of individual interviews were conducted after the participants return from practicum, which started during the last two weeks of the course and lasted

until two weeks after the course completion. The purpose of the first interview was to obtain deeper insight into the data collected from the SoAT and the *W(e)Learn* instruments. Of the ten identified participants, seven contributed to this in-depth, semi-structured, individual face-to-face or phone interview. The interviews took place on campus at the university where the course was offered. Telephone interviews were arranged for participants who were not able to meet on campus. The interviews lasted from 22-50 minutes. At the end of the first interview, the participants were reminded that the second interview would take place within five months and they would receive a reminder from the researcher.

Second interview. Five months after course completion, all ten identified participants were invited via the researcher's email invitation for the second interview. At the time the participants were just about to complete their second practicum. The interview questions were focused on the application of newly acquired knowledge and skills from the course in their current practice. Five of the ten identified participants participated in the second interview. Again, the interviews took place on campus at the university that offered the course. Telephone interviews were arranged for participants who were not able to meet on campus. The interviews lasted from 15-20 minutes.

During phase III, the interviews were audio-taped with the participants' permission and then transcribed verbatim and coded through content analysis. Copies of the transcripts were returned to the participants for verification or revision if they felt it would clarify or better represent their answers (Borland, 1991; Crepeau, 2000). No participant responded to the request for transcript verification.

Instrumentation and Data Collection

Both quantitative and qualitative data were collected using a number of instruments. The quantitative data were collected via pre- and post-course surveys and the course records that

recorded their online participation. Qualitative data were collected through the researcher journal of the instructional design process, the participants' reflection submitted at the end of each enriched learning activity, and transcripts of two interviews that were administrated five months apart.

Researcher journal. The researcher used the journal template (see Appendix I) to keep a journal throughout the instructional design process. The journal documented the instructional design strategies and actions taken. It also included the researcher's reflections on her experiences as an instructional designer using the outcome-based instructional design approach. By doing so, the researcher obtained a unique view of the instructional design process, the challenges and the design approach. The researcher's reflection on-and-in action documented the connection between the instructional design strategy and the expected learning outcomes. The researcher's reflection also informed the identification of effective instructional design strategies that contributed to learners' achievement of learning outcomes as well as those strategies that could be enhanced or improved. Moreover, the researcher journal captured learner support provided by the researcher directly or through the course instructor during the course delivery phase. The journal supplemented the findings from the learner data and provided a well-rounded perspective of outcome-based instructional design using social software.

Pre-course survey. The pre-course survey comprised both the learner demographic survey and a Stages of Adoption of Technology (SoAT) survey (Christensen, 1997; Christensen & Knezek, 1999).

Demographic survey. As part of the pre-course survey, the purpose of the demographic survey (Appendix E) was to solicit relevant information about the participants' age group, gender, their past experiences and attitudes toward e-learning and social software, and their past experience and attitudes toward collaborative learning activities in an e-learning context. The demographic

information collected from the learners helped put the findings into context.

SoAT survey. The Stages of Adoption of Technology or SoAT survey (Appendix F) is a single-item survey used in both pre-service and in-service education to measure the changes in technology adoption, as well as trends over time. SoAT is a standardized ‘stage scale’ that utilizes Likert-type items for participants to self-identify their stage of adoption of technology from 1 to 6. Higher stages correlate with higher adoption of the social software. The stage descriptions in the SoAT instrument can be generalized for measuring stage changes in any technology adoption (Christensen, 1997; Christensen & Knezek, 1999). As such, this survey was used in both pre- and post-course surveys to obtain an understanding of the participants’ self-reported changes in their social software adoption.

As part of the pre-course survey, SoAT stages of the participants before the course were collected as a baseline for the subsequent comparison with their post-course SoAT stages.

Post-course survey. The post-course survey comprised both the *W(e)Learn* survey instrument (MacDonald et al., 2009) and a SoAT survey.

W(e)Learn survey instrument. The *W(e)Learn* instrument (Appendix H) was designed to capture information relating to the quality of e-learning course design and learners’ learning experiences with respect to the structure, content, media, services, and learning outcomes. In this study, the *W(e)Learn* survey instrument was administered after the learners had completed the course so that the researcher could collect data related to the type and quality of the learners’ experiences, including the participants’ perceived opportunities for collaboration, relevancy of content, learning outcomes, and the overall satisfaction of their learning experience with the enriched learning activities.

SoAT survey. As part of the post-course survey, the participants SoAT stages after the

course were collected as their post-course outcome. The participants' pre-course SoAT stages were therefore compared with their post-course SoAT stages. This comparison allowed for the participants' change in their stages of social software adoption, if any, being analyzed.

Course records. The course records captured data about the participants' online participation in the institution learning management system, on social software sites, and their reflections on each enriched learning activity. The participation records informed the analysis of online participation patterns in enriched learning activities and in those unchanged activities.

Participants' reflections. Learners were required to complete a brief reflection on the pros and cons, their experience, perceived future use and/or learning of using social software. Learners submitted these reflections after each social software enriched activity as part of their assignment. As part of the course records, data collected from participant reflections informed a detailed analysis of their positive or negative experiences with each enriched learning activity, knowledge and skills learned, and their attitudes toward and application of social software. This information provided an in-depth view of learner's experiences and achieved learning outcomes.

Interview transcripts. In this study, two sets of interview transcripts were generated. One from the first interview conducted right before the end of the course and the second interview conducted 5 months after course completion.

The interview transcripts collected from the first interview provided more in-depth detail about the participants' learning experience, including their attitudes toward and learning outcomes from using social software enriched learning activities. Data about the participants' overall impression on the use of social software in the course was also collected.

The interview transcripts from the second interview collected the results of participants' integration of newly acquired knowledge and skills from the course into their teaching practice.

Data Analysis

Data analysis consisted of quantitative and qualitative analysis of the researcher's journal, pre- and post-course surveys, course records, and interview transcripts. The integration of quantitative and qualitative data was also a feature in this study.

Quantitative data analysis. Descriptive statistics were calculated for the quantitative data from the pre-course demographic survey, the post-course *W(e)Learn* survey, and the pre- and post-course SoAT survey.

A comparison of the number of postings made by participants in the social software enriched learning activities and the unchanged learning activities was conducted to determine whether there were differences in the level of participation.

A paired samples t-test was conducted to determine whether there was an overall difference of the participants' SoAT mean stages before and after the course and to measure whether there was an overall change in the stage of adoption of social software for all participants. Further, in order to understand whether the change in participants' stage of social software adoption was affected by factors of interest, five one-way analyzes of variances (ANOVA) of SoAT changes among participant groups were conducted. The dependent variable for the ANOVAs is the change in SoAT (Post-SoAT minus Pre-SoAT). The independent variables are gender, age group, prior online course experience (whether this was the first online course taken), pre-course SoAT, and satisfaction with the course.

All statistical data analyzes were conducted with the Statistical Package for Social Sciences software (SPSS), version 18.

Interviewee identification. As a step to inform further qualitative data collection, participants' responses to pre- and post-course surveys including their change of SoAT stages were

used to inform the purposeful participant selection for interviews. The following combinations were used:

1. More previous experience, negative attitude, and achieved the learning outcomes;
2. More previous experience, negative attitude, and did not achieve the learning outcomes;
3. More previous experience, positive attitude, and achieved the learning outcomes;
4. More previous experience, positive attitude, and did not achieve the learning outcomes;
5. No/less previous experience, negative attitude, and achieved the learning outcomes;
6. No/less previous experience, negative attitude, and did not achieve the learning outcomes;
7. No/less previous experience, positive attitude, and achieved the learning outcomes;
8. No/less previous experience, positive attitude, and did not achieve the learning outcomes.

Taking the age and gender factors into consideration, and some possible overlaps among demographic factors with these 8 combinations, in the end 10 participants representing these possibilities were selected for interviews (see Table 3.3).

Qualitative data analysis. The researcher's journal as well as the participant reflections and interview transcripts were subject to content analysis. For the researcher journal, the researcher searched for instructional intent, the reasoning of choices made and the challenges encountered during the process.

For the participants' reflections and interview transcripts, the researcher searched for information that addressed participants' reactions to the learning activities, social software, and the overall learning experience; the acquisition and application of new knowledge and skills; changes in participants' attitudes; and participants' reflections on the learning outcomes.

The constructs of *W(e)Learn* were used to help identify categories of data with respect to the

structure, content, media, service, and outcomes. Then, through an inductive process using the constant comparison technique, the researcher identified analytical sub-categories under each *W(e)Learn* construct and new themes as they were identified from the data within and across individual accounts (Ayres, Kavanaugh, & Knafl, 2003; Strauss & Corbin, 1990). As a result, the subcategories under each *W(e)Learn* construct are not identical to those in the original *W(e)Learn* model. In addition, if an identified theme did not fall under the five *W(e)Learn* constructs, it was further analyzed with all other identified themes. As such, new categories beyond the *W(e)Learn* constructs were identified. The researcher went through the data several times until no additional themes, categories or subcategories were identified. The researcher also had a colleague code selected passages of text to determine inter-coder reliability. Themes identified from the qualitative analysis can be found in Chapter 4 Figure 4.10.

For each subcategory to be included in the report, it was identified by at least two participants. Once the categories reflected “the recurring regularities or patterns in the study” (Crepeau, 2000, p. 36) and the researcher was satisfied that the themes reflected the views of the participants through a constructive approach, the data were assigned to the categories and the findings were compiled (Crepeau, 2000). Direct quotations were used throughout to preserve the voice of the participants (Lincoln & Guba, 2000). It was expected that the data analysis and compiling process would lead to a rich description of the participants’ private and shared experiences of using social software in the social software enriched learning activities.

The instructional intents identified at the onset of the study include: exposing participants to social software, enhancing participant’s digital literacy, and stimulating reflection. Qualitative findings on learning outcomes related to the instructional intents were identified as following: improved social software skills (Box F2 in Figure 3.3) links to enhancing digital literacy; attitude of

future use (Box F3 in Figure 3.3) links to enhancing digital literacy and stimulating connection; and knowledge about the purposes and benefits of using social software in education (Box F1 in Figure 3.3) and using social software in practice (Boxes G1 and G2, in Figure 3.3) link to all three intents.

Unexpected learning outcomes are usually not anticipated and hold unique meaning to individual learners (Academic Quality Initiative, 2008; Killen, 2000). The researcher did not intentionally “guess” what additional learning outcomes could derive from using social software. However, learners’ reflections and interview transcripts captured and qualitative analysis revealed unexpected learning outcomes that were not part of the original instructional intent.

Integration of quantitative and qualitative data. Quantitative and qualitative data integration is an integral part of mixed methods research (Teddlie & Tashakkori, 2009, 2011). In this study, the integration was done through the following three strategies.

Applied keyword frequency techniques analyze qualitative data. Determining the quantitative presence of certain words or concepts within a text is a technique often used to analyze transcripts of asynchronous, computer mediated discussion groups in formal educational settings (de Weaver, Schellens, Valke, & van Keer, 2006). Keywords that represented the concept of using social software were searched in the participants’ reflections, and the most frequent keywords were used to determine the demonstrated learning outcomes.

Answering the research questions is the focus of mixed methods studies and the inclusion of both quantitative and qualitative findings provides breadth and depth to the answer (Teddlie & Tashakkori, 2009). The overall outcomes (quantitative, breadth) and the inference on how the outcome happened (both quantitative and qualitative, depth) were integrated to answer the research questions of this study.

The convergence and divergence of findings and inference across qualitative and

quantitative data can lead to conformity or more complex understandings for further investigation (Teddlie & Tashakkori, 2011). The convergence and divergence across quantitative and qualitative findings of this study were constantly checked and critically discussed to confirm the outcome-based instructional design strategies, or to inform the areas of instructional design improvement and areas of future research.

Strengths and Limitations of the Research Design

Strengths. There were four advantages of the research design for this study. First, the phased approach made the collection of all data logistically possible for the researcher who attended to every aspect of the study. While there were planned overlaps between the three phases of this study, each overlap provided a continuum for data collection in the next phase.

Second, the sequential mixed methods design strengthened the logic in phase two and three of the study. Quantitative data were obtained and analyzed then the results were used to focus qualitative data collection and interpretation in the next phase. With this pre-planned sequence, the researcher collected and analyzed one type of data at a time prior to the data integration. This was desirable due to the amount and the sources of data.

Third, the sequential explanatory design allowed the researcher to explore the quantitative outcomes in great detail, which resulted in a richer understanding of the achievement of learning outcomes. This in turn further informed the effectiveness of the outcome-based instructional design.

Fourth, the design of this study allowed for comprehensive data collection and analysis over a long period of time (11 months). Thus the research questions were answered effectively through qualitative and quantitative data, and results informed the identification of themes and areas for further studies.

Limitations. There were four limitations of the research design in this study. First, generalizability of research findings is limited due to the relatively small number of participants recruited from one e-learning course on a specific subject. Since the research was based on theory and literature of e-learning, further research could be conducted in other e-learning programs.

Second, while the surveys and interview questions focused on the enriched learning activities, it was possible that the participants' views also reflected regarding the learning activities, the instructor, the learning management system, the course, and the teacher education program in general.

Third, since the SoAT stages were self-reported by the participants, there was a possibility that the participants might have over or under reported their stages.

Forth, this research was conducted in the context where pre-service teachers were engaged in a teacher education course. It was possible that the participants' experiences in teaching profession could be influencing their experiences, reactions, and learning.

Despite these limitations, the sequential mixed methods research design was robust. However, using this case study approach was extremely time and workload intensive for the researcher. Data collection took 11 months to complete from inception with the researcher journal, to the final second interview five months after the course completion. The researcher spent a great deal of time tracking data from different sources so that everything was well organized for data analysis. Further, qualitative analysis was very time-consuming due to the amount, sources, and time span of data collection. Finally, the integration of quantitative and qualitative data involved constant cross-referencing that was supported by a continuous and intensive literature review. The researcher reinterpreted data multiple times to check the meaningfulness of the integrated results.

Researchers who want to choose a sequential mixed method case study design need to prepare for an intensive workload and long time commitment, but can be rewarded with rich, unique findings.

Validity, Reliability, and Trustworthiness

The validity, reliability, and trustworthiness of this explanatory mixed methods case study were considered from three aspects: the use of a case study, quantitative data instruments, and qualitative data analysis.

Validity. Yin (2009) stressed the importance of construct, internal and external validity of an explanatory case study.

Construct validity. Construct validity deals with identifying sufficient operational measures for the concepts being studied (Kidder & Judd, 1986; Yin) and it may be obtained through the use of multiple sources of evidence and the establishment of a chain of evidence (Creswell, 2009; Yin). In this study, data were collected from various sources (e.g. researcher journal, learners' reflection, interview transcripts) and multiple participants. The chain of evidence on learners' change (learning outcomes) was first specifically measured by the SoAT instrument, then the *W(e)Learn* survey, next by rich descriptive data, and finally led to the answers to the research questions.

Internal validity. Internal validity deals with explaining causal relationship and avoiding spurious relationships (Kidder & Judd, 1986; Yin, 2009) and it may be obtained by explanation building, addressing rival explanations, and using logic models (Yin). This study used a logic model (Figure 3.3) to assist with the explanation that was supported by both quantitative and qualitative data from multiple sources by multiple participants. In addition, the divergence between quantitative and qualitative data and rival explanations in the literature (e.g. satisfaction versus outcomes) were discussed in a transparent manner.

External validity. External validity deals with the domain to which the findings of the study can be generalized and it may be obtained by using theory in single-case studies (Kidder & Judd, 1986; Yin, 2009). Guba and Lincoln (2005) suggested that “theoretical rigor of a study” is increased because of the focus on subsets of variables and the relationship between the data and the subject is easier to demonstrate, therefore research validity is increased by providing contextual information to enhance applicability or generalizability. This study used the *W(e)Learn* framework as the foundation which established e-learning programs as the domain where the findings of this study could be applied or generalized.

Reliability. Reliability of an explanatory case study deals with whether the operations of the study can be repeated with the same results and may be obtained by using a case study protocol (Kidder & Judd, 1986; Yin, 2009). In this study, not only a clearly structured case study procedure, but also a well-studied framework was used as the foundation to guide the study. All research instruments were tested and studied elsewhere, including the survey instruments, interview protocol, and template the researcher used for journaling.

Regarding quantitative data instruments, reliability of scores from an instrument needs to be determined by empirical means (Archibald, 2011; Johnson & Christiansen, 2008). The SoAT instrument is a single item survey. Although internal consistency reliability measures cannot be calculated, high test-retest reliability estimates (0.91) have been obtained from validation studies on SoAT (Christensen & Knezek, 2002). The *W(e)Learn* survey was developed based on years of research (MacDonald et al., 2009). The *W(e)Learn* instruments, including the survey, have been tested for reliability in programs involving over 1600 participants in Canada and New Zealand (Archibald et al., 2011). Reliability analysis included internal consistency which was assessed using Chronbach's Alphas. Item-total correlations were also calculated. All scales reported adequate

internal consistency.

Trustworthiness. Qualitative data analysis undergoes different criteria for judging the credibility or accuracy of the findings than quantitative analysis (Archibald, 2011). Creswell (2009) suggested the following strategies for validation or trustworthiness of the qualitative data.

Triangulation. Researchers use triangulation among data sources, data collection methods, time periods, and theoretical schemes (MacMillan & Schumacher, 2001). In this study the researcher compared different sources of data to determine whether there were reoccurring patterns. The researcher also triangulated the qualitative findings with the quantitative results.

Rich data. The researcher's detailed journaling regarding the design, development and delivery phases of the research, the participants' reflections on each enriched learning activity, and two series of interviews that allowed participants time to reflect and give detailed responses, resulted in rich data.

Participant verification. Interviewees were approached to verify their interview transcripts.

Searching for discrepant evidence. Miles and Huberman (1994) have indicated that after an initial set of codes or themes has been established the research should search the text again for any confirming or discrepant evidence. For this study the researcher read the data several times until no new themes were indentified.

Inter-coder reliability. The researcher asked an experienced researcher who has a PhD in e-learning to code selected passages of text to determine inter-coder reliability. The two researchers coded interview transcripts and reflections from different participants. QSR NVivo 10 qualitative analysis software was used to calculate a reliability coefficient. Consensus among the coders was approximately 95% and considered trustworthy. Miles and Huberman (1994) consider adequate and trustworthy inter-coder agreement to be in the 80%-90% range.

Auditing. The researcher's advisor is highly experienced in studying e-learning, instructional design, educational innovation, and evaluating learning outcomes. The researcher's committee members brought a wealth of research, teaching, and administration experiences in e-learning, teacher education, adult education, and educational innovations. A presentation was made to the thesis committee presenting the preliminary analysis of the research findings prior to the data analysis and discussions chapters being written up. The advisor and committee members have provided insightful advice and guidance on data collection and analysis.

Minimizing Researcher Bias

Creswell (2009), Maxwell (2005) and Yin (2009) discussed the influence of researcher bias which involves the selection of data that fits the researcher's preconceptions about the research. The researcher in this study assumed two roles: primary research investigator and instructional designer of enriched learning activities. The researcher carefully examined her potential bias prior to the study. For example, the researcher was proud of the integrity of her instructional design and she had a high comfort level with using social media. It was possible that she might have had expectations that participants would appreciate the social software exposure and apply it to a high degree. During the data analysis, it would be tempting to "look for" results that promoted the researcher's stance or not report contrary findings.

The following strategies were used to minimize potential subjectivity and bias posed by the dual role of the researcher, included:

1. Recognizing the possibility of researcher bias and aiming to minimize subjectivity throughout the study;
2. Using tested theories to inform instructional design;
3. Approaching the participants for data verification;

4. Pursuing inter-coder reliability during data analysis;
5. Reporting both positive and negative findings using participants' voices;
6. Discussing discrepancies between the research intent and results in qualitative and quantitative data in a transparent manner;
- 7 Reporting findings of this study (Chapter 4) in third person; and
8. Obtaining an audit of the research through the advisor and thesis committee.

Ethical Considerations

Stake (2005) identifies privacy, exposure, access, and agreements as issues that can impact the ethics of conducting case study research. The research ethics approval was sought before the researcher commenced participant recruitment. As per the Research Ethics Board's requirement, informed consent to participate in the pre- and post-course survey and the use of course records was sought from the learners. The identified interviewees also provided a separate consent for the interviews.

The researcher was given a username and password to access all aspects of the online course environment (e.g., Learning Management System, Google Docs, Del.icio.us, YouTube) to allow observation of all the activities in the course. The researcher's online presence was known by all participants. The researcher provided online support to all learners in the course (both participants and nonparticipants).

Participants' responses to surveys and interview questions were not available to the course instructor before learners' final marks had been submitted to the university administration. The researcher did not teach or participate in the content related activities, nor was she involved in the assessment and evaluation of the learners.

Participants' confidentiality was ensured. Online resources generated from the learning

activities did not contain personal information. Online activities of the non-participants were screened out before the course records were analyzed. All data, including transcripts of online postings, communication, surveys, and audio tapes, are stored on a USB memory key in a locked cabinet. To ensure anonymity of the participants, pseudonyms have been and will be used in any reports, communications and publications resulting from this research. Data and findings presented have not been and will not contain identifiable personal information.

This study provided a unique opportunity for learners to experience three social software enriched learning activities. All learners enrolled in the course were able to take advantage of these activities whether or not they chose to participate in the study. The learners were required to connect this learning experience with their future teaching career, and the social projects produced and resources shared by the learners remain available to date.

Summary of Methodology

In this chapter, the methodology, justification, procedure and considerations for this sequential explanatory mixed methods case study were described. Methodology justification also included a discussion on the pragmatism paradigm as it relates to a mixed methods approach. Procedures and instruments used in the study were discussed.

In phase one, the researcher kept a journal about the outcome-based instructional design including details of the social software enriched learning activity design and production that were presented with illustrations. Phase two involved quantitative data collection through pre- and post-course surveys on participants' demographics, past experiences and attitudes with using social software, achieved learning outcomes, and their reactions to the enriched learning activities. Qualitative data collected in this phase included participants' reflections on their experiences and perceived connections between using social software and their future teaching career. In phase three,

the demographics of the participants and rationale for the purposeful selection of interviewees, and the interview process were described.

The research design was conducive to the collection of rich data from multiple sources and participants. Quantitative and qualitative analysis was conducted. The integration of findings from both analyses produced effective answers to the research questions that sought to understand how outcome-based instructional design can enrich e-learning using social software, and what is its connection with the expected and achieved learning outcomes.

The chapter concluded with a discussion on the ethical considerations, methods used to minimize researcher bias, and the validity, reliability and trustworthiness of this study.

CHAPTER 4

FINDINGS

Introduction

This mixed methods explanatory case study explored how social software can be used to enrich an e-learning course using outcome-based instructional design. Specifically, the study was designed to answer the following research questions:

1. In what ways can outcome-based instructional design be used to incorporate social software in e-learning?
2. In what ways does the use of social software affect learners' level of participation?
3. How does outcome-based instructional design impact learners' learning outcomes?

This study had three phases. Phase I involved the design and development of social software enriched learning activities which were integrated into one section of an online Bachelor of Education Curriculum Design and Evaluation course in a Faculty of Education. The instructional design process was documented in the researcher's journal. Phase II comprised the delivery of three social software enriched learning activities in the context of an existing online course. Data were collected using pre- and post-course surveys and the course records. Phase III involved conducting two interviews with purposefully selected participants; one right after the completion of the online course and the other five months later.

The findings from this explanatory mixed-methods single case study are presented in four sections. The first section summarizes the considerations taken by the researcher during the outcomes-based instructional design process and during delivery of the enriched learning activities. The second section presents the overall participant profile and learning outcomes. The third section describes participants' reflections and further explores interviewees' experiences

and outcomes with social software enriched learning activities. The fourth section answers the research questions.

I. Instructional Design Considerations

The researcher kept a journal in which she recorded and reflected on the instructional design considerations in enriching learning activities and supporting learners during the course delivery. The instructional intent, design, and production of the social software enriched activities were reported in Chapter 3. This section discusses the challenges encountered by the researcher during the development of these activities and when providing participant with support during the delivery of the enriched learning activities.

Unknown learner profiles and needs. Information about the learners was not available during the design process. The researcher therefore designed the activities with the assumption that learners had no previous experience with using social software tools in formal learning settings and most of them were technologically savvy:

The challenge is that I don't know this group of learner, nor will I have access to them until they are actually registered to the course.... What I understand so far from conversations with the course instructors is that the population of learners varies [each] year and they are mixed in [terms of] age, previous experience, technology proficiency, and, possibly, attitude.... I cannot assume that they are technology advanced, even though some of them may belong to the "Net generation". (June 20, 2010)

Workload. The enriched learning activities introduced "add-ons" to the already heavy workload of the online course. Workload was a main consideration during the entire design process. The researcher tried very hard to minimize the workload for learners by finding a

natural fit for social software to be used in a learning activity, providing simple step-by-step instructions without adding too much information to the existing course:

Since I am not trying to redesign the existing learning activities in the course, these learning outcomes will be “add-ons” to this unit. Learners will inevitably spend a little more time on tasks like this, but I will try to keep the added workload to [a] minimum. I am thinking about providing basic information, such as step-by-step instructions on how to use the social software and an overall introductory message about the purpose and the importance of considering social software in their practices. I want to let them know that this is a starting point and they may find other technologies/means that better suit their needs in the future. If learners are interested in more information, I will provide more upon request. Hope the message can get across. (July 3, 2010)

Concept versus technology. The researcher found it challenging to keep a good balance between exposing learners to social software versus attracting too much attention to a specific technology that could become quickly outdated. The researcher attempted to make the learning activities short and straightforward without including too much information about the technologies and to leave room for learners to explore and reflect on how they could use social software in their teaching practice:

There are no cross-cutting rules about how teacher[s are] using social software in education, it really depends on the individual. I hope the approach I take simulates [a] real-life scenario so that learners can get a quick and straightforward introduction [to] the social software and then, in the future, they can explore how to use it in their teaching, if desired. The purpose of these learning activities is not to teach learners how to use the software; ... the emphasis here is on the concept and potential.... It would be great if the

learners would learn some social [software] skills and I am happy to help [them do this]. Using short instructions with video demos seems to be the least intrusive approach ... make all efforts to make the concept clear while minimizing technical difficulty. (July 3, 2010)

Administrative factors. During the course of the research, the researcher encountered some direct and indirect administrative challenges. Ideally, the researcher would have been present in the online course to provide support directly to the participants upon request. However, when the course started, the research's ethics approval was still in progress. The researcher was therefore not able to be in direct contact with the participants from the start. She therefore stayed in close contact with the course instructors and guided them to provide participant support as needed:

The students have already started this unit. It looks like there are some questions coming in and the instructors have sent me student questions and requests for support on using GoogleDocs, I responded rapidly via the instructors. I have included YouTube video instructions on how to use Google Docs as part of the enriched activity. The questions are related to issues with the formatting, confusion about where to start, and file size etc.... I really wish I could provide a live demo which could have helped clarify a lot of issues down the road. (September 30, 2010)

Administrative challenges related to the course also had an impact on the research. A computer lab was not available for the first face-to-face class, which was supposed to be a hands-on orientation to the online course. Participants therefore did not obtain an orientation to the social software as planned.

Technology compatibility and reliability. The researcher attempted to identify social software that had large user population, and that would be reliable, sustainable, and accessible to integrate into the course. To minimize potential technical issues, prior to the start of the course the researcher tested the different tools with different people, from different networks, using different types of computers. No issues were identified.

Starting September 30, 2010, the researcher received a number of requests for support for using GoogleDocs from the participants via the course instructors. It became apparent that GoogleDocs was not able to properly recognize and convert some of the advanced functions in the existing lesson plan template, which caused formatting errors in the lesson plans uploaded by the participants. The researcher tried to provide timely support to the participants through the instructors. Fortunately, soon after, on October 7, 2010, ethics approval was received and the researcher was able to provide timely support to participants directly from that point on.

Between October 14 and 15, 2010, the video clips in TeacherTube were temporarily inaccessible due to an unexpected server issue. The researcher learned about this from the participants' and switched the video links to those identical videos already uploaded to YouTube. The researcher also contacted TeacherTube technical support who resolved the issue by the following morning. The video links to both TeacherTube and YouTube sites were all kept available for participants.

On October 16, 2010, there was an unexpected Del.icio.us server downtime for several hours. The researcher informed the participants about the server issue and advised them that they may choose to try again later or use other means to access classroom management resources.

Table 4.1 provides an overview of the support provided to participants by the researcher. The numbers online represent the researcher's postings and email messages to provide

participant support; they do not include participants' or course instructors' email messages or postings.

The unexpected technology issues, compounded with the delay of research ethics approval, made the support process unusually challenging for the researcher. Also, the researcher felt some participants' frustration given that all three social software activities were undergoing technical reliability or compatibility issues. The researcher herself was overwhelmed by the fact that none of the activities were delivered smoothly:

Table 4.1

Support Provided to Participants during the Online Course Delivery

Date	Type of Support	Number of Researcher Postings/Email Messages	Method of Support
September 30 – October 6, 2010	Answering questions about how to start, file types/sizes, why having to use GoogleDocs, fixing formatting issues	16	Postings on the bulletin board (via course instructors)
October 7, 2010	Explaining the purposes for using GoogleDocs and social software in the course and that these technologies are examples	1	Postings on the bulletin board
October 7-31, 2010	Answering questions about how to use GoogleDocs; communicating the root cause of the formatting issues, updating the lesson plan	32	E-mail

Date	Type of Support	Number of Researcher Postings/Email Messages	Method of Support
October 14-15, 2010	Resolving issues related to accessing the videos on TeacherTube, posted YouTube videos, Contacted TeacherTube, made both TeacherTube/YouTube available, communicating to participants	5	E-mail, postings on the bulletin board
October 16-17, 2010	Informing participants about Del.icio.us server downtime, informing participants Del.icio.us back online	3	Postings on the bulletin board
Total		57	

It looks [like] everything that can go wrong went wrong for these 3 activities.... Issue with individual browser setup was also a contributing factor to the level of frustration. (October 18, 2010)

In summary, the researcher journal contained a number of instructional design challenges confronting the researcher during the design, production, and delivery of the social software enriched activities. The researcher used a number of pedagogical strategies to manage unknown learner profiles, minimize learner workload, and help learners to focusing on the concept of

using social software in education. These strategies include realistically anticipating learner profile, using short and straightforward learning activities and instructions, and enabling learners to make connections between technology and practice. Experiences from dealing with administrative challenges and technology compatibility and reliability issues were recorded to inform future instructional design considerations prior to offering an e-learning course.

Quantitative and qualitative findings presented in the following sections will be integrated with findings of this section to answer the research questions. Also, in Chapter 5, the researcher will discuss the implications of these experiences and try to make connections to the learning outcomes.

II. Quantitative Findings

In this section, the quantitative data from the pre-course demographic survey, post-course *W(e)Learn* survey, pre-and post-course SoAT, and the course records are presented. There were a total of 37 consenting participants in this study. Not all of them generated data in all sources of data collection. Therefore the number of participants in different data sources varies. For the surveys, 25 pre- and post-course survey responses were considered valid, as both pre- and post-course SoATs must be received to conduct a comparison.

Pre-course demographic survey. The pre-course demographic survey gathered information about the participants' experiences with and perceptions of social software, including their use in formal learning settings.

Experiences with and perceptions of informal online learning. Participants reported whether or not they had previously participated in informal online learning (see Table 4.2) and the reasons why. Of the 25 participants, 3 (12%) indicated they "always" used the Internet for

informal learning, 13 (52%) reported they “often” did, 8 (32%) said they “sometimes” did, and 1 indicated he/she (4%) “never” did.

Table 4.2

Participants’ Previous Participation in Informal Online Learning ($N=25$).

Informal online learning	Never	Occasionally	Sometimes	Often	Always
Using the Internet for information learning	1	0	8	13	3

Of the sixteen participants who used the Internet often/always for informal learning, twelve reported they did so because the Internet was easy to access, nine expressed it was because they were able to find the desired resources, seven stated it allowed them to quickly locate resources, six responded that the wide range of quality and practical resources available online appealed to them, and four stated the Internet was flexible and/or convenient.

Five participants reported reasons for why they did not frequently participate in informal online learning. Three participants indicated they preferred getting information from other sources, such as other people, one indicated he/she was too busy to browse the Internet for fun, and the other noted concern about the credibility and accuracy of online information.

Experiences with and perceptions of formal online learning. Participants were asked to report their previous experiences with online learning programs, meetings, research, and professional development activities within formal learning institutions. Data were analyzed to identify participants’ experiences and participation in traditional online learning tools; their experience consuming, producing (contributing to and / or creating) resources using social software; and their previous use of the social software used in the course.

Traditional online learning tools. Methods and tools commonly seen in formal online learning environments included computer-based training, threaded discussions, real-time/instant messaging, video conferencing, audio conferencing, and simulations. Participants were asked to identify how frequently they had used these methods and tools in formal online learning settings (see Figure 4.1). Overall, participants reported they had never, occasionally, or sometimes used these methods. However, participants used threaded discussions, computer-based training, and instant messaging more frequently than the other methods and tools.

Consuming web content through social software. One feature of social software is that it allows users to easily consume web-based content; for example, by listening to podcasts, subscribing to social bookmarks, viewing shared documents online, reading blogs, viewing wiki entries, or watching YouTube videos. Participants were surveyed about their use of social software to access content and the findings are presented in Figure 4.2. Most participants watched YouTube videos frequently. However, they much less frequently listened to podcasts, viewed shared documents online, read blogs, or viewed wiki entries. Social bookmarking was the least frequently used type of social software.

Producing to web content through using social software. Social software also allows users to collaboratively produce web content as contributors or creators. Contributing to web content can be done by sharing social bookmarks, creating and sharing documents online, commenting on blogs, editing wiki entries, commenting on YouTube videos, and participating in social networking sites, such as Facebook. Participants were surveyed about their contributions to web-based content through the use of social software (see Figure 4.3). Results show that participants infrequently used social software to contribute to the web content.

However, the use of social networking sites, such as Facebook, was an exception. Most participants used social networking sites much more frequently.

Social software also allows users to create to web content through the site. Creating web content through social software takes initiative and it initiates and invites collaborative effort of many users, and it requires a user to take on the leading role for web content generation. This role can be fulfilled by efforts such as sharing social bookmarks, collaboratively working on shared documents online, create a blog, co-create a wikis, and uploading YouTube videos. The participants were surveyed on their past experiences in creating web content through social software.

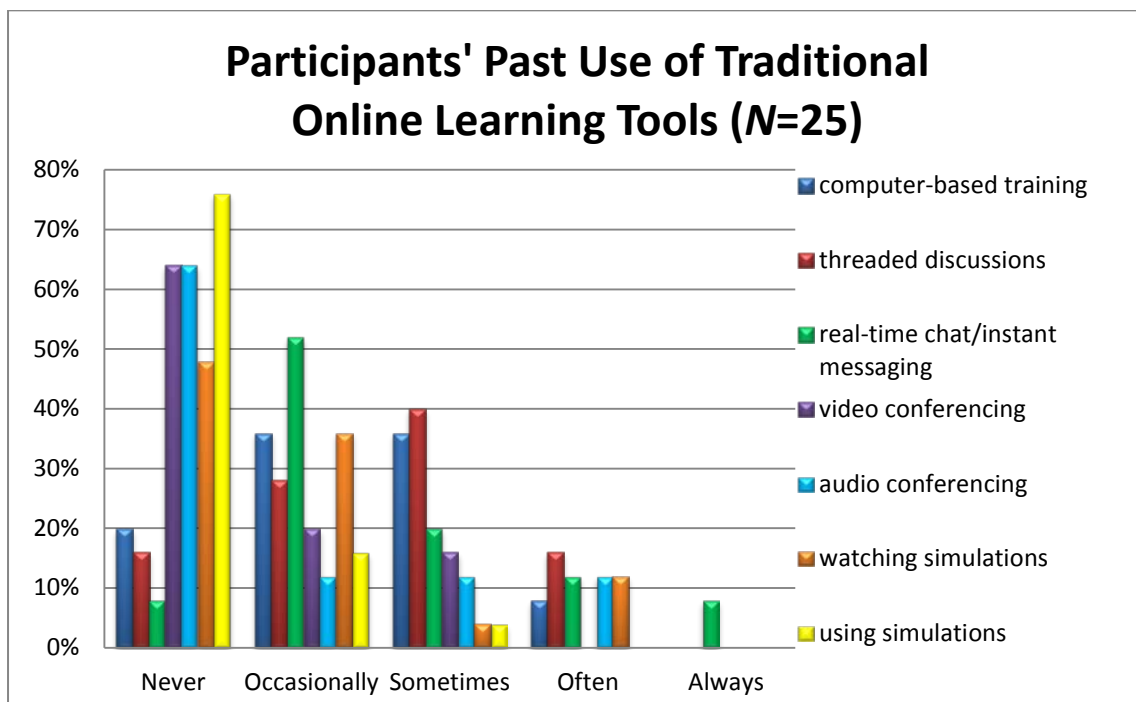


Figure 4.1. *Participants' use of traditional e-learning methods and tools in formal online learning settings.*

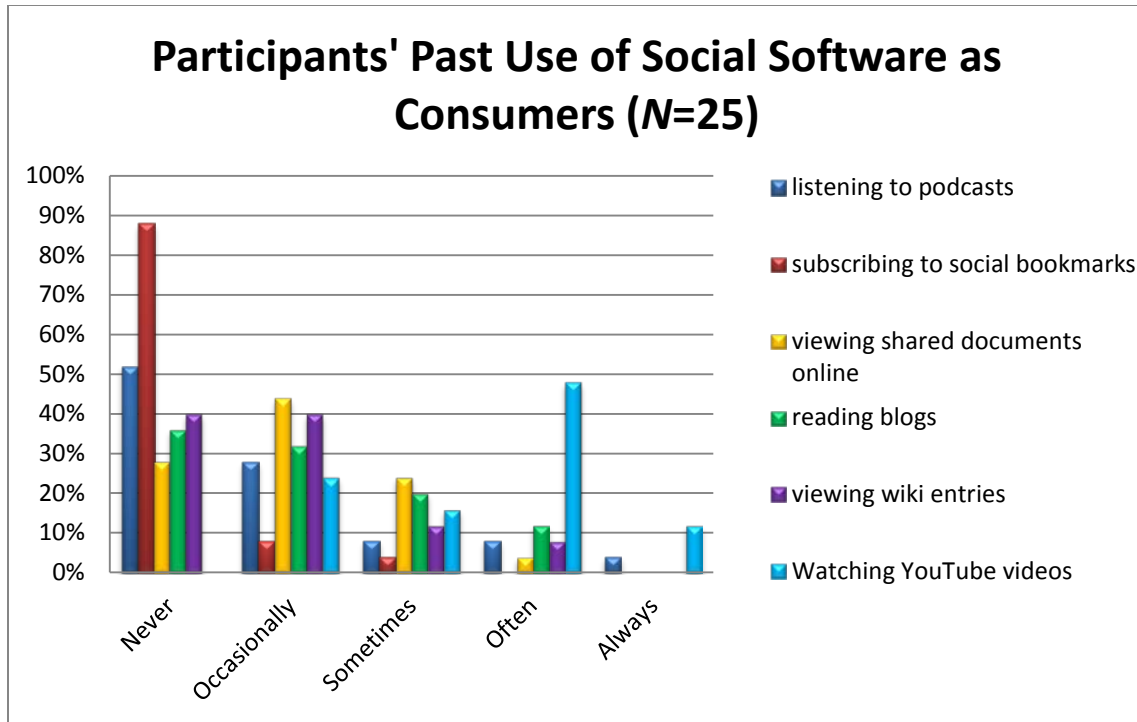


Figure 4.2. Participants' past use of social software as consumers.

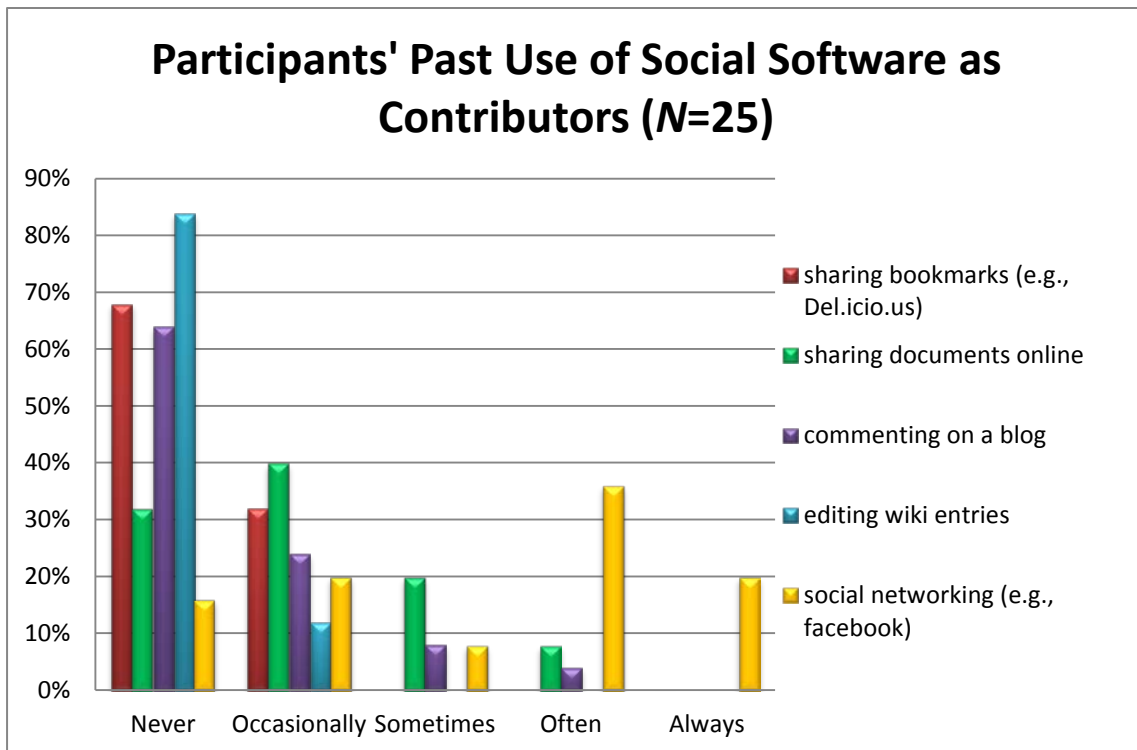


Figure 4.3. Participants' past use of social software as contributors.

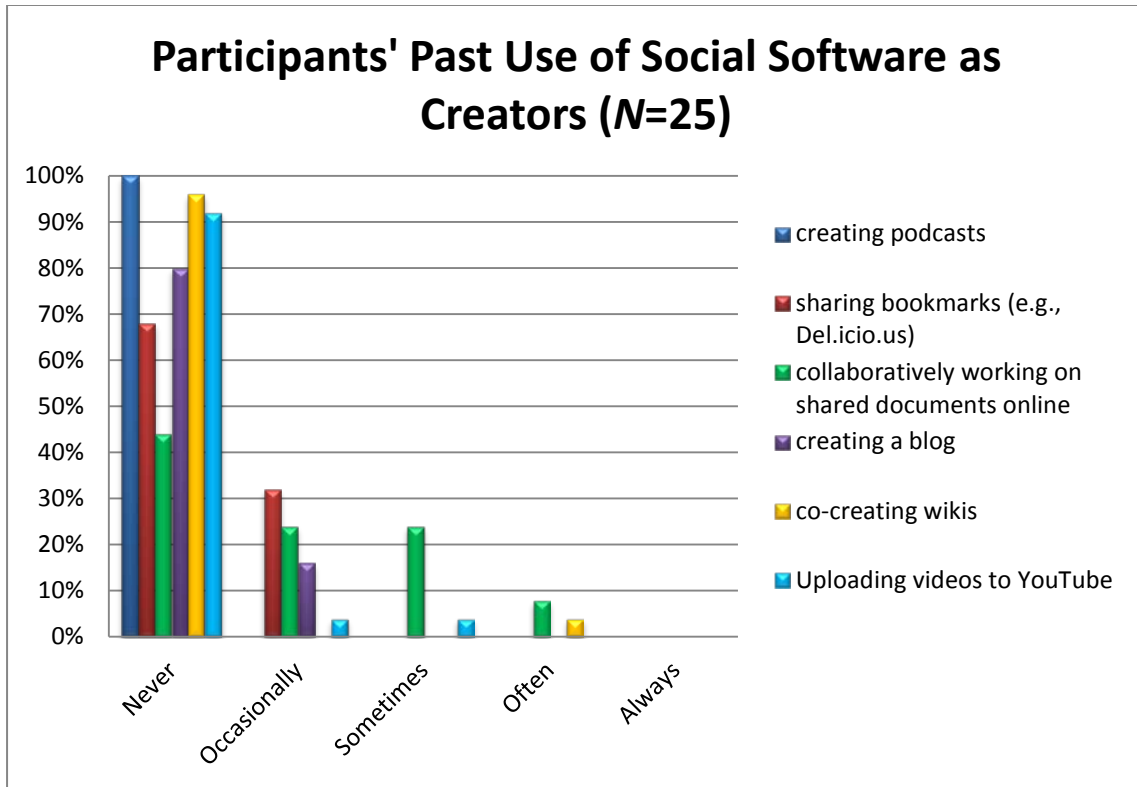


Figure 4.4. Participants' past use of social software as creators.

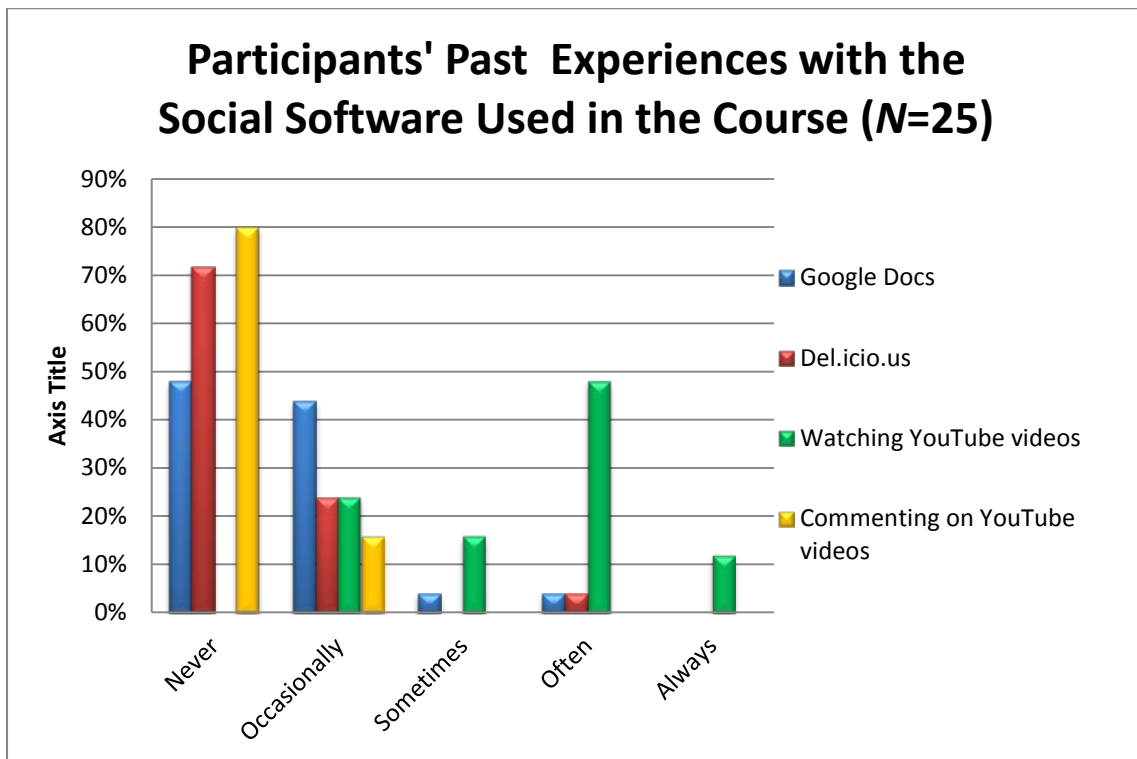


Figure 4.5. Participants' past experiences with social software used in the course.

Figure 4.4 presents participants' past use of social software for creating web content in formal online learning settings. Overall, participants' past participation in creating to web content using a variety of social software was close to none. However, participants worked collaboratively on shared documents online slightly more frequently than using other social software.

Past experiences with social software used in the course. The social software used in the course in this research included GoogleDocs, Del.icio.us, and YouTube. Participants were asked to identify their past experiences with these social software tools (see Figure 4.5). Most participants watched YouTube videos very frequently; however, their experience using GoogleDocs and Del.icio.us was limited.

Learners' perceptions of past formal online learning experiences. In general, around half of the participants reported they had had positive formal online learning experiences before (see Table 4.3). The reasons they gave for this included the following: being able to find desired resources successfully (n = 5); the online resources were easy to access and organize (n = 4); the learning experience was flexible and/or convenient in terms of time, location, pace, and how to complete the tasks (n = 4); they learned about new and relevant education tools and/or software (n = 3); the online interactions among participants allowed them to learn from each other (n = 3); and they had good computer skills and felt comfortable learning online (n=3).

Table 4.3

Participants' Perceptions of Past Formal Online Learning Experiences (N=25).

Formal Online Learning	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
My formal online learning experiences are positive	2	10	10	3	0

Also, for those who reported they did not have positive formal online learning experiences before, seven participants preferred face-to-face classes over formal online learning. They provided the following reasons for this: they preferred to learn from a person in real-time; online learning took too long and was too challenging if the course was not well organized, explained, and did not have an orientation session at the start; online tasks were too time consuming; it is difficult to follow computer instructions; and they had encountered technical difficulties in the past.

The participants explained why they had partaken of formal online learning activities in the past. Eight said it was because the activities were relevant to their professional practices and they learned from these activities. Six reported it was because the activities were fun and were of interest to them. Two participants indicated it was because the activities were easy, convenient to do, and they were connected with colleagues. Two others noted they loved the technology and felt comfortable not working with colleagues face-to-face.

Of the twenty-five participants, twelve gave reasons why they had not participated in formal online learning activities using technologies or social software in the past. Five reported there was no need for this in their professional activities or practice. Another five stated they were not interested in the activities and/or did not care or want to know about technology. Four felt it was too time-consuming and they did not want to spend too much time in front of a computer. Other participants stated that they had not had the opportunity to be introduced to the technology or that they preferred to stay in the real-world rather than a virtual one.

Experiences with and perceptions of collaborative learning experiences. Participants were surveyed about their past collaborative learning experiences and their perceptions about

these experiences. In general, most participants had participated in a moderate amount of collaborative learning experiences in formal online learning settings (See Table 4.4).

Around half the participants reported they had had positive collaborative learning experiences (see Table 4.5). Nine stated they enjoyed learning with and supporting each other. Four indicated they liked working with people and collaboration was a natural fit. Three revealed they found collaborative learning helpful to distribute the workload among members and complete the task efficiently. Two reported they received helpful ideas and feedback as a result of collaborative learning. Others revealed they felt they could contribute to the group with their personal strengths and that being able to work together was a requirement for future teachers.

Table 4.4

Participants' Past Collaborative Learning Experiences ($N=25$)

Formal online learning activities	Never	Occasionally	Sometimes	Often	Always
Participate in collaborative learning in formal online learning settings	1	12	6	6	0

Table 4.5

Participants' Past Collaborative Learning Experiences in Formal Learning Settings ($N=25$).

Formal Online Learning	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
My collaborative learning experiences in formal online learning settings are positive	0	12	11	2	0

Nine participants reported the reasons why they felt their past collaborative learning experiences were not positive. Four indicated that schedule conflicts were hard to resolve. Three revealed that workload distribution was a challenge and that the majority of the work was done

by one or two members of the group. Two reported they encountered personality conflicts when discussions or project direction were dominated by one member. Others indicated that not all members had Internet access and that collaboration was time consuming.

Post-course *W(e)Learn* survey. The *W(e)Learn* survey was administered right before the participants completed the course. The survey questions were related to opportunities for collaboration, learning activities, relevancy of contents, learning outcomes, and the overall satisfaction of the learning experience with the enriched learning activities.

In general, participants felt the course content was relevant to their professional practice and they were given opportunities to learn collaboratively (see Appendix N). Specifically, many participants agreed that the learning activities were practical, relevant to their teaching, fostered their collaboration, and helped them to achieve the learning outcomes. Participants reported their ability to solicit information from peers was improved. However, 56% (14/25) of the participants did not enjoy the learning experience.

Online participation. All thirty-seven consented participants all took part in the online bulletin board discussions. Twenty-seven of them also participated in the social software enriched activities and had a number of exchanges with the researcher when seeking assistance with the social software. All participants' online participation is summarized in Table 4.6. In this course, 83% (895/1078) of the online participation related to content discussions on the bulletin boards and the rest related to the use of social software. In general, the total number of interactions within a unit was significantly higher in units that used social software than those that did not. In units with a face-to-face class, the level of participants' online participation was minimal.

Participants went on a month-long practicum after completing Unit 7 and came back on campus for Unit 8. There was an overall decline in the level of participants' participation after Unit 7 when participants were busy preparing for the month-long practicum to teach in real classrooms. However, participants' online participation levels continued to be significantly higher in units that used social software than those that did not.

In units 1 to 5 before the practicum, participation in the core course content discussions on the bulletin boards was consistent across units regardless of whether social software was used. In Unit 5, GoogleDocs was used. This was the first time social software was introduced in the course and the overall online participation significantly increased in that unit as a result of the interactions in GoogleDocs. Some of these additional online interactions were related to obtaining support to deal with the technical issues. However the online interactions on providing and receiving feedback on GoogleDocs platform were higher than those related to technical issues. While the number of postings related to content discussions decreased since participants started the practicum preparation, the number of postings in units using social software was much higher than in those not using social software.

Overall online participation is consistent with the amount of interaction required to complete the learning tasks. The qualitative data from the participant reflections and interview transcripts will be used to understand whether the use of social software contributed to participants' higher level of participation in the discussions on the course content.

Table 4.6

Number and Type of Participant Online Postings and Exchanges by Unit

Units of the Course (Sept. – Dec., 2010)	Social Software Used	Content Discussion Posted on Bulletin Boards	Social Software Questions Posted on Bulletin Boards	Exchanges with the Researcher	Documents, URLs, or Comments Posted on Social Software Sites	Total
1. Welcome	-	151	-	-	-	151
2. Curriculum in Ontario	-	161	-	-	-	161
3. Building and Delivering Curriculum	-	155	-	-	-	155
4. Scheduled break	-	-	-	-	-	-
5. Planning – Lesson Plans	GoogleDocs (YouTube)**	153	16*	29*	50*	248*
6. Assessment & Evaluation – The Big Picture (face-to-face)	-	10	-	-	-	10
7. Building Your Classroom Community <i>(Practicum preparation in parallel with this Unit, Practicum started after this Unit)</i>	Del.icio.us, (TeacherTube e/ YouTube)**	84	8*	-	39*	131*
8. Assessment and Evaluation – Authentic Methods	-	23	-	-	-	23
9. Assessment and Evaluation – Rubrics	-	44	-	-	-	44
10. Planning – Units (face-to-face)	-	-	-	-	-	-
11. Planning – Short-Term and Long-Range	-	50	-	-	-	50
12. Assessment and Evaluation – Traditional Methods	TeacherTube/ YouTube	57	2*	1*	38*	97*
13. Wrap Up	-	7	-	-	-	7
Total		895	26	30	127	1078

Note:

Non-participants' responses had been screened out from the course records before data analysis started.

“*” The number represents participants' online postings recorded in the course records and/or exchanges with the researcher.

The number does not include the researcher's response. This number is limited to the main social software used for the activity.

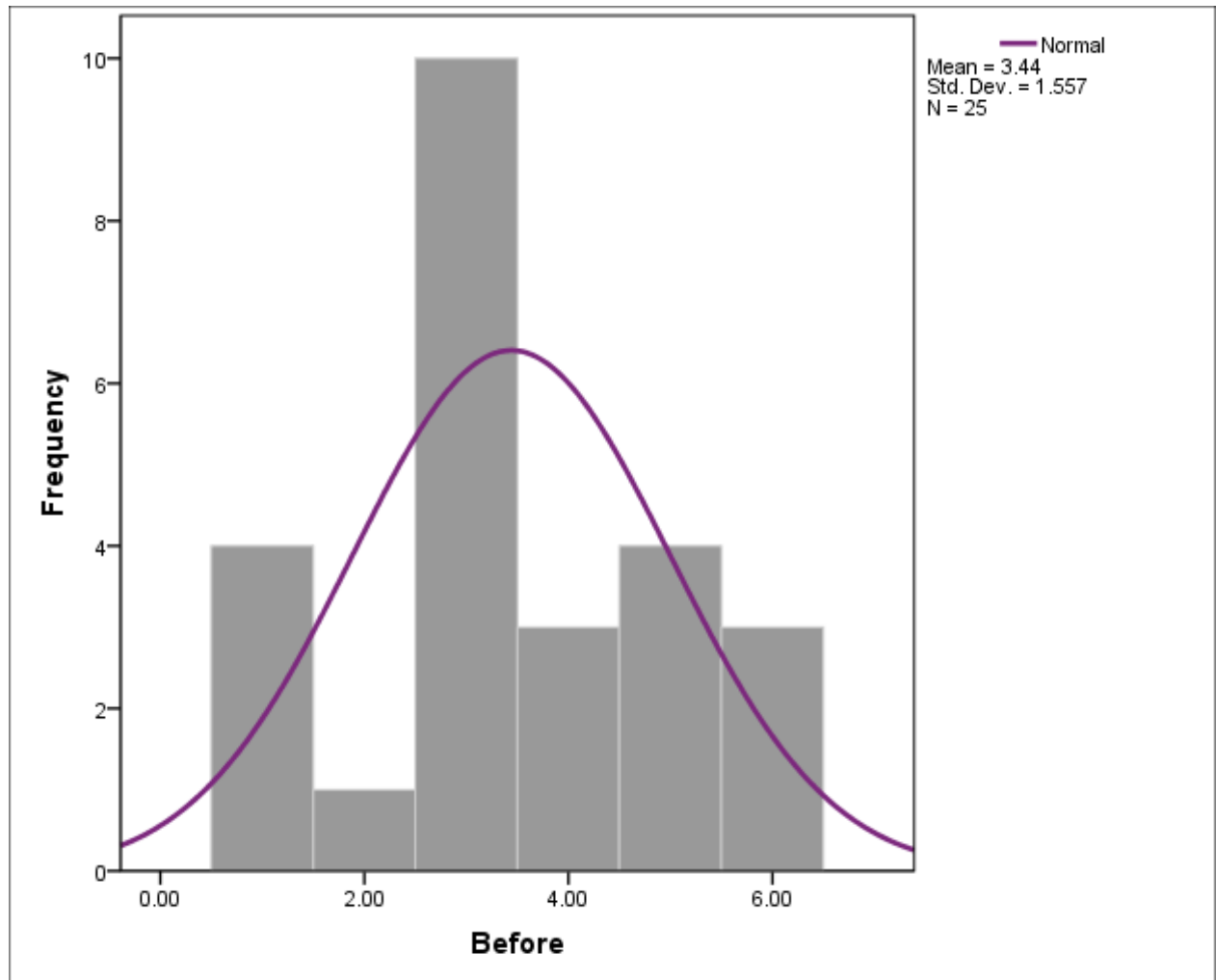
Participants may have had other types of online or face-to-face interactions that are not known or quantifiable in this study.

“**” TeacherTube/YouTube was not the main social software activity of the unit. The social software was used to provide technical instructions or as a video resource to course content. In this case, the degree of participation was not counted.

“-” Not applicable or zero.

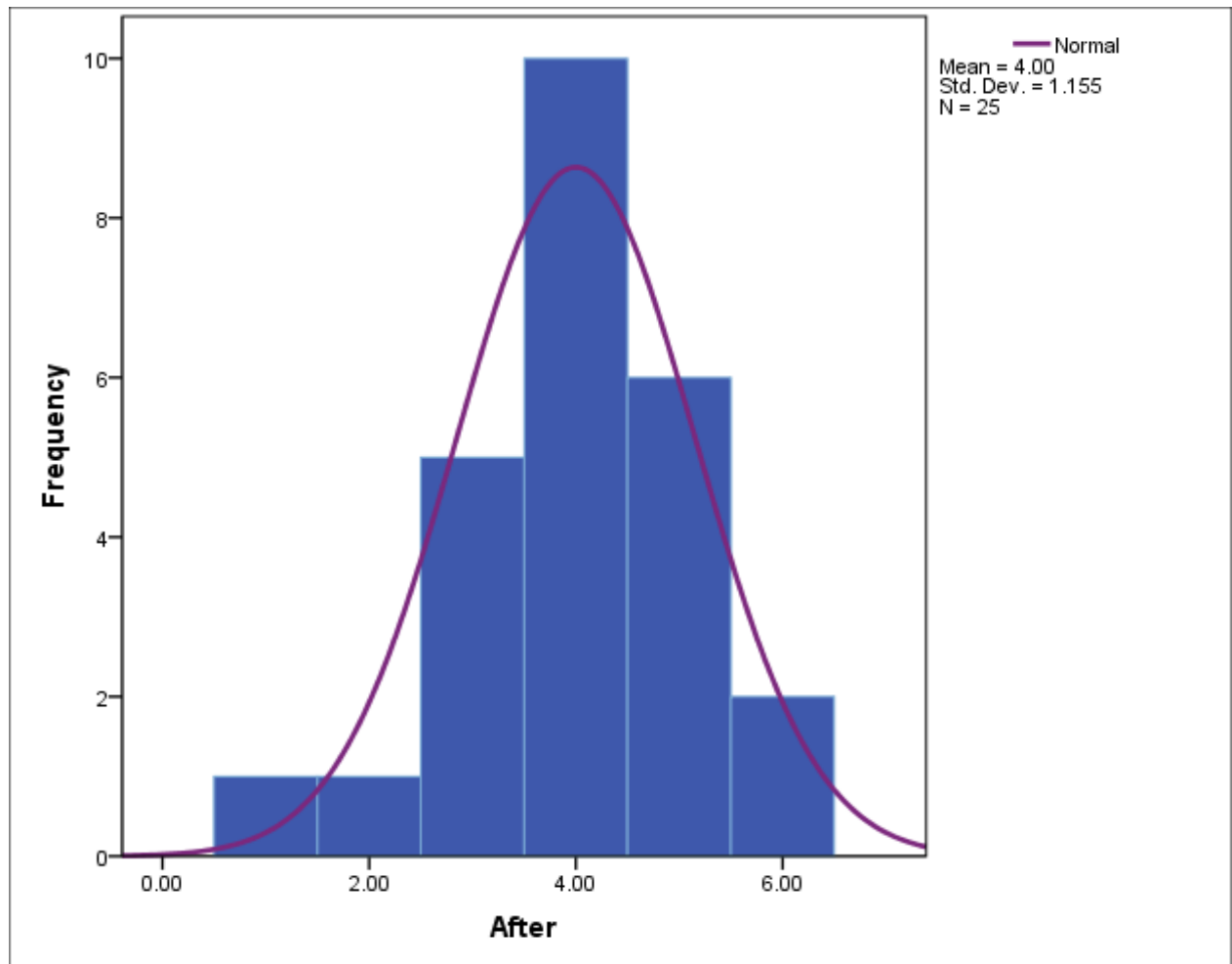
Pre- and post-SoAT comparison. This analysis was to determine the impact of social software enriched activities on the stages of adoption of technology (in this case social software) with pre-service teachers enrolled in the online course. Stages of Adoption of Technology or SoAT is a standardised 'stage scale' that utilizes Likert-type items for participants to self-identify their stage of adoption from 1 to 6. Higher stages correlate with higher adoption of the social software.

Paired samples t-test on pre- and post-course SoAT. Twenty-five participants responded to both the pre- and post-course SoAT surveys. Figures 4.6 and 4.7 show the distribution of participants across the stages of technology adoption before and after the course. As you can see, the SoATs are mostly normally distributed in both histograms. A paired samples t-test was performed on the pre- and post-course SoAT scores to determine whether participants' overall stage of adoption of social software changed after the course. For this t-test, the comparison of two means (the means of pre- and post-course SoAT of all participants) was of interest. Analysis of other factors, such as age and gender, is described in ANOVAs later in this chapter. The results are shown in Tables 4.7 and 4.8. A one-tailed test was used because the difference between the means must be sufficiently large and in a particular direction (post-course SoAT mean is higher than that of pre-course) to reject the null hypothesis (no difference or lower means for post-course SoAT). Since SPSS assumes paired-samples *t*-tests are two-tailed, the *p* value presented in Table 4.8 must be divided by 2 to represent the *p* value for this one-tailed pair-samples *t*-test: $p=0.001/2=0.0005$.



Stages	Percentage	Responses
Stage1: Awareness	16%	4
Stage 2: Learning the process	4%	1
Stage 3: Understanding and application of the process	40%	10
Stage 4: Familiarity and confidence	12%	3
Stage 5: Adaptation to other contexts	16%	4
Stage 6: Creative application in new contexts	12%	3
Total Number of Responses (N)		25

Figure 4.6. Pre-course Stages of Adoption of Technology (SoAT) distribution.



Stages	Percentage	Responses
Stage1: Awareness	4%	1
Stage 2: Learning the process	4%	1
Stage 3: Understanding and application of the process	20%	5
Stage 4: Familiarity and confidence	40%	10
Stage 5: Adaptation to other contexts	24%	6
Stage 6: Creative application in new contexts	8%	2
Total Number of Responses (N)		25

Figure 4.7. Post-course Stages of Adoption of Technology (SoAT) distribution.

Table 4.7

Paired Samples Statistics on Pre- and Post-Course SoAT

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Before	3.4400	25	1.55671	.31134
	After	4.0000	25	1.15470	.23094

Table 4.8

Paired Samples Test on Pre- and Post-Course Stages of Adoption of Technology (SoAT)

	Paired Differences					t	df	Sig. (p)
	Mean (M)	Std. Deviation (SD)	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Before - After	-.56000	.71181	.14236	-.85382	-.26618	-3.934	24	.001

In general, participants reached higher SoAT after the course $t(24) = -3.93, p < 0.05$. Due to the means of the SoAT stages and the direction of the t -value, there was a statistically significant improvement in SoAT stages after the course from 3.44 ± 1.55 m to 4 ± 1.15 m ($p < 0.05$), an improvement of 0.31 ± 0.23 m. These results suggest that, overall, the online course had a positive impact on the participants' stage of adoption of social software.

Individual pre- and post-SoAT changes. Changes in stage of technology adoption pre- and post-course for each participant are shown in Figure 4.8. Twelve individuals increased their level of adoption (one individual increased by 3 stages) whereas five individuals showed decreases in stage of adoption by one stage.

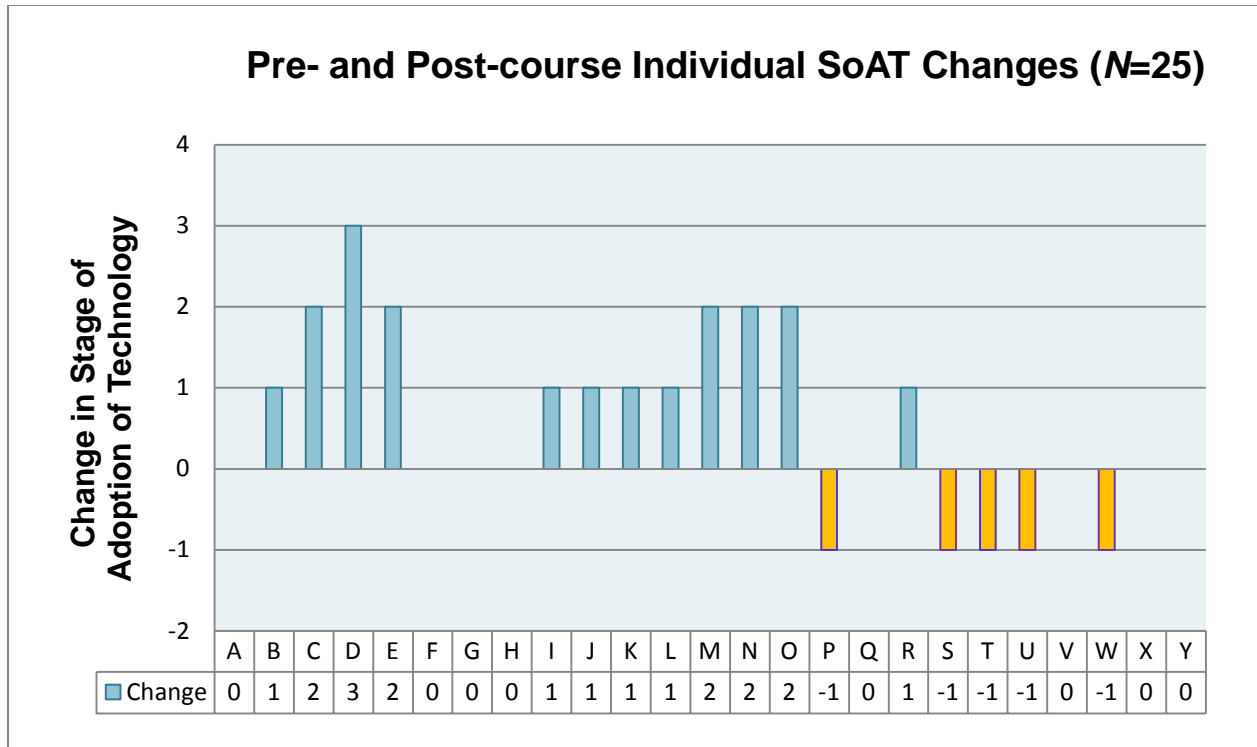


Figure 4.8. Pre- and post-course individual Stages of Adoption of Technology (SoAT) changes.

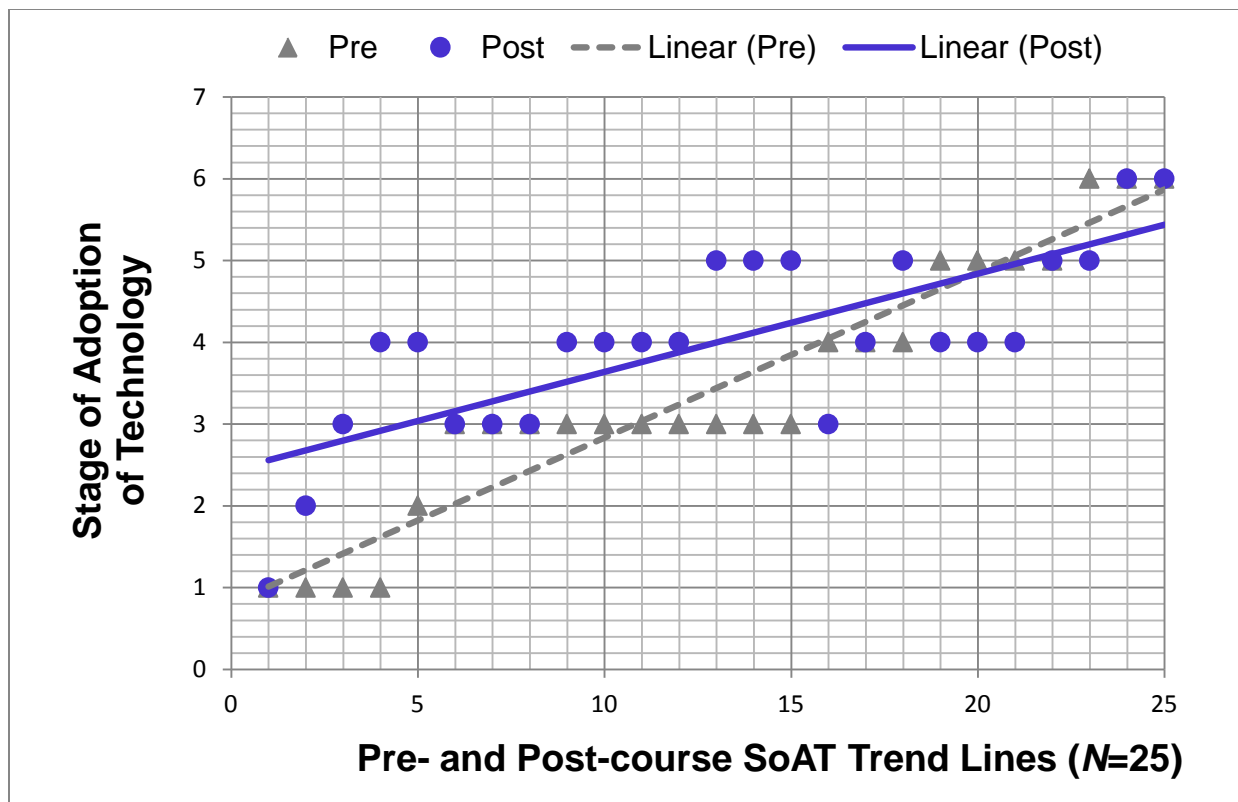


Figure 4.9. Pre- and post-course Stages of Adoption of Technology (SoAT) trend lines.

To further understand the data, a sorted pre- and post-course SoAT trend line chart was produced (see Figure 4.9). The data presented in the chart was sorted by two levels: Level 1, all pre-course stages were sorted in ascending order; then, in level 2, all entries associated with a specific pre-course stage were sorted from low to high according to post-course stage. If participants all achieved increased post-course SoAT, the post-course trend line would always be above that of the pre-course. However, in this case, the pre- and post-course trend lines cross at a point close to stage 5. This trend suggests that participants with lower pre-course SoAT scores (stage 4 and lower), reached higher post-course SoAT; whereas participants who had higher pre-course SoAT scores (stage 5 and higher) reported slightly reversed post-course SoAT.

Factors affect SoAT outcome or not. In order to understand whether the change in participants' stage of social software adoption was affected by factors of interest, five one-way ANOVAs of SoAT changes among participant groups were conducted. The dependent variable for the ANOVAs is the change in SoAT (post SoAT minus pre SoAT, range from -1 to 3). The independent variables are gender, age group, prior online course experience (whether this was the first online course taken), pre-course SoAT, and satisfaction with the course.

Gender. A one-way ANOVA was conducted to examine whether there were statistically significant differences in the change of SoAT between male and female participants. The results revealed a statistically significant difference $F(1, 23) = 5.457$ ($p < 0.05$) between female ($M=0.19$, $SD=0.911$) and male participants ($M=1.22$, $SD=1.302$) (see Tables 4.9 and 4.10). Male participants reported significantly higher post-course Stage of adoption in comparison to that of female participants.

Table 4.9

Descriptive Statistics of SoAT Changes between Female and Male Participants ($N=25$)

Gender	N	Mean (M)	Std. Deviation (SD)	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Male	9	1.22	1.302	.434	.22	2.22	-1	3
Female	16	.19	.911	.228	-.30	.67	-1	2
Total	25	.56	1.158	.232	.08	1.04	-1	3

Table 4.10

One-way ANOVA - SoAT Changes between Female and Male Participants

Gender vs. SoAT Change	Sum of Squares	df	Mean Square	F	Sig. (p)
Between Groups	6.167	1	6.167	5.457	.029
Within Groups	25.993	23	1.130		
Total	32.160	24			

Age group. A one-way ANOVA was conducted to examine whether there were statistically significant differences in the change of SoAT among participants in age groups of 23 and under, 24-29, and 30 and above. The results revealed no statistically significant differences in change of SoAT $F(1, 23) = 0.307$ ($p/2=0.369 > 0.05$) between participants aged 23 and under ($M=0.86$, $SD=1.215$), 24-29 ($M= 0.43$, $SD=1.222$), and above 30 years of age ($M=0.50$, $SD=1.000$) (see Tables 4.11 and 4.12).

Table 4.11

Descriptive Statistics of SoAT Changes among Participants of Age 23 and Under, 24-29 and Above 30 (N=25)

Age	N	Mean (M)	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
23-	7	.86	1.215	.459	-.27	1.98	-1	2
24-29	14	.43	1.222	.327	-.28	1.13	-1	3
30+	4	.50	1.000	.500	-1.09	2.09	0	2
Total	25	.56	1.158	.232	.08	1.04	-1	3

Table 4.12

One-way ANOVA - SoAT Changes among Participants of Age 18-23, 24-29 and Above 30

Age vs. SoAT Change	Sum of Squares	df	Mean Square	F	Sig. (p)
Between Groups	.874	2	.437	.307	.738
Within Groups	31.286	22	1.422		
Total	32.160	24			

Prior online course experience. A one-way ANOVA was conducted to examine whether there were statistically significant differences in the change of SoAT between participants who had done an online course before and those for whom this was their first online course.

Table 4.13

Descriptive Statistics of SoAT Changes among Participants Who Had or Had Not Taken Online Course Before ($N=25$)

1 st Online Course?	N	Mean (M)	Std. Deviation (SD)	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1st	12	.42	1.165	.336	-.32	1.16	-1	2
Not 1st	13	.69	1.182	.328	-.02	1.41	-1	3
Total	25	.56	1.158	.232	.08	1.04	-1	3

Table 4.14

One-way ANOVA - Stages of Adoption of Technology (SoAT) Changes among Participants Who Had or Had Not Taken Online Course Before

1 st online course vs. SoAT Change	Sum of Squares	df	Mean Square	F	Sig. (p)
Between Groups	.474	1	.474	.344	.563
Within Groups	31.686	23	1.378		
Total	32.160	24			

The results revealed no statistically significant differences in change of SoAT $F(1, 23) = 0.344$ ($p > 0.05$) between participants who had taken an online course before ($M=0.69$, $SD=1.182$) and those who had not ($M=0.42$, $SD=1.165$) (see Tables 4.13 and 4.14).

Pre-course SoAT. A one-way ANOVA was conducted to examine whether there were statistically significant differences in the change of SoAT between participants who were at different stages of adoption before the course started.

Table 4.15

Descriptive Statistics of Stages of Adoption of Technology (SoAT) Changes among Participants Who Reported Different Pre-Course SoAT ($N=25$)

Satisfaction	N	Mean (M)	Std. Deviation (SD)	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Stage 1	4	1.50	1.291	.645	-.55	3.55	0	3
Stage 2	1	2.00	2	2
Stage 3	10	1.00	.816	.258	.42	1.58	0	2
Stage 4	3	.00	1.000	.577	-2.48	2.48	-1	1
Stage 5	4	-.75	.500	.250	-1.55	.05	-1	0
Stage 6	3	-.33	.577	.333	-1.77	1.10	-1	0
Total	25	.56	1.158	.232	.08	1.04	-1	3

Table 4.16

One-way ANOVA - SoAT Changes among Participants Who Reported Different Pre-Course Stages of Adoption of Technology (SoAT)

Satisfaction vs. SoAT Change	Sum of Squares	df	Mean Square	F	Sig. (p)
Between Groups	17.743	5	3.549	4.677	.006
Within Groups	14.417	19	.759		
Total	32.160	24			

The results revealed statistically significant differences of SoAT changes $F(5, 19) = 04.677$ ($p < 0.05$) among participants who started the course with pre-course SoAT stage 1 ($M=1.50$, $SD=1.291$), stage 2 ($M=2.00$, SD null no two or more participants found in this

category), stage 3 ($M=1.00$, $SD=0.816$), stage 4 ($M=0.00$, $SD=1.000$), stage 5 ($M=-0.75$, $SD=0.5$), stage 6 ($M=-0.33$, $SD=0.577$) (see Tables 4.15 and 4.16). Participants who started the course at the lower stages of technology adoption (stages 1-3) had significant improvement in SoAT change after the course, stage 4 participants did not change, and those who reported higher pre-course SoAT stages (5 and 6) had reduced SoAT after the course. This confirms the findings of the individual SoAT change shown in Figure 4.10.

Satisfaction. A one-way ANOVA was conducted to examine whether there were statistically significant differences in the change of SoAT among participants who did not enjoy the learning experience, who were neutral about the learning experience, and who enjoyed it.

Table 4.17

Descriptive Statistics of Stages of Adoption of Technology (SoAT) Changes among Participants Who Did or Did not Enjoy the Online Learning Experiences ($N=25$)

Satisfaction	N	Mean (M)	Std. Deviation (SD)	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Not Enjoyed	14	.64	1.082	.289	.02	1.27	-1	3
Neutral	6	.33	1.506	.615	-1.25	1.91	-1	2
Enjoyed	5	.60	1.140	.510	-.82	2.02	-1	2
Total	25	.56	1.158	.232	.08	1.04	-1	3

The results revealed no statistically significant differences in the changes of SoAT $F(1, 23) = 0.143$ ($p > 0.05$) between participants who did not enjoy the learning experiences ($M=0.64$, $SD=1.082$), who were neutral about the learning experiences ($M=0.33$, $SD=1.506$), and who enjoyed the learning experiences ($M=0.60$, $SD=1.140$) (see Tables 4.17 and 4.18).

Table 4.18

One-way ANOVA - Stages of Adoption of Technology (SoAT) Changes among Participants

Who Did or Did not Enjoy the Course ($N=25$)

Satisfaction vs. SoAT Change	Sum of Squares	df	Mean Square	F	Sig. (p)
Between Groups	.412	2	.206	.143	.868
Within Groups	31.748	22	1.443		
Total	32.160	24			

In summary, the quantitative findings revealed that, overall, the majority of the participants used the Internet for informal learning and half of them had taken online courses before. While some participants had used traditional online learning tools (such as online discussion boards) and social software to gather information, the majority of the participants had rarely used social software to contribute to or create online resources in formal education settings.

Changes in the participants' SoAT scores suggested that the participants' overall social software adoption improved after taking this course. Moreover, online participation in the course content discussion forums and in the social software sites associated with the software enriched activities, was higher compare to that in units with learning activities that did not include social software. However, increased online participation in content discussions only happened after the practicum.

Further, male participants' adoption of social software improved more than that of their female peers. In addition, participants who started at a lower SoAT increased their post-course social software adoption level, whereas their peers who started with a higher SoAT level did not increase, in a few cases, decreased.

III. Qualitative Findings

In this section, the qualitative findings from the participants' reflections and interview transcripts are presented under the five *W(e)Learn* constructs. Twenty-seven participants submitted reflections after Unit 5 on using GoogleDocs and after Unit 12 on using TeacherTube/YouTube. Twenty-six participants submitted reflections after Unit 7 on using Del.icio.us. Participants who wrote reflections also responded to the pre- and/or post-course surveys. Ten interviewees were purposefully selected from participants who responded to both pre- and post-course surveys, seven participated in interview one right after the course and five of them came back for interview two five months later (details see Chapter 3). Since interviewees are a sub-group of participants who completed the reflections, unless specified, the head counts or percentages presented in this section are based on the number of participants who submitted their reflections. Participants of reflection are quoted as "Participant 1" to "Participant 27", and interviewees' are quoted by their pseudonyms.

Qualitative data themes. The qualitative data analysis revealed that the participants' reflections about the course requirements and their responses to the interview questions largely fell under the five constructs of the *W(e)Learn* framework: structure, content, media, service, and outcomes. For each of the five constructs, the findings were organized into subcategories as dictated by the data. Seven new subcategories were identified during the qualitative data analysis: "Learning social software in teacher education" under the structure category, "Peer Support" under the service category, "GoogleDocs", "Del.icio.us", "TeacherTube/YouTube", and "Online Delivery" under the media category, and "Unexpected Outcomes" under the outcome category. Two new category called "Factors affecting application" and "Changes overtime" were identified beyond the *W(e)Learn* constructs. Figure 4.10 illustrates the themes of qualitative data.

<p>Structure</p> <ul style="list-style-type: none"> • Learners' needs • Learners' preferences • Instructional design and learning • Learning social software in teacher education * 	<p>Service</p> <ul style="list-style-type: none"> • Accessibility • Responsiveness • Peer support*
<p>Content</p> <ul style="list-style-type: none"> • Depth • Authenticity • Relevance 	<p>Outcomes</p> <ul style="list-style-type: none"> • Meeting learning expectations • Attitude towards future use • Knowledge and skills • Application • Unexpected outcomes*
<p>Media</p> <ul style="list-style-type: none"> • GoogleDocs* • Del.icio.us* • TeacherTube/YouTube* • Online delivery* 	<p>Factors affecting application *</p> <ul style="list-style-type: none"> • Awareness and willingness* • Usefulness* • Practicing teachers' adoption* • Student population* • Technology readiness and accessibility*

Changes overtime *

Figure 4.10. *Themes of qualitative data*

Note: * New category or subcategory different from the *W(e)Learn* framework

Structure. In their reflections and interviews, participants expressed their learning needs and preferences, as well as shared comments on the instructional design of the course and the teacher education program.

Learners' needs. Participants indicated that they needed more time, practice, and experiences to become more familiar with the social software and what it can do:

I need to be a little bit more familiar with GoogleDocs and know that if I am editing or working on it at the same time as someone else, it is not going to erase either of our work. ... [That is also] especially [the case] for Del.icio.us. I think that most of us just didn't really know [how it worked]. I still think there are a lot of things about Del.icio.us that I don't know how to use and maybe I would love it if I knew those things. (Arthur, interview #1)

Most interviewees suggested that a face-to-face demonstration in a computer lab would have helped them to better understand the objective, potential, and technical aspects of using social software. This theme was also apparent in participants' reflections.

Sometimes, I did not know where to find Del.icio.us or GoogleDocs or apps and I didn't know what they meant. I think it would be good if [the instructors] could actually show us how to use it, a demonstration. Instead of learning by ourselves, it would be better for a professional to demonstrate it to us clearly. (Charley, Interview #1)

Some participants suggested that clear learning objectives helped them learn:

It came down to whether we could use the technology to achieve the learning objectives. With the learning objectives being clearly stated and us understanding what was required of us, then we were able to use the social software to achieve those objectives. (Sam, Interview #1)

The need for clear explanations was especially relevant for those who claimed they were not as technically savvy as others: "My generation doesn't quite get social software right away; ... it needs to be explained, as well as its purpose." (Nancy, Interview #1)

Some participants indicated they would like the video content to be made available as audio podcasts for more flexibility.

The content could also have been effective as audio files that could be downloaded as podcasts, which would have allowed for even more flexibility. It would allow us students to listen to it whenever we wanted, rather than only on the computer when we had an Internet connection. (Participant 27)

Other participants indicated that they wanted the social software activity to be more practical and relevant to their future teaching:

I think the key is to tell [students] that you are learning this because you will need to know this in your future career. We need to see that it is an actual realistic future career option. [For example], “OK guys, we are going to set up a Section M wiki where you can upload all [the work] that you do in all your classes. You can share everything. You can either [use it to] get help on your courses now or you can use it in the future when you become a teacher”. That, to me, is a more concrete idea. I need that. I need to know how to do it. I think people would buy into that because they can see how they’re going to use that again. (Lisa, Interview #1)

Learners’ preferences. In their reflections and during the interviews, participants talked about which software they preferred to use to support their learning.

Preferences to GoogleDocs. Some participants stated they preferred Microsoft Office products over GoogleDocs. For example, Participant 27 reported that the track changes function in MS Word was more familiar to him/her and therefore easier to use. Others reported they would rather use email to share documents, again because it was more familiar, as well as easier

to use: “Sending my lesson plan through an email attachment was a much easier way to share it.”
(Participant 25)

Some participants found other social software not specified in the course was easier for document sharing:

I am more experienced with [Dropbox] and I found it easier [to use] ... I [could] upload every file type. ... [My] partners and I, in our project, used Dropbox with no problem.

(Lisa, Interview #1)

Preferences to Del.icio.us. Some participants reported that using a search engine was preferable to using Del.icio.us when trying to find teacher related resources. Participant 5 reported that using a search engine was quicker: “The additional steps [required when using Del.icio.us] were somewhat time-consuming and I did not get information that was different from [what I would get using] my usual search engines.”

In terms of sharing resources, participants had preferences to Del.icio.us. Participant 3 preferred to use email for resource gathering and sharing:

[Using del.icio.us means] there are too many places to look for things. [If someone shared a great resource with me], I would just keep the link in an email. [I] know that if I want to find something again, and can’t find it on Google, I have it in an email.

Participant 11 preferred using the favourites function on a browser to bookmark online resources as it was a tool he/she was familiar with. Participant 15 preferred printed resources: “I much prefer to find teaching resources in print form (e.g., books, journal articles) and would only try a website if a colleague recommended one specifically.”

Preferences to TeacherTube/YouTube. Some participants preferred TeacherTube over YouTube for classroom use due to the appropriateness of the content: “I will definitely use

YouTube in my lessons but feel that TeacherTube is probably a better resource because the material is appropriate for students.” (Participant 17)

Preferences to online delivery. Some participants preferred learning face-to-face than online. They provided different reasons for why. Diane indicated:

I had lots of questions about curriculum design and lots of things that I really wanted to clarify but [I] wasn't able to do that because we didn't have discussions. I couldn't participate; I could in a way that I was typing things, but it is just not the same. (Interview #1)

Some other participants preferred the personal connection in face-to-face environments. In the words of Participant 21: “I prefer to speak to people face-to-face and have an opportunity to ask questions and relate to an actual person.”

While some supported online delivery for teacher education courses, they did not feel this was the best course to be delivered online:

The software itself was good, I just think that this class shouldn't be online and we should be in a classroom. There are other classes that you don't have to be present to gather all the information, but this [topic] is something that I feel [students] should be present for. (Arthur, Interview #1)

Instructional design and learning. In their reflections and interviews, participants expressed their thoughts about how the instructional design of the social software enriched activities affected their learning.

Appropriateness. While some participants indicated that using GoogleDocs for the lesson plan activity “makes sense” (Nancy, Interview #1) and “definitely facilitated our learning” (Lisa, Interview #2), two participants expressed that GoogleDocs was not suitable for a triad group

activity. Participant 27 indicated that using GoogleDocs introduced extra work: “For the purposes of this activity I did not find GoogleDocs to be a useful tool. This process was therefore frustrating and created extra work instead of facilitating the activity”. Participant 3 stated:

I do see the benefit in using GoogleDocs for very large files, as they would take up a ton of space in your inbox, or if you wanted many people to comment on the document. But for [a document the] size [we needed to share] and [that we were] only sharing with one or two people, I would be much more likely to send [the document] as an attachment [rather than share it through GoogleDocs]. (Participant 3)

Technical instructions. Participants expressed different views on the technical instructions provided in the course. Some felt the instructions were clear and the use of video instructions appealed to them. In the words of Participant 24: “I have noticed that there are some online instructions inserted into the Apply It! section and I think this A/V source will prove fruitful”. Similarly, participant 22 noted that the step-by-step instructions were easy to follow. However, two participants said they could not find the technical instructions on how to use Del.icio.us. Participant 26 explained:

The [Del.icio.us] site itself was not intuitive and the instructions given to us [on how to use it] on the Virtual Classroom site were also somewhat unclear. The experience would have been better had there been an explanation of the purpose of using Del.icio.us before we were asked to use it, as well as clearer instructions [on how to use it]. (Participant 26)

Social software selection. Some participants commented that social software being introduced to participants should aim to introduce familiar tools for sharing and exchanging, as tools used by many people would likely be better received.

When it comes to a forum to exchange work that [has been] done, it definitely needs to be something that everybody knows how to use and that everybody does use. If everyone decides to go for it, it will work. (Arthur, Interview #1)

Also, participants indicated that selecting social software that was similar to software familiar to them would allow them to use existing skills without experiencing the initial fear of using an entirely unfamiliar technology.

[Google Docs and Microsoft Office] mirrored each other ... Getting to use Google Docs online, we understood how to use [the social] software ... because we were already comfortable with using Microsoft office. [There were] little things that we had to learn [about GoogleDocs], but there wasn't that initial fear of using that software ... it was very similar [to Microsoft Office]. (Sam, Interview #2)

TeacherTube/YouTube videos. Participants reported that they liked the way the course videos were posted on TeacherTube/YouTube and that the short clips with descriptive titles kept them engaged and interested in the activity.

The fact that the videos were separated into a number of short videos, rather than all lumped into one video, made it easy to watch and to identify the salient parts of each. I found it helpful as a pedagogical tool in that it provided variety in the way concepts and ideas were presented. (Participant 27)

Further, as noted by Participant 26, using questions that new teachers may ask as the video titles “allowed you to know what the purpose of each video is and it makes it easy to go back to later for future reference”.

Having experienced teachers present the information through video was viewed positively by the participants. Participant 6 stated: “It provided an interesting perspective on

teaching from seasoned professionals. The key to the success of this format is to keep the content brief and engaging”. Participants reported that the course page with the embedded video clips was convenient and reliable: “Sometimes links break, [so] it is always nice to have a page with the videos. That is a little bit more reliable” (Arthur, Interview #1). However, other participants felt that linking to TeacherTube/YouTube videos, rather than embedding them on the course webpage, would be more helpful in aiding them to find other related videos.

The video clips on TeacherTube/YouTube were used throughout the course. Participants expressed their satisfaction with the sequence of the videos. In Unit 5, the videos included instructions on using GoogleDocs. In Unit 7, the videos were about classroom management and participants used these as a reference for their course discussion. In Unit 12, the videos were on assessment and evaluation. Participants were asked to comment on YouTube regarding the content presented in the videos.

Participants felt prepared to use TeacherTube/YouTube videos in Unit 12 given they had been using them earlier on in the course: “I think it was a good idea to present TeacherTube in Unit 5 to introduce students to TeacherTube and have them become familiar with the site” (Participant 10). As well, participants felt the video clips produced by the instructional design team of the course that included the university logo, were tailored to the course. Participant 17 stated: “I found it particularly intriguing that the Ottawa U backdrop was used. It made the videos seem more legitimate and personalized to this course”.

Workload. Participants reported that the workload was heavy and the expectations of the participants were high in the course. The social software enriched activities became extra workload. Some participants reported they felt rushed to complete the social software activities,

in addition to the existing workload, and only did so because they had to complete course requirements:

It is reasonable to expect that kind of workload in a face-to-face class. I did what we had to do in the course but I felt it was rushed. After I finished a social software task, I didn't go back to look at what I have done. (Charley, Interview #1)

Another attested to the heavy workload and the desire to want to just get through the course: "I think because it was kind of packed with the online course that unfortunately no one really cared about it because everyone wanted to be done with it" (Amy, Interview #1).

Participants were also concerned about the limited time available to explore the social software given that learning the core content of the course should take higher priority. For example, Participant 25 stated in his/her reflection: "Perhaps one day, when we have a better grasp on making lesson plans, we will be able to use some breathing time to get more out of some of these sites".

Learning social software in teacher education. In the interviews, participants suggested that learning social software should be done in other courses of the teacher education program. For example, Amy indicated: "Maybe [the technology aspect] spills over too much into this [course]. I think if we learned this in our science and technology course we would be quite interested in it" (Interview #1). Similarly, Lisa stated that focusing on technologies in the technology elective course would be more effective:

[The] technology elective should be a mandatory course.... I personally took a technology class as my elective and we covered hundreds of different technologies. I think [that] was a much more direct route for learning about the technology. For the

entire course, I was assigned a technology [to learn and teach to others. The technology] could have been a piece of software, a website, a tool, etc. (Lisa, Interview #2)

The timing of this curriculum design course and the technology elective was also a challenge. Sam expressed that he would have liked to have taken the technology elective course first so he was better prepared to learn online; however, at the same time he recognized the importance of learning about curriculum design at the start of the teacher education program:

If I had taken the online course after I had taken the elective I would have been a lot less nervous at the beginning of the class.... If anything, it would have helped if I had taken the elective first. But, at the same time... because the online course deals with curriculum development, it has to be taken first. (Sam, Interview #2)

Content. In their reflections and interviews, participants reflected and commented on the course content presented in the TeacherTube/YouTube videos on classroom management and assessment and evaluation.

Depth. Participants reported they found the information presented in the videos to be of high quality and appropriate depth, informative, and useful. In the words of Participant 6: “The information provided in the TeacherTube videos was of high quality and useful, particularly the discussion on assessment as [an] ongoing [and] not a culminating event”. Another participant demonstrated how his/her learning developed over the course, as measured by his/her understanding of the video content:

Some of the pros and cons of presenting TeacherTube videos in Unit 5 versus [Unit 12] relate to the fact that at the beginning of the course I did not know some of the terms that were being presented in the videos. [But,] at the end of [Unit 12] I understood all of the vocabulary being presented by the teachers in the videos. (Participant 15)

Others desired more interaction with the experts in the videos: “In many cases, I found some of the information too generic. Teachers in training would benefit more from a round table or fireside chat where they could be interactive with the professionals and let them expand on their experience.” (Participant 6)

Authenticity. Participants reported they appreciated the advice and information shared by the experienced teachers and “enjoyed watching the videos of the experienced teachers” (Participant 17). Participants felt the content in the videos was authentic and they appreciated the introductions the two experienced teachers gave, the strategies and first hand information they shared, and the passion they demonstrated:

Heather and Leslie were able to describe why it is important to be organized and have things planned ahead of time [when teaching]. This is something I will definitely do starting November 1st in my practicum. They also provided some direct strategies that will be useful to include in my teaching toolbox. (Participant 12)

Another participant reported: “I liked the videos too because in the introduction we get to see who these people are, and we get points of view from people with different backgrounds”. Similarly, participant 20 indicated that hearing the experienced teachers’ views about their teaching careers was encouraging: “It is nice to hear from a variety of people about certain aspects of teaching and I find it very encouraging when many people comment on how wonderful yet challenging of a career choice it is”. Another attested: “With TeacherTube, you can actually see the enthusiasm and excitement in their voices and actions, which validates the message that they are conveying.” (Participant 23)

However, some participants expressed that a real-time presentation by a person would give them more confidence and trust in the content:

People in the videos, okay that's nice.... I don't know or trust you though. There's nothing wrong with the videos, it's just that I prefer [to hear from] a real life person. And when you have real life people, you don't have to go to a video. Videos are great when you can't make/see it. (Lisa, Interview #1)

Relevance. Participants indicated that the firsthand experiences presented in the videos helped them to understand the topic:

I think that [in] Unit 12, [on assessment and evaluation, it] is especially good to have the videos because we (the students) can hear about firsthand experiences from somebody; and assessment and evaluation is really something that I know many students are still struggling to grasp the concept of. (Participant 18)

They also felt that the content presented in the video clips was relevant to the classroom could be applied in their practice:

The videos ... offered real-life examples of potential issues that are commonly seen in classrooms and/or in the playground. The [learning] activities that were designed [in the course] also allowed for a "role play" type exercise that gave me an opportunity to imagine myself in the situation and [reflect on] how I would react. (Sam, Interview #1)

Indeed, other participants reported that the video content helped them to reflect on their direct classroom experience during the practicum:

It was much more beneficial to [watch the] TeacherTube [videos on assessment and evaluation] in Unit 12. I found I was better able to relate to the teachers after having my practicum experience. I was able to understand the concept of assessment and evaluation in more detail after having learned what it was and how to apply it during my practicum. (Participant 10)

Participants also indicated the videos could be used for future reference if they faced a similar situation to those that occurred in the video: “Based on the clips that have been shown to us, if you are having any issues within the classroom you could use TeacherTube, which may possibly solve the problem” (Participant 23). However, some participants suggested that a real classroom management scenario in the video would be more relevant. Participant 12 stated: “Overall, the videos are a useful source of information, but it would be beneficial to actually have videos of [teachers] working in a classroom in a certain situation to see how they reacted or acted upon it”.

Media. The instructional intent of the social software enriched activities included exposing the participants to social software in the context of collaboration and learning. Participants’ reflections and interview transcripts revealed their experiences using social software in the course activities.

GoogleDocs. Participants had mixed views about GoogleDocs. Some participants reported GoogleDocs was user friendly, easy to use, and an effective tool for sharing. Even some who had never used GoogleDocs before reported they found it easy to use to share documents:

This was the first time I had ever used [GoogleDocs] and I understood how to upload material and share with others right away. It’s very easy to use and this is a major advantage over some of the other file sharing websites I’ve used. (Participant 26)

However, others, less familiar with the tool, found some aspects of GoogleDocs not user friendly. Most participants talked extensively about their frustrations with the compatibility issues between the lesson plan template and GoogleDocs:

The hugest [sic] problem wasn’t Google Docs, it was the fact that the course’s template was incompatible with GoogleDocs, which is a huge frustration. This, I think, made

people “hate” GoogleDocs even though it wasn’t anything to do with GoogleDocs, it was the template. The fact that we couldn’t, most of the time, upload it, or share it, or see it once we uploaded. It [was] really frustrating. (Lisa, Interview #1)

Further, some participants thought that using the lesson plan template in GoogleDocs sacrificed the ability to customize the document as desired.

For those not familiar with GoogleDocs, they had to learn how to use the tool and deal with the lesson plan template compatibility issue, which was “frustrating and created extra work instead of facilitating the activity” (Participant 27). Some participants revealed they used alternative methods to share their work instead:

Even though GoogleDocs may have given us opportunities to constantly edit [the work as a group] and work on the same [version],... we just found it was easier for us as a group to email [the work].... We just did it [in] a very traditional way; maybe it is not as beneficial, but for us it was easier and it worked. (Amy, Interview #1)

However, despite the lesson plan template compatibility issues encountered, some participants reported they overcame their initial frustrations and found solutions to the problem. For example, Participant 23 stated: “Overall, I believe that GoogleDocs could be a useful tool if you create a new document using their template and not having to upload”.

For some, having to have a Gmail account to use GoogleDocs created a barrier. For one, “it is another password and username to remember” (Participant 2). For another, not being able to use a non-Gmail account for document sharing in GoogleDocs caused some initial confusion (Participant 11).

Other participants expressed concern about blurring the boundary between professional and personal use of email accounts. Participant 10 explained: “The activity required an email

account other than the uOttawa account, which is not the primary email of most University of Ottawa students. This mixes personal and professional emails”.

Del.icio.us. Participants had mixed views regarding how user friendly Del.icio.us is. Participant 24 indicated that he/she enjoyed the quick and easy resource sharing via Del.icio.us: “It is quick and easy. In 30 seconds you can save a new bookmark and access others, which is a major advantage”. Similarly, others found Del.icio.us to be an effective tool for sharing and accessing resources and staying organized. Amy noted: “I think Del.icio.us is good. It just helps you to organize different sites or resources. It keeps you connected and virtually organized. It is nice not to have documents and papers lying everywhere.” (Interview #1) Still more found Del.icio.us to be a good tool for sharing resources with peers: “Much to my surprise, I found Del.icio.us to be quite useful when sharing resources amongst peers.” (Participant 9) The utility of the tool for new teachers was also commented on”:

Del.icio.us is a user friendly site which can be a great resource to a first year teacher or a supply teacher who is constantly moving from school to school.... Del.icio.us is simply a few clicks away from bookmarking desired sites. (Participant 1)

As well, it would allow for sustained access to information: “It seems like it could be a useful site if our colleagues continue to use it and refer to it.” (Participant 25) Participants felt Del.icio.us made relevant resources accessible to people with similar interests. In the words of Participant 17: “I think it is a really neat website to have; to share websites and information with other people who are interested in the same subjects as you.”

While many of the participants saw the positive aspects of Del.icio.us, some participants reported that navigating and sharing resources using Del.icio.us was not easy. In the words of Participant 14: “I did encounter many complications and drawbacks while I was interacting with

the interface. For example, sharing the link, creating a new e-mail account, creating a title, and tag labeling.” Yet, other participants acknowledged that spending more time using Del.icio.us would help them use the social software more effectively: “After spending some time on it, I began becoming a little more familiar with it.” (Participant 2)

Some participants expressed concerns about privacy and identity theft associated with using Del.icio.us:

A downfall for Del.icio.us was identified in online blogs. Many bloggers noted that this may be a place for concern for identity theft and fraud. They mention that this type of site requires a lot of personal information, such as your e-mail address, name, and location. (Participant 10)

As was the case with GoogleDocs, some participants commented that having to create a new account to use Del.icio.us was not appealing to them as they already had many accounts and passwords to manage and “it gets confusing to have so many different types of accounts and [to have to] check them all.” (Participant 19) However, others felt that this was manageable. For example, Participant 22 stated: “I will really have to keep track of these new accounts but that should not be a serious problem.”

TeacherTube/YouTube. Participants reported that TeacherTube and YouTube had similar interfaces and were easy to use and convenient. The feature of suggesting similar videos was remarked on positively by participants: “It was also interesting because you have the option of watching similar videos that are linked along the sidebar of the page that talk about the same topic on evaluation and assessment.” Another positive feature noted by participants was TeacherTube’s rating feature and the ease with which users can provide comments: “I felt that it was very easy using TeacherTube. It was extremely user friendly. It was easy to comment on

videos and also rate each video.” (Participant 21) Other participants appreciated that TeacherTube allowed them to mix the quality media available on the site (e.g., videos, pictures, audio, and documents). Yet, while signing up on the TeacherTube and YouTube websites allowed them to access some good features, it also added another account for the participants to manage:

Making users create an account can be good because it will allow people to know who posted what. There is also a page to remember the user’s favourite clips. However, if someone wants to upload a video then the individual must have an account with the website, which can be a disadvantage of needing to memorize another login account. (Participant 13)

For those with a Gmail account, this was simple as they could “easily link my YouTube account to my Google account.” (Participant 10)

Participants reported mixed views on the resources available through TeacherTube. Some enjoyed the teaching and learning resources available on TeacherTube. One participant described the tool as follows:

This website is a place for one-stop shopping for teachers who require assistance, be it audio or visual. Also, under the resources heading, there is a long list of topics such as lesson plans, grades, and themes that can support teachers and students. (Participant 22)

Others concurred on the usefulness of the site for classroom use and indicated: “Kids love it!” (Amy, Interview #1) and “it is evident that this could be a resource that could be very useful throughout my teaching career” (Participant 5). However, the need to plan is not mitigated: “I don’t know what TeacherTube really has on it for resources, so if I were to use it I would need to do a lot of researching beforehand” (Participant 23). Further, participant 9 reported

disappointment at not being able to find desired resources on TeacherTube: “I was disappointed with the search results I received when I conducted searches during my practicum”. Similarly, Participant 16 commented:

One of the only drawbacks I found with TeacherTube, if you can call it a drawback, is the huge amount of information. There is so much that it will definitely take time to locate ... good videos or short clips to show the students.

One challenge noted by a participant was access to these sites within schools: “TeacherTube is not blocked by the majority of school boards; however, there are fewer videos [on TeacherTube] than you would find on YouTube. However, YouTube is not accessible on school board computers and networks.” (Participant 9) Lastly, participants reported they did not like the advertisements at the beginning of each video clip: “There are a lot of ads at the beginning of the videos.” (Participant 3)

Online delivery. Most interviewees indicated that adding social software in an online course delivered through an unfamiliar learning management system might have negatively impacted participants’ acceptance of social software:

I think one of the problems with this course was that the whole system was frustrating. Blackboard is tough to use, it makes people uncomfortable.... And then, if you add on top of that other technologies that people aren't comfortable with, they're just resist.... They just don't want to give GoogleDocs, Del.icio.us, TeacherTube a chance,... which is not really fair on the actual technology you're showing us. But when you make things harder and harder and harder, and I have a lot of other things going on, it's like “Ugh, I have one more thing”. (Lisa, Interview #2)

Service. Participants shared their thoughts about the services associated with social software enriched activities.

Accessibility. One participant was upset about not being able to get the videos to play properly and the lack of support he/she got from the course team:

Seeing the YouTube video embedded in the page is a nice feature – when it works. I personally experienced quite a bit of frustration over this with little help from the admin team for this course, which was quite upsetting. (Participant 25)

This was a result of server issues and the support provided to this individual was documented earlier.

Peer support. Some participants turned to their peers to get support when facing difficulties using social software. For example, participant 24 indicated: “After discussing it with my triad members and other members of the online course, I was able to upload and share my lesson plan”. Further, Charley found routine and face-to-face peer support was helpful to him: “Every Wednesday [morning] I met with my triad partners and ... we worked together and supported each other. I found that very helpful.” (Interview #1)

Responsiveness. Most interviewees indicated that when they asked for assistance, responses were quick and helpful.

I was actually really surprised at how quickly I got responses from you [the researcher] when I was having difficulties with using GoogleDocs. I felt it was really good ... With the social software I didn't have any trouble and I got help really quickly. (Nancy, Interview #1)

However, others indicated that, unlike in a face-to-face class, the online environment was not conducive to receiving immediate responses to their concerns:

If I sent out [a] question, it could take a good 24 hours in order to get the final answer.

Whereas, if I had asked in class and the teacher had misunderstood the question, it would have been clarified in two minutes and I would have gotten the answer. (Diane, Interview #1)

Outcomes. The intent of the instructional design of the course included exposing participants to social software in a collaborative learning setting, stimulating reflection on how social software could be used in the future, and enhancing digital literacy. The learning outcomes identified from the analysis of participants' reflections and the interviews were: Meeting learning expectations, attitude towards future use, knowledge and skills, application, and unexpected outcomes.

Meeting learning expectations. Some interviewees indicated that learners came into the course to learn about curriculum design and planning. They did not expect to be exposed to using social software. However, using social software did not have a negative impact on their learning experiences:

I didn't have many expectations for the social software. It wasn't until towards the end of [the course] that I started to think about finding places to implement this and then it started to really be beneficial.... I didn't think [there] was too much or too little [use of social software]. It didn't hinder the learning experience. (Arthur, Interview #1)

Some interviewees recognized that one needs practice to become better at using technology. Indeed, this was something that happened as a result of the course:

I knew there was no need to panic about using [social] software. The more you use it, the more accessible other platforms within that software become ... because you start understanding what it is there for. I didn't really have any expectations [for using social

software], but what I did want to do was make sure that I learned something from being able to interact in an online environment. In the end, I did find that I had come a long way ... interact[ing] online.... I felt [I] was more comfortable at the end of the class.

(Sam, Interview #2)

Conversely, a couple of interviewees said they expected to have more exposure and experiences with different technologies for teaching but this expectation was not met:

I think my class, as a whole, believed that we needed more exposure and experience with different technologies to be a better teacher and this course didn't really meet our expectations [for that]. (Lisa, Interview #2)

Attitude toward future use. In the participant reflections and interviews, some participants expressed their thoughts on whether they would use the social software in the future. Participants who explicitly indicated their intentions regarding whether they would use social software in the future were categorized as “Yes” or “No”. Those who did not explicitly provide a clear answer were categorized as “Unclear” (see Table 4.19).

Table 4.19

Participant Reflections: Attitude toward Future Use of Social Software

Future Use	GoogleDocs <i>N=27</i>	Deli.cio.us <i>N=26</i>	TeacherTube/YouTube <i>N=27</i>
Yes	8 (30%)	6 (23%)	13 (48%)
No	6 (22%)	4 (15%)	0 (0%)
Unclear	16 (48%)	16 (64%)	14 (52%)
Total	27	26	27

GoogleDocs. Despite repeated technical issues with GoogleDocs, 8 participants still felt the software was beneficial and would use it again. Participant 15 noted: “Once a document is

shared, it allows all of the collaborators to see the same file and be able to edit [it] at the same time. The results are instantaneous and can be done with any e-mail account and anywhere as long as one has internet connection.” (Participant 15) In fact, some participants saw using social software as a necessity. Participant 14 noted: “Technology is growing a lot in the schools and it is important as a teacher to become familiar with it, even though sometimes it can be rather difficult to grasp or understand.”

Some indicated that they would use GoogleDocs in the future to benefit their professional development. For example, Participant 18 indicated: “As I embark upon a teaching career, a site like GoogleDocs will be very useful for me to share resources with other teachers.” Other ways participants indicated they would use GoogleDocs in the future included creating a virtual community among students:

I would introduce my students to GoogleDocs ... when they have a group project or even as a whole class ... [it] would be a really neat thing to have to make everyone contribute and collaborate with one another and create a virtual community. (Amy, Interview #1)

While these participants reported they would use GoogleDocs in the future, they indicated they would be cautious about its limitations given the technical issues they faced. They also suggested that social software would be more suitable for technically savvy users: “Overall, I would recommend GoogleDocs to an advanced or intermediate computer user and if they are not to simply save themselves the frustration and use email.” (Participant 19)

Six (22%) participants said they would not use GoogleDocs in the future. Participant 25 stated: “[GoogleDocs] did not work for me [and it] did ... not work for many other students. Therefore, many of the students avoided using it altogether.” While some participants indicated

that they understood the purpose of using social software, they did not feel that their time and efforts were well directed using GoogleDocs given the technical issues experienced.

For the remaining 16 (48%) participants, it was not clear whether or not they would use GoogleDocs in the future. Ten of these participants acknowledged the potential benefits of the social software:

Besides having problems with uploading my lesson plan ... I had no other issues with the site. In fact, I thought it is an excellent tool in terms of sharing documents, papers, lesson plans, and much more. What I really liked was the collaborative piece because it creates professional learning communities online. In future practice, I think it could be an effective “swap shop” for teachers and other professionals ... to share unique and creative lessons. I also feel that Google Docs could be implemented in the classroom. Students could share project ideas and documents with members of their groups.

(Participant 1)

Most of the sixteen participants who did not have a clear decision on future use stated that social software was useful for professional development. In the words of Participant 24: “I believe that sharing lesson plans is a big advantage for teachers, and GoogleDocs is one method for sharing our work that will in turn benefit our students.” However, participant 6 indicated: “I can see this being a useful tool to share lessons plans with other teachers but if it is going to change the format, then using GoogleDocs will create more work than good.”

Other participants expressed the need to become more familiar with the social software before being able to decide whether they would use it in the future. For example, Participant 11 stated: “I don’t know how I would use GoogleDocs in the future but if I do, I will have to read the instructions more carefully on how to use it.”

Deli.cio.us. Six (23%) participants stated they intended to use *Deli.cio.us* in the future. They suggested that *Deli.cio.us* would be useful for selecting, collecting, and organizing ever-growing online resources:

I think it works very well and I will definitely use it. There are so many sites you stumble across; you probably are not at your computer so you want to be able to save them.

[*Deli.cio.us*] is a very good way for you to tag [the resource] so you can go back and find it and share it that way. (Sam, Interview #1)

Others suggested using *Deli.cio.us* with peers and in classroom settings in the future:

Del.icio.us has the ability to share sites and information, which can be [a] huge advantage to teachers since they can easily trade electronic sites with each other. As a teacher, it is beneficial among other staff and can be useful with students as well. (Participant 1)

Participants also indicated that *Deli.cio.us* would be a helpful tool for new teachers: “It is definitely useful for first time teachers out in the field, it is a good resource for finding different tips and strategies from classroom management to lesson plans to samples of work and rubrics.” (Participant 17) A benefit of using *Deli.cio.us* is the ability to share rated resources with fellow teachers without having to worry about quality of the content:

Del.icio.us is a great site for teachers who want to share their resources with other teachers. You can rate sites so that other teachers get an idea of the quality of the information, as well as search by subject. It was interesting to see what my classmates posted on classroom management and many of the sites were helpful to me. (Participant 16)

Four (15%) participants indicated that they would not use *Deli.cio.us* in the future. While three of them indicated that they understand the benefit of using the technology, one individual

was adamant that the technology would not be beneficial as he/she was unclear as to the purpose. Yet, while understanding the benefit, some did not perceive the need: “I can see how it would be useful to manage and share your bookmarks but currently I just have no need to do anything of such.” Another felt the tool was not a good fit for his/her teaching style: “Del.icio.us is a social bookmarking site that I have not found a use for in my style of teaching.” (Participant 8) Others reported preferences for other types of resources, such as paper-based articles. In the words of Participant 15: “I much prefer to find teaching resources in print form (e.g., books, journal articles).” Others indicated there are many other methods of sharing and they would not consider using Del.icio.us. For example, Amy indicated: “For me I didn’t like using [social software]. I do not use Del.icio.us and I do not think I will often, partially because there are so many other ways; [for example,] if someone was to email you something or share online.” (Interview #1)

Sixteen (64%) participants did not have a clear decision about future use of Del.icio.us. All these individuals appreciated the concept and benefits of using Del.icio.us: “It is a great idea to share resources with other teachers and this can promote cooperative learning. We will always be searching for new and improved lesson plans and this should prove fruitful.” (Participant 22) Twelve participants indicated that they could consider using the social software when conditions or timing were right and four participants did not mention future consideration.

Some participants belonged to the “unclear” group expressed that Del.icio.us could be very useful for information sharing and professional development among teachers.

I found that the website was an amazing concept and something that is quick and easy to do. I think that it is a great way of sharing legitimate online sources which are hard to come by. Delicious could be a great tool for department heads to show other faculty teachers and help in the collaboration process of building curriculum. (Participant 12)

Some participants who did not indicate a clear decision on future social media use expressed they wanted to become more familiar with the technology: “As long as there are teachers who are familiar and make use of this tool then it is something that would be very useful in my future teacher career.” (Participant 6)

Others reported they would consider using the technology when they saw the need. In the words of Participant 4: “I personally don’t have much use for it at the moment but perhaps once I am teaching and find a lot of good sites for resources I would definitely think about using this site to bookmark those.”

TeacherTube/YouTube. As indicated earlier in this chapter, due to unexpected temporary technical difficulties with TeacherTube, YouTube was used as a backup for accessing the videos. As such, the participants might have used either or both of the video platforms. Nine participants commented on both TeacherTube and YouTube; nine reflected on TeacherTube only; six on YouTube only; and three did not specify which platform they were referring to.

Thirteen (48%) participants expressed that they would definitely use TeacherTube/YouTube in the future. Some indicated they would use them in their classrooms: “There are multiple videos and clips available that can enhance your lessons and be used as hooks—motivations to grab the students’ interest and keep them locked into our lessons.” (Participant 19) They noted that using existing resources in their teaching would allow them to spend more time improving their teaching skills. For example, Participant 16 stated: “I don’t think teachers need to reinvent the wheel. If we learn to use the resources available to us, it will leave time to improve our pedagogy and our craft.” Not only did participants feel that this software could help in their teaching, but they also reported that TeacherTube contributed to their own learning:

TeacherTube did have some positive effects on my learning, both [in terms of] the content [in the videos], [and] also the way it was delivered. I liked how the videos were really short so it was really easy to focus on what the person was specifically talking about.... Before I clicked on [the video] I knew what they were going to be talking about [from its descriptive title] and what I should be listening for. The format was very good. (Nancy, Interview #1)

Some participants identified that social media is an inevitable phenomenon and they attempted to distinguish professional from personal use. In the words of Participant 9: “YouTube and other public media are here to stay. I enjoy using it in my personal life; however, professionally, I am cautious about it.”

Some participants acknowledged that while “both YouTube and TeacherTube have their pros and cons” (Participant 9) both can be used in teaching. At the same time, others felt that TeacherTube videos were more focused on teaching and learning and would be easier to incorporate into the classroom. For example, Participant 17 reflected: “I will definitely use YouTube in my lessons but feel that TeacherTube is probably a better resource because the material is appropriate for students.”

Eleven participants indicated that they would use TeacherTube in the classroom by “having students watch videos relating to topics we will cover in class.” (Participant 10) Eleven participants also expressed that TeacherTube and/or YouTube could be used for professional development: “Teachers can use this website to help gain knowledge on classroom management, [find] future unit and lesson plans and tips on having a successful class, and assist with any other inquiries or issues that a teacher might have.” (Participant 5)

Fourteen participants did not provide a clear statement about the future use of TeacherTube/YouTube. Among these participants, three did not specify which “Tube” they were referring to but stated the videos were “extremely helpful”. The remaining eleven acknowledged the potential value of using TeacherTube/YouTube. For example, Participant 12 stated: “I was able to pick up on certain concepts and strategies that will be useful when I begin my practicum and when I have my own classroom one day.”

Some participants in the “unclear” group recognized that the manner in which the tool was used would determine its effectiveness in the classroom: “If YouTube is used correctly by teachers, it can be a great tool in the classroom, which will get student attention and keep them engaged.” (Participant 24) Moreover, one participant expressed that TeacherTube/YouTube should be used only under conditions when face-to-face sources are not accessible:

I think I would not necessarily use it as a primary source to go to for my future practice.... It may be useful when you need to understand a concept and there is no one else around; you can refer to it as a backup. (Participant 21)

Further, Participant 20 cautioned:

Not all classrooms are equipped with the resources to show Internet media clips and some clips may be inappropriate for student viewing. It would be necessary for the teacher to first preview the content and find a way to lead a discussion about it. (Participant 20)

Six participants did not indicate clear decision on future use commented positively about this social software and expressed that they would continue monitoring the development of TeacherTube. In the words of Participant 3: “I will continue to check out TeacherTube and see what it has on it. It is a great idea.”

Knowledge and skills. The majority of participants reported they had gained new knowledge and skills through using social software in the course. Three types of learning were identified through content analysis of participants' reflections on the social software enriched activities and interview transcripts: Participants who described their understanding of the purpose, value, or benefits of using social software; participants who reported being first time users of the social software; and individuals who explored the advanced functions of or applied the social software beyond the assignment requirements.

In the content analysis of the participants' reflections and interview transcripts, the following key words and synonyms were used to identify the participants' demonstrated learning of new knowledge and skills: "share", "resource", "gather", "collect", "organize", "rate", "edit", "collaborate", "comment", and "create". Text units (sentence or paragraph) containing one or more keywords were counted as one. The number of text units by keyword related to each type of social software in the participant reflections and interview transcripts is shown in Table 4.20. Table 4.21 shows the numbers of participants who reported new knowledge and skills learned from the enriched learning activity.

Table 4.20

Number of Text Units by Keyword in Participant Reflections and Interview Transcripts for Each Type of Social Software

Keywords	Number of Text Units		
	GoogleDocs	Del.icio.us	TeacherTube/YouTube
Collaborate	14	0	1
Collect/Find/Gather	0	20	19
Comment/Feedback/Rate	13	2	12
Create	10	15	0
Edit	21	0	0

Keywords	Number of Text Units		
	GoogleDocs	Del.icio.us	TeacherTube/YouTube
Incorporate/Integrate	3	0	1
Organize	0	5	3
Resource	7	35	18
Share	59	51	9
Total	203	171	229

Table 4.21

Participant Reflections: Knowledge and Skills of Learned in the Enriched Learning Activities

Knowledge and Skills Learned	GoogleDocs	Del.icio.us	TeacherTube/YouTube
Reported	25 (93%)	24 (92%)	25 (93%)
Not reported	2 (7%)	2 (8%)	2 (7%)
Total	27	26	27

GoogleDocs. Of the 27 participants who reflected on GoogleDocs, 25 (93%) reported they acquired new knowledge and/or skills as a result of participating in social software enriched activities in the course. All interviewees reported new knowledge and/or skills related to the social software used in these activities. Most participants explained their understanding of the key benefits of using GoogleDocs. For example, Nancy stated: “It did make sense to use Google Docs in order to exchange our lesson plans.” (Interview #1) Some participants stated that document sharing and collaborative editing could facilitate community building for professional development as well as make group activities in the classroom effective:

What I really liked was the collaborative piece because it creates professional learning communities online ... I also feel that GoogleDocs could be implemented in the

classroom. Students could share project ideas and documents with members of their groups. (Participant 1)

Seven participants reported that this was the first time they had used this social software and they had learned new skills as a result:

This was the first time I had ever used it. I understood how to upload material onto it and share with others right away. It's very easy to use and this is a major advantage over some of the other file sharing websites I've used. (Participant 26)

Other participants stated they had learned specific skills related to using GoogleDocs:

The lesson plan [activity] showed us how we can peer-edit without having to have face-to-face meetings ... [We] could provide feedback and share the documents with people as we needed. [We] could edit and [GoogleDocs] gave you an opportunity to see all the additions and changes you have made in the document from the beginning to the end.

(Sam, Interview #1)

Del.icio.us. Of the 26 participants who reflected on *Del.icio.us*, 24 (92%) reported they acquired new knowledge and/or skills. Most interviewees also reported new knowledge and skills gained. Most participants explained their understanding of the key benefits of using *Del.icio.us*. Some stated that this social software could help teachers share and organize resources. In the words of Participant 5: "I am happy to be aware of this technology. The source is good and I enjoyed the organized, shared resources when I entered classroom management on the site".

Some noted that sharing and rating resources with other teachers would help them learn from each other and improve their teaching. For example, Charley stated: "I think with *Del.icio.us*, collectively sharing is always important. The more resources that teachers have, the

more knowledge they have, and the better suited they will be to help explain [concepts] to their students.” (Interview #1)

Six participants reported that this was the first time they used Del.icio.us and they had learned new skills as a result of using this tool:

By having [a resource] stored as a favourite or bookmarked online, you always have access to it as long as you have Internet. You don't have to be at your computer where it is stored under your favourites to be able to access those sites. (Sam, Interview #1)

Some participants reported they gained skills by exploring some of the advanced functions in Del.icio.us. Participant 17 stated: “I have been working with it and looking into what its capabilities are. I think it's going to take me some time to figure out the whole website because it offers so much information.”

TeacherTube/YouTube. Of the 27 participants who reflected on TeacherTube/YouTube, 25 (93%) reported they acquired new knowledge related to the course content as a result of participating in the social software enriched activities. They also learned how to use the social software. Similar findings were identified with most of the interviewees. Some participants reported that TeacherTube enhanced their learning of knowledge and skills. For example, Nancy stated: “It enhanced my understanding of assessment and evaluation. Rather than just getting words [you also get visuals], I think it enhanced my learning of that subject.” (Interview #1)

Other learning from the course included participants learning they could conveniently find appropriate videos for classroom use and their own professional development on YouTube and that “Tube” videos can be used as pedagogical tools in the classrooms:

I think there is definitely a place for using video clips in the classroom, especially short ones that won't take up too much time [and prevent] students being more actively

engaged and creating in other activities.... I found [YouTube/TeacherTube] helpful as a pedagogical tool in that it provided variety in the way concepts and ideas were presented.
(Participant 27)

Some participants had not used TeacherTube before. Nine participants reported that they learned new skills as a result of using this software in the course. For example, some participants learned how to comment on “Tube” videos. Participant 17 reflected: “I was also thrilled to realize that my Google account would sign me up to YouTube where I can now post videos and comment on others.”

Some participants explored other functions on the “Tube” sites that went beyond the course requirements. Participant 20 discovered: “TeacherTube also has the option to send you daily links of featured media which may be an interesting way to start each day.”

Application. The analysis of participants’ reflections and interview transcripts revealed that some participants had started using the social software outside the course (see Table 4.22).

Table 4.22

Participant Reflections and Interviews: Application of Social Software beyond the Course

Application beyond the course	GoogleDocs	Del.icio.us	TeacherTube/YouTube
	<i>N=27</i>	<i>N=26</i>	<i>N=27</i>
Reported	8 (29%)	3 (12%)	5 (19%)

GoogleDocs. In two participant reflections and six interviews, participants reported using GoogleDocs in other teacher education classes. Some participants stated that they had learned about the limitations and benefits of GoogleDocs in this course and so were now more comfortable using the social software, which influenced their decision to use GoogleDocs in other courses:

We now understand the limitations of the system as far as the programming goes, but we [also] understand its usefulness in regards to sharing the information that we need to share to complete our projects. Sometimes, [in] the evenings [we] would all be [working] on the document and, using the chat function, we would chat and see what was going on. You are able to view your group mates' editing in a different colour, so you get to see the real-time results. (Sam, Interview #2)

Del.icio.us. Three participants indicated they used Del.icio.us outside the learning activities in the course and took the initiative to further explore the social software. For example, Participant 10 not only explored other functions of Del.icio.us but also went further to research others' experiences using this tool:

The tagging system allows for a personalized organization system and hopefully will help the reader find the sites or files they are looking for. A downfall of Del.icio.us was identified in online blogs; many bloggers noted that this may be a place for concern for identity theft and fraud. (Participant 10)

Another used Del.icio.us during the practicum and quickly recognized its value as a tool to collect and organize resources: "Especially after the practicum experience I could appreciate it more as there were so many emails already that sharing websites might be overwhelming."

(Participant 21) Yet another participant shared Del.icio.us with other teachers.

TeacherTube/YouTube. Seven participants reported they used TeacherTube or YouTube beyond the required learning activities. Some participants used TeacherTube for professional development; they reported they found videos of professional interest. For example, Participant 24 was enlightened to discover "that in many of the videos, students are doing the teaching". Others reported they used TeacherTube videos as a resource when working with fellow teachers:

“I used TeacherTube with one of my colleagues while doing some research on the unit that we were writing” (Arthur, Interview #2). Similarly, others used TeacherTube videos as inspiration for their own teaching: “TeacherTube allows you to learn about new techniques in classroom management; what is working for other teachers in the field and about creative lessons that have worked for other teachers.” (Participant 23)

Five participants reported they used TeacherTube during their practicum. Some used TeacherTube to stimulate productive professional discussions with the associate teacher:

I was able to introduce TeacherTube to my associate teacher. There was a very good TeacherTube video on Venn diagrams; we previewed and used it in the classroom. After the class, I had a professional discussion with the associate teacher about using technologies in the classroom. It was really helpful and rewarding. (Charley, Interview #1)

However, not all participants’ attempts at using TeacherTube were smooth. For example, Participant 9 reported: “[TeacherTube] is not blocked by the majority of school boards. However, there are fewer videos than you would find on YouTube. I was disappointed with the search results I received when I conducted searches during my practicum”. A second example came from Participant 11 who reported he/she was not able to pass the TeacherTube preview process due to the content of the video he attempted to upload: “TeacherTube does not allow for some fun/music videos that could be used for hooks before getting into some of the more academic informative videos”.

Unexpected outcomes. The analysis of participants’ reflections and interview transcripts revealed some unexpected learning outcomes that were not part of the instructional intent.

Learner initiated comparison. Nine participants reported in their reflections that they used both YouTube and TeacherTube and they compared the two sites. Participants unanimously

agreed that YouTube contains an enormous amount of resources that are easily accessible, whereas TeacherTube contains a relatively limited collection of videos that focus on topics appropriate for classroom use:

The specificity of the videos on TeacherTube makes it a very useful resource for teachers, as they can find videos that are more specific to their lessons that YouTube doesn't offer. This, coupled with the fact that it is student led in many cases and is engaging to students, makes TeacherTube a very useful resource for teachers if the videos are appropriate.

(Participant 24)

The focus on teaching material and the upload preview process offered by TeacherTube appealed to many of the participants:

I feel that TeacherTube offsets the negatives about YouTube. It provides for an interactive, live video learning experience for the students and is monitored so that not just anyone can upload onto the site. [TeacherTube] provides links to curriculum, lesson plans, and other relevant teaching material. (Participant 11)

Others revealed they preferred TeacherTube because it was accessible on most school board networks and allows teachers to customize the media for their own purposes.

Broader reflections. Some participants evaluated the implications of using social software in relation to their individual professional experiences and beyond. Regardless of which social software was used, participants thought these technologies could be used to facilitate community building, cooperative learning, and professional development. Others felt that sharing resources through social software would contribute to better teaching and better education for students. For example, Participant 26 noted: "GoogleDocs could also be used for teachers to share ideas /information/ concepts/ resources. This will enhance a teacher's ability to

teach and in turn help the students get a better education”. Some participants suggested that social software could be used more broadly in teacher education programs:

I did a collaborative assignment using GoogleDocs....We were all able to post our parts and to contribute and edit each other's [work] which is very beneficial. I think that there are definitely opportunities in teacher's college to use it. (Arthur, Interview #1)

Some participants related the use of social software to their recently completed month-long practicum and suggested Del.icio.us could be used to facilitate cooperative learning. For example, Participant 21 stated: “Especially after the practicum experience I could appreciate Del.icio.us more ... It is a great idea to share resources with other teachers and this can promote cooperative learning”.

Some participants stated that teaching was a continuing effort and that social software would allow teachers to share their ideas and support each other's learning. In the words of Participant 16: “Teaching is a continuous learning experience and Del.icio.us is a great site for sharing your ideas with other teachers. I think this site would be a great resource for new teachers”. Indeed, some participants expressed their appreciation of other teachers who contributed and shared their experiences on social software sites:

I think TeacherTube is a great resource for teachers young and old. One of the benefits of the site is there is an online community of teachers that are willing to share their knowledge/experience with you and thousands of others. (Participant 14)

The emotional support they gained from other teachers' reflections was also commented on:

I found TeacherTube videos to be very interesting. It is nice to hear from a variety of people about certain aspects of teaching. I find it very encouraging when many people comment on how wonderful yet challenging of a career choice it is. (Participant 20)

Some participants also reflected on concerns they had and challenges they faced related to using social software. Some expressed their opinions regarding Internet security:

We are not working with super sensitive data so I am not worried if someone has access to it.... Anything that I do upload I will sit down and see if it is worth me uploading it. If I thought it was sensitive I wouldn't upload it. (Sam, Interview #2)

Others expressed concerns about how easily accessible online materials could potentially affect academic integrity and information accuracy:

On the flip side, having such a convenient source [of information] brings into question, "How much work are students putting into their reports or presentations if they can simply find a clip in a matter of moments?" Also, the question of academic accuracy comes in to play as anyone can post anything on a subject whether factual or not. I feel the next step past TeacherTube and YouTube would be to create a site featuring only refereed academic inspired videos. (Participant 8)

Other participants cautioned about potential copyright infringement when using social software sites. For example, Participant 24 reflected: "Teachers also need to be sure that they don't infringe any copyright laws when using YouTube".

Creative ideas. Participants reported that they were seeking or generating creative ideas when using social software. For example, Participant 27 recommended using GoogleDocs as a communication tool among teachers, students, and parents. Participant 9 suggested using social

software to centralize resources into a single virtual space that would be beneficial to individual teachers, schools, or school boards:

Having a centralized database of handy resources could be used on a personal level but also at a school or board level. Having attended numerous in-service seminars, the lead speaker always informs the staff that they will email the links to them. Why not just say, “Log on to Del.icio.us and they will be there tomorrow”.

Other participants considered the use of videos to be a good approach for accommodating different learning styles. Further, the resources available on TeacherTube would help to make lessons creative, interesting, and flexible:

There are no major cons other than that our lessons cannot become just watching clips, movies, and documentaries because that would be an injustice to students who have other learning styles. The lessons we teach need to be flexible, interesting, and with a lot of variety. (Participant 19)

Some participants also put forward a wish list noting some technologies they thought might be beneficial to their future teaching:

Learning ... online marking, online grading, [and] online report card system programs ... would have been a [better] use of our time.... I think that's the kind of technology we, as future teachers, are going to be using and we are going to need to be prepared for. (Lisa, Interview #2)

Factors affecting application. Analysis of the interview transcripts revealed factors that affected the participants' use of social software beyond the online course.

Awareness and willingness. Participants reported that the exposure to social software in the online course had made them consciously looking for suitable tools in their practice:

Now that we are curious, we are going out there and looking for social software and looking for the new improvements of the stuff that we have learned.... You need to have the base to be able to understand the capabilities. It has been very beneficial to learn it.

(Sam, Interview #1)

Some participants also suggested that teachers need to be willing to embrace the concept of how to learn and experiment with innovative tools:

You need to learn how to embrace the change and new things. Social software is going to be outdated next year.... Are you learning the concept of *how* to learn ... versus specifically learning how to use an iPod. (Lisa, Interview #1)

Usefulness. Participants suggested that for them to use social software it needed to be beneficial to their activities and easy to use. Diane stated: “If I need to use it then I will. If it made my life easier, I would use it. If it made my job easier I would totally use it” (Interview #2).

Similarly, Arthur indicated that he would use social software if it would help resolve an issue he was facing: “If we were all out on practicum and we still had to do some sort of collaborative thing, it would definitely be beneficial” (Interview #1). For Lisa, the social software needed to have a clear connection and benefit to classroom use: “For me easiness [sic], quickness, and, most importantly, how clearly I can connect it to what I am teaching in the classroom [are important factors to consider in adoption]... I am more interested in technologies that I can see the value or relevancy of” (Lisa, Interview #2).

Practicing teachers’ adoption. Interviewees suggested that practicing teachers’ use of technology affected their own use of social software in practice. Nancy reported that her associate teacher used GoogleDocs in the classroom and so was inspired to use it in her future

teaching: “I actually really like GoogleDocs now.... my [Associate Teacher] was already using it.... I will definitely use that when I am a teacher”.

Student population. Participants indicated that social software needed to be suitable for the student population if it is to be used in the classroom. Arthur suggested:

The kids that I am with now, when they get to high school it is going to be all about the technology, plain and simple. The only factor I can think about is age appropriate, at the younger ages it is not really useable. (Interview #2)

Not only should age be considered, but also the student population. Sam noted: “I am in a special education class.... Most of the stuff that we are using is dealing with assistive technology in the classroom” (Interview #2).

Technology readiness and accessibility. Participants reported that the infrastructure readiness and network accessibility in schools affected their use of social software in their practicum. Lisa reported that the low-tech school environment she was in made it harder to use social software in the classroom:

I definitely see a place for technology as a tool in teaching and I am really looking forward to it. In my current placement, my classroom has an overhead projector. We have a smart board [but] it is in a box in our room. The board has not been able to get someone into our classroom to install it. It is really disappointing to see the box but not be able to use it. This practicum will be a low-tech placement for me ... I have to think more creatively. (Lisa, Interview #2)

Arthur concurred: “I guess the biggest thing is having the technology available in the school; whether we have wireless Internet, ... whether the school has the technology or the computers or the up-to-date software to back everything up” (Interview #2).

Changes overtime. Development of interviewees' opinions revealed from the analysis of the transcripts of interview two in comparison to that of interview one (see Table 4.23).

Participants had completed their first month-long practicum when they were first interviewed. Interview two was conducted five months later when they were ready to complete the second month-long practicum.

All interviewees reported they had used social software outside of the online course, mostly in other teacher education courses, and some during their practicum. Some indicated that after the online course they voluntarily took an elective course featuring using technologies in education.

Diane expressed her resistance to using social software five months ago, but now reported she saw the value of using it in the classroom. Lisa who initially preferred other social software to GoogleDocs, but now she became more familiar with the technology and acknowledged the potential benefits of using it. Arthur and Sam originally understood the value of using GoogleDocs in their professional development activities, but now reported they were able to make informed decisions for using social software in the curriculum. Nancy was encouraged by seeing her associate teacher used GoogleDocs in the first practicum, but was not excited about her current practicum environment where little technology was used. Despite the environment, Nancy continued using social software with her teacher education classmates for professional exchanges and resource sharing.

While Amy preferred using other familiar tools and Charley needed more time to develop social software skills, both reported they understood the value of using social software. Since neither Amy nor Charley participated in the second interview, it was not clear whether their opinions changed since the first interview.

Table 4.23

Participant Interviews: Changes Overtime - Participant Opinions and Actions on Using Social Software in Teaching and Learning

Pseudonym	Social SW Used beyond the Course*	Took the Technology Elective Course	Interview #1 (Immediately after the course)	Interview #2 (Five months after the course)
Amy	GoogleDocs	Yes	Social software has a role in facilitating collaboration ... For me I didn't like using them ... because there are so many other ways like ... [using] email [rather than sharing online]. (Amy, Interview #1)	(Did not participate)
Arthur	GoogleDocs TeacherTube Skype	No	The concept [of using GoogleDocs] is a great idea ... [Having] a [web] place where you can be sharing resources is definitely ideal and ... gather[ing] something back from other teachers ... is definitely a plus. ... (Arthur, Interview #1)	... at first I didn't see much use for it when we were using it, but the more I thought about it the [better I see the] opportunities to use it are definitely going to arise ... when [the Grade 5 and 6 kids I am teaching] get to high school, it is going to be all about the technology, plain and simple ... If I was with high school kids [now], I would definitely be using [social software] for collaborative assignments. (Arthur, Interview #2)
Charley	TeacherTube	Unknown	Well I say generally speaking, because I am a relative beginner with social software that I found it a little challenging because it was new to me, however I think if I continue using it, it will be beneficial to me and to my future in the classroom and at home and at school when I do my lesson planning. (Charley, Interview #1)	(Did not participate)

Pseudonym	Social SW Used beyond the Course*	Took the Technology Elective Course	Interview #1 (Immediately after the course)	Interview #2 (Five months after the course)
Diane	GoogleDocs Wiki	No	I didn't really enjoy using [social software] at anytime ... typing things ... is just not the same [as face-to-face communications]. (Diane, Interview #1)	I definitely think there is a value to incorporate [social software in the classroom] ... It could be really useful ... but it needs to be relevant. (Diane, Interview #2)
Nancy	GoogleDocs Wikispace	No	... my [associate teacher] ... would write down the homework and agenda of his class for the next week in Google Docs [which] was accessible to the parents and the children ... it was a really good communication tool ... I will definitely use [GoogleDocs]. (Nancy, Interview #1)	At my new practicum school there is very little technology being used by the teachers themselves ... [my classmates and I] have [been] using [W]ikispaces [a lot] to share ideas and lesson plans ... but that is us ... not the schools ... (Nancy, Interview #2)
Lisa	GoogleDocs Dropbox	Yes	I think I really like that concept of [using] Google Docs [for collaboration], but we actually used Dropbox this semester, which I preferred, mostly because I am more experienced with it, and I found it easier. (Lisa, Interview #1)	The fact that we were exposed to Google Docs the first semester, we already knew it so it was an easy one for us to do in our project and then after doing it for a project it was easier to use ... [GoogleDocs] definitely would be something ... I would consider [using] again ... the real time stuff was amazing. (Lisa, Interview #2)
Sam	GoogleDocs	Yes	I can see how beneficial Google Docs could be if I was team teaching with another teacher and sharing a lesson or unit plan. (Sam, Interview #1)	When I look at [social software] now I definitely look to see what the benefits are, the constraints and the disadvantages within the class. I have a better view of how I look at the software and its effectiveness in how I deliver a curriculum. (Sam, Interview #2)

* Only the social software mentioned by the interviewees was reported herein.

Summary of All Findings

Findings from all three phases are used to answer the research questions of the study in this section.

Research question 1 integrates qualitative findings on instructional considerations reported by the researcher and that on learning experiences, preferences and needs reported by the participants. In addition, quantitative findings on the participants' profiles are also integrated to answer this question.

Question 2 is addressed through quantitative findings with regard to the online participation documented in the course records and social software platforms.

Research question 3, including its sub-questions, presents learner reported learning outcomes. The overall learning outcome is informed by quantitative findings on the self-reported pre- and post-course SoAT changes and factors affecting such change. Sub-question 3.1 includes quantitative findings on the overall participants' reaction to their learning experience. Qualitative findings on learning outcomes reported in the participants' reflections and interviews are included into the answers to all sub-questions (3.1 to 3.5).

1. In what ways can outcome-based instructional design be used to incorporate social software in e-learning? In this study, an outcome-based instructional design approach was adopted to enrich an existing e-learning course by incorporating social software into the selected learning activities. The instructional intents identified at the onset of the design process include: exposing participants to social software, enhancing participant's digital literacy, and stimulating reflection. This approach was guided by the conceptual framework of the study derived from the *W(e)Learn* framework. The researcher encountered a number of challenges during the design, development and delivery of these learning activities, including unknown

learner profiles, minimizing extra workload on learners, focusing on concept not technology, administrative factors, and technology compatibility and reliability issues. A number of instructional design considerations, including pedagogical strategies and experiences gained from dealing with these challenges, recorded by the researcher; and the learning experiences and comments on instructional design reported by the participants are integrated to answer this question.

The findings revealed that more than half of the participants had taken online courses before. The majority of them indicated their past online learning experiences were positive. Further, most of the participants had used the Internet for informal learning. Participants' experiences using social software for formal education were limited. Some participants had used social software to consume (i.e., read, collect, watch) web content in formal learning programs; however, they rarely had experienced producing (i.e., commenting, reviewing, sharing, writing, uploading) web content in formal education settings.

Some participants preferred using familiar tools to support their learning rather than using social software. Some indicated new technologies being introduced to them should resemble familiar tools they were already comfortable with. Some expressed the need for more time and practice with social software to become familiar with it. They also wanted a face-to-face orientation to guide them through technical instructions, clarify the purpose of using social software, and make connections to their teaching practice.

Participants' experiences using social software for formal learning were limited. This was consistent with the assumption made during the instructional design phase. While a face-to-face orientation was planned in the instructional design, this did not happen due to administrative challenges.

The researcher attempted to minimize potential technical problems and extra workload by selecting widely used social software that were considered simple, reliable and sustainable by their users, conducting a series of tests prior to the start of the course, and providing timely technical support during the course. Nonetheless, all the social software used in the course had issues with technical reliability or compatibility, and the participants commented extensively on their frustration related to these issues. Indeed, these technical difficulties resulted in more time and effort required from the participants, despite the intent to minimize extra workload associated with using social software in the online course.

The researcher also attempted to help participants stay focused on the concept and potential of using social software by straight forward instructions on collaborative online content production (social object), explaining the purposes of the activity, and stimulating reflection on how to use social software in the future teaching practice. While participants struggled with the technical difficulties and unfamiliarity with social software, many indicated the instructions were clear, and the social software used in the learning activities was appropriate, especially when relevant and well organized course content was delivered through the social software. Some participants commented that including social software into a course focusing on technology would be more effective.

2. In what ways does the use of social software affect learners' level of participation?

Overall, 17% (183/1078) of the online postings were generated using social software. In general, if more participation was required to complete the learning activities, the overall online participation was higher. In addition to the online participation in the learning management system that were required for all learning activities, the participants were also required to use social software platforms for the enriched learning activities. The total number of interactions

was significantly higher in units that used social software compared to those that did not. The additional interactions in enriched learning activities were all generated by the required social software use. While some of the additional online interactions were triggered by the technical difficulties that needed additional support, the number of additional content related online interactions on social software platforms was higher than that of technical support interactions. If a face-to-face class was scheduled, the level of participants' online participation was minimal.

However, there was a change in the level of participation in course content discussions since Unit 7 when participants started to prepare for their month-long practicum. Before Unit 7, participants' participation in core course content discussions was consistent across all units. The additional number of interactions was solely generated by using or obtaining support for the social software. Starting from Unit 7, the overall online participation level continued to be higher in units that used social software. Further, the number of postings related to the core course content in the units using social software was higher than that in units that were not enriched with social software.

3. How does outcome-based instructional design impact learners' learning outcomes?

Quantitative analysis revealed a significant difference in SoAT stages in this study. In general, participants reached higher SoAT after the course. These results suggest that the course had an overall positive impact on the participants' stages of adoption of social software. This overall outcome is consistent with the instructional intent to help participants improve their SoAT.

Quantitative analysis also revealed a statistically significant difference in SoAT changes among participants who started the course at different SoAT stages. Participants who started with a low stage of adoption reached a higher stage after the courses and a few participants started with higher stages of adoption reduced one level of adoption. This finding reveals that the

instructional intent was achieved with some participant groups but not others. Further, male participants' adoption of social software improved more than that of their female peers. This result is further discussed in Chapter 5.

3.1. To what extent do the learners' reactions to the learning experience coincide with the instructional intent? Overall, 56% of the participants did not enjoy their learning experience. While quantitative data indicated that many participants did not enjoy the learning experiences, qualitative data showed that some participants enjoyed straightforward and step-by-step instructions, the organized resources, and using social software in practice. The instructional intent was to make the social software experiences short and straightforward but the participants had to spend more time and efforts on using social software and they experienced technical difficulties. However, qualitative data also suggested that some participants' negative responses could have been attributed to factors other than solely the use of social software. For example, some participants may not have enjoyed the unfamiliar learning management system, the course, the instructor or the teacher education program itself. As such the high non-enjoyment rate can not be entirely attributed to the use of social software. Moreover, the participants' attitude towards future use of social software was much more positive compare to their learning experiences.

Participants had mixed views about using social software in the course. Some found the social software was user friendly, straightforward, and conducive to collaboration and sharing. However, due to technology reliability and compatibility issues experienced during the course, many participants reported frustration with using social software, others reported they were not familiar with the social software, and still more indicated it was hard to use.

Technical difficulties were reported by all participants. However, regardless of whether they were frustrated or not, some participants reported that they would like to spend more time using the social software and becoming familiar with it, as it could potentially be beneficial.

The learning experiences of using social software in the online course had some impact on the participants' attitudes toward using social software in the future. Some participants (15-22%) reported they would not use social software in the future. Some were not happy with their learning experiences in using social software in the course. Others reported that they used familiar tools instead of social software and that social software was not a good fit for them.

However, some participants (23-48%) decided they would use social software in the future, despite the difficulties encountered, as they understood the potential benefits and the necessity for collaboration and sharing in their future practice.

Some participants' attitude remains unclear (48-64%) as to whether they would use social software in the future. However, their experience using social software helped them to understand the value and limitations of the software, as well as their own needs for skill development in this area. Most of these participants had a positive view of social software. Some of them committed to monitor the developments in social software and determine their need to use them in the future.

3.2. To what extent do the learners' newly acquired knowledge and skills coincide with the instructional intent? The majority of participants (92-93%) acquired new knowledge and/or skills regarding social software. The overall learning outcomes related to knowledge and skill development are consistent with the instructional intent described in Chapter 3.

Participants demonstrated that they understood the concept, purposes, and benefits of using social software in education. Many participants had never been exposed to the social

software that was introduced in the online course before and they learned new social software skills. Some participants even explored the advanced functions of the social software and learned new skills on their own initiative.

For GoogleDocs, sharing, editing, and collaborating were the top three areas of knowledge and/or skill demonstrated. For Del.icio.us, finding, sharing, and resources (information useful to the participant) were the top three. However, rating the resources (determining the quality of the resources) was only mentioned twice. Lastly, for TeacherTube/YouTube, finding, resources (information useful to the participant), and commenting came up as the top three areas of knowledge and/or skill demonstrated.

Not all participants who demonstrated a gain in knowledge and/or skills committed to using social software in the future. A lack of perceived need or benefit for them as individuals, a lack of experience using social software, and alternative preferred or established methods of sharing, collaboration, or teaching were all reported as limiting factors to the adoption of this technology. However, all participants who committed to using social software in the future (23-48%) demonstrated they had learned new knowledge and skills.

3.3. *What unexpected or unique learning outcomes do learners experience?* The comparisons participants made between TeacherTube and YouTube led to a higher level of comfort using the focused and pre-reviewed content in TeacherTube for professional development and classroom use, despite the relatively smaller collection of videos on the website compared to YouTube.

Participants evaluated the use of social software in relation to their professional experiences and reflected on the implications associated with such use in the broader context of their teaching career. They expressed that using social software in teaching, learning, and

professional development would facilitate collaborative and cooperative learning and build online communities. Some reflected on their views about the impacts of misusing social software. Some suggested creative ideas for using the technology in teaching and learning.

3.4. How, if at all, are the learners (pre-service teachers) able to apply new knowledge and skills to their teaching practice? The analysis of participants' reflections and interview transcripts revealed that 12-29% of participants had started using the newly learned social software knowledge and skills beyond the course. This outcome is consistent with the instructional intent and not surprising as application takes time.

Some participants reported they were able to use new knowledge and skills in other teacher education courses. The exposure to social software helped them to cautiously look for social software that could resolve issues they were confronting. Some participants indicated the social software knowledge and skills learned in the online course helped them to find ways to avoid technical limitations when using social software. When the environment allowed them to, some participants were able to apply new knowledge and skills in their practicum. Some shared their knowledge about social software with, and influenced, other practicing teachers. There were a number of factors outside the course that affected their application of their new social software knowledge and skills, such as school environment, technology readiness and accessibility, perceived usefulness of social software, and participant attitude.

3.5. In what ways does the use of social software impact the learners' achievement of the learning outcomes? Participants indicated that using social software facilitated their learning or at least had some positive effects on their learning. Being able to make the connection between using social software and their practice was important for them to achieve the learning outcomes. Participants made such connections firstly through their reflections on using social

software in the enriched learning activities. They made additional ties in the learning activities that used TeacherTube, as the connection to the course content was obvious and imminent. As time went by, and the participants had more experience in the classroom, they started to make more connections between the value of social software and their teaching practice.

CHAPTER 5

DISCUSSION, CONTRIBUTION AND CONCLUSION

Introduction

The purpose of this mixed-methods explanatory case study was to explore how outcome-based instructional design could be used to incorporate social software into an e-learning course. The first phase of this three-phased study involved the design and development of social software enriched learning activities and the data were recorded by my research journal. The second phase involved the delivery of social software enriched learning activities and the data were collected through pre- and post-course surveys and the course records. The third phase involved conducting two interviews, one at the end of the course and the other five months after, and the data were generated by interview transcripts.

W(e)Learn framework was used to create the conceptual framework and guide the instructional design of this study. *W(e)Learn framework* has been used in numerous research studies (Archibald, et al., 2011; Halabisky et al., 2010; Kellam et al., in press; MacDonald, et al., 2010; Puddester et al., 2010; Pullen, 2012) since its publication in 2009. A number of quantitative studies have been administered to validate the *W(e)Learn* survey instrument that assesses learning experiences and outcomes (Archibald et al.). However, no mixed-methods study had explored the relationships between learning outcomes and pedagogical strategies informed by the *W(e)Learn* framework until this research was conducted. This study is also the first known study to use both quantitative and qualitative data to explore the relationships between learning outcomes and the outcome-based instructional design that incorporated social software into an existing online course in a postsecondary institution. Further, the use of a researcher's journal is novel in a mixed-methods explanatory case study.

In this chapter, the quantitative and qualitative data from all three phases are linked, interpreted, and discussed in relation to the literature on online learning. Learners' reactions, experiences, level of participation, and learning outcomes are discussed in connection to the instructional design approach for the online course. The implications to outcome-based instructional design are discussed by looking at the learning outcomes (research question three) first and then the level of online participation (research question two). This sequence allows the effective instructional strategies to be confirmed and the areas for instructional design improvement identified. Finally, the first research question regarding how to enrich an online course with social software was discussed by proposing a revised outcome-based instructional design approach that is informed by the interpretation of the answers from research questions two and three. By discussing research question one, implications to instructional design theory and practice are also presented. Potential areas for future research, as well as connections to the conceptual framework of this study and the *W(e)Learn* framework are presented.

The next four sections present the interpretations of the research results. Section one interprets the learning outcomes. Section two discusses the online participation results. Section three proposes amendments to the conceptual framework of this study and the application of the results discussed in the previous two sections to outcome-based instructional design. Section four discusses connections to the *W(e)Learn* framework.

The contributions, the strengths and limitations, and my personal reflections of this study are also presented in this chapter. Lastly, the directions for future research and conclusion complete the chapter.

Interpretations of Learning Outcomes

This section interprets the results related to research question 3: How does outcome-based instructional design impact learners' learning outcomes?

Stage of adoption of technology (SoAT). The quantitative results showed that, overall, social software adoption improved after taking the online course. This suggests that the social software enriched learning activities had a positive impact on the participants' stage of adoption of social software, which is consistent with the instructional intent.

Reduced post-course SoAT for some participants. It is interesting that while there was an overall increase in participants' post-course SoAT, learners who started at a lower SoAT increased their social software adoption level post-course, whereas their peers who started at a higher SoAT level maintained or decreased their post-course social software adoption level. A one-way analysis of variance (ANOVA) confirmed that the pre-course SoAT stage had statistically significant influence on the post-course SoAT change among participants. This finding reveals that the expected learning outcomes achieved in some learner groups but not others.

A participant whose SoAT decreased post-course was invited to participate in an interview to further investigate this finding; however, this individual did not respond to the invitation so it remains unclear what factors contributed to a reduced SoAT in some learners. Some researchers have proposed that the perceived usefulness and perceived ease of use of technology affect an individual's stage of technology adoption (Davis, 1986; Davis, Bagozzi, & Warshaw, 1989; Liao, Palvia, & Chen, 2009). Others have asserted that when an individual cannot successfully learn a technology with manageable effort, a negative cycle of adoption may be induced (de Vries, Midden, & Bouwhuis, 2003; Straub, 2009). However, in the literature,

there is a lack of understanding about the possibility of a negative cycle of technology adoption, let alone the contributing factors (Straub).

Moreover, some researchers have argued that individuals' behaviours are different at different stages of adoption and so different tactics are required to promote technology adoption for different groups of users (Davis, 1986; Davis et al., 1989; Foster & Rosenzweig, 2010; Jaspersen, Carter, & Zmud, 2005; Karahanna, Straub, & Chervany, 1999; Liao et al., 2009). Again, the lack of understanding of behaviours at different stages of technology adoption make it challenging for researchers and practitioners to effectively facilitate the progression of stages of technology adoption (Liao et al.). The inconclusive literature invites further research in understanding the potential negative cycle of social software adoption after an educational intervention. Also, research studies exploring strategies that support learners at different SoAT stages is warranted.

Convergence of post-course SoAT. Eighty-four percent (21/25) of the participants showed a convergence at stages 3, 4, and 5 of SoAT after the course. It appears that after the online course, most participants started to understand social software and think of where it can be useful (SoAT 3), felt comfortable using social software and confident using it for specific tasks (SoAT 4), and were no longer concerned about social software and started to use it to assist teaching (SoAT 5).

While some participants regressed in terms of SoAT, it is not clear whether this convergence of post-course SoAT suggests that some participants might have recognized they need to learn more about the social software, some might be considering the appropriate use of social software, and others might have become more selective when using social software in teaching and learning. Researchers have acknowledged that the SoAT measures changes in

technology adoption and represents teachers' concerns about using the technology. As such, most of the stages are not mutually exclusive and teachers may have some concerns about technology at various stages of adoption (Christensen, 1997; Christensen, Griffen, & Knezek, 2001; Christensen & Knezek, 1999; Hall, 1979; Straub, 2009).

This convergence of post-course stage of adoption could be considered a desired outcome for a relatively short educational intervention such as the one in this study. The majority of the participants were at a stage of gaining understanding, familiarity, and confidence with social software that could lead to technology adoption in other contexts (e.g., beyond the online course, in teaching practice). As such, and considering the overall post-course SoAT increase, the results of this study support the use of social software in e-learning to help participants achieve the expected learning outcomes. However, future research that assesses pre- and post-SoAT change over a longer period of time and that investigates how time can influence SoAT change is warranted.

Gender. Male learners' adoption of social software increased more than that of their female peers in this study. In contrast, in the extant literature some researchers have argued that gender differences in learning with technology might be diminishing (Mossberger, Tolbert, & Stansbury 2003). However, Selwyn (2008) indicated that gender differences remain a strong concern among postsecondary learners participating in e-learning.

As seen in Appendix O, most male participants started the course at a low stage of technology adoption (stages 1-3), whereas the majority of participants who started the course at a higher stage of adoption (4-6) were female. It is possible that the decreased post-course SoAT in female participants might have offset the increase of the post-course SoAT of other female participants.

Female participants at low pre-course SoAT increased an average of 0.86 of a stage post-course, whereas male participants at low pre-course SoAT increased an average of 1.5 stages after the course. It is not clear what factors contributed to the different improvement in post-course adoption between the two genders. Some studies found that females use more social software than males (Manago, Graham, Greenfield, & Salimkhan, 2008; Salaway, Garuso, & Nelson, 2008). It is possible that more female participants started the course with higher SoAT, therefore leaving less room for them to improve. Other studies found that female learners experience higher levels of anxiety when using social software for educational purposes compared to male learners (Barron, 2004; Cooper, 2006). It is possible that female and male participants in this study perceived social software enriched learning activities differently which, in turn, affected their post-course SoAT.

Some researchers have argued that social software can provide social support that is critical to female users' anxiety therefore measures should be taken to make the process of using social software less intimidating (Huang, Hood, & Yoo, 2013). These authors also suggested that social software might be better introduced in the classroom first so that it is more engaging for all users. It therefore seems important to consider planning a classroom introduction to social software when integrating it into e-learning.

Satisfaction. With regards to the learning experiences, participants generally felt the learning activities were practical, relevant to their teaching, fostered collaboration, improved their ability to solicit information from peers, and helped them to achieve the learning outcomes. Quantitative findings also suggested that in general, learners achieved the expected learning outcomes. However, learner satisfaction with the learning experiences was relatively low; 56% of participants reported they did not enjoy the learning experience.

In this study, quantitative findings of learner satisfaction refer to their learning experiences with the enriched learning activities. It was not intended to include the overall experiences with the online course. The online course in this study had been offered by the same instructors, at the same university, using the same technical infrastructure in the past. Historically, learners have reported high levels of satisfaction with the course when responding to the satisfaction question of the *W(e)Learn* instrument (Personal conversation with the course instructor, 2010). Since the social software enriched learning activities were the only changes made to the online course and the participants were asked to only respond to the change, it is assumed that, for quantitative responses to the surveys, participants only reported their learning experiences of the enriched learning activities.

The fact that just over half the participants did not enjoy the learning experiences begs the question whether their satisfaction with the course influenced their technology adoption. However, a one-way analysis of variance (ANOVA) revealed no statistically significant differences in the change of stage of adoption between participants who reported they did not enjoy the learning experiences, those who were neutral about the experiences, and participants who reported they enjoyed the experiences.

While participants felt the learning outcomes were achieved, many did not enjoy the learning experiences. The original instructional intent was to make the social software experiences short and straightforward while fostering learning outcomes. Qualitative results suggested that, contrary to the original intent, the participants spent a lot of time and effort on the enriched learning activities and felt frustrated due to unexpected technical difficulties. However qualitative findings also revealed that some participants did not enjoy the unfamiliar learning management system, the online course, or some arrangements in the teacher education program.

As such, it is difficult to attribute the participants' dissatisfaction entirely to the enriched learning activities.

While the quantitative data did not provide a clear connection between participants' satisfaction and their learning outcomes, the qualitative findings related to student reactions to and satisfaction with the learning experiences provide a clearer picture of the learners' experiences and the achievement of the instructional intent (expected learning outcomes).

It is unclear whether the research component of this course affected how participants reacted to the learning activities. The participants reported they did not expect using social software in the online course, it is possible they were not prepared to experience social software difficulties when participating in the enriched learning activities. Moreover, the participants were pre-service teachers who likely had their own views of teaching and learning that might have been different from mine. It is possible that some participants' reactions to the learning experiences might have been influenced by their existing opinions about the use of social software in teaching and learning.

Effort was made to minimize any potential issues associated with using social software in the online course. The following sections discuss sources of learner dissatisfaction by linking relevant findings related to learners' needs, instructional design, and participants' reactions to their learning experiences.

Learners' needs. While some participants indicated they understood the purpose of the enriched learning activities, others expressed that they were not clear about the purpose and questioned why using social software was necessary. Not being clear on the purpose of the activities was a source of dissatisfaction for these learners.

I communicated to all course learners through a number of venues that the purpose of this study was to expose the participants to the concept of using social software and identify the potential value of using these tools in teaching and learning. The communication venues included the participant recruitment letter, a presentation during the second face-to-face class, the bulletin board, individual exchanges, and the learning activity instructions. The purpose was indicated as follows:

Technology quickly changes and evolves. The social software used in this course are examples of this rapidly changing technology. As a teacher, you will need to select appropriate social software in your future practice. This experience will help you develop the required knowledge and skills to do this. (Appendix K, Researcher Posting on the Bulletin Board of the Online Course)

It is not clear whether the participants did not see or hear the communications on the purpose of the social software in this course or whether they did not believe in the benefits of using social software in teaching and learning. Neither is it clear whether the participants' expertise in teaching and learning as pre-service teachers influenced their expectations for more elaborate information on the instructional design that supported the use of the enriched learning activities. Regardless, this source of learner dissatisfaction is supported by the Joint Information Systems Committee's (2009) report. This report indicated that incorporating Web 2.0 tools in a formal learning context presents conceptual difficulties to learners and they need demonstration, persuasion, and opportunity to experiment in this context. This finding confirms that the instructional design should include strategies to communicate the purposes and benefits of social software enriched learning activities when they are used. It is important to consider ways to support demonstration, persuasion, and experimentation to better help learners understand the

purpose and benefits of using social software in teaching and learning and to generate more buy-in.

Many participants wanted a face-to-face orientation to help guide them through technical instructions, clarify the purpose of using social software, and make connections to their teaching practice. They also wanted more time and practice with social software to become familiar with it and be better prepared for the enriched learning activities. A face-to-face orientation session was planned but it was not offered due to administrative challenges. Although the lack of orientation was not expressed as a source of dissatisfaction by the participants, offering an orientation session before online courses start can help increase students' confidence in performing online activities in the course and, in turn, enhance student satisfaction (Kuo, Walker, Belland, & Schroder, 2013). This finding confirmed that the originally planned face-to-face orientation was necessary and was consistent with the recommendations of Huang et al. (2013) that technology be introduced in a classroom setting to engage all learners. Future instructional design considerations should include a pre-course orientation and resources to provide additional sessions when necessary to better prepare learners.

Technology compatibility and reliability. To minimize potential technical issues, the social software selection and testing was carefully planned and carried out during the instructional design phase. The selection criteria for the social software included: appropriate for the type of collaboration learners engage in during the learning activity, used and positively reviewed by many users, easy to use or similar to other popular tools, sustainable, and reliable. Step-by-step technical instructions and demonstration videos were also included in the instructions provided for each enriched learning activity.

The unexpected lesson plan template compatibility issues occurred while I did not have

direct contact with the participants due to the administrative challenges. This compatibility issue was reported by almost all participants in their reflections and interviews and some expressed their frustration with it. It was also unfortunate that while chances for server issues are normally low, the participants experienced these problems with both Del.icio.us and TeacherTube during the course of the learning experience.

The two types of technical issue described above were a source of frustration for the learners. This finding is in line with reports in the literature. Kuo, Walker, Belland, and Schroder (2013) found that technical issues can cause student dissatisfaction. Technologies are always evolving and, as such, technology platforms will always have problems and may not be available 100% of the time (Fein & Logan, 2003). Technology reliability and compatibility issues appear to be unavoidable even with careful planning and selection of the social software. To address this source of dissatisfaction, future instructional design should consider the management of learner expectations by providing information on the potential of technical inaccessibility, as well as remove or minimise compatibility issues by doing additional testing and using compatible templates.

Workload. Many participants reported that they preferred using social software that resembled familiar tools to support their learning. Despite all the instructional design efforts to introduce familiar or simple social software and provide clear technical instructions, some learners still did not understand how to use social software and had to spend more time and effort on this element of the course. The additional effort required was another source of dissatisfaction for them.

It is not clear whether the participants who had difficulties using social software followed the technical instructions provided. Neither is it clear whether the participants' difficulties using

social software were related to their level of technical and/or online learning skills. However, it is clear that learners dealt with technical issues differently. Some participants were able to resolve the issues by themselves, some reached out for support and got the problem resolved, and some were unable to resolve the issue and used other applications instead. It is apparent that participants had to put in additional time and effort to complete the enriched learning activities as a result of the technical problems they experienced.

Capdeferro and Romero (2012) have reported that excess time spent and high workload using technology contribute to learner dissatisfaction. While this source of dissatisfaction appeared to be linked directly to an increased workload as a result of the use of these tools, the additional time and effort required of the participants seems to be closely connected to their technical skills, as well as their perception and understanding of social software. More researchers have reported that technical problems require extra time and effort and can lead to student frustration and dissatisfaction (Choy, McNickle, & Clayton, 2002; Kane, 2004; Mandernach, 2005; Sloan-C, 2008). These reports seemed to support this identified source of dissatisfaction in this study. It is too soon to conclude that reducing learners' workload will address this source of dissatisfaction. Rather, the instructional design should address the root cause of the increased workload.

The heavy workload reported by learners seems to be related to the participants' perceptions of teaching and learning, their technical skills, and their readiness to use social software in online education. Oppermann and Specht (2006) reported that learners resist new forms of learning, especially in a web-based environment, as this is perceived as something with an additional level of difficulty that requires extra effort and time. As such, when academics want their students to undertake unfamiliar learning activities, they will need to provide direction

on why they will benefit, as well as how to approach the task and achieve the desired learning outcomes (Kirkwood & Price, 2011).

The results of this study emphasize the importance of considering workload during instructional design. Moreover, while selecting familiar and simple social software, including straightforward learning tasks, and providing step-by-step technical instructions works for some learners it may not work for all as other factors may be at play. Future instructional design should provide learners with information on the purposes and benefits of the enriched learning activities and more targeted technical support so that extra time and effort required to learning technology can be reduced.

Online delivery. A number of participants were adamant about their dislike of online learning and considered using social software in an online course a difficult task. It seems that learners' perceptions of online delivery have affected their satisfaction with the online learning experience. It is well documented in the literature that learner preference for face-to-face learning can unfavourably affect their perception of online learning (Cobb, 2004; Filion Carrière, 2001). The results of this study seem to confirm these findings.

Researchers have acknowledged that online learning may not be for everyone (Thompson MacDonald, 2005). It would be interesting to know how learners respond to social software enriched activities in different delivery modes or contexts. Current research does not provide a roadmap for anticipating learners' responses to technology, nor is there an empirical basis for understanding the influence of satisfaction on the adoption process. However, the social cognitive and adoption theories suggest that context can influence individuals' responses to the experience (Bandura, 1986; Straud, 2009). Exploring learners' perceptions on the incorporation

of social software in different contexts, such as online, blended, and face-to-face courses, would be useful for educators.

Attitude toward future use. The participants' attitudes toward the future use of social software were much more positive compared to their satisfaction with the learning experiences. Individuals' experience with technology informs their perception of the level of difficulty involved and their judgement of their own capability of using the technology, which, in turn, links to their attitudes of future technology use (Compeau, Higgins, & Huff, 1999; Rogers, 1995; Straub, 2009). As such, the participants' experiences using social software in the online course are discussed in the following sections and linked to their attitudes of using social software in the future.

Media. Individual learners had different experiences with each of the different social software enriched learning activities. Further, the learners as a whole had different experiences with the same activity. It was expected that participants would react differently to the same activity due to diverse learner profiles. These differences seem to be related to their past experiences using these technologies and the opportunity to become familiar with the technology during the course.

Some participants reported they used GoogleDocs infrequently before the course and some had never used it. It is interesting that while GoogleDocs offered similar text editing interface to the most prevailing desktop programmes, only some participants stated that the technology was easy and effective for sharing and collaborating, some suggested the technology was difficult to use.

Some participants reported they occasionally used Del.icio.us in the past and most said they had never used the social software before. It is interesting that while Del.icio.us was known

for its simple concept and clean user interface, participants' reactions to their Del.icio.us experiences were drastically different. Some stated that the technology was simple, easy and effective for resources organizing and sharing and they shared their resources momentarily. However, some suggested the technology was confusing and took them a while to learn how to share their resources.

Participants reported that they frequently used YouTube to watch videos in their past formal and informal online learning. Interesting that TeacherTube resembled the interface of YouTube and the participants reported no difficulties in using TeacherTube/YouTube. Still, some participants responded positively to the fact that the "Tube" sites were introduced early in the course and were used in more than one units. They thought this arrangement was helpful as they were given time and opportunity to become familiar with the social software and were prepared well for the enriched learning activity using TeacherTube/YouTube later in the course.

The finding of this study suggesting participants were most comfortable with familiar tools or methods. This seems to be consistent with findings of Anderson, Poellhuber, and McKerlich (2010) who found learners were most interested in and comfortable with the most familiar types of social software found among the diverse types of Web 2.0 tools used in online learning. Indeed, learners' past experiences with the software, as well as their experiences using it many times throughout the course, might have contributed to their familiarity and level of comfort using social software. Smith (2007) suggested that using social network tools students are comfortable and already familiar with helps to facilitate student engagement and interest. This idea was applied to the social software selection strategies used in this study. Future instructional design should consider continue building on learners' past experiences with

software and providing opportunities for learners to gain familiarity with social software within the course.

In addition, a relatively common reaction to using the social software in the online course was related to having to sign up for new accounts to obtain access to different social software. While some participants reported that using multiple user names and passwords was manageable, some expressed that the actual issue was learning multiple types of social software in addition to the unfamiliar learning management system, which was overwhelming. It seems that learners' familiarity with the social software and the quantity of the technologies they had to learn might have contributed to their reaction to the learning experiences.

This finding seems to be consistent with researchers' findings that difficulties in learning multiple technologies can become an issue in delivering online learning (McLoughlin 2002; McLoughlin & Lee, 2007). Future instructional design should consider the appropriate number of social software sites being used in a course to allow learners to become more familiar and comfortable with them.

Attitude. Decision on whether to use a technology in the future is related to learners' acceptance to the technology (Rogers, 1995, 2003). The results of this study suggest that the different types of social software used in the course were accepted by the participants differently.

Regarding intended future use of the technology, no participants said they would NOT use TeacherTube/YouTube in the future, 15% participants reported they would not use Del.icio.us, and 22% indicated they would not use GoogleDocs. With more technical problems reported with GoogleDocs, it is not surprising that more participants indicated they would not use this social software in the future. Further, with participants' unfamiliarity with and difficulty using GoogleDocs and Del.icio.us, it is not surprising that some participants chose not to use

these two technologies. Participants are more likely to encounter difficulties with less familiar technologies and need to devote more time and effort in order to learn the technology and complete the learning task (Opperman, 2008). This result suggests that participants will choose not to use social software in the future if they have difficult experiences using the technology to complete learning activities or the technologies are perceived as unfamiliar or difficult to use. Researchers have reported that individuals' judgments, based on their experience, of their abilities for completing tasks assisted by technology have been correlated to future technology use (Compeau, Higgins, & Huff, 1999; Straud, 2009). This is consistent with the findings of this study.

Despite the technical problems experienced when completing the enriched learning activities, 48% participants indicated they would use TeacherTube/YouTube in the future, 30% would use GoogleDocs, and 23% would use Del.icio.us. The result for the "Tube" sites was not surprising as this is the most familiar tool used by the learners. However, participants indicated they would use GoogleDocs and Del.icio.us in the future despite the fact they experienced technical difficulties and the social software was not familiar to them. Further, participants reported they would use these technologies because they understood the potential benefits and the necessity for collaboration, information sharing, and using technology in their future teaching practice. It appears that the perceived benefits of using social software might outweigh the negative experiences when learners are deciding whether or not they would use social software in the future. Some researchers have claimed that the usefulness of technology is more important than ease of use in determining adoption (Lippert & Forman, 2005; Straud, 2009). However, there is a lack of empirical data to support this claim. Future research may consider investigating the connection between learners' experiences and their future use of social software.

It is also interesting while many participants (48% -64%) did not commit to using social software in the future, they reported that their experience with social software in the course helped them to understand the value and limitations of the software, as well as their own needs for skill development in this area. These participants also had a positive view of social software. Some of them committed to monitor the developments in social software and determine their need to use these tools in the future. It seems that participants were neither fully convinced nor completely discouraged about using social software to enhance teaching and learning experiences. The adoption of social software may require providing additional information in order to help justify its use as pre-service teachers learn to become critical about learning activities. They might also need more time to assess whether there are benefits to them using these tools. However, it was not clear how the learning experiences affected the number of participants who had unclear opinions. Moreover, since acceptance of technology (making the decision whether to adopt or not) takes time (Rogers, 1995, 2003), it is not clear whether prolonged use would allow more participants to make a clear choice about the future use of social software.

The results of this study suggest that a short timeframe, technical difficulties, and not sufficient awareness of the benefits may have all contributed to the low uptake of social software. Future research exploring the relationships among learners' learning experiences, their opinions towards future use, and length of time using the tool is warranted.

Knowledge and skills. Although the technologies introduced to the participants were adopted to varying degrees, the participants learned new skills. Further, the concept and value of using social software was understood by the majority of participants.

The instructional design focused on facilitating learning about the concept and the potential of social software by providing direct instruction on collaborative online content production, creating hands-on activities where the participants had to use the social software, and stimulating reflection on how social software could be used in their future teaching practice. The tangible learning products that demonstrated the achievement of the expected learning outcome were social objects produced by the participants (e.g., lesson plans that had gone through feedback and revision cycles, a collection of online resources reviewed and rated by their peers) and the participants' reflections on their understanding of the concept and value of using social software in teaching and learning.

In general, more than 90% of the participants demonstrated they learned new knowledge and/or skills related to social software. This finding was consistent with the instructional intent of facilitating learning through the production of social objects. As well, it seemed to confirm the findings from a recent study that found pre-service teachers participating in learning activities using social software considered meaningful learning products were an important part of their learning (Ng, 2012). However, other research on how learning occurred in a social software environment found that learners still learned without actively creating learning products (Kop, 2008). Kop also called for further investigation to study this claim.

MacDonald et al. (2001) emphasised that meaningful learning should engage learners in interaction, application, and reflection to achieve learning outcomes. This supports the instructional strategy of this study. Participants discussed the appropriateness of using social software for collaboration, used reflection to demonstrate learning of the concept and value of social software, and linked this learning to their own practice.

Appropriateness. The decision to use technology for teaching and learning should be informed by its added value to achieving the desired outcomes (Jones et al., 2011), including its educational value that can contribute to the learning process and learning outcomes (Margaryan, Littlejohn, & Vojt, 2011). In this study, the participants produced social objects through collaboration using social software. The collaborative learning process in a Web 2.0 environment involves co-producing social objects and can help the students progress their learning (Rennie & Morrison, 2013). Social objects not only provide tangible learning products but also provide insight into the learning process itself and the non-tangible learning outcomes that are associated with it (Conole et al., 2008). Through collaboratively producing social objects, learners “internalize” their learning of technology and become more capable of identifying the appropriate technology to facilitate future learning.

Collaborative editing Web 2.0 sites, such as GoogleDocs, are useful pedagogical tools for collaborative production as they contain added value for sharing, editing, collaborating, and inviting feedback from peers (Conole & Alevizou, 2010; Williams & Jacobs, 2004). In this study, the participants produced individual lesson plans that they then shared and provided and received feedback on through GoogleDocs. The top three areas of knowledge and/or skill gain in the enriched lesson plan activity were sharing, editing, and collaborating. This aligned with the purpose of the original learning activity and the additional pedagogical value of using GoogleDocs.

Social bookmarking sites, such as Del.icio.us, are of value to formal educational settings. They provide a web space for resource sharing, rating, and commenting for learners, as well as a place where collections of relevant resources can be built (Barsky, & Purdon, 2006; Franklin & van Harmelen, 2007; Vuorikari, 2007). In this study, participants produced a collection of self-

rated resources on classroom management in Del.icio.us. The top three areas of knowledge and/or skill gain demonstrated in the enriched classroom management resource collection activity were finding, sharing, and resources (information useful to the learner). Moreover, participants rated the resources they shared based on their assessment of the resource quality. This aligns with the purpose of the original learning activity design and the additional pedagogical value enabled by Del.icio.us.

Grassroots video sharing sites, such as YouTube, enable and encourage digital artifact uploading, sharing, and commenting and transform users increasingly into content contributors and/or producers (Conole & Alevizou, 2010; OECD, 2007; O'Reilly, 2005). In this study, the participants not only watched the YouTube and TeacherTube video clips on student assessment and evaluation that were produced and published by the course instructional design team, but also posted their comments on the video content. The top three areas of knowledge and/or skill gain demonstrated in the enriched discussions on the student assessment and evaluation activity were finding, resources (information useful to the learner), and commenting. This aligns with the purpose of the original learning activity design and the additional pedagogical value of the “Tube” sites.

Researchers have argued that meaningful learning that involves analysis, synthesis, and deep engagement with ideas can be facilitated through the use of different social software applications (Rennie & Morrison, 2013). In this study, although the participants had rarely used the social software to contribute or produce web content before this course, they obtained new skills by using social software applications to produce their learning products (social objects) during the course. Learners need to have the opportunity to be actively engaged with social software for meaningful purposes to develop the technical skills needed for completing learning

tasks (Conole & Alevizou, 2010). Tearle and Golder (2008) stressed that “watching” technology being used could not substitute for “doing”. Pre-service teachers should be provided with opportunities for more hands-on experience. While social software evolves rapidly in terms of function and the quantity of different tools available, hands-on skills learned from using social software are transferable from one technology to another (Ng, 2012). It is expected that the skills participants developed completing the enriched learning activities can be transferred to other social software applications for future collaboration. While the participants reported both positive and negative experiences, in general they supported the pedagogical value of social software and the appropriateness of using them for collaboration.

Despite the demonstrated knowledge and skill gain, a couple of participants questioned the appropriateness of the enriched lesson plan activities, and some questioned whether the social software enriched activities were appropriate for the online course. It is possible that these participants were not sold on the idea of using social software for collaboration. Benbunan-Fich and Arbaugh (2006) found that learners constructing knowledge through collaborative activities using technology perceived learning as less favourable than those learners adopting a traditional knowledge acquisition model. However, the former group demonstrated a higher level of knowledge in their final evaluation.

Nonetheless, questioning the appropriateness of technology can be considered a desirable knowledge gain. Participants have to ask these questions when considering the use of social software in their future teaching practice. As some researchers have stated, discerning users of new technologies in education are resistant to attempts to integrate technology for technology's sake; they want to be convinced that there is clear educational or social value in using technologies before doing so (Waycott et al., 2010; Weaver, Spratt, & Nair, 2008). This study

attempted to address the appropriateness of social software in education. Moreover, future instructional design should always consider the appropriateness of using technology in teaching and learning.

Concept versus technology. Some participants indicated their need to understand the purpose and benefit of using social software in teaching and learning. Researchers have argued that social software cannot be learned by attending a workshop or reading a support guide. Rather, teachers must actively engage with the software and find a reason for appropriating the technologies to their teaching practice (Conole & Alevizou, 2010). This reason can be identified through critical reflection on the purpose and benefits of using technology, as well as their experiences. Connections can then be made to their teaching conceptions and practice, which in turn can lead to a perspective transformation (McAlpine & Weston, 2000; Mezirow 1991; Wlodarsky, 2005).

In this study, learner reflection was used to direct the participants' attention to the concept of using technology for pedagogical purposes. The participants were asked to submit a reflection on their experiences, the pros and cons, and potential use of social software in teaching and learning after each enriched learning activity. It was found that the majority of the participants achieved the expected learning outcomes through their reflections and they related the use of social software in their practicum or future teaching. The reflections seem to have also generated critical thinking, including the adoption of social software beyond the individual's teaching and learning. Some literature suggests that reflection, if excised as a linguistic approach, could be misused to produce reflective words rather than generate deep learning (Moon, 2004). However, thirty years of educational research literature has revealed that reflection is commonly used as a means for teachers to clarify their conceptions of teaching and learning and linking

change in their teaching practice (Amundsen & Wilson, 2012). Specific questions for reflection include: “What we do, what works and what doesn’t work, and what premises and rationales underlie our teaching and that of others” (Hubball, Collins, & Pratt, 2005, p. 60).

The findings from this study suggest that reflection is an effective approach to help participants make connections between the use of social software in the course with its use in their future teaching practice. Given that learner reflection is considered a form of formative assessment and is frequently used in social software enabled learning environments (Chen & Bryer, 2012), it can be used in the future instructional design to assess learning outcomes in these context.

Content. While developing new course content was not the focus of this study, new video content was created to enable the enriched TeacherTube/YouTube activity. MacDonald et al. (2009) stated that the depth and breadth of the content must align with the learners’ professional interests and work-related requirements; the content must reflect problems and issues that are relevant to professional practice and that resemble situations that arise in the workplace; and subject matter experts should be involved during content development to help ensure that the content is authentic.

In this study, the course instructor was instrumental in the development of the video content. She not only provided a collection of questions commonly asked by pre-service teachers, but also invited two experienced teachers to answer these questions and provide real-life examples, advice, and tips to novice teachers. The video production was carried out by an award winning instructional design team. I incorporated the short video clips into the course using clear title descriptions and institutional branding.

The connection between the TeacherTube/YouTube enriched learning activity and the course content seemed to have helped participants understand the benefits of using social software to enhance their teaching practice. Most participants indicated that they learned new knowledge that informed their own perspective of teaching. Participants reported that the videos enhanced their understanding of the course content, provided a perspective from experienced practising teachers, and reflected teaching practice in real classrooms. Moreover, both the video content and the way the short videos were presented were considered useful to the participants' future teaching practice. Researchers have claimed that, "People find learning relevant when it has personal and cultural meaning, allows for their perspective, and reflects their reality" (Wlodkowski, 2004, p. 147). The findings from this study definitely seem to support this. This finding also confirmed that the instructional strategy used for content production and delivery in this study was effective. Future instructional design should continue using these strategies.

While the "Tube" activity required only moderate content creation (i.e., commenting on video content), the results indicated that participants learned new knowledge and skills. This finding suggests that learning can happen without the creation of a learning product from scratch, which is supported by findings by Kop (2008, 2011). It is possible that contributing to web content on a subject that is perceived relevant can facilitate learning. For learners to contribute to the authorship of meaningful content through the use of social software, they need to interpret information through interactions with the content, the device, and other learners (Alexander, 2006; Ng, 2012; Oliver et al., 2007). That is, making contributions to relevant web content also facilitates learning. However, the extant literature is inconclusive with regards to the level of social software engagement required for knowledge and skill gain (Kob, 2008; Conole & Alevizou, 2010). Further investigation in this area is necessary.

Unexpected learning outcomes. The participants evaluated the use of social software in relation to their own professional experiences and reflected on the implications associated with their use in the broader context of their teaching career. Pre-service teachers can establish relevant connections between concept and practice through reflection (Oner & Adadan, 2011).

In the attempt to manage the server problems with TeacherTube, the participants were exposed to both TeacherTube and YouTube in the course. It was unexpected that they would initiate comparisons between the “Tube” sites. They expressed a higher level of comfort using the reviewed video content related to teaching and learning on TeacherTube than videos on YouTube. In addition, some participants related social software to their teaching practice and wondered how to use the technology creatively in their classrooms to make student learning more interesting. They also pondered the impacts of misusing social software and how to avoid such misuse. Further, it was unexpected that some participants would relate their professional experiences in the schools and consider opportunities where social software could be used to facilitate collaborative and cooperative learning and build online communities of practice in a broader context, such as in a school or a school district.

Unexpected learning outcomes usually hold unique meaning to individual learners (Academic Quality Initiative, 2008; Killen, 2000). While it is not clear whether these unexpected learning outcomes were unique to an individual participant, it appeared that the learning outcomes were relevant to the teaching profession and the participants’ professional experiences. Since studies examining unexpected learning outcomes are rare (Killen), future research to examine how unexpected learning outcomes are achieved and how they are connected to participants’ profession and professional experiences.

Application. Participants had started using the newly learned social software knowledge and skills in other contexts outside of the course, including using it in other teacher education courses, among peers, and in their practicum. Applications beyond the course represent social software adoption by the participants as adoption involves acquiring the skills and knowledge that lead to usage (Rogers, 2003). Rogers declared that adoption takes time. However, 12-29% of the participants in this study adopted social software in their teaching and/or learning within the relatively short timeframe of this study. The factors affecting social software application are discussed in the following sections.

Awareness and willingness. Kop (2008, 2011) argued that people have to become confident and competent using technology tools in order to apply them for meaningful interactions. When learners are exposed to and gain expertise using one tool, they soon become interested in using that expertise and exploring other tools (Anderson, Poelhuber, & McKerlich, 2010). In this study, learners become aware of the capabilities of social software by producing meaningful social objects. They repeatedly reported that their awareness of the capabilities of social software positively affected their application of these tools. Researchers have argued that training on how to use technology and apply it to real-life is crucial to awareness development, which in turn, facilitates the learner to develop new capabilities to assess the feasibility of applying new skills in a new situation (Carr Jr., 1999; Marton & Booth, 1997). Indeed, the findings from this study confirm that an awareness of how to use social software can be achieved through enriched learning activities, which then leads to adoption. This finding seems to confirm learner awareness can be increased through the instructional design strategy of using social object production and learner reflection.

If an individual feels competent they can complete a task, they are more likely to be willing to work on the task (Linnenbrick & Pintrich 2002; Miller & Brickman 2004). Willingness is often connected to motivation; motivation is enhanced when learners feel competent and autonomous (Graham & Weiner, 2011). In this study, the decision to use social software beyond the online course rested with the participants. While the participants' knowledge and skill gain can be perceived as them being more competent to apply social software in teaching and learning, other factors such as the perceived value of adopting social software and open-mindedness to the use of social software were also reported to influence their willingness to adopt social software. In short, the greater the perceived value of a task and the feeling of being capable of performing the task, the greater the motivation (Linnenbrick & Pintrich; Miller & Brickman). This is in line with the findings from this study.

However, while willingness could be a factor linked to adoption, there was no evidence that a causal relationship existed between willingness, motivation, and adoption. As Ahl (2006) pointed out, that motivation causes behaviour is an assumption because "motivation represents an unproven theoretical construct" (Casimiro, 2009, p.183). As such, it is challenging to justify and specify instructional strategies to boost willingness and motivation. Future instructional design may continue using social object production and reflection while monitoring further investigation in the area of willingness and adoption.

Usefulness. Interestingly, the degree of social software application does not seem to be fully aligned with learner satisfaction and perceived future use. In this study, more participants were committed to using TeacherTube/YouTube in the future than they were GoogleDocs. Moreover, almost all participants reported frustration using GoogleDocs, while the majority were

satisfied with the TeacherTube/YouTube enriched activity. However, fewer participants reported using TeacherTube/YouTube outside of the course compared to GoogleDocs.

In this study, the participants repeatedly reported that being exposed to social software allowed them to become aware of the capabilities of the technology. In turn, this helped them to assess the usefulness of the tool beyond the online course. While application takes time and many factors might have contributed to this result, participants suggested that the perceived usefulness of using social software in their practice informed their decision on whether to use it or not.

Schunk (2011) indicated that value refers to the perceived importance or usefulness of learning. Bandura (1986) argued individuals' actions reflect their values. Hall (1979) and Rogers (2003) reported that the higher the perceived usefulness of a technology the more likely it is for an individual to adopt the new technology. Further, the perceived usefulness of social software has been suggested to be more important than its perceived ease of use when determining adoption (Lippert & Forman, 2005; Straud, 2009). These studies confirm "usefulness" as a factor that affects the application of social software. However, other factors such as satisfaction with the learning activities and attitude toward future use seem to be less influential on social software adoption.

In addition, current literature lacks an understanding of what constitutes usefulness of technology from the learners' point of view, how the decision-making process on usefulness occurs, and how the perception of usefulness can change (Straub, 2009). As such, it would be challenging to foster perceived usefulness when trying to increase social software application. Future instructional design may continue to use social object production and learner reflection while monitoring research studies in this area.

School environment. Participants reported three factors in the school environment that influenced their social software adoption: Associate teachers' adoption, student population, and technology accessibility and readiness. These factors were all beyond my control and represented the "real-life" factors the participants experienced.

In this study, the associate teachers' social software adoption influenced some participants' application of social software or their commitment to using it in the future. The decision to use social software can be influenced by others' adoption (Mizuko Ito, 2010). Since the associate teachers were the closest role model available to pre-service teachers, their application of social software could serve as instructional examples that could influence pre-service teachers' adoption (Dexter & Riedel, 2003).

Interestingly, one associate teacher's social software adoption was influenced by a participant. The associate teacher was described as being willing to adopt the social software introduced by the participant into the classroom based on the perceived pedagogical value. In this case, the participant was not only applying social software but also initiated a change in teaching practice. Barton and Haydn (2006) indicated pre-service teachers showed a strong sense of achievement by applying their knowledge. It seemed that the influence between the participants and their associate teachers can flow both ways. The idea and skill of using social software in teaching and learning learned within a postsecondary institution can be transferred into the schools. The participants thus became an agent of change (Cochran-Smith & Lytle, 1999). Since there is limited literature available on the mutual influence on social software adoption, future research may consider exploring how mutual influence affects social software adoption in pre-service teachers.

Using social software in teaching involves active student participation. Participants indicated that their application of social software was influenced by their assessment of the student population and the appropriateness of using the technology. Many researchers have reported that pre-service teachers are active in making the decision to integrate technology into learning. Student population characteristics are commonly considered when justifying how and why technology should be used in the school setting (Angeli & Valanides, 2008a; Jacobson & Archodidou, 2000; Kramarski, & Michalsky, 2010; Linn & Muilenburg, 1996). The findings from this study seem to be consistent with these existing studies.

Technology accessibility and readiness in the schools was also a factor affecting participants' social software adoption. Some participants reported unsuccessful attempts to adopt social software due to accessibility issues in schools. Dexter and Riedel (2003) argued that if technology integration is being encouraged in pre-service teacher education, the schools need to be ready to make technology accessible to the pre-service teachers. This study supports that assertion.

While factors relating to the school environment are beyond my control, it would be interesting to incorporate this information into the enriched learning activities to reflect the real-life teaching environment in schools. Future instructional design may consider using school environments as scenarios and build learning activities around them.

Changes overtime. Participants showed development in their opinions about using social software for teaching and learning five months after the course. The passage of time allowed them to gain experience in the school setting. Participants were able to make connections between the concept of using social software and their practice, especially when there were demands and opportunities in the school environment. Polly et al. (2010) found that pre-service

teachers' technology adoption is a complex process that requires the development of various capabilities, including knowledge of good pedagogical practices, technical skills, and content knowledge, as well as how these concepts relate to one another (Foulger et al., 2009; Koehler & Mishra, 2009). Goktas, Yıldırım, and Yıldırım, (2008) pointed out it is important for pre-service teachers to link the theoretical understanding of using technology that they learned in university to their practice in authentic school environments. It is important for pre-service teachers to know how the world operates where so many processes are being governed by technology (Ng, 2012). There has been limited study on how pre-service teachers' opinions about technology change over time and following teaching experiences (Tondeur et. al, 2012). This research supports the idea that participants develop their understanding when they are better able to make connection between their knowledge and teaching practice.

An interesting development in this research was that a few participants became part of a self-organized virtual community of practice (vCoP). They used a Wiki platform to exchange ideas and lesson plans with classmates, as well as others outside the program. Through online interactions in a formal online learning environment participants become connected to an informal community of practice – a group of people who learn together, have a common orientation to work (context, profession, skills and knowledge), and want to stay connected beyond formal learning settings (MacDonald et al., 2009). While the formation of vCoPs cannot be directly attributed as a learning outcome from this study, it is reasonable to link it to the participants' social software knowledge and skills learned through the enriched learning activities. VCoPs have become an increasingly common informal learning space for workplace professional development and lifelong learning (Wenger, 1998). It would be interesting to

explore what prompted the participants to establish a vCoP beyond the formal educational institution's walls and how their formal learning influenced this informal learning initiative.

Summary of interpretation of learning outcomes. In general, participants achieved the expected learning outcomes in line with the instructional intent. However, more than half of the participants did not enjoy the learning experiences. While extra time and effort spent by the participants in the study was not consistent with the instructional intent to make using social software short and straightforward, the participants also revealed other reasons why they did not enjoy the learning experiences. Both the literature and participant comments helped provide insight into the sources of participant dissatisfaction, which included a lack of clear purpose and understanding of the benefits of the social software enriched activities, issues related to technology compatibility and reliability, lack of technical skills, the online delivery format of the course, the unfamiliar learning management system, the online course, and the teacher education program. Strategies to address participant dissatisfaction were proposed. Both the literature and the participants' achievement of the learning outcomes provide support for the instructional strategies used in the study, including the outcome-based approach to instructional design, the production of social objects, hands-on experience using social software, and reflection. In addition, some interesting findings that require further study were identified and discussed. These included the discrepancy between learner satisfaction and the achievement of learning outcomes, the relationship between the perceived usefulness of social software and participant adoption, the participants' influence on practitioners' social software adoption, and the initiation of a community of practice. This discussion has informed the refined instructional design (proposed later in this chapter) and implications for future research.

Most male participants started the course with low social software adoption stages but acquired higher improvement than that of the female participants after the course. It is possible that more female participants started the course with higher social software adoption stages and therefore had less room for improvement. Some Internet adoption studies (Lin, 2001; Lynn, Lipp, Akgun, & Cortez, 2002; Madden & Savage, 2000) reported faster technological adoption by younger users. In this study, no statistically significant differences of the adoption stage change were found among participants of different age groups. It is possible that each age group had similar proportion of participants who had low, medium or high social software adoption stages before the course, thus the group improvements are similar.

Interpretation of Online Participation

This section interprets the results of research question 2: In what ways did the use of social software affect learners' level of participation?

Online participation. Participants participated in the online learning if they were required to do so. That is, if more participation was required in the learning activities, the overall participation level was higher. As a result of the requirements for using social software, the total number of interactions was significantly higher in those units in the course that used social software compared to those that were unchanged. Seventeen percent (183/1078) of the online postings were generated using social software. Researchers have found that unless there is a purpose to integrate technologies in their learning (e.g., as part of an assessment requirement), it is unlikely that learners will deliberately use social software in their normal learning routine (Bennett & Maton, 2010; Jones et al., 2010; Kennedy et al., 2008; Ng, 2012). A possible explanation for the higher level of online participation is that there was a requirement for the participants to do so.

In this study, the online participation was a formal part of the learning activities. While online participation in the enriched learning activities was required and reflections were submitted after each enriched learning activity as part of the assignment, online participation in these activities was not part of the participants' assessment or evaluation. The higher level of online participation in the ungraded activities in this study contradicted the report of Veletsianos and Navarrete (2012). In their study, Veletsianos and Navarrete found that while the technology and pedagogy enabled (and even encouraged) sharing, learners deviated little from the tasks and assignments and focused on the activities that were graded.

Opperman (2008) stated that unfamiliar learning activities within a novel learning environment increase the cognitive load on the learner. In this study, the participants had a number of technical issues that could have increased their cognitive load and distracted them from learning. However, their online participation did not decrease. Complex learning tasks can cause working memory overload and learning with technology can cause mental effort too high to benefit learning; in this situation, online participation can decrease (Early, 2006; Lohnes & Kinzer, 2007; Steel, 2008). In this study, the learning tasks were deliberately designed to be straightforward, as such, perhaps the technical issues did not cause working memory overload and the online participation was consistently higher when social software is used.

Only the quantity of learners' online participation in this study was discussed. The quality of participation was not addressed in this study. Future research may consider investigating the frequency and quality of learner participation in social software enriched learning activities. Consideration can be given to comparing learner participation in enriched learning activities to that in standard learning activities within one course, or among the same courses offered at different times or to different groups.

Implications to Outcome-Based Instructional Design

Valenti, Panti, and Leo (2003) emphasized that continual evaluation must inform the design, development, delivery, and evaluation throughout the lifecycle of a learning program. This section proposes a revised outcome-based instructional design approach based on the suggested instructional strategies discussed in the previous sections. The section addresses research question 1: How can social software be used to enrich an e-learning course?

The following sections are organized by the five *W(e)Learn* constructs: Outcome, content, media, support, and structure. Next, revisions to the conceptual framework of this study are proposed and discussed. Connection between the *W(e)Learn* framework and the revised conceptual framework of this study is then discussed.

Outcomes. For an outcome-based instructional design approach, the expected learning outcomes are specified at the beginning of the process and the learning experiences are specifically designed to support and assess these outcomes (Acharya, 2003; Boettcher, 2007; Killen, 2000; Littlewood, 2009; Pang et al., 2009). The overall purpose of the design is identified first; in this case, promoting the adoption of social software in teaching and learning by enriching an existing online course with social software by incorporating its use into selected learning activities. The three expected outcomes and the learning experiences identified are:

- Improved digital literacy through the active use of social software in enriched learning activities
- Development of social objects (learning products) through collaborative content contribution or creation using social software
- Connection to practice through reflection on the benefits and shortfalls of using social software in teaching and learning

Content. The content of learning activities should align with the identified learning outcomes (Pang et al., 2009). Content should reflect learners' professional interests, be relevant to real problems and requirements in the workplace, and be developed with the involvement of subject matter experts (MacDonald et al., 2009). In addition, to facilitate knowledge construction using the chosen technology platform, content presentation should follow the principles of cognitive theory of learning, including splitting content into manageable portions, labeling content multimedia components clearly, coherently sequencing learning, and ensuring content is aesthetically appealing (Mayer, 2005). For example, the development of the videos in this study involved experienced teachers answering commonly asked questions by pre-service teachers. The content was presented using short video clips with clear descriptive titles and institutional branding. The participants of this study responded positively to the content presentation strategy described herein.

In this study, it was found that learners appreciate content that presents examples, scenarios, advice, and tips that can help them to solve relevant, real world problems. Since student generated content was an expected learning outcome in the course, content generation should also reflect relevancy, authenticity, and proper depth. This should result in products of lasting value to students individually, to other students, as well as to the wider community (Foley & Ojeda, 2008; Latham & Carr, 2012; Sener, 2007).

Media. A couple of instructional design challenges are associated with incorporating social software into learning experiences. These include the appropriate use of social software to help learners focus on the concept that is being taught rather than the technology itself and the selection of simple or familiar social software to minimize extra workload. In an outcome-based

learning environment, the technology chosen should support the learning outcomes and the type of learning experiences it facilitates (Sadaf, Newby, & Ertmer, 2012).

Social software selection. Since the selection of social software is a critical consideration for learning, four criteria for selecting social software that are informed by literature and this study are described.

First, social software selection must support the learning outcome and learning activity (Sadaf et al., 2012). The potential for learning through the use of Web 2.0 and social software is supported by the fact these tools enable collaboration, knowledge construction and co-construction, knowledge creation through the social process of teaching and learning—producing social objects is within its nature (Rudd et al., 2006). The learning activity may involve different types of process and generate different types of learning products. De Laat (2006) developed a collaborative learning matrix (see Table 5.1) that is effective in assisting the selection of social software for the appropriate type of collaborations. For example, the lesson plan activity in this study asked participant groups to share their lesson plans and exchange feedback prior to submitting a revised and final version to the instructor. This activity involved collaborative editing through a collective process that produced an individual product. Social software that can support this type of activity can be identified using this matrix in conjunction with the other selection criteria presented below.

The second criteria for social software selection is the consideration of learners' needs (MacDonald et al., 2009) and ensuring the technology adds value and is useful to the learners (Collis & Moonen, 2005). Learners need the technology used to support learning to resemble already familiar tools. Therefore, the educator should consider choosing the most common social software so that learners can focus their attention on completing the learning tasks, rather than

being overloaded by having to learn new tools (Anderson & Dron, 2011; Smith, 2007). For example, in this study, TeacherTube was chosen to host the videos as the interface and functionality resemble that of YouTube, which is familiar to almost everyone. By using already familiar tools, learners could focus their attention on the learning task and reflect on the added value of TeacherTube as a means to access reviewed and education-specific content that was relevant to them.

Table 5.1

Collaborative Learning Matrix: Individual and Collective Learning Process and Outcomes (de Laat, 2006)

Outcomes	Individual	Collective
Process		
Individual	Individual learning	Individual learning process, collective results
Collective	Learning in social interaction	Collaborative learning

Third, social software selection must consider technology compatibility and reliability (Rodriguez, 2011). Using social software poses compatibility issues when we incorporate existing learning elements or use it in conjunction with other platforms. This can be the case even with the most popular social networking sites (e.g., Facebook) that appear to be globally compatible (Rodriguez). Using social software can provide effortless access to the network until there is an outage with server issues. Since this issue cannot be avoided entirely and is beyond educators' control, selecting the most popular sites that have a huge user population and are rated positively by their users may minimize potential issues (Smith, 2007). Managing learner expectations is another approach for managing this issue. This will be discussed further in the "Structure" section.

Four, social software selection must consider cost-effectiveness (Rodriguez, 2011). While quality online programs involve a partnership between: (a) technical and administrative personnel, (b) instructional designers and faculty, and (c) decision makers who allocate fiscal and human resources to the project (MacDonald & Thompson, 2005), recent reports on using Web 2.0 tools in higher education have indicated that institutional support is uncommon and the adoption of social software for teaching has been at the individual faculty level (Ajjan & Hartshorne, 2008; Armstrong & Franklin, 2008). In addition, adopting social software in teaching requires an increased time commitment from the educator who has already been facing competing responsibilities (Hopewell, 2012).

With limited resources available to experiment with the use of social software in teaching, the social software itself must not require additional resources. For example, the video production in this study could have cost a lot. However, the instructor, the subject matter experts (experienced teachers), the instructional design team, and the experts who provided feedback on the finished product did so on a voluntary basis. The cost of the actual video production was supported by the course instructor's research funds. These factors allowed the TeacherTube/YouTube learning activity to become a reality. When such resources are not available, alternative cost-effective methods such as SlideShare have to be considered. Alternatives should not be at the cost of students' learning however.

Online delivery. Learners' perceptions about online delivery vary and may affect their perceived learning experiences and learning outcomes. The course in this study was an online course. Outcome-based instructional design aims to help learners achieve the expected learning outcomes in an existing course. Future studies may explore using social software in different

delivery modes such as online, blended, or face-to-face, and how learners' perceptions of the delivery mode affect their learning.

Service. Educators should ensure learners have appropriate technical support, measures for access to technology are taken, and timely support is available (MacDonald et al., 2009).

Accessibility. When using social software, accessibility becomes more complex and access to social software platforms is unpredictable and beyond the educator's control (Rodriguez, 2011). For example, two of the three enriched learning activities were inaccessible for a short time during this study. As a result, I had to upload the videos to YouTube and use this tool to address the TeacherTube server issue and provide updates to learners. Results of this study suggest that in addition to making learning, information technology, and support resources accessible to learners, learners' expectations need to be managed. Learners need to be told about what accessibility issues they might face and what to do should they occur.

Responsiveness. The Internet creates a reality of immediacy. Timely feedback and responses to questions and requests from all media channels, including email, social software, and the communication tools in the learning management system, is essential. Synchronous interactions should be encouraged.

Peer support. This study revealed that peer support was important to the participants. They would have not been able to complete the learning activities without working as a group and solving problems together. Students in social networks often ask others in their social environment for help (Caspi & Gorsky, 2006; Poellhuber, 2007)

The *W(e)Learn* framework acknowledges that timely access to technical support can be challenging, and recommended a number of alternative ways to enable support, including a discussion board thread for learners to support each other (MacDonald et al., 2009). The findings

from this study suggest that consideration should be given to make peer support a standalone service item. As little is known about how to stimulate peer support and peer interaction (Anderson et al., 2010), further investigation on peer support as a service item and how to facilitate this is necessary.

Structure. In this study, ‘structure’ reflects the outcome-based instructional design. Figure 5.1 illustrates the revised conceptual framework derived from the *W(e)Learn* framework and informed by the results of this study. The revised conceptual framework reflects four *W(e)Learn* constructs (outcome, content, media, and service) and more closely represents the instructional strategies used in this study. The structure components are illustrated in the green circle and include constructivist pedagogical strategies, learner analysis, and Web 2.0 social software applications. The expected learning outcomes, digital literacy development, and social object production reflections on relevance surrounding the conceptual framework are the four instructional elements included in of each enriched learning activity.

This conceptual framework represents the instructional design for individual learning activities and can be used to guide the enrichment of existing activities in a course. Therefore, some components of “Structure” in the *W(e)Learn* framework for overall course design do not apply. The design process for individual learning activities starts from outcome identification. Once the outcomes have been identified then structure, content, media, and service can be considered. The design of the learning activity is an iterative process that allows for just-in-time adjustment to all instructional elements of the learning activity as these elements are broad enough for flexibility.

Instructional design requires ongoing adjustment to the instructional approach. The four instructional elements that constitute each learning activity are flexible and can be adjusted

independently or collectively based on the analysis of the *W(e)Learn* constructs. For example, if an analysis of the *W(e)Learn* constructs suggests that a new social software application is more conducive for social object production, then the new social software application can be applied to the social object production element. In this case, instructional design remains the same for the digital literacy development and reflection elements. If the analysis of the *W(e)Learn* constructs suggests that a change to the real-life scenario is required to reflect development in the profession, all instructional elements for the learning activity need to be adjusted accordingly. Moreover, the four instructional elements are interconnected; learners may experience these four elements simultaneously. For example, learners may develop digital literacy and reflect on relevance while producing a social object; by doing so, the expected learning outcomes are achieved at the same time.

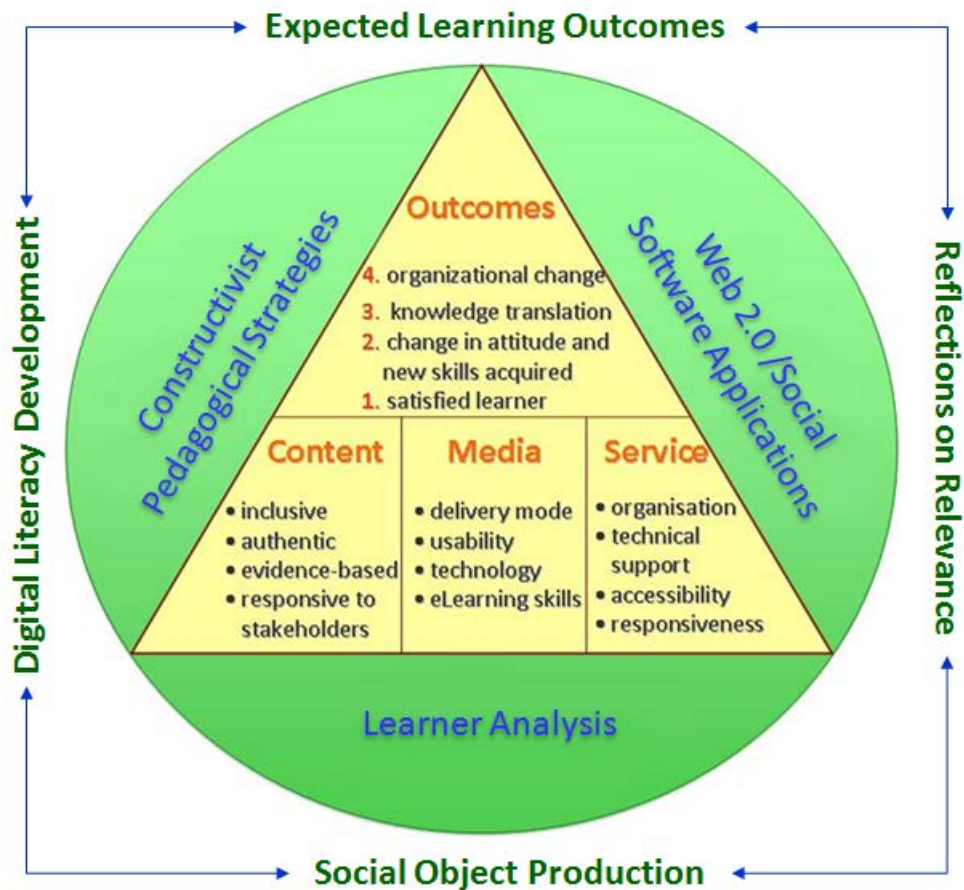


Figure 5.1. *Conceptual Framework: Outcome-Based Instructional Design*

Learner analysis. This study found that most participants used technology, including social software, in their daily lives or for informal learning purposes. However, they did not necessarily already possess proficient technology skills, nor did they voluntarily have the motivation or expectation to use social software in a formal education course. Dohn (2009) suggested that learners coming into higher education are digital natives; they are technically and physiologically ready and want to use new technology tools, such as social software, in their formal learning courses or programs. However, Bennett et al. (2012) found that learners taking courses using social software had “little prior experience with relevant technologies and that many struggled to see the value of using Web 2.0 technologies for learning and teaching” (p. 524). Pedró (2009) argue that the generations of today’s higher education learners are

substantially different to previous ones when it comes to technology. However today's student profiles are increasingly diverse. Higher education learners cannot be simply divided by age group or "generation", there is no single identity associated with a certain age group (Jones & Shao, 2011). For example, a 20-year-old participant may prefer a video cassette recorder (VCR) whereas a 30-year-old may prefer social software. As a result, instructional design should not be determined solely by age. Many younger learners who have grown up in a technology-mediated environment do not necessarily have the skills to learn with technology (Conole & Alevizou, 2010).

Educators should aim to help learners recognize the value of using social software in formal learning (Ng, 2012). This literature supports the "reflection on relevance" element in the conceptual framework. The instructional design should ensure learners have technical support through multiple resources, including support personnel, institutional technical support, online tutorials, customized technical instructions, and contact information of for all support personnel (MacDonald et al., 2009). This strategy is much need for supporting learners' "digital literacy development", which is another element in the conceptual framework.

Prior to this study, most participants had used the Internet for informal learning. More than half of the participants had taken online courses before and most of them indicated their past online learning experiences were positive. Many participants were actively using and generating artifacts (photos, conversations) on social software sites in their personal life. Participants' social software experience in personal life suggests that they share characteristics of "prosumers" where they simultaneously consume and produce ideas on social software sites (Benkler & Shaw, 2012; Chia, 2012; Ritzer, 2012). However the participants' experiences using social software for formal education were limited. Most participants had used social software to consume

information rather than to contribute to or create web content in formal learning settings. This suggests that participants were mostly knowledge consumers in formal education settings.

Collis and Moonen (2005) recommended a contribution-oriented pedagogy to actively engage learners to contribute course content during the learning process. By doing so, learners thus become part of the learning community and their learning product becomes part of the knowledge base of that community. Such collaboration and contribution can prepare learners to become part of a community of practice later on (Ascough, 2002; Collis & Moonen). This supports the “social object production” element in the conceptual framework.

In this study, the learners’ needs, which were discussed earlier, indicated that the participants wanted a face-to-face pre-course orientation in a computer laboratory to clarify the purpose, benefit, and value of using social software in teaching and learning. They also requested demonstration and hands-on time during the orientation. The literature supports the idea of an orientation session, as when educators introduce unfamiliar learning activities to learners, they need to provide them with direction on the expected learning outcomes, potential benefits, and clear instruction on how to carry out the learning task (Kirkwood & Price, 2011).

Social software applications. As discussed, social software should only be used when there are pedagogical reasons to support its use to facilitate the learning process and desired learning outcomes (Margaryan, Littlejohn, & Vojt, 2011). For a specific learning activity, social software should be aligned with the purpose of the activity, meet learners’ needs, add value to the learning experience, be compatibility with other systems used, reliable, and cost-effective (Collis & Moonen, 2005; MacDonald et al., 2009; Rodriguez, 2011; Sadaf et al., 2012).

Interpretation of the learning outcomes from this study suggested that the instructional design can be adjusted in terms of how social software is introduced to the learners. One

suggestion was to introduce social software early on in the course to allow learners to become familiar with the tool so they can focus on core learning later on. One of the reasons the “Tube” sites activity was well received was because the participants had multiple exposures to the software and made moderate contributions to meaningful content. Another finding suggested that the number of social software tools used in the course should be reduced to allow for better familiarity and make the amount of technology the participants had to learn more manageable. Since desired learning outcomes can be achieved using different social software applications, and the same application could be used in multiple learning activities, it is recommended that in this course GoogleDocs or Wikis are used to share resources, produce practicum questions and answers, share peer feedback on the lesson plans, and build new activities that involve real-life case studies. It was recommended that the collaborative aspect of GoogleDocs could be enhanced by using a real time collaborative editing function or by producing a joint learning product with a group of learners. The TeacherTube activity should remain as is. The GoogleDocs educator site should be recommended to pre-service teachers and included in the course support material. The use of Del.icio.us in this course is not recommended in the future due to the low uptake and little collaborative effort found in this study.

Constructivist pedagogical strategies. To support the development of a learning community, pedagogical strategies should maximize collaboration, dialogue, and critical inquiry (MacDonald et al., 2009). It is therefore important to use social software to foster collaboration and social learning where learners are encouraged to come together as a community to share and discuss professional issues and best practices (Evans, 2009; Greener, 2009; Greenhow et al., 2009; Mackey & Evans, 2011). The learning outcomes of such collaboration are socially constructed and incorporate all participants’ input (Gunawardena et al., 2009). Social software

should be incorporated into learning activities to enable or facilitate collaboration. Learners should be actively engaged in content contribution oriented learning activities (Collis & Moonen, 2005) and critical reflection that is related to their professional practice (McAlpine & Weston, 2000; Mezirow 1991; Wlodarsky, 2005). Learners must be supported and their learning products must be assessed (Collis & Moonen).

The constructivist pedagogical strategies should reflect the results of learner analysis and facilitate the achievement of learning outcomes (Siber & Foshay, 2010). As seen in the conceptual framework, the learning outcomes for each activity have been identified so a clear expectation of the learners exists. Producing social objects involves relevant content contribution (e.g., collaborative problem-solving based on authentic school scenarios) and production through meaningful collaboration using social software. Actively participating in social object production involves hands-on practice of social software that allows digital literacy development. Reflection on relevance critically assesses the learning experience and seeks connections to professional practice.

Currently, many social activities are not formally or directly graded in formal education settings (Chen & Bryer, 2012). Using social software is seen as value-added competence for the contemporary world; a 'lifelong, life-wide' set of skills that weaken boundaries between formal and informal learning (Bennett et al., 2012; Dohn, 2009). While mandatory assessment on learning outcomes using social software is currently not required, the social objects produced by the learners, the learners' reflections, and their participation records can all be used to evaluate learners' progress and their ability to apply what they learned to authentic situations (Chen & Bryer; Siber & Foshay, 2010).

Summary of the implications to outcome-based instructional design. The following table provides a summary of the instructional strategies used in the original outcome-based instructional design and the proposed revisions informed by the literature and the results of this study.

Table 5.2

Comparison of Original and Revised Outcome-based Instructional Design.

	Original Outcome-based Instructional Design Strategies	Proposed Revisions to Outcome-based Instructional Design Strategies
Outcomes	Identify desired learning outcomes at the start of design	No change
	Develop digital literacy by getting learners to actively use social software to complete learning activities	No change
	Use reflection to recognize opportunities for the application of social software to the teaching and learning process	No change
	Using social object production to contribute to increased awareness of the potential value using social software in teaching and learning	No change
	Using reflection to facilitate knowledge and skill development	No change
	Use social object production and learner reflection to facilitate the application of social software	No change
	Consider the school environment to develop scenarios for authentic learning activities	Consider collaborative problem-solving based on authentic school scenarios
Content	Produce and present relevant and authentic content based on instructional design principles	No change
Media	Use familiar, popular, simple, and cost effective social software to facilitate learning outcomes	No change
Service	Selecting popular and well-rated social	No change but also manage learner

	Original Outcome-based Instructional Design Strategies	Proposed Revisions to Outcome-based Instructional Design Strategies
	software tools that have been on the market for a long time to minimize issues with reliability	expectations and provide problem-solving guidelines
	Face-to-face orientation planned but not executed	Ensure resources are available for face-to-face orientation
		NEW strategy: Learners' peer support is valued and encouraged in group activities and across class, platforms are provided (e.g. discussion threads created, social software synchronous functions or synchronous tools such as Skype supported)
Structure	Clarify the purpose and benefits of the social software enriched activities through multiple channels	No change but provide more targeted support, secure resources for support, and conduct a face-to-face orientation
	Consider repeated use of social software throughout the course and allow learners to gain familiarity with the tools early on in the course	Provide opportunities for the learners to use social software before they need to use it for the required learning activity
	Review the appropriate number of social software tools being introduced	Limit to two tools (GoogleDocs and TeacherTube) and introduce them early in the course so learners have more opportunities to learn how to use the tool
	Select simple, familiar, and popular social software tools, design straightforward activities, and provide clear technical instruction to minimize workload associated with the introduction of the tool	No change
	Ensure social software serves a pedagogical purpose	No change
	Original Conceptual Framework, Figure 1.1	Revised Conceptual Framework, Figure 5.1

The *W(e)Learn* framework and outcome-based instructional design. In this study, the *W(e)Learn* framework was instrumental in guiding the outcome-based instructional design. The conceptual framework of this study is a derivation of the *W(e)Learn* framework, specifically

adapted to guide the instructional design of individual learning activities. The conceptual framework adopted four *W(e)Learn* constructs (content, media, service, and outcome) and adjusted the structure construct to focus on incorporating social software into learning activities.

The *W(e)Learn* framework includes four levels of outcomes: 1) learner satisfaction, 2) change in attitude and development of new knowledge and/or skill, 3) change in learner behaviour, and 4) organizational change (Casimiro, MacDonald, Thompson, & Stodel, 2009). The outcomes construct is of interest to outcome-based instructional design for two reasons. First, the *W(e)Learn* outcomes, represent a continuum of learning from a formal education program to informal learning settings such as the workplace. These outcomes have an origin in the Kirkpatrick (1967) framework that describes a hierarchy of educational outcomes beginning with reaction (satisfaction), and progressing in a step-wise fashion to learning (knowledge and skills), behaviour (transfer of learning to practice), and results (impact on society). The outcome-based instructional design in this study aimed to help pre-service teachers make the connection between their learning of social software in an online course and the value of using it in their practice. As such, the achievement of these expected learning outcomes can be linked to the level of outcomes of *W(e)Learn*. Second, *W(e)Learn* refers to level 3 outcomes as changes in learner behaviour (Kirkpatrick; MacDonald et al., 2009). This study focused on behaviour related to social software adoption or application; therefore, the terms adoption and application are used to describe behaviour-related outcomes.

The results of this study found that, overall, the majority of participants' learning outcomes and the learning activity design preference are captured within the *W(e)Learn* framework constructs. However, the findings from this study suggest the need for two additional elements related to "Service": "peer support" and "expectation management".

“Peer support” should be added as a standalone component of the “service” construct. Participants reported that peer support was instrumental in helping them complete the social software enriched learning activities. Others in the literature have also suggested that learners turn to their peers for help in a social environment. MacDonald et al. (2009) encouraged educators to set up a discussion thread for learners to help each other. Peer support or peer interaction is particularly important in a social software environment for learners. To allow for an inviting and effective social software integration, peer support should be considered. While it is acknowledged that social software is not always used in education programs, as an e-learning framework, *W(e)Learn* provides guidance to program design that involves technology. Given the social and constructive nature of *W(e)Learn*, and the fact that social technologies are increasingly being used in e-learning programs, it is arguable that peer support will become more and more critical. Although researchers have recognized that our current understanding of peer support and peer interaction is limited, there is a need to fill this knowledge gap. Including peer support as a standalone item in the framework would allow it to be measured and studied to inform the instructional design process.

The second element that should be considered for inclusion in the framework is “expectation management”. This strategy should be added to the “Accessibility” component of the “Service” construct. Participants encountered technology accessibility problems in two of the three social software applications used. While *W(e)Learn* suggested comprehensive strategies to minimize the accessibility issue, technology outage is beyond the educator’s control and is unpredictable. E-Learning programs are delivered using technology, including social software. Technology can never be accessible 100% of the time, even if an educator does implement all the recommendations in *W(e)Learn*. Using technology can be a smooth sail or a nightmare and

learners should expect occasional issues accessing the technology. Including “expectation management” as an element in the “Accessibility” component could help to reduce learner anxiety caused by unexpected technical problems.

Not all data collected in this study fell under the *W(e)Learn* constructs. Additional themes were identified: “factors affecting application” and “changes over time”. The *W(e)Learn* outcomes represent a longer term change process, which was an important justification for using this framework as the foundation for the outcome-based instructional design. Pre-service teachers’ learning happens in both the formal education setting and the workplace. The factors that contribute to the behavioural outcomes provide important insight into the participants’ change, which is an outcome. Changes over time also represent learning outcome. It would be interesting to consider measures that can capture outcomes over a longer period of time. The nature of *W(e)Learn* outcomes points to longer term change at the individual and organizational level. It would be interesting to explore longitudinal e-Learning studies using *W(e)Learn* and investigate the factors affecting the achievement of different levels of outcomes.

Similar to other researchers (Casimiro, 2009; Pullen, 2012), I found that while *W(e)Learn* can be applied to a wide range of e-Learning programs, it does not provide specific guidance on designing specific tasks. However, specific guidance may limit the applicability of *W(e)Learn*. This study has generated a conceptual framework to guide learning activity design; while it has many similarities to *W(e)Learn* it can be applied at a more specific level.

In summary, this study found *W(e)Learn* to be comprehensive, effective, and relevant in guiding outcome-based instructional design and analyzing the achievement of the expected learning outcomes.

Implication to School Board Policy

Many school boards are introducing systemic adoption of technology and they encourage teachers, including pre-service teachers, to become capable of using innovative technology in student-centred learning (Ertmer & Ottenbreit-Leftwich, 2013).

The findings of this study suggest that factors in school environment, including in-service teachers' practice, student population for whom the appropriate technology adoption is considered, and readiness toward and accessibility to technology, affects pre-service teachers' adoption of technology in their teaching practice.

It is important to recognize that individual teacher's adoption of technology is a part of the larger change at the school board level. The school board policy should consider enabling provisions to support individual teacher's adoption of technology (Ertmer & Ottenbreit-Leftwich, 2013). These enabling policy provisions could be informed by the factors affecting pre-service teachers' adoption of technology found in this study, and could include: Teacher's professional development in pedagogy and technology; support mechanisms to facilitate opportunities for teachers to discuss problems and explore solutions; and accessible technology resources and support (Somekh, 2008).

Personal Reflection

A mentor of mine once said that "pursuing a PhD is a journey to discover one's inner love of knowledge". In addition to this discovery, the PhD process also provided me with an opportunity to analyze my personal assumptions about learning and how my beliefs influence the projects in which I am involved.

Constructivism is at once a philosophy of education, an orientation toward curricular design, a pedagogical strategy, and a description of how individual psychology operates

(O'Donnell, 2011). I appreciate the constructivist approaches to learning and the promising potential of using emerging technology to facilitate learning.

As an instructional designer, I value learners' active engagement in knowledge construction. I attempt to adopt emerging technologies, such as social software, to support constructivist pedagogical strategies. It appears that when learners collaboratively generate social objects on a social software platform, they "prosume" (produce and consume) knowledge through searching, collecting, evaluating, selecting, sharing, discussing, negotiating, critiquing, analyzing and integrating the existing knowledge and construct that of their own. As such, my present stance considers knowledge prosumption a constructivist pedagogical approach that can be supported by the innovative use of social software.

At times I notice some tensions when developing social software enriched learning activities that reflect the pedagogical strategies I value. The first tension is between my approaches to learning and my desire to respect learners' needs. I wish to adhere to learner-centered pedagogy with a particular focus on social software enabled collaborations. However, I do not want to impose my own epistemological beliefs when I select a social software application to support a particular pedagogical approach. When adopting a learner-centered pedagogical strategy, ideally, the instructional design should be flexible enough to reflect the diverse learner's needs. Fortunately, it appears that social software applications with a collaborative pedagogical approach can accommodate a range of learner needs if accompanied by targeted, flexible, and timely learner support strategies.

The other tension is between my outcome-based instructional design approach and the view that defining learning outcomes is being counter-constructivism. I wish to encourage learners to construct meaningful knowledge informed by the pre-defined learning outcomes, but

I do not want to impose a limit to learners' knowledge construction. My present stance acknowledges that instructional design should include expectations and opportunities for learners to develop competencies that are commonly required in today's workplace, including active communication, knowledge sharing, critical thinking, and collaboration supported by emerging technologies such as social software. It appears that learners can construct meaningful and unique knowledge, meet the pre-defined learning outcomes, while achieving both the expected and unexpected learning outcomes.

As a researcher, I conducted applied research on e-learning, with an attempt to inform practice and theory. During the study, I learned the value of rigorous methods, careful planning, minimized bias, integrated data analysis and reporting, as well as broad consultation with experienced researchers. At the beginning of the study, I wondered to what extent the research findings would be useful to others. Through this journey, I become increasingly optimistic that the use of tested theory, the comprehensive review of literature, and the increasing number of robust applied research studies will benefit all educators wishing to advance practice and/or theory of social software.

This journey has helped me to appreciate that as the social, cultural, economic, historical, and political context of education changes, my understanding of learning and assumptions of knowledge evolve. Through this seven year PhD experience, I have also come to realize that research is a science and an art and it involves individual and collaborative efforts for robust design and informative findings. As I near the end of this PhD journey, the journey of pursuing knowledge and conducting research will continue.

Contributions of the Study

Theoretical contribution. This study provided an illumination of the phenomenon of

using social software in outcome-based instructional design, as well as the impact of social software on learners' learning experiences and outcomes. From a theoretical perspective, this study explored the importance of using a relevant instructional design framework that articulates the expected outcomes as a guide for social software adoption and e-learning improvement. In addition, the use of outcome-based instructional design when integrating social software elucidated information regarding how social software contributes to the intended outcomes of learning. The findings of this study informed the development of a framework that can be used to enhance learning activities through the use of social software. The framework now needs to be tested across different educational contexts.

This study also suggested two elements to be added to the *W(e)Learn* framework: “peer support” and “expectation management”.

Practical contribution. A novel component of this research, the journaling of the instructional design process, provided practical insights to educators and instructional designers. I was able to document and reflect on the effectiveness of adopting instructional design strategies to develop various forms of collaborative learning activities, as well as criteria for the selection of social software. Also, the outcome-based instructional design process of using social software to enhance collaborative learning activities was documented in detail and the effectiveness was thoroughly discussed. From a practical point of view, the findings of this study provide instructional designers and educators with insights into how future e-learning courses can be improved or enriched.

In addition, there is an ongoing debate about whether outcome-based instructional design is consistent with the constructivist school of epistemology and whether learning outcomes should be predefined in the context of constructivist learning. With the adoption of more and

more social software in education and the call for accountability in education, the findings of this study contributed to the current e-learning literature that addresses the need for defining learning outcomes in the era of Web 2.0.

Methodological contribution. Teddlie & Tashakkori (2011) indicated that the mixed-methods research approach is still developing and that there are important unresolved issues and unexplored aspects that need to be addressed. This study outlined the research design, defined terms and concepts used in this mixed-methods case study, and demonstrated how qualitative and quantitative data can lead to findings that coordinate, complement, or challenge each other. Insights into how mixed-methods can be used in a single case study were also gained through this study.

Strengths of the study

There are a number of strengths of this study. First, in this study, the outcome-based instructional design was grounded in learning theories, research studies, extant literature and a relevant framework to guide the development of quality learning activities. This study captured the full cycle of the design, production, delivery, evaluation, and revision of an outcome-based instructional design process.

Second, the quantitative data were collected through standardized evaluation instruments including the SoAT and the *W(e)Learn* surveys, as well as the course records. These well-tested standardized instruments strengthened the validity and reliability of this study. The qualitative data were collected through my research journal documenting the design and delivery process, learner reflections, and two series of interviews that captured key learning experiences and detailed learning outcomes overtime. Data triangulation was achieved through collecting qualitative data from multiple sources which, in turn, strengthened the confidence in the study

findings.

Third, research findings, analysis and discussions were informed by the integration of both quantitative and qualitative data to provide a comprehensive view of the outcome-based design and its effectiveness. In addition, my research journal provided not only a detailed record of the instructional design process but also a unique view of challenges that educators and instructional designers could encounter, and the way these challenges were managed. This novel approach helped to reveal how instructional strategies can lead to the achievement of the expected learning outcomes.

Finally, this study was supported by a group of top performers in e-learning and education, including an award winning instructional design team that design, developed and delivered numerous e-learning programs across education disciplines and settings; subject matter experts who are accomplished and experienced teachers; and experienced educators and instructional designers. Their advice, input and feedback on the research design and instructional design strengthened this study.

Limitations of the Study

There are a number of limitations of this study. First, this study was confined to one case and a limited number of postsecondary learners participating in a pre-service teacher education e-learning course. Second, changes of attitude, knowledge, skill, and behaviour take time. While data from the SoAT survey suggest an overall improvement in technology adoption, the participant reflections revealed many unclear attitudes towards the use of social software in the future. A second interview was conducted five months after the course completion to gain further information on any changes. However, only five participants responded to the interview invitation so the findings on changes over time only represent a small portion of participants.

Third, due to the rapid advancement of Web 2.0 applications, the social software used in this study may soon become outdated and not be applicable to future studies. However, outcome-based instructional design is not technology dependent and the findings will have valuable application in the future. Finally, the participants in this study are pre-service teachers; their feedback and reflection might represent unique teaching professionals' perceptions on the outcome-based instructional design and their experiences in social software enriched activities. The participants' perceptions of teaching and learning and their evolving perception and experiences in the teaching profession might have had an impact on the findings. Moreover, while the surveys and interview questions focused on the enriched learning activities, it was possible that the participants' responses also incorporated their views regarding the learning activities, the instructor, the learning management system, the course, and the teacher education program in general. Future research may consider using different protocols or instruments that could result in a clearer distinction between the overall learning outcomes and those specific to using social software.

Directions for Future Research

Satisfaction and learning outcomes. Application of knowledge and skills takes time. There are many factors that could affect learners' application of social software. In this study, the participants' satisfaction with the enriched learning activities was not reported to be a factor. Interestingly, there seemed to be a consistent discrepancy between the learners' satisfaction with their learning experiences and the achieved learning outcomes of this study. Others have suggested that teachers' satisfaction with their experiences using technology is important because satisfaction is frequently assumed to lead to better implementation and outcomes (Witt & Elliott, 1985). However, the causal relationship between satisfaction and outcomes has yet to

be established (Eckert & Hintze, 2000). It would be interesting to explore how improved learner satisfaction could affect the achievement of learning outcomes.

In addition, there are unsettled arguments about whether satisfaction should be the first level outcome that leads to higher level outcomes, such as knowledge and skill development. Alliger and Janak (1994) asserted that reaction measures, such as satisfaction, should not be used as surrogates for other measures, such as performance. Keller (1999, 2006) considered satisfaction as a condition for learning rather than a targeted outcome of learning. The relationship between reaction to instruction (i.e., satisfaction) and learning is far from conclusive and requires further exploration (Bradford, 2011). The inconclusive relationship between learner satisfaction and learning outcomes in this study supports the need for further research in this area.

Knowledge production and learning outcomes. Knowledge creation through using social software involves the social process of teaching and learning and requires knowledge construction and co-construction (Rudd et al., 2006). Educators increasingly use social software for teaching and learning. Some researchers have found that learners are still learning without creating artifacts using social software (Kop, 2008). This study has found that moderate contribution to the relevant course content can facilitate learning. Future study may explore how levels of engagement (consumption, contribution, and creation/production) using social software affect the achievement of learning outcomes. Moreover, how levels of engagement using social software can affect the quality and quantity of learner participation is also worth pursuing.

Long-term learning outcomes. When introducing social software in teaching and learning, educators should aim to help learners achieve learning outcomes that are transferable from formal education settings to real life or workplace. This study has found that implementing knowledge and skills learned from formal education setting in their practice can contribute to

participants learning overtime. When the demand and opportunities in real life environment are conducive for participants to apply social software, they apply it and develop deeper understanding of benefits and tactics for the application.

Factors affecting application social software that are identified from this study include awareness of the potential benefits, willingness to use social software, perceived usefulness of using, associate teachers' attitude to and use of technology, student population, and technology accessibility and readiness. This area is complex and many factors are beyond the educators' control. However, factors affecting application can inform future instructional design using authentic real life scenarios. Future research may further explore factors affecting social software application in practice, and how can these factor inform outcome-based instructional design.

This study has also found participants initiate their own virtual community of practice (vCoP) using social software. VCoPs are widely adopted in workplace that promotes life-long learning. Future research can explore how the transferable knowledge and skills using social software contribute to learners' future participation in or creation of vCoPs.

As discussed in the *W(e)Learn* framework section, assessing these long-term learning outcomes require longitudinal studies that can explore factors affecting the achievement of different levels of the *W(e)Learn* outcomes.

Outcome-based instructional design. This study reported the instructional design process in detail, and proposed a conceptual framework for the outcome-based instructional design to guide social software enriched learning activity design. Future research may test the conceptual framework across different educational contexts, including incorporating social software in learning activities in an online, blended, or face-to-face setting, in different disciplines, and in different educational programs.

Conclusion

This dissertation adopted a mixed-methods explanatory case study approach to explore how social software can be used to enrich an e-learning course using outcome-based instructional design. Pre-service teachers enrolled in a teacher education program of a university voluntarily participated in the study where they developed digital literacy, produced social objects, and reflected the relevance of this experiences and their future teaching practice. I thoroughly documented the instructional design process. Findings of this study provided a comprehensive view of the outcome-based instructional design and its effectiveness.

In general, participants achieved the expected learning outcomes in line with the instructional intent (expected learning outcomes). Both the literature and the participants' achievement of the learning outcomes provide support for the instructional strategies used in the study, including the outcome-based approach to instructional design, the production of social objects, hands-on experience using social software, and reflection. In addition, this study found *W(e)Learn* to be comprehensive, effective, and relevant in guiding outcome-based instructional design and analyzing the achievement of the expected learning outcomes.

Some interesting findings have informed directions for further research that included the relationship between learner satisfaction and the achievement of learning outcomes, the relationship between the perceived usefulness of social software and participant adoption, the participants' influence on practitioners' social software adoption, and the initiation of a community of practice. These findings have also informed the revised conceptual framework for outcome-based instructional design which aims to guide the design of individual learning activities. Further study is needed to test this conceptual framework.

References

- Academic Quality Initiative (2008). *About expected learning outcomes*. Retrieved from http://www.etsu.edu/aqi/Year1/about_outcomes.asp
- Acharya, C. (2003). Outcome-based education (OBE): A new paradigm for learning. *CDT Link, National University of Singapore*. Retrieved from <http://www.cdtl.nus.edu.sg/link/nov2003/obe.htm>
- Ahl, H. (2006). Motivation in adult education: A problem solver or a euphemism for direction and control? *International Journal of Lifelong Education*, 25(4), 385-403.
- Albee, J. J. (2003). A study of preservice elementary teachers' technology skill preparedness and examples of how it can be increased. *Journal of Technology and Teacher Education*, 11(1), 53-71.
- Alexander, B. (2006). *Web 2.0 – A new wave of innovation for teaching and learning?* Retrieved from <http://www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume41/Web20ANewWaveofInnovationforTe/158042>
- Alliger, G. M., & Janak, E. A. (1994). Kirkpatrick's levels of training criteria: Thirty years later. In C. E. Schneier, C. J. Russell, R. W. Beatty, & L. S. Baird (Eds.), *The training and development sourcebook* (pp. 219-227). Amherst, MA: HRD Press.
- Amiel, T., & Reeves, T. C. (2008). Design-based research and educational technology: Rethinking technology and the research agenda. *Educational Technology & Society*, 11(4), 29-40.
- Amundsen, C., & Wilson, M. (2012). Are we asking the right questions? A conceptual review of the educational development literature in higher education. *Review of Educational Research*, 82(1), 90-126.

- Anderson, P. (2007). What Is Web 2.0? *Ideas, Technologies and Implications for Education*. *JISC TechWatch Report*. Retrieved from <http://www.jisc.ac.uk/media/documents/techwatch/tsw0701bword.doc>
- Anderson, T. (2005). *Distance learning – Social software’s killer app?* In Proceedings of the Open & Distance Learning Association of Australia, Adelaide. Retrieved from www.unisa.edu.au/odlaconference/PPDF2s/13%20odlaa%20-%20Anderson.pdf
- Anderson, T., & Dron, J. (2011). Three generations of distance education pedagogy. *The International Review of Research in Open and Distance Learning*, 12(3), 80-97.
- Anderson, T., & Wark, N. (2004). Why do teachers get to learn the most? A case study of a course based on student creation of learning objects. *e-Journal of Instructional Science and Technology*, 7(2). Retrieved from http://www.usq.edu.au/electpub/e-jist/docs/Vol7_no2/FullPapers/WhyDoTeachers.pdf
- Anderson, T., Poelhuber, B., & McKerlich, R. (2010). Enhancing social presence in online learning: mediation strategies applied to social networking tools. *Online Journal of Distance Learning Administration*, XIII(III). Retrieved from http://www.westga.edu/~distance/ojdl/Fall133/anderson_poellhuber_mckerlich133.html
- Angeli, C., & Valanides, N. (2009). Epistemological and methodological issues for the conceptualisation, development and assessment of ICT-TPCK: Advances in technological pedagogical content knowledge (TPCK). *Computers & Education*, 52(2009), 154-168.
- Archibald, D. (2011). *Fostering cognitive presence in higher education through the authentic design, delivery, and evaluation of an online learning resource: A mixed methods study*

- (Doctoral dissertation, University of Ottawa, Canada). Retrieved from:
<http://www.ruor.uottawa.ca/en/handle/10393/19911>
- Archibald, D., MacDonald, C. J. &, Trumpower, D. (2011). Toolkit Development of Interprofessional Education Assessment Instruments. Paper presented at the *University of Ottawa's Conference on Measurement, Evaluation and Assessment: Evaluation and Assessment in Contemporary Society: Issues and Promises*. Ottawa, ON: Canada.
- Arinto, P. B. (2013). A framework for developing competencies in open and distance e-learning. *The International Review of Research in Open and Distance Learning*, 14(1), 167-185.
- Ascough, R. S. (2002). Designing for online distance education: Putting pedagogy before technology. *Teaching Theology and Religion*, 5(1), 17-29.
- Ausubel, D. P., Novak, J. D., & Hanesian, H. (1978). *Educational psychology: A cognitive view* (2nd ed.). New York: Holt, Rinehart & Winston.
- Ayres, L., Kavanaugh, K., & Knafl, K. (2003). Within-case and across-case approaches to qualitative data analysis. *Qualitative Health Research*, 13, 871-883.
- Bandura, A. (1977). *Social learning theory*. New York: General Learning Press.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bang, J., & Dalsgaard, C. (2006). Rethinking e-learning – shifting the focus to learning activities. In E. K. Sorensen & D. Murch (Eds.), *Enhancing Learning through Technology* (pp. 184-202). Hershey; London; Melbourne; Singapore: Information Science Publishing.
- Barker, E. L., Niemi, D., & Chung, G. K. W. K. (2008). Simulations and the transfer of problem-solving knowledge and skills. In E. L. Barker, J. Dickieson, W. Wulfeck & H. F. O'Neil

- (Eds.), *Assessment of Problem Solving Using Simulations*. New York: Lawrence Erlbaum Associations.
- Barsky, E., & Purdon M. (2006). Introducing Web 2.0: Social networking and social bookmarking for health librarians. *Journal of the Canadian Health Libraries Association*, 27(3), 65-67.
- Barton, R., & Haydn, T. (2006). Trainee teachers' views on what helps them to use information and communication technology effectively in their subject teaching. *Journal of Computer Assisted Learning*, 22, 257–272.
- Bednar, A. K., Cunningham, D., Duffy, T. M., & Perry, J. D. (1992). Theory into practice: How do we link? In T. M. Duffy & D. H. Jonassen (Eds.), *Constructivism and the technology of instruction*. Hillsdale, NJ: Lawrence Erlbaum.
- Beldarrain, Y. (2006). Distance education trends: Integrating new technologies to foster student interaction and collaboration. *Distance Education*, 27(2), 139-153.
- Bell, F. (2011). Connectivism: Its place in theory-informed research and innovation in technology-enabled learning. *The International Review of Research in Open and Distance Learning*, 12(3), 98-118.
- Bennett, S., & Lockyer, L. (2004). Becoming an online teacher: Adapting to a changed environment for teaching and learning in higher education. *Educational Media International*, 41(3), 231–244.
- Bennett, S., & Maton, K. (2010). Beyond the 'digital natives' debate: Towards a more nuanced understanding of students' technology experiences. *Journal of Computer Assisted Learning*, 26(5), 321–331

- Bennett, S., Bishop, A., Dalgarno, B., Waycott, J., & Kennedy, G. (2012). Implementing Web 2.0 technologies in higher education: A collective case study. *Computers & Education*, 59(2012), 524–534
- Bennett, S., Maton, K., & Kervin, L. (2008). The digital natives' debate: a critical review of the evidence. *British Journal of Educational Technology*, 39(5), 775–786.
- Bernard, R. M., Abrami, P. C., Borokhovski, E., Wade, C. A., Tamim, R. M., Surkes, M. A., & Bethel, E. C. (2009). A meta-analysis of three types of interaction treatments in distance education. *Review of Educational Research*, 79(3), 1243-1289.
- Biesta, G. (2010). Pragmatism and the philosophical foundations of mixed methods research. In & A. Tashakkori & C. Teddlie (Eds.), *SAGE handbook of mixed methods in social & behavioral research* (2nd ed., pp. 95-117). Thousand Oaks, CA: Sage.
- Biggs, J., Kember, D., & Leung, D. Y. P. (2001). The revised two-factor study process questionnaire: R-SPQ-2F. *British Journal of Educational Psychology*, 2001(71), 133–149.
- Birmingham, C. (2004). Phronesis: A model for pedagogical reflection. *Journal of Teacher Education*, 55(4), 313-324.
- Bisoux, T. (2008). Teaching business in a web 2.0 world. *BizEd*, 7(1), 28-35.
- Blanchette, C., & Pinet, R. (2003). *E-kit: Towards a positive experience for students and faculty members using e-learning*. Paper presented at the Conference on Teaching with Technology, St. Catharines, ON, Canada.
- Boettcher, J. (2007). Ten core principles for designing effective learning environments: insights from brain research and pedagogical theory. *Innovate* 3(3). Retrieved from <http://www.innovateonline.info/index.php?view=article&id=54>

- Bonwell, C. C., & Eison, J. A. (1991). *Active learning: Creating excitement in the classroom*. *Eric Digest*, Washington, DC: George Washington Press.
- Borkan, J. (2004). Mixed methods studies: A foundation for primary care research. *Annals of Family Medicine*, 2(1), 4-6.
- Borland, K. (1991). "That's not what I said": Interpretive conflict in oral narrative research. In S. B. Gluck & D. Patai (Eds.), *Women's words: The feminist practice of oral history* (pp. 63-75). New York: Routledge.
- Borsheim, C., Merritt, K., & Reed, D. (2008). Beyond technology for technology's sake: Advancing multiliteracies in the twenty-first century. *The Clearing House*, 82(2), 87-90.
- Bouchard, P. (2011). Network promises and their implications. In *The impact of social networks on teaching and learning* [Online monograph]. *Revista de Universidad y Sociedad del Conocimiento (RUSC)*, 8(1), 288-302. Retrieved from <http://rusc.uoc.edu/ojs/index.php/rusc/article/viewFile/v8n1-bouchard/v8n1-bouchard-eng>
- Bouras, C. S. (2009). *Instructor and learner presence effects on student perceptions of satisfaction and learning in the university online classroom* (Doctoral dissertation). Regent University. AAT 3361795.
- Bower, G. H., & Clapper, J. P. (1989). Experimental methods and cognitive science. In M. I. Posner (Ed.), *Foundations of cognitive science* (pp. 245-300). Cambridge, MA: The MIT Press.
- Boyd, D. (2010). Streams of content, limited attention: The flow of information through social media. *EDUCAUSE Review*, 45(5), 26-36.

- Boyd, E. M., & Fales, A. W. (1983). Reflective learning: Key to learning through experience. *Journal of Humanistic Psychology, 23*(2), 99-117.
- Bradford, G. R. (2011). A relationship study of student satisfaction with learning online and cognitive load: Initial results. *The Internet and Higher Education, 14*(4), 217-226.
Retrieved from <http://dx.doi.org/10.1016/j.iheduc.2011.05.001>
- Brandt, R. (1993). On outcome-based education: A conversation with Bill Spady. *Educational Leadership, 5*(4), 66-70.
- Brookfield, S. (1985). The continuing educator and self-directed learning in the community. In S. Brookfield (Ed.), *Self-directed learning: From theory to practice*. San Francisco: Jossey-Bass.
- Brookfield, S. (1993). Self-directed learning, political clarity and the critical practice of adult education. *Adult Education Quarterly, 43*(4): 227-242.
- Brookfield, S. D. (1995). Adult learning: An overview. In A. Tuinjmans (Ed.), *International encyclopedia of education*. Oxford: Pergamon Press. Retrieved from http://www.digitalschool.net/edu/adult_learn_Brookfield.html
- Brooks, M. G., & Brooks, J. G. (1999). The courage to be constructivist. *Educational Leadership, 57*(3), 18-24.
- Brouwer, N., & Korthagen, F. (2005). Can teacher education make a difference? *American Educational Research Journal, 42*(1), 153-224.
- Brown, C., & Czerniewicz, L. (2010). Debunking the 'digital native': beyond digital apartheid, towards digital democracy. *Journal of Computer Assisted Learning, 26*(5), 357-369.
- Brown, R. E. (2001). The process of community-building in distance learning classes. *Journal of Asynchronous Learning Networks, 5*(2), 18-35.

- Bruner, J. (1996). *The culture of education*. Boston: Harvard University Press.
- Bruns, A., & Humphreys, S. (2007) 'Building collaborative capacities in learners: the M/cyclopedia project revisited'. *Proceedings of the 2nd International Symposium on Wikis*, 2007, 1-10. Retrieved from http://portal.acm.org/ft_gateway.cfm?id=1296952andtype=pdfandcoll=ACManddl=ACMandCFID=66282364andCFTOKEN=27663776
- Brusilovsky, P., Chavan, G., & Farzan, R. (2004). Social Adaptive Navigation Support for Open Corpus Electronic Textbooks. *Paper presented at the AH 2004*, August 23-26, Eindhoven, The Netherlands.
- Bryman, A. (2006). Paradigm peace and the implications for quality. *International Journal of Social Research Methodology Theory and practice*, 9(2), 111-126.
- Capdeferro, N., & Romero, M. (2012). Are online learners frustrated with collaborative learning experiences? *The International Review of Research in Open and Distance Learning*, 13(2), 26-44.
- Carmichael, P., & Burchmore, H. (2010). Social software and academic practice: postgraduate students as co-designers of Web 2.0 tools. *Internet and Higher Education*, 13, 233-241.
- Carr Jr., V. H., (1999). *Technology Adoption and Diffusion*. Retrieved from <http://www.au.af.mil/au/awc/awcgate/innovation/adoptiondiffusion.htm>
- Carr, N. (2010). *The shallows: What the Internet is doing to our brains*. New York, NY: Norton.
- Carroll, F., Jenkins, A., Woodward, A., Kop, R., & Jenkins, E. (2012). Exploring how social media can enhance the teaching of action research. *Action Research* 10(2), 170-188.

- Casimiro, L. (2009). *An intrinsic case study of an online workshop: Learning how to facilitate interprofessional collaborative practice* (Doctoral dissertation). University of Ottawa, Ottawa, Ontario.
- Casimiro, L., MacDonald, C. J., Thompson, T-L., & Stodel, E. J. (2009) 'Grounding theories of W(e)Learn: A framework for online interprofessional education', *Journal of Interprofessional Care*, 23(3), 1-11.
- Catts, R. & Lau, J. (2008). *Towards Information Literacy Indicators*. UNESCO, Paris. Retrieved from <http://www.uis.unesco.org/template/pdf/cscl/InfoLit.pdf>
- Chan, Y. K., Chow, K., & Cheung, K. S. (2004). Student Participation Index: Student Assessment Online. *Advances in Web-based Learning* (pp. 449-456). Berlin, Heidelberg: Springer.
- Chen, B., & Bryer, T. (2012). Investigating Instructional Strategies for Using Social Media in Formal and Informal Learning. *The International Review of Research in Open and Distance Learning*, 13(1), 87-104.
- Chernay, I. D. (2008). The effects of active learning on students' memories for course content. *Active Learning in Higher Education*, 9(2), 152.
- Ching, K. L., & Ching, C. C. (2012). Past is prologue: Teachers composing narratives about digital literacy. *Computers and Composition*, 5(1). Retrieved from <http://dx.doi.org/10.1016/j.compcom.2012.05.001>
- Christensen, R. (1997). *Effect of technology integration education on the attitudes of teachers and their students* (Doctoral dissertation, University of North Texas). Retrieved from <http://courseweb.tac.unt.edu/rhondac>

- Christensen, R., & Knezek, G. (1999). Stages of adoption for technology in education. *Computers in New Zealand Schools, 11*(3), 25-29.
- Christensen, R., & Knezek, G. (2002). Instruments for Assessing the Impact of Technology in Education. *Computers in the Schools, 18*(2), 5-25
- Christensen, R., Griffen, D., & Knezek, G. (2001, March). *Measures of teacher stages of technology integration and their correlates with student achievement*. Paper presented at the annual meeting of the American Association of Colleges for Teacher Education, Dallas, TX.
- Churchill, D., (2007). Web 2.0 and Possibilities for Educational Applications. *Educational Technology, 47*(2), 24-29.
- Churchill, D., Wong, W., Law, N., Salter, D. & Tai, B. (2009). Social bookmarking–repository–networking: Possibilities for support of teaching and learning in higher education. *Serials Review, 2009*(35), 142-148.
- Clarke, L. (2002). Putting the ‘C’ in ICT: Using computer conferencing to foster a community of practice among student teachers. *Journal of Information Technology for Teacher Education, 11*(2), 157-173.
- Clarke, L. (2009). The POD model: Using communities of practice theory to conceptualise student teachers’ professional learning online. *Computers & Education 52*(2009), 521–529.
- Clarke, L., & Abbott, L. (2008). Put posters over the glass bit on the door and disappear: Tutor perspectives on the use of VLEs to support pre-service teachers. *Teaching in Higher Education, 13*(2), 169-181.

- Clendinneng, D. B. (2010). *Exploring simulation and debriefing as an educational strategy for perioperative nurse learners : a case study* (Doctoral dissertation). University of Ottawa, Ottawa, Ontario.
- Cobb, S. C. (2004). Internet continuing education for health care professionals: An integrative review. *The Journal of Continuing Education in the Health Professions*, 24, 171-180.
- Cochran-Smith, M., & Zeichner, K. M. (Eds.). (2005). *Studying teacher education: The report of the panel on research and teacher education*. Washington, DC: American Educational Research Association/Mahwah, NJ: Erlbaum.
- Collins, A., & Halverson, R. (2010). The second educational revolution: rethinking education in the age of technology. *Journal of Computer Assisted Learning*, 26(1), 18-27.
- Collis, B., & Moonen, J. (2001). *Flexible learning in a digital world*. London: Kogan.
- Collis, B., & Moonen, J. (2005). *An on-going journey: technology as a learning workbench*, University of Twente, Enschede, The Netherlands. Retrieved from <http://www.BettyCollisJefMoonen.nl>
- Compeau, D., Higgins, C. A., & Huff, S. (1999). Social cognitive theory and individual reactions to computer technology: A longitudinal study. *MIS Quarterly*, 23, 145-158.
- Conole, G., & Alevizou, P. (2010). A literature review of the use of Web 2.0 tools in Higher Education. A report commissioned by the Higher Education Academy August 2010 The Open University Walton Hall, Milton KeynesUK.
- Conole, G., & Culver, J. (2009). Cloudworks – Social networking for learning design. *Australasian Journal of Educational Technology*, 25(5), 763-782.

- Conole, G., Culver, J., Williams, P., Cross, S., Clark, P., & Brasher, A. (2008). *Cloudworks: Social networking for learning design*. Paper presented at the ascilite 2008, Melbourne: Australia.
- Conole, G., de Laat, M., Dillon, T., & Darby, J. (2008). 'Disruptive technologies', 'pedagogical innovation': What's new? Findings from an in-depth study of students' use and perception of technology. *Computers & Education, 50*, 511-524.
- Cramer, S. F. (2006). Student information system implementations: A context for campus change, results of an AACRAO membership survey. *College & University, 81*, 21-33.
- Crepeau, E. B. (2000). Reconstruction Gloria: A narrative analysis of team meetings. *Qualitative Health Research, 10*(6), 766-787.
- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage.
- Creswell, J. W. (2008). *Educational research: planning, conducting, and evaluating quantitative and qualitative research* (3rd ed.). Upper Saddle River, NJ: Pearson Education Inc.
- Creswell, J. W. (2009). Editorial: Mapping the field of mixed methods research. *Journal of Mixed Methods Research, 3*(2), 95-108.
- Creswell, J. W. (2009). *Research design: Qualitative, Quantitative, and Mixed Methods Approaches* (3rd ed.). Thousand Oaks, CA: Sage Publications.
- Creswell, J. W. (2010). Mapping the developing landscape of mixed methods research. In & A. Tashakkori & C. Teddlie (Eds.), *SAGE handbook of mixed methods in social & behavioral research* (2nd ed., pp. 269-283). Thousand Oaks, CA: Sage.

- Creswell, J. W. (2011). Controversies in mixed methods research. In N. K. Denzin, & Y. S. Lincoln (Eds.), *SAGE handbook of qualitative research* (4th ed., pp. 269-283). Thousand Oaks, CA: Sage.
- Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into Practice*, 39(3), 124-130.
- Creswell, J. W., & Plano Clark, V. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage Publications.
- Creswell, J. W., & Plano Clark, V. L. (2010). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage.
- Creswell, J. W., Plano Clark, V. L., Gutmann, M., & Hanson, W. (2003). Advanced mixed methods research designs. In A. Tashakkori & C. Teddlie (Eds.), *SAGE handbook of mixed methods in social and behavioral research* (pp. 249-240). Thousand Oaks, CA: Sage.
- Crook, C. (2008). *Web 2.0 technologies for learning: The current landscape-opportunities, challenges and tensions* (Report: Web 2.0 technologies for learning at Key Stages 3 and 4). London: British Educational Communications and Technology Agency (BECTA). Retrieved from. <http://dera.ioe.ac.uk/1474/>
- Cross, K. P. (1981). *Adults as learners*. San Francisco: Jossey-Bass.
- Dalsgaard, C. (2006). Social software: E-learning beyond learning management systems. *European Journal of Open, Distance and e-learning*, 2006.
- Davis, F. D. (1986). *A technology acceptance model for empirically testing new enduser information systems: theory and results* (Doctoral dissertation). Sloan School of Management, Massachusetts Institute of Technology.

- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, 35(8), 982-1002.
- Davis, I. (2006, December 11). *Redefining Web2.0*. Retrieved from <http://blog.iandavis.com/2006/12/11/redefining-web-2-0/>
- Day, C. (1999). *Developing teachers: The challenges of lifelong learning*. London/ Philadelphia: Falmer Press.
- De Laat, M. (2006). *Networked learning* (Doctoral dissertation). University of Southampton, Apeldoorn.
- De Vries, P., Midden, C., & Bouwhuis, D. (2003). The effects of errors on system trust, self-confidence, and the allocation of control in route planning. *International Journal of Human-Computer Studies*, 58, 719-735.
- De Waard, I., Abajian, S., Gallagher, M. S., Hogue, R., Keskin, N., Koutropoulos, A., & Rodriguez, O.C. (2011). Using mLearning and MOOCs to understand chaos, emergence, and complexity in education, *International Review of Research on Open and Distance Learning (IRRODL)*, 12(7). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/1046/2026>
- De Weaver, B., Schellens, T., Valcke, M., & van Keer, H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers and Education*, 46, 6-28.
- Denscombe, M. (2008). Communities of practice: A research paradigm fo the mixed methods approach. *Journal of Mixed Methods Research*, 2, 270-283.
- Dewey, J. (1900). Psychology and social practice. *Psychological Review*, 7, 105-24.
- Dewey, J. (1916). *Democracy and education*. New York: The Free Press.

- Dobrovolny, J. (2006). How adults learn from self-paced, technology-based corporate training: New focus for learners, new focus for designers. *Distance Education, 27*(2), 155-170.
- Doering, A., Hughes, J. & Huffman, D. (2003). Preservice teachers: Are we thinking with technology? *Journal of Research on Technology in Education, 35*(3), 342-361.
- Dohn, N. (2009). Web 2.0: inherent tensions and evident challenges for education. *Computer Supported Collaborative Learning, 4*, 343-363.
- Dron, J. (2007). Designing the undesignable: Social software and control. *Educational Technology & Society, 10*(3), 60-71.
- Du, H. S., & Wagner, C., (2007). Learning with Weblogs: enhancing cognitive and social knowledge construction. *IEEE Transactions on Professional Communication, 50*(1), 1–16.
- Duffy, T. M., & Jonassen, D. H. (1991). Constructivism: New implication for technology? *Educational Technology, 31*(5), 7-12.
- Ehrlich, D. B. (2002). Establishing connections: Interactivity factors for a distance education course. *Educational Technology & Society, 5*(1).
- Engeström, Y. (1999). Innovative learning in work teams: analyzing cycles of knowledge creation in practice. In Y. Engeström, R. Miettinen & R.-L. Punamäki (Eds.), *Perspectives on Activity Theory* (pp. 377-404). Cambridge, UK: Cambridge University Press.
- Engeström, Y. (2005). *Why some social network services work and others don't - Or: the case for objectcentered sociality*. Retrieved from http://www.zengestrom.com/blog/2005/04/why_some_social.html

- Ertmer, P. A., & Ottenbreit-Leftwich, A. (2013). Removing obstacles to the pedagogical changes required by Jonassen's vision of authentic technology-enabled learning. *Computers & Education*, 64, 175–182.
- Evans, T. N. (2009). *An investigative study of factors that influence the retention rates in online programs at selected state, state-affiliated, and private universities* (Doctoral dissertation). Robert Morris University. AAT 3388741.
- Fabry, D. (2009). Designing online and on-ground courses to ensure comparability and consistency in meeting learning outcomes. *Quarterly Review of Distance Education*, 10(3), 253-261.
- Fanning, R., & Gaba, D. (2007). The role of debriefing in simulation-based learning. *Simulation in Healthcare*, 2(1), 1-11.
- Farres, L. G., & MacDonald, C. J. (2006). Activity theory and context: an understanding of the development of constructivism instructional design models. In A. D. D. Figueiredo, & A. P. Afonso (Eds.), *Managing learning in virtual settings: the role of context* (pp. 164-181). London: Information science publishing.
- Fein, A. D., & Logan, M. C. (2003). Preparing instructors for online instruction. *New Directions for Adult and Continuing Education*, 100, 45-55.
- Ferdig, R. E. (2007). Editorial: Examining Social Software in Teacher Education. *Journal of Technology and Teacher Education*, 15(1), 5-10.
- Feuerstei, R., & Feuerstei, R. (1999). Mediated learning experiences: A theoretical review. In R. Feuerstein, P. S. Klein, & A. J. Tannenbaum (Eds.), *Mediated learning experience (MLE): theoretical, psychosocial and learning implications* (pp. 3-52). Tel Aviv, Israel: Frenud Publishing House Inc.

- Filion Carrière, M. (2001). Current state of distance continuing medical education in North America. *The Journal of Continuing Education in the Health Professions*, 21, 150-157.
- Fink, L. D. (2003). *Creating significant learning experiences: An integrated approach to designing college courses*. San Francisco: Jossey-Bass.
- Fitzgerald, R., Barrass, S., Campbell, J., Hinton, S., Ryan, Y., Whitelaw, M., . . . , & McGinness, N. (2009). *Digital learning communities (DLC): Investigating the application of social software to support networked learning (CG 6-36)*. Project Report, Australian Learning and Teaching Council, Strawberry Hills.
- Flyvbjerg, B. (2011). Case study. In N. K. Denzin, & Y. S. Lincoln (Eds.), *SAGE handbook of qualitative research* (4th ed., pp. 301-316). Thousand Oaks, CA: Sage.
- Foley, J., & Ojeda, C. (2008). Teacher beliefs, best practice, technology usage in the classroom: A problematic relationship. In K. McFerrin et al. (Eds.), *Proceedings of society for information technology and teacher education international conference 2008* (pp. 4110-4117). Chesapeake, Virginia, USA: AACE.
- Foster, A. D., & Rosenzweig, M. R. (2010). Microeconomics of technology adoption. *Annual Review of Economics*, 2010(2), 395-424.
- Foulger, T. S., Ewbank, A. D., Kay, A., Popp, S. O., & Carter, H. L. (2009). Moral spaces in MySpace: Preservice teachers' perspectives about ethical issues in social networking. *Journal of Research on Technology in Education*, 42(1), 1-28. Retrieved from <http://ezproxy.lib.ucf.edu/login?URL=http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ856930&site=ehost-live>
- Frاند, J. L. (2000). The information-age mindset. Changes in students and implications for higher education. *Educause review*, 35(5), 15-24.

- Franklin, T., & van Harmelen, M. (2007). *Web 2.0 for learning and teaching in higher education*. London: London, UK: Joint Information Systems Committee. Retrieved from http://www.obhe.ac.uk/documents/view_details?id=24
- Garrison, D. R. (2003). Self-directed learning and distance education. In M. Moore (Ed.), *Handbook of distance education* (pp. 161-168). Mahwah, NJ: Erlbaum.
- Garrison, D. R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education*, 10(3), 157-172.
- Garrison, D. R., & Archer, W. (2000). *A transactional perspective on teaching and learning: A framework for adult and higher education*. Oxford, UK: Pergamon.
- Garrison, D. R., Cleveland-Innes, M., Koole, M., & Kappelman, J. (2006). Revisiting methodological issues in the analysis of transcripts: Negotiated coding and reliability. *Internet and Higher Education*, 9(1), 1-8.
- Gerber, K. (2010). *Using Google Docs in the classroom: Simple as ABC*. Retrieved from http://docs.google.com/View?docid=dcdn7mjpg_72nh25vq#Get more Google Docs help
- Gerber, S., & Scott, L. (2007). Designing a learning curriculum and technology's role in it. *Education Tech Research Development*, 2007(55), 461-478.
- Goktas, Y., Yildirim, Z., & Yildirim, S. (2008). A review of ICT related courses in pre-service teacher education programs. *Asia Pacific Education Review*, 9, 168-179.
- Goodfellow, R. (2011). Literacy, literacies and the digital in higher education. *Teaching in Higher Education*, 16(1), 131-144.

- Goodyear, G. (2001). Online learning and teaching in the arts and humanities: Reflecting on purposes and design. Paper presented at the *HAN Conference: Online conferencing in the Arts and Humanities*.
- Google (2013). Google Docs tour. Retrieved from <http://www.google.com/drive/apps.html#product=docs>
- Grabinger, R. S., & Dunlap, J. C. (2002). Applying the REAL model to web based instruction. In Ed-Media (Ed.), *ED-MEDIA 2002 Proceedings*: AACE.
- Graffam, B. (2007). Active learning in medical education: Strategies for \ beginning implementation. *Medical Teacher*, 29(1), 38-42.
- Green, S. K., & Gredler, M. E. (2002). A review and analysis of constructivism for school-based practice . *School Psychology Review*, 31, 53-70.
- Greene, J. C. (2007). *Mixing methods in social inquiry*. San Francisco: Jossey-Bass.
- Greene, J. C., & Hall, J. (2010). Dialectics and pragmatism: Bing of consequence. In & A. Tashakkori & C. Teddlie (Eds.), *SAGE handbook of mixed methods in social & behavioral research* (2nd ed., pp. 119-143). Thousand Oaks, CA: Sage.
- Greener, S. (2009). Talking online: Reflecting on online communication tools. *Campus Wide Information Systems*, 26(3), 178–190.
- Greenhow, C., Robelia, E., & Hughes, J. (2009). Web 2.0 and classroom research: what path should we take now? *Educational Researcher*, 38(4), 246–259.
- Grenfell, M. (2006). Knowledge construction online: Does constructivism deliver the goods? In B. Mann (Ed.), *Selected styles in web-based educational research* (pp. 384-402). London: Information Science Publishing.
- Guba, E. G., & Lincoln, N. K. (2005). Paradigmatic controversies, contradictions, and emerging

- confluences. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Sage handbook of qualitative research* (3rd ed., pp. 191-216). Thousand Oaks, CA: Sage.
- Gunawardena, C. N., Hermans, M. B., Sanchez, D., Richmond, C., Bohley, M., & Tuttle, R. (2009). A theoretical framework for building online communities of practice with socialnetworking tools. *Educational Media International* 46(1), 3-16.
- Gustafson, K. L., & Branch, R. M. (2002). Revisioning models of instructional development. *Educational Technology Research and Development*, 45(3), 73-89.
- Halabisky, B. L., Humbert, J., Stodel, E. J., MacDonald, C. J., Chambers, L. W., Doucette, S., ... Conklin, J. (2010). E-learning, knowledge brokering, and nursing: Strengthening collaborative practice in long-term care. *Computers, Informatics, Nursing*, 28(5), 264-273.
- Hall, G. E. (1979). The concerns-based approach to facilitating change. *Educational Horizons*, 57(4), 202-208.
- Harden, N. (January/February 2013). *The end of the university as we know it. An American Interest*. Retrieved from <http://the-american-interest.com/article.cfm?piece=1352>
- Harden, R.M. (2002). Learning outcomes and instructional objectives: Is there a difference? *Medical Teacher*, 24(2), 151-155.
- Hardy, I. (2006). *The Viral Video Online Revolution*. Retrieved from http://news.bbc.co.uk/2/hi/programmes/click_online/5020364.stm
- Harmon, O., & Lambrinos, J. (2007). *Student performance in traditional vs. online format: Evidence from an MBA level introductory economics class*. University of Connecticut, Department of Economics Working Paper Series, 2007(3), 1-15.
- Helsper, E., & Eynon, R. (2010). Digital natives: where is the evidence? *British Educational Research Journal*, 36(3), 503-520.

- Hemmi, A., Bayne, S., & Land, R. (2009). The appropriation and repurposing of social technologies in higher education. *Journal of Computer Assisted Learning*, 25(1), 19-30.
- Hew, K. F. (2011). Students' and teachers' use of Facebook. *Computers in Human Behavior*, 27(2), 662-676. doi:16/j.chb.2010.11.020
- Hofstadter, D. R. (1979). *Gödel, Escher, Bach: An Eternal Golden Braid*. New York: Basic Books.
- Holmes, B., & Gardner, J. (2006). *E-learning concepts and practice*. London: Sage Publications.
- Honebein, P. C. (1996). Seven goals for the design of constructivist learning environments. In B. Wilson (Ed.), *Constructivist learning environments: Case studies in instructional design* (pp. 11–24). Englewood Cliffs, NJ: Educational Technology.
- Hopewell, T. M. (2012). Risks Associated With the Choice To Teach Online. *Online Journal of Distance Learning Administration*, XII(IV). Retrieved from <http://www.westga.edu/~distance/ojdla/winter154/hopewell154.html>
- Hsu, J. (2007). Innovative technologies for education and learning: education and knowledge-oriented applications of blogs, wikis, podcasts, and more. *International Journal of Information & Communication Technology Education*, 3(3), 70–89.
- Huang, H. (2002). Toward constructivism for adult learners in online learning environments. *British Journal of Educational Technology*, 33(1), 27-37.
- Huang, W. H. D., Hood, D. W., & Yoo, S. J. (2013). Gender divide and acceptance of collaborative Web 2.0 applications for learning in higher education. *Internet and Higher Education*, 16(2013), 57-65.

- Hubball, H., Collins, J., & Pratt, D. (2005). Enhancing reflective teaching practices: Implications for faculty development programs. *Canadian Journal of Higher Education*, 35(2005), 57–81.
- Huijser, H. (2008). Exploring the educational potential of social networking sites: The fine line between exploiting opportunities and unwelcome imposition. *Studies in Learning, Evaluation Innovation and Development* 5(3), 45–54.
- Hung, H., & Yuen, S. (2010). Educational use of social networking technology in higher education. *Teaching in Higher Education*, 15(6), 703–714.
- Hussey, T., & Smith, P. (2002). The trouble with learning outcomes. *Active Learning in Higher Education*, 3, 220-233.
- Hutchins, E. (1995). *Cognition in the Wild*. Cambridge, MA: MIT Press.
- Ives, S., & Steinbrenner, K. (2005). *Bridging the divide: Combining faculty centers and instructional technology support*. Retrieved from <http://www.educause.edu/LibraryDetailPage/666?ID=ERB0509>
- Jasperson, J. S., Carter, P. E., & Zmud, R. W. (2005). A comprehensive conceptualization of post-adoption behaviors associated with information technology enabled work systems. *MIS Quarterly*, 29(3), 525–558.
- Johnson, C. M. (2001). A survey of current research on online communities of practice. *Internet and Higher Education*, 4(2001), 45-60.
- Johnson, R. B., & Christensen, L. (2008). *Educational research: Quantitative, qualitative, and mixed approaches* (3rd ed.). Boston: Pearson.
- Johnson, R. B., Onwuegbuzi, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research*, 1(2), 112-133.

Joint Information Systems Committee, (2009) *Higher Education in a Web 2.0 World*. Retrieved from

<http://www.jisc.ac.uk/publications/generalpublications/2009/heweb2.aspx#downloads>

Jonassen, D. H. (1994). Thinking Technology. *Educational Technology*, 34(4), 34-37.

Jonassen, D. H. (2000). Transforming learning with technology: Beyond modernism and post-modernism or whoever controls the technology creates the reality. *Educational Technology*, 40(2), 21-25.

Jonassen, D. H. (2002). Learning as activity. *Educational Technology*, 42(2), 45-51.

Jonassen, D. H. (2003). The vain quest for a unified theory of learning. *Educational Technology*, 43(4), 5-8.

Jonassen, D. H., Marra, R. M., & Palmer, B. (2002). Epistemological development: An implicit entailment of constructivist learning environments. In S. Dijkstra & N. Seel (Eds.), *Instructional design: International perspectives*, vol. 3. Mahwah NJ: Lawrence Erlbaum Associates.

Jonassen, D. H., Peck, K. L., & Wilson, B. G. (1999). *Learning with technology: A constructivist perspective*. Columbus, OH: Prentice Hall.

Jones, C., & Shao, B.H., (2011). *The net generation and digital natives: implications for higher education*. Higher Education Academy, York.

Jones, N., & Thomas, P. (2007). Inter-organizational collaboration and partnerships in health and social care: The role of social software. *Public Policy and Administration*, 22(3), 289-302.

Jones, C., Ramanau, R., Cross, S., & Healing, G. (2010). Net generation or Digital Natives: Is there a distinct new generation entering university? *Computers & Education*, 8(3), 722-732.

- Joyce, K. M., & Brown, A. (2009). Enhancing Social Presence in Online Learning: Mediation Strategies Applied to Social Networking Tools. *Online Journal of Distance Learning Administration, XII(IV)*. Retrieved from <http://www.westga.edu/~distance/ojdla/winter124/joyce124.html>
- Kane, K. (2004). Quality matters: Inter-institutional quality assurance in online learning. *Sloan-C View: Perspectives in Quality Online Education, 3(11)*.
- Kanuka, H., & Garrison, D. R. (2004). Cognitive presence in online learning. *Journal of Computing in Higher Education, 15(2)*, 21-39.
- Karagiorgi, Y., & Symeou, L. (2005). Translating Constructivism into Instructional Design: Potential and Limitations. *Educational Technology & Society, 8(1)*, 17-27.
- Karahanna, E., Straub, D. W., & Chervany, N. L. (1999). Information technology adoption across time: A cross-sectional comparison of pre-adoption and postadoption beliefs. *MIS Quarterly, 23(2)*, 183–213.
- Kay, R. H. (2006). Evaluating Strategies used to incorporate technology into preservice education: A Review of the literature. *Journal of Research on Technology in Education, 38(4)*, 382-408.
- Keenan, T. P. (2002). Distance and distributed learning in continuing education: Notes from the front lines. *Centre for Development of Teaching and Learning (CTDL) Brief, 5(1)*. Retrieved from <http://www.cdtdl.nus.edu.sg/brief/v5n1/default.htm>
- Kellam, H. M., MacDonald, C. J., Archibald, D., & Puddester, D. (in press). Designing digital video to support learner outcomes: A study in an online learning resource for healthcare professionals and students. *International Journal of Online Pedagogy and Course Design*.
- Kelly, K. (2007). *The next 5000 days of the web*. Paper presented at the EG 2007, Los Angeles.

- Kennedy, G. E., Judd, T. S., Churchward, A., Gray, K., & Krause, K. (2008). First year students' experiences with technology: Are they really digital natives? *Australian Journal of Educational Technology*, 24(1), 108–122.
- Kidd, J. R. (1973). *How adults learn*. New York: Association Press.
- Kidder, L. H., & Judd, C. M. (1986). *Research methods in social relations* (5th ed.). New York: Holt, Rinehart and Winston.
- Killen, R. (2000). *Outcomes-based education: Principles and possibilities*. Unpublished manuscript, University of Newcastle, Faculty of Education.
- Kirkpatrick, D. (1967). Evaluation of training. In: R. Craig. & I. Bittel (Eds.), *Training and Development Handbook*. New York, NY: McGraw-Hill.
- Kirkwood, A., & Price, L. (2011). *Enhancing learning and teaching through technology: a guide to evidence-based practice for academic developers*. Higher Education Academy, York, UK.
- Kirshner, D., & Whitson, J. A. (1997). Editors' introduction to situated cognition: Social, semiotic, and psychological perspectives. In D. Kirshner & J. A. Whitson (Eds.), *Situated cognition: Social, semiotic, and psychological perspectives* (pp. 1-16). Mahwah, NJ: Lawrence Erlbaum Associates.
- Klages, M. (2001). *Structuralism/poststructuralism*. Retrieved from <http://www.colorado.edu/English/courses/ENGL2012Klages/1997derridaA.html>.
- Knowles, M. S. (1975). *Self-directed learning: A guide for learners and teachers*. New York: Association Press.
- Knowles, M. S. (1980). *The modern practice of adult education: From pedagogy to andragogy* (2nd ed.). New York: Cambridge.

- Koehler, M., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)? *Contemporary Issues in Technology and Teacher Education*, 9(1), 60–70.
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. New Jersey: Prentice-Hall.
- Kop, R. (2008). The challenges to connectivist learning on open online networks: learning experiences during a Massive Open Online Course. *The International Review of Research in Open and Distance Learning*, 12(3), 19-38.
- Kop, R. (2011). The challenges to connectivist learning on open online networks: Learning experiences during a massive open online course. *The International Review of Research in Open and Distance Learning*, 12(3), 19–38. Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/882/1689>.
- Kop, R., Fournier, H., & Mak, J. S. F. (2011). A pedagogy of abundance or a pedagogy to support human beings? Participant support on massive open online courses. *International Review of Research on Open and Distance Learning (IRRODL)*, 12(7). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/1041/2025>
- Korkofingas, C., & Macri, J. (2008). Does online participation improve student learning outcomes? Evidence from a business forecasting course in Australia. *Review of business research*, 8(6), 143-150.
- Korthagen, F.A.J. (2010). Situated learning theory and the pedagogy of teacher education: Towards an integrative view of teacher behavior and teacher learning. *Teaching and Teacher Education* 26(2010), 98–106.

- Kuo, Y., Walker, A. E., Belland, B. R., & Schroder, K. E. E. (2013). A predictive study of student satisfaction in online education programs. *The International Review of Research in Open and Distance Learning*, 14(1), 16-39.
- Laru, J., Näykki, P., & Järvelä, S. (2012). Supporting small-group learning using multiple Web 2.0 tools: A case study in the higher education context. *The Internet and Higher Education*, 15(1), pp. 29-38. Retrieved from <http://dx.doi.org/10.1016/j.iheduc.2011.08.004>
- Latham, G., & Carr, N. (2012). Authentic learning for pre-service teachers in a technology-rich environment. *Journal of Learning Design*, 5(1), 32-42.
- Lave, J., & Wenger, E (1991). *Situated learning: Legitimate peripheral participation*. New York: Cambridge University Press.
- Lawler, P. A., & King, K. P. (2003). Changes, challenges, and the future. *New Directions for Adult and Continuing Education*, 98, 83-91.
- Leach, L., Neutze, G., & Zepke, N. (2001). Assessment and empowerment: Some critical questions. *Assessment & Evaluation in Higher Education*, 26(4), 293-297.
- Leflore, D. (2000). Theory supporting design guidelines for web-based instruction. In B. Abbey (Ed.), *Instructional and cognitive impacts of web-based education*. London, UK: Idea Group.
- Lévy, P. (1994). *L'intelligence collective. Pour une anthropologie du cyberspace*. Paris: La Découverte.
- Liao, C., Palvia, P., & Chen, J-L. (2009). Information technology adoption behavior life cycle: Toward a Technology Continuance Theory (TCT). *International Journal of Information Management*, 2(2009) 309–320.

- Lin, C. (2001). Audience attributes media supplementation and likely online service adoption. *Mass Communication & Society*, 4, 19–38.
- Lincoln, Y. S., & Guba, E. G. (2000). Paradigmatic controversies, contradictions, and emerging confluences. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed.) (pp. 105 -117). Thousand Oaks: Sage Publications.
- Littlewood, W. (2009). Process-oriented pedagogy: Facilitation, empowerment, or control? *ELT Journal*, 63(3), 246-254.
- Lohnes, S., & Kinzer, C. (2007). Questioning assumptions about students' expectations for technology in college classrooms. *Innovate*, 3(5). Retrieved from <http://www.innovateonline.info/index.php?view=article&id=431>
- Lorenzo, G., & Dziuban, C.D. (2006). Ensuring the Net Generation is Net Savvy. In C. D. Oblinger (Eds), *Educause Learning Initiative*. ELI Paper 2: September 2006. Retrieved from <http://www.educause.edu/ir/library/pdf/ELI3006.pdf>
- Loughran, J. J. (2002). Effective reflective practice: In search of meaning in learning about teaching. *Journal of Teacher Education*, 53(1), 33-43.
- Lowry, C. M. (1989). *Supporting and facilitating self-directed learning*. Retrieved from <http://www.ntlf.com/html/lib/bib/89dig.htm>
- Loyens, S. M. M., Rikers, R. M. J. P., & Schmidt, H. G. (2006). Students' conceptions of constructivist learning: A comparison between a traditional and a problem-based learning curriculum. *Advances in Health Sciences Education*, 11(4), 365-379.
- Lynn, G., Lipp, S., Akgun, A., & Cortez, A. (2002). Factors impacting the adoption and effectiveness of the World Wide Web in marketing. *Industrial Marketing Management*, 31, 35–49.

- Madden, G., & Savage, S. (2000). Some economic and social aspects of residential Internet use in Australia. *The Journal of Media Economics*, 13, 171–185.
- MacDonald, C. J. (2008). Exploring the use of social software to enhance e-learning: SSHRC Application.
- McDonald, D. M., & Kay, N. (2006). *Towards an evaluation framework for complex social systems*. Retrieved from <http://necsi.org/events/iccs6/viewpaper.php?id=221>
- MacDonald, C. J., & Thompson, T. L. (2005). Structure, content, delivery, service, and outcomes: Quality e-Learning in higher education. *The International Review of Research in Open and Distance Learning*, 6(2). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/237/321>
- MacDonald, C. J., Archibald, D., Trumpower, D. L., Casimiro, L., Cragg, B., & Jelley, W. (2010). Designing and operationalizing a toolkit of bilingual interprofessional education assessment instruments. *Journal of Research in Interprofessional Practice and Education*, 1(3), 304-316.
- MacDonald, C. J., Stodel, E. J., & Casimiro, L. (2006). Online dementia care training for healthcare teams in continuing and long-term care homes: A viable solution for improving quality of care and quality of life for residents. *International Journal on E-learning*, 5(3), 373-399.
- MacDonald, C. J., Stodel, E. J., Farres, L. G., Breithaupt, K., & Gabriel, M. A. (2001). The demand-driven learning model: A framework for web-based learning. *Internet and Higher Education*, 4, 9-30.

- MacDonald, C. J., Breithaupt, K., Stodel, E., Farres, L., & Gabriel, M. A. (2002). Evaluation of web-based educational programs via the demand-driven learning model: A measure of web-based learning. *International Journal of Testing*, 2(1), 35-61.
- MacDonald, C. J., Stodel, E. J., Thompson, T-L., & Casimiro, L. (2009). W(e)Learn: A framework for interprofessional education. *International Journal of Electronic Health Care*, 5(1), 33-47.
- Mackey, J., & Evans, T. (2011). Interconnecting networks of practice for professional learning. *The International Review of Research in Open and Distance Learning*, 12(3), 2-17.
- Manago, A. M., Graham, M. B., Greenfield, P. M., & Salimkhan, G. (2008). Self-presentation and gender on MySpace. *Journal of Applied Developmental Psychology*, 29(6), 446–458.
- Mandernach, B. J. (2005). A faculty evaluation model for online instructors: Mentoring and evaluation in the online classroom. *Online Journal of Distance Learning Administration*, 8(3), 1-10.
- Margaryan, A., Littlejohn, A, & Vojt, G. (2011). Are digital natives a myth or reality? University students' use of digital technologies. *Computers & Education*, 2(2011), 429-440
- Martin, A. (2003). Towards e-literacy. In A. Martin and H. Rader (Eds.), *Information and IT literacy: Enabling learning in the 21st century* (pp. 3-23). London: Facet.
- Martin, A. (2008). Digital literacy and the “digital society”. In C. Lankshear & M. Knobel (Eds.), *Digital literacies: Concepts, policies and practices*, 151_76. New York, Berlin and Oxford: Peter Lang.
- Martin, A., & Grudziecki, J. (2007). DigEuLit: Concepts and tools for digital literacy development. *Italics*, 5(4). Retrieved from <http://www.ics.heacademy.ac.uk/italics/vol5iss4/martin-grudziecki.pdf>

- Martin, A., & Madigan, D. (2006). *Digital literacies for learning*. London: Facet.
- Marton, F. & Booth, S. (1997). *Learning and awareness*. Mahwah, N.J.: Lawrence Erlbaum.
- Mayer, R. E. (1996). Learners as information processors: Legacies and limitations of educational psychology' s second metaphor . *Educational Psychologist*, 31, 151-161.
- Mayer, R. E. (2005). Introduction to multimedia learning. In R. E. Mayer (Ed.), *The Cambridge Handbook of Multimedia Learning* (pp. 1-15). New York: Cambridge University Press.
- McAlpine, L., & Weston, L. (2000). Sustainable faculty development: An Indonesian case study. *Innovations in Education and Teaching International*, 39, 205-216.
- McAuley, A., Stewart, B., Siemens, G., & Cormier, D. (2010). *The MOOC model for digital practice*. Retrieved from http://www.elearnspace.org/Articles/MOOC_Final.pdf
- McLoughlin, C. (2002). Learner support in distance and networked learning environments: Ten dimensions for successful design. *Distance Education*, 23 (2). Retrieved from <http://www.c3l.uni-oldenburg.de/cde/media/readings/mcloughlin.pdf>.
- McLoughlin, C., & Lee, M. J. W. (2007). *Social software and participatory learning: Pedagogical choices with technology affordances in the Web 2.0 era*. Paper presented at ascilite 2007, Singapore.
- Mejias, U. (2005). A nomad's guide to learning and social software. *The Knowledge tree: An e-journal of learning innovation*. Retrieved February 2, 2008, from http://knowledgetree.flexiblelearning.net.au/edition07/download/la_mejias.pdf
- Mejias, U. (2006). Teaching social software with social software. *Innovate* 2(5). Retrieved from http://www.innovateonline.info/pdf/vol2_issue5/Teaching_Social_Software_with_Social_Software.pdf

- Merriam, S. B. (2004). The role of cognitive development in Mezirow's transformational learning theory. *Adult Education Quarterly*, 55(1), 60-68.
- Merriam, S. B., Cafarella, R. S., & Baumgartner, L. M. (2007). *Learning in adulthood: A comprehensive guide* (3rd ed.). San Francisco: Jossey-Bass.
- Meyer, K. A. (2010). Web 2.0 research: Introduction to the special issue. *The Internet and Higher Education*, 13(4), 177-178.
- Mezirow, J. (1981). A critical theory of adult learning and education. *Adult Education Quarterly*, 32(1), 3-24.
- Mezirow, J. (1995). Transformation Theory of Adult Learning. In M. R. Welton (Ed.), *In defense of a lifeworld* (pp. 39-70). New York: SUNY Press.
- Michel, N., Cater, J. J. III, & Varela, O. (2009). Active versus passive teaching styles: An empirical study of student learning outcomes. *Human Resource Development Quarterly*, 10(1002).
- Milbrath, Y. L., & Kinzie, M. B. (2000). Computer technology training for prospective teachers: computer attitudes and perceived self-efficacy. *Journal of Technology and Teacher Education*, 8(4), 373-396.
- Minocha, S. (2009). Role of social software tools in education: A literature review. *Education and Training*, 51(5/6), pp. 353-369.
- Moon, J. (2004). *Reflection and Employability*. Retrieved from http://www.heacademy.ac.uk/assets/York/documents/ourwork/tla/employability/id339_reflection_and_employability.pdf

- Morgan, D. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research, 1*(1), 48-79.
- Morrison, G. R., Ross, S. M., & Kemp, J. E. (2004). *Designing effective instruction* (4th ed.). Hoboken, NJ: John Wiley & Sons Inc.
- Morse, J. M. (1991). Approaches to qualitative-quantitative methodological triangulation. *Nursing Research, 40*(2), 120-123.
- Moshman, D. (1982). Exogenous, endogenous, and dialectical constructivism. *Developmental Review, 2*, 371-384.
- Neale, P., Thapa, S., & Boyce, C. (2006). *Preparing a case study: A guide for designing and conducting a case study for evaluation input*. Watertown: Pathfinder International.
- New London Group, The (2000). A pedagogy of multiliteracies: Designing social futures. In B. Cope & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 9-38). London: Routledge.
- Ng, W. (2012). Can we teach digital natives digital literacy? *Computers & Education, 59*(2012), 1065–1078.
- O' Donnell, A. M. (2000). Constructivism by design and in practice: a review. *Issues in Education, 3* (2), 285-294.
- O'Donnell, A. M. (2011) Constructivism. In K. R. Harris, S. Graham, T. Urdan, C. B. McCormick, G. M. Sinatra, & J. Sweller (Eds.), *APA educational psychology handbook, Vol 1: Theories, constructs, and critical issues* (pp. 61-84). Washington, DC, US: American Psychological Association.

- O'Reilly, T. (2005). *What is Web 2.0 – Design patterns and business models for the next generation of software*. Retrieved from <http://oreilly.com/web2/archive/what-is-web-20.html>
- Oblinger, D. G. (2003). Boomers, gen-xers and millennials. Understanding the new students. *Educause review*, 38(1), 37-47.
- Oblinger, D. G., & Hawkins, B. L. (2005). The myth about e-learning. *Educause review*, 40(4), 14–15.
- Oblinger, D. G., Barone, C. A., & Hawkins, B. L. (Eds.). (2001). *Distributed education and its challenges: An overview*. Washington, DC: American Council on Education.
- Oblinger, D., & Oblinger, J. L. (Eds.). (2005). *Educating the Net Generation*. Washington, DC: Educause.
- O'Dowd, R., & Waire, P. (2009). Critical issues in telecollaborative task design. *Computer Assisted Language Learning*, 22(2), 173 — 188.
- Oliver, R., Harper, B., Willis, S., Agostinho, S., & Hedberg, J. (2007). Describing ICT-base learning designs that promote quality learning outcomes. In H. Betham & R. Sharpe (Eds.), *Rethinking pedagogy for a digital age: Designing and delivering e-learning* (pp. 64–80). Abingdon, UK: Routledge.
- Oner, D., & Adadan, E. (2011). Use of web-based portfolios as tools for reflection in preservice teacher education. *Journal of Teacher Education*, 62(5), 477-492.
- Ottensbreit-Leftwich, A.T., Brush, T. A., Strycker, J., Gronseth, S., Roman, T., Abaci, S., ... Plucker, J. (2012). Preparation versus practice: How do teacher education programs and practicing teachers align in their use of technology to support teaching and learning? *Computers & Education*, 59 (2012), 399-411.

- Pachler, N., & Daly, C. (2009). Narrative and learning with Web 2.0 technologies: Towards a research agenda. *Journal of Computer Assisted Learning*, 25(1), 6-18.
- Palincsar, A. S. (1998). Social constructivist perspectives on teaching and learning. *Annual Review of Psychology*, 49, 345-375.
- Palloff, R. M., & Pratt, K. (1999). *Building learning communities in cyberspace: Effective strategies for the online classroom*. San Francisco: Jossey-Bass.
- Palloff, R. M., & Pratt, K. (2001). *Lessons from the cyberspace classroom: The realities of online teaching*. San Francisco: Jossey-Bass.
- Palloff, R. M., & Pratt, K. (2005). *Collaborating online: Learning together in community*. San Francisco: Jossey-Bass.
- Pang, M., Ho, T. M., & Man, R. (2009). Learning approaches and outcome-based teaching and learning: A case study in Hong Kong, China. *Journal of Teaching in International Business*, 20(2), 106 -122.
- Pawan, F., Paulus, T. M., Yalcin, S., & Chang, C-F. (2003). Online learning: Patterns of engagement and interaction among in-service teachers. *Language Learning and Technology*, 7(3), 119-140.
- Pedr , F. (2009). *New Millennium Learners in Higher Education: Evidence and Policy Implications*. Paris: Centre for Educational Research and Innovation (CERI) Directorate for Education, OECD. Retrieved from http://search.yahoo.com/r/_ylt=A0oG7IIZjpFRdTcASmlXNyoA;_ylu=X3oDMTBybnZlZnRlBHNIYwNzcgRwb3MDMQRjb2xvA2FjMgR2dGlkAw--/SIG=12cumnrvv/EXP=1368522393/**http%3a//static.ow.ly/docs/NML-in-Higher-Education_5n0.pdf

- Perkins, D. (1993). Person-plus: A distributed view of thinking and learning. In G. Salomon (Ed.), *Distributed Cognitions*, Cambridge University Press: Cambridge.
- Perkins, D. N. (1999). The many faces of constructivism. *Educational Leadership*, 57 (3), 6-11.
- Petraglia, J. (1998). The real world on a short leash: The (mis) application of constructivism to the design of educational technology. *Educational Technology Research and Development*, 46(3), 53-65.
- Polly, D., Mims, C., Shepherd, C. E., & Inan, F. (2010). Evidence of impact: transforming teacher education with preparing tomorrow's teachers to teach with technology (PT3) grants. *Teaching and Teacher Education*, 26, 863–870.
- Pope, M., Hare, P., & Howard, E. (2002). Technology integration: Closing the gap between what preservice teachers are taught to do and what they can do. *Journal of Technology and Teacher Education*, 10(2), 191–203.
- Prensky, M. (2001a). Digital natives, digital Immigrants. *On the Horizon*, 9(5), 1-6.
- Prensky, M. (2001b). Digital Natives, Digital Immigrants, part 2: Do they really think differently? *On the Horizon*, 9(6), 6.
- Prensky, M. (2004). *The emerging online life of the digital native: What they do differently because of technology, and how they do it*. Retrieved from http://www.marcprensky.com/writing/Prensky-The_Emerging_Online_Life_of_the_Digital_Native-03.pdf
- Prensky, M. (2009). From digital immigrants and digital natives to digital wisdom. *Innovate*, 5(3).
- Prensky, M. (2010). *Teaching Digital Natives: Partnering for Real Learning*. London: Sage Publishers.

- Prestridge, S., Dunn, J., & Lang, W. (2006). *Building an international collaborative learning community within a virtual space*. Paper presented at the QUT Online Learning & Teaching Conference: "Learning on the Move". Retrieved from https://olt.qut.edu.au/udf/oltconferencepapers/gen/static/papers/Prestridge_OLT2006_paper.pdf
- Price, L., & Kirkwood, A. (2013). Using technology for teaching and learning in higher education: A critical review of the role of evidence in informing practice. *Higher Education Research and Development* (in press).
- Puddester, D., MacDonald, C.J., Archibald, D., Sun, R., & Stodel, E.J. (2010). Caring for physicians and other healthcare professionals: Needs assessments for eCurricula on physician and workplace health. *International Journal on Advances in Life Sciences*, 2(1&2), 63-72.
- Pullen, C. (2012). *Exploring learning experiences and outcomes among cardiologists participating in a web conference workshop series* (Doctoral dissertation, University of Ottawa, Canada). Retrieved from <http://www.ruor.uottawa.ca/en/handle/10393/23492>
- Reid, J. C. (1999). Adult education. In E. Ulmer (Ed.), *An online education sourcebook* (pp. 6-13). Washington, DC: Educational Resources Information Centre.
- Rennie, F., & Morrison, T. (2013). *E-Learning and Social Networking Handbook: Resources for Higher Education* (2nd ed.) New York: Routledge.
- Rodriguez, J. E. (2011). Social Media Use in Higher Education: Key Areas to Consider for Educators. *MERLOT Journal of Online Learning and Teaching* 7(4). Retrieved from http://jolt.merlot.org/vol7no4/rodriguez_1211.htm
- Rogers, E. M. (1995). *Diffusions of innovations*. New York: The Free Press.

- Rogers, E. M. (2003). *Diffusion of innovation* (5th ed.). NY: The Free Press.
- Ronteltrap, F., & Eurelings, A. (2002). Activity and interaction of students in an electronic learning environment for problem-based learning. *Distance Education*, 23, 11-22.
- Rosen, C. (2007). Virtual friendship and the new narcissism. *The New Atlantis*, 17(Summer 2007), 15-31.
- Ross, S. M., Morrison, G. R., & Lowther, D. L. (2010). Educational technology research past and present: Balancing rigor and relevance to impact school learning. *Contemporary Educational Technology*, 1(1), 17-35.
- Rudd, T., Sutch, D., & Facer, K. (2006). *Towards new learning networks*. Bristol: Futurelab
Opening Education Reports. Retrieved from
http://www.futurelab.org.uk/resources/documents/opening_education/Learning_Netorks_report.pdf
- Russell, A. L. (1995) Stages in learning new technology. *Computers in Education*, 25(4), 173-178.
- Ryerson, M. H. (2002). *Technology and student success in higher education: A research study on faculty perceptions of technology and student success*. Toronto: McGraw-Hill Ryerson.
- Saadé, R. G., He, X., & Kira, D. (2007). Exploring dimensions to online learning. *Computers in Human Behavior*, 23(4), 1721-1739.
- Salaway, G., Caruso, J. B., & Nelson, M. R. (2008). *The ECAR study of undergraduate students and information technology 2008*. Boulder, Colorado: EDUCAUSE Center for Applied Research.
- Salomon, G. (1993). *Distributed cognitions – psychological and educational considerations*. Cambridge University Press: Cambridge.

- Savery, J. R., & Duffy, T. M. (1996). Problem-based learning: An instructional model and its constructivist framework. In B. G. Wilson (Ed.), *Constructivist Learning Environments: Case Studies in Instructional Design* (pp. 135-148). New Jersey: Educational Technology Publications.
- Schön, D. (1983). *The reflective practitioner: How professionals think in action*. London: Temple Smith.
- Schön, D. (1991). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*. Oxford: Josey-Bass.
- Schön, D. (1996). *The reflective practitioner: How professionals think in action*. Aldershot: Arena Ashgate.
- Schroeder, A., Minocha, S., & Schneider, C. (2010). The strengths, weaknesses, opportunities, and threats of using social software in higher and further education teaching and learning. *Journal of Computer Assisted Learning*, 26, 159–174.
- Schunk, D. H. (2011) Social cognitive theory. In K. R. Harris, S. Graham, T. Urdan, C. B. McCormick, G. M. Sinatra, & J. Sweller (Eds.), *APA educational psychology handbook, Vol 1: Theories, constructs, and critical issues* (pp. 101-123). Washington, DC, US: American Psychological Association.
- Selwyn, N. (2008). An investigation of differences in undergraduates' academic use of the internet. *Active Learning in Higher Education*, 9(11), 11-22.
- Shedroff, N. (2009). *Experience design 1.1: A manifesto for the design of experiences*. Experience Design Books. Retrieved from <http://www.experiencedesignbooks.com>

- Siemens, G. (2008). Learning and knowing in networks: Changing roles for educators and designers. *ITFORUM for Discussion*. Retrieved from <http://it.coe.uga.edu/itforum/Paper105/Siemens.pdf>.
- Siemens, G. (2009). *Learning organizations*. Paper presented at Learning Technologies 2009, London, UK.
- Siemens, G. (2011). *George Siemens on massive open online courses (MOOCs)*. Retrieved from http://www.youtube.com/watch?v=VMfipxhT_Co
- Siemens, G., & Downes, S. (2008, 2009). Connectivism & connected knowledge [Online Course]. Retrieved from <http://lrc.umanitoba.ca/connectivism/>
- Siemens, G., & Tittenberger, P. (2009). *Handbook of emerging technologies for learning*. Retrieved from http://umanitoba.ca/learning_technologies/cetl/HETL.pdf
- Silber, K. H., & Foshay, W. R. (Eds.). (2010). *Handbook of improving performance in the workplace (Vol 1)*. San Francisco, CA: Pfeiffer.
- Simpson, P. M., Leonard, J., Ballenger, J. W., Coleman, J. C. (2010). Student Satisfaction of Online Courses for Educational Leadership. *Online Journal of Distance Learning Administration, XIII(III)*. Retrieved from http://www.westga.edu/~distance/ojdla/Fall133/sampson_ballenger133.html
- Sims, R., & Jones, D. (2002). Continuous improvement through shared understanding: Reconceptualising instructional design for online learning. In A. Williamson, C. Gunn, A. Young, & T. Clear (Eds.), *Winds of change in the sea of learning. Proceedings of the 19th Annual Conference of the Australian Society for Computers in Learning in Tertiary Education*. Auckland, NZ: UNITEC Institute of Technology.

- Smith, B. L., & MacGregor, J. T. (1992). What Is Collaborative Learning? In A. Goodsell, M. Maher, V. Tinto, B. L. Smith and J. T. MacGregor (Eds.), *Collaborative Learning: A Sourcebook for Higher Education*. Pennsylvania: National Center on Postsecondary Teaching, Learning, and Assessment.
- Smith, C. (2007). When in Rome: Teaching 21st century students using 21st century tools. Retrieved from <http://students.ed.uiuc.edu/arosu2/IdealHighSchool/21stcenturytools.pdf#page=3>
- Smith, E. (2011). Teaching critical reflection. *Teaching in Higher Education*, 16(2), 211_223.
- Somekh, B. (2008). Factors affecting teachers' pedagogical adoption of ICT. In J. Voogt, & G. Knezek (Eds.), *International handbook of information technology in primary and secondary education* (pp. 449–460). New York: Springer.
- Sreebny, O. (2007). Digital rendezvous: Social software and higher education. *EDCAUSE Research Bulletin*, 2007(2), 1-12.
- Steel, C. (2006). Influence of teacher beliefs on web-enhanced learning experiences: Learners and teachers. Who's learning? Whose technology? In L. Markauskaite, P. Goodyear, & P. Reimann (Eds.), *Proceedings of the 23rd annual conference of the Australasian society for computers in learning in tertiary education* (pp. 795–805). Sydney: Sydney University Press.
- Stodel, E. J., Thompson, T-L., & MacDonald, C. J. (2006). Learners' perspectives on what is missing from online learning: Interpretations through the community of inquiry framework. *International Review of Research in Open and Distance Learning*, 7(3). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/325/744>

- Straub, E. T. (2009). Understanding technology adoption: Theory and future directions for informal learning. *Review of Educational Research* 79(2), 625–649.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory, procedures and techniques*. Newbury Park, CA: Sage.
- Surowiecki, J. (2005). Independent individuals and wise crowds. *IT Conversations*, 468.
Retrieved from <http://itc.conversationsnetwork.org/shows/detail468.html>
- Sutinen, A. (2007). Constructivism and education: Education as an interpretative transformational process. *Studies in Philosophy and Education*, 27, 1-14.
- Taba, H. (1962). *Curriculum development: Theory and practice*. New York: Harcourt, Brace & World.
- Tan, S. C., & Hung, D. (2002). Beyond information pumping: Creating a constructivist e-learning environment. *Educational Technology*, 42(5), 48-54.
- Tan, C., Amin, Z., & Khoo, H. (2007). Student perceptions of the benefits of problembased learning. *Medical Teacher*, 29(2 & 3), 284.
- Tapscott, D. (1999). *Growing Up Digital: The Rise of the Net Generation*. New York: McGraw-Hill.
- Tapscott, D. (2008). *Grown up digital: How the Net generation is changing your world*. New York: McGraw-Hill.
- Tapscott, D. (2009). *Grown up digital: How the Net generation is changing your world*. New York: McGraw-Hill.
- Tashakkori, A., & Creswell, J. W. (2007). The new era of mixed methods. *Journal of Mixed Methods Research*, 1(1), 3-7. Retrieved March 23, 2007, from <http://mmr.sagepub.com>.

- Tashakkori, A., & Creswell, J. W. (2008). Envisioning the future stewards of the social-behavioral research enterprise. *Journal of Mixed Methods Research, 2*, 291-295.
- Tashakkori, A., & Teddlie, C. (2003). The past and future of mixed methods research: From data triangulation to mixed model designs. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of Mixed Methods in Social & Behavioral Research* (pp. 671-701). Thousand Oaks, London, New Delhi: SAGE Publications.
- Tearle, P., & Golder, G. (2008). The use of ICT in the teaching and learning of physical education in compulsory education: how do we prepare the workforce of the future? *European Journal of Teacher Education, 31*(1), 55-72.
- Teddlie, C., & Tashakkori, A. (2009). *The foundations of mixed methods research: Integrating quantitative and qualitative techniques in the social and behavioral sciences*. Thousand Oaks, CA: Sage.
- Teddlie, C., & Tashakkori, A. (2011). Mixed methods research: Contemporary issues in an emerging field. In N. K. Denzin, & Y. S. Lincoln (Eds.), *SAGE handbook of qualitative research* (4th ed., pp. 285-299). Thousand Oaks, CA: Sage.
- Tham, C. M., & Werner, J. M. (2005). Designing and evaluating e-learning in higher education: a review and recommendations. *Journal of Leadership and Organizational Studies, 11*(2), 15-25.
- The New Media Consortium, & EDUCAUSE Learning Initiative. (2010). The 2010 horizon report. Retrieved January 30, 2010, from <http://www.nmc.org/pdf/2010-Horizon-Report.pdf>

- Tondeur, J. van Braak, J., Sang, G., Voogt, J., Fisser, P., & Ottenbreit-Leftwich, A. (2012). Preparing pre-service teachers to integrate technology in education: A synthesis of qualitative evidence. *Computers & Education* 59(2012) 134–144.
- Tough, A. M. (1979). *The adult's learning projects: A fresh approach to theory and practice in adult learning* (2nd ed.). Toronto: Ontario Institute for Studies in Education.
- Towers, J. M. (1994). The perils of outcome-based teacher education. *Phi Delta Kappan*, 75(8), 624–627.
- Uden, L., & Beaumont, C. (2006). *Technology and problem-based learning*. Hershey, PA: Information Science Publishing.
- UK Quality Assurance Agency for Higher Education, (2007). *Outcomes from institutional audit: The adoption and use of learning outcomes*. Adamsway, Mansfield, UK: Linney Direct.
- Retrieved from
<http://www.qaa.ac.uk/reviews/institutionalaudit/outcomes/learningoutcomes.pdf>
- Uzunboylu, H., Bicen, H., & Cavus, N. (2011). The efficient virtual learning environment: A case study of web 2.0 tools and windows live spaces. *Computers in Education*, 56(3), 720–726.
- Valenti, S., Panti, M., & Leo, T. (2003). Relevant issues for the design of a successful web-based instructional system: MODASPECTRA. In A.K. Aggarwal (Ed.), *Web-based Education: Learning from Experience* (pp. 371-397). London: IRM Press.
- Veletsianos, G., & Navarrete, C. C. (2012). Online social networks as formal learning environments: Learner experiences and activities. *The International Review of Research in Open and Distance Learning*, 13(1), 144-166.

- Von Glasersfeld, E. (2003). An exposition of constructivism: Why some like it radical. Retrieved from <http://www.oikos.org/constructivism.htm>
- Vuorikari, R. (2007). *Folksonomies, Social Bookmarking and Tagging: State-of-the-Art*. European Schoolnet and Insight observatory for new technologies and education, Retrieved from http://events.cliro.unibo.it/file.php/5/moddata/forum/5/26/Specia_Report_Folksonomies.pdf
- Vygotsky, L. S. (1978). *Mind in society: the development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner & E. Souberman, Trans.). Cambridge, MA: Harvard University Press.
- Watson, K., & Harper, C. (2008). Supporting knowledge creation: Using Wikis for group collaboration [Electronic Version]. *EDCAUSE Research Bulletin*, 2008, 13. Retrieved from <http://www.edcause.edu/ecar>
- Watson, P. (2002). The role and integration of learning outcomes into the educational process. *Active Learning in Higher Education*, 2002(3), 205-219.
- Waycott, J., Bennett, S., & Kennedy, G. (2010). Digital divides? Student and staff perceptions of information and communication technologies. *Computers & Education*, 54(2010), 722-732. Retrieved from <http://dx.doi.org/10.1016/j.compedu.2009.11.006>
- Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. Cambridge: Cambridge University Press.
- Wenger, E., Trayner, B., & de Laat, M. (2011). *Promoting and assessing value creation in communities and networks: A conceptual framework*. Rapport 18, Ruud de Moor Centrum, Open Universiteit, The Netherlands.

- Wheeler, S. (2009). Learning space mashups: Combining web 2.0 tools to create collaborative and reflective learning spaces. *Future Internet*, 1(1), 3–13.
- Wikipedia, (2013). *Digital literacy*. Retrieved from <http://en.wikipedia.org/wiki/Wikipedia:About>
- Williams, J., & Chinn, S. J. (2009). Using web 2.0 to support the active learning experience. *Journal of Information Systems Education*, 20(2), 165-174.
- Wills, K., & Clerkin, T. A. (2009). Simulation projects for improved learning outcomes. Focus on Teaching. *Business Communication Quarterly*, June, 2009. Pp. 221-227.
- Wlodarsky, R. (2005). The professoriate: Transforming teaching practices through critical reflection and dialogue. *Teaching & Learning: The Journal of Natural Inquiry & Reflective practice*, 19, 156-172.
- Yin, R. K. (1984). *Case study research: Design and methods*. Newbury Park, CA: Sage.
- Yin, R. K. (2006). Mixed methods research: Are the methods genuinely integrated or merely parallel? *Research in the schools*, 13, 41-47.
- Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). California, SAGE Publications.

Appendix A: Context of the Research Site

Bachelor of Education Program at the University of Ottawa

Curriculum Design and Evaluation in Education (PED3103) – online version

Fall Semester, 2010

Course Description

This course will provide an examination of the Ontario Curriculum and other curriculum documents; instruction on the development of lessons and units based on the Ontario Curriculum; and an overview of the theory, issues, and strategies for assessing students.

There are 13 units in this course. Three are face-to-face (as outlined in the Road Map and Calendar) and the remaining 10 are online. The online units contain four types of activity: Read it!, Explore it!, Discuss it!, and Apply it!.

- The Read it! will provide the learners with relevant background information on the unit topic. They can be read online or downloaded in PDF format and printed. It is expected that each of these content documents, will take about 30 minutes to read.
- Through a series of questions, the Explore its! will lead the learners to examine websites or resources more critically. It is expected that each Explore it! component will take the learners approximately one hour to complete.
- The purpose of the Discuss it! activities is to create a learning community and to have the learners reflect on the unit's key issues and come up with the learners' own solutions or ideas in relation to the issues presented. Each week it is expected that the discussion activities will take the learners approximately 30-60 minutes to complete.
- The Apply it! activities will help the learners apply the unit content in a meaningful way. The learners' will focus on one strand or unit from the Ontario curriculum and synthesize new material. The individual Apply Its! will come together to form a "Teaching Snapshot" that will be submitted at the end of the course. The learners will also be required to submit the Apply its! for formative and summative assessment at one other point during the course as a "Teaching Tools in Progress". It is expected that these activities will take the learners between 30 minutes and two hours to complete each week.

The course is delivered using the University of Ottawa's Blackboard Learning Management System. It was developed in 2006 and has since been delivered 5 times. Each time it is delivered it is refined and improved. Two learning activities currently in the course will be enriched through the use of social software and one new activity, named Share it!, will be added. Detailed descriptions of the learning activities can be found in Appendix D. The three new online collaborative learning activities will be course requirements and so will not require additional time for participants to complete. It is anticipated that the participants will use social software to complete the learning activities and develop social objects (e.g., a collection of credible online resources on classroom management, a lesson plan that incorporates group members' comments and feedback, and reflections on YouTube video clips on authentic and traditional assessments). It is also anticipated that by completing these enriched learning activities, the learners will

develop or enhance their social software skills and develop an understanding of the potential use of social software in educational settings. The researcher will observe the work done in all learning activities and provide technical assistance to all learners (participants and nonparticipants) if required. The researcher will not be involved in teaching and assessing learners' assignments and will not have any influence on the learners' final mark of the course. The exact start date of the course is not known yet.

This course is only available online for pre-service teachers and the enriched learning activities are first introduced in this program. It is not expected that the learners will have experienced similar learning activities prior to the course.

Appendix B: Letter of Informed Consent to the Participants

Researcher: Candidate Name, Faculty of Education, University of Ottawa
Contact Information: Candidate E-mail

The purpose of this research study, which is part of the requirements for my PhD, is to revise and evaluate an online learning course that promotes deep approaches to learning through social software enabled activities using outcome-based instructional design (e.g., resource sharing, peer feedback, and co-creating resources on professional topics). Three social software enabled learning activities are part of the course requirements. No extra time is required to complete these activities. Activities include using social bookmarking to share resources using Del.icio.us; providing feedback to other group members' assignments using Google Docs, a collaborative document sharing site; and commenting and reflecting on the topics discussed in two video clips posted on the video sharing site TeacherTube. New approaches to education will be examined and insights into the relationships between outcome-based instructional design, level of participation, using social software, learning experiences, and learning outcomes will be developed.

This study will take place within the context of the online version of Curriculum Design and Evaluation in Education (PED3103) in the Faculty of Education at the University of Ottawa. If you agree to participate in this study, your involvement will consist of attending and taking part in this course, completing two brief surveys that will take between 5 and 10 minutes each, and possibly participating in two 30-45 minute interviews. The surveys will be completed online at the beginning and end of the course. You MAY also be selected to participate in two individual interviews that will be conducted face-to-face or by telephone and scheduled right before and five months after the course ends. The interviews will be audio-taped and transcribed verbatim. In the first interview, you will be invited to discuss your experiences with, and perceived learning outcomes from, completing the learning activities in the course. In the second interview, you will be invited to discuss your application of new knowledge and skills acquired in the course. After completing the second interview you will be provided with a twenty-five dollar gift card as a token of appreciation. About a month after each interview you will be given a transcript of your interview. You will be asked to verify it and add, delete, or clarify any information to better represent your answers.

Your identity will be kept anonymous. Pseudonyms will be used in any reports, publications, and presentations resulting from the research. To ensure confidentiality, all data will be stored in a secure manner and will only be accessible to the researcher and her thesis supervisor. It will be kept in this manner for five years after the completion of this study and then destroyed.

The researcher will not be teaching and assessing your assignments in this course and so has no influence on your final marks. The researcher will have access to your online postings and interactions in this course. Your responses will not be shared with the course instructor before your final marks have been submitted. The researcher will be available to provide technical assistance when using the social software if required. The technical assistance will be provided equally to all learners in the course, regardless of whether you participate or not. You may withdraw from this project at any time, refuse to participate, and choose not to answer questions

without penalty. At the same time, however, your involvement in this study will enable you to reflect on your own learning. If you agree to participate in this study, your email address is required to schedule the individual interviews if you are selected. Your email address will be used solely for the purpose of this study.

The University of Ottawa Research Ethics Board has approved this research. Any information requests or complaints about the ethical conduct of the project may be addressed to the Protocol Officer for Ethics in Research at the University of Ottawa or my thesis supervisor in the Faculty of Education at the University of Ottawa.

If you have any questions about this research now or at any time throughout the study, please email me. To indicate your decision to participate in this study, please sign this letter during this course or send it to the researcher in the pre-stamped envelope provided. You may also want to keep a copy of this letter for your records.

Your time and cooperation is greatly appreciated.
Sincerely,

Candidate Name
Faculty of Education
University of Ottawa

Thesis Supervisor Name
Thesis Supervisor
University of Ottawa

Signatures:

I, _____, agree to collaborate in the research
(participant name, please print)

project and certify that I understand the nature of the research as described above.

My email address: _____

Signature of Participant

Date (yyyy/mm/dd)

Signature of Researcher

Date (yyyy/mm/dd)

I wish to receive a summary of the findings of this research, which will be sent to me by the researcher.

Yes No

Appendix C: Distinctions between Instructional Objectives and Learning Outcomes

Area of difference	Instructional objectives	Learning outcomes
1. The detail of the specification	Instructional objectives are extensive and detailed <i>Implication—They are difficult and time consuming to use</i>	Learning outcomes can be described under a small number of headings <i>Implication—They provide an intuitive, user-friendly and transparent framework for curriculum planning, teaching and learning and assessment</i>
2. Level of specification where the emphasis is placed	Instructional objectives emphasize specification of instructional intent at a lower and more detailed level <i>Implication—This may trivialize and fragment and make it difficult to get agreement</i>	Learning outcomes emphasize a broad overview with a design-down approach to a more detailed specification <i>Implication—Key areas of learning are emphasized, making it easier to get agreement. It also results in more flexibility in their use</i>
3. The classification adopted and interrelationships	Instructional objectives are classified into discrete areas: knowledge, skills and attitudes <i>Implication—This ignores the complexities of medical practice and interrelationships</i>	Interrelationship of learning outcomes with nesting of outcomes, knowledge embedded and metacompetences recognized <i>Implication—This reflects the behaviour expected of a doctor and encourages application of theory to practice and a holistic integrated approach to patient care</i>
4. Intent or observable result	Statement of aims and instructional objectives are perceived as intentions <i>Implication— They may be ignored in practice as unrealistic</i>	Learning outcomes are guaranteed achievements <i>Implication—They are institutionalized and incorporated into practice</i>
5. Ownership	Aims and objectives are owned by the curriculum developer and reflect a more teacher-centred approach to the curriculum <i>Implication—They are perceived as prescriptive and threatening to the teacher and student. It is more difficult for the student to identify with them</i>	The development and use of learning outcomes can engage teaching staff and reflect a more student-centred approach <i>Implication—Teachers identify with the outcomes and students take more responsibility for their own learning</i>

Distinctions between instructional objectives and learning outcomes (Harden, 2002).

Appendix D: The Enriched Learning Activity Design

Enriched Learning Activity for Unit 5:

Unit 5: Planning – Lesson Plans			
Activity: Apply it!			
Original Design	Enriched Design	Type of Collaboration	Learning outcomes
<p>Using what you have learned about lesson plans and teaching strategies, complete Unit 5 Apply it! (develop a lesson plan for your unit or strand). Share your work with one of your triad members for feedback (email it to him or her as an attachment)</p>	<p>Using what you have learned about lesson plans and teaching strategies, complete Unit 5 Apply it! (develop a lesson plan for your unit or strand). Share your work with both of your triad members for feedback (upload your lesson plan into Google Docs, share it with your peers and give them editing privileges, arrange a time for synchronous feedback OR give a timeline for asynchronous feedback, provide feedback on your triad members’ lesson plans shared with you in Google Docs) In your learning portfolio, briefly (one paragraph) reflect on your experience using Google Docs (e.g., what were the highlights, pitfalls, advantages? How could you use it in future in your practice etc.)</p>	<p>Collaborative process, individual product</p>	<p>Providing feedback on a lesson plan to develop online social interaction, and openness to feedback, comments, and critiques; Providing /integrating feedback based on personal understanding / knowledge base (i.e., development of a social object); Negotiating/ accommodating means of social interaction, (e.g., synchronous, asynchronous); Learning/exploring collaborative editing in Google Docs (i.e., developing IL & TL); Reflecting on collaborative editing; Making connection to future use of this type of social software in other contexts (i.e., application of knowledge).</p>

Enriched Learning Activity for Unit 7:

Unit 7: Building your classroom community (Classroom management)			
Activity: Apply it!			
Original Design	Enriched Design	Type of Collaboration	Learning outcomes
Using what you have learned about classroom management and discovered about your own management style, complete Unit 7 Apply it! (develop a classroom management list and tracking tool for one strategy).	Using what you have learned about classroom management and discovered about your own management style, complete Unit 7 Apply it! (develop a classroom management list and tracking tool for one strategy). Share it! Share the online resources you used to complete the Apply it! in this unit. Post one or two online resources on classroom management in Del.icio.us, tag your resources with “PED3103-2010” and “Classroom-Management”, add “PED3103” and/or your peers to your Del.icio.us network. Use the following “ <i>Question list for evaluating online information sources</i> ” (see below) to rate the resources you are sharing: 5-star for resources meeting all 5 criteria, 4-star for resources meeting 4 criteria, and so on. In your learning portfolio, briefly (one paragraph) reflect on your experience using Del.icio.us (e.g., what were the highlights, pitfalls, advantages? How could you use it in future in your practice etc.)	Collaborative process, collaborative product	Contributing to an online resource repository for the course (i.e., development of a social object); Using evaluation criteria to rate the quality of the resources (i.e., developing IL); Making connections with other social bookmarkers who are interested in similar topics, expanding the collection of online resources in the course; Learning/exploring/organizing social bookmarks in Del.icio.us (i.e., developing IL and TL); Reflecting on social bookmarking, contributing to course content (bookmarks becomes a resource for other learners and new learners in the future); Making connections to the future use of this type of social software in practice (i.e., application of knowledge).

Question list for evaluating online information sources:

- Authority: What are the author's credentials and reputation? Is the publisher, author, or association reputable?
- Objectivity: Are the author's goals clearly stated? Does he or she exhibit a particular bias? Does the information appear to be well researched?
- Quality: Is the information well organized, complete, and accurate? Are the graphics—images, tables, charts, diagrams—appropriate and clearly presented?
- Coverage: Does the information substantiate other materials you have read or does it add new information? Have you found enough information to support your arguments?
- Currency: Is the topic one that requires current information? When was the information published? Has the information been revised, updated, or expanded in a subsequent edition?

(Adapted from Cornell University Library (n.d.). *Five criteria for evaluating Web pages*. Retrieved from <http://www.library.cornell.edu/olinuris/ref/research/webcrit.html>)

Enriched Learning Activity for Unit 12:

Unit 12: Assessment and Evaluation – Traditional Methods			
Activity: Discuss it!			
Original Design	Enriched Design	Type of Collaboration	Learning outcomes
<p>Having completed the Unit 12 Explore it! and reflected on your experience, actively discuss the following question in the discussion group called Unit 12: Assessment and Evaluation – Traditional Methods: Given the growing interest in online learning at the secondary level, what issues, if any, do you foresee with online testing?</p>	<p>Having completed the Unit 12 Explore it! and reflected on your experience, watch the YouTube video clip in which an experienced Ontario teacher is discussing traditional methods for assessment and evaluation and perceived trends in student assessment. Rate the video and discuss the following question in the YouTube video comments section: Given the growing interest in online learning at the secondary level, what issues, if any, do you foresee with online testing? Mark your comments with “PED3103-2010”. In your learning portfolio, briefly (one paragraph) reflect on your experience using YouTube video and discussion (e.g., what were the highlights, pitfalls, advantages? How could you use it in future in your practice etc.)</p>	<p>Individual process, collaborative product</p>	<p>Contributing to an online thoughts/ comments repository for the course (i.e., developing a social object); Making connections with other YouTube users who might be interested in similar topics; Learning how to use the YouTube site (i.e., developing TL); Reflecting on YouTube video discussions that will contribute to the course content (i.e., comments and reflections become a resource for other learners); Making connections to the future use of this type of social software in practice (i.e., application of knowledge).</p>

Appendix E: Demographic Questionnaire

Please complete the following questions. All responses will be kept confidential.

1. Age group: O 18-23 O 24-29 O 30-34 O 35-39 O 40-44 O 45-49 O 50 +
2. Gender: Female _____ Male _____
3. Permanent Postal Code _____
4. E-mail address: _____
5. The frequency of my **informal learning** on the Internet (i.e., using the Internet to help answer questions about life, personal interests, and/or essential needs; Internet browsing; playing online games; finding medical information; finding help with hobbies etc.).

Please circle the most correct response.

- 1= never
- 2= occasionally
- 3=sometimes
- 4=often
- 5=always

6. I do not frequently use Internet for my informal learning because

7. I frequently use Internet for my informal learning because

8. a. Is this the first online program or course you have taken? (yes / no)
b. If you answered no, how many online courses have you taken before this one? _____
9. Indicate the frequency of your participation in the following activities in **formal online settings** (e.g., in online learning programs, meetings, research, and professional development) using the response options below:

1= never, 2= occasionally, 3=monthly, 4=weekly, 5=daily

computer-based training	1	2	3	4	5
threaded discussions	1	2	3	4	5
real-time chat/instant messaging	1	2	3	4	5
listening to podcasts	1	2	3	4	5
subscribing to podcasts	1	2	3	4	5
creating podcasts	1	2	3	4	5
sharing bookmarks (e.g., Del.icio.us)	1	2	3	4	5
subscribing to social bookmarks	1	2	3	4	5
viewing shared documents online	1	2	3	4	5

sharing documents online	1	2	3	4	5
collaboratively working on shared documents online	1	2	3	4	5
reading blogs	1	2	3	4	5
commenting on a blog	1	2	3	4	5
creating a blog	1	2	3	4	5
viewing wiki entries	1	2	3	4	5
editing wiki entries	1	2	3	4	5
co-creating wikis	1	2	3	4	5
social networking (e.g., facebook)	1	2	3	4	5
video conferencing	1	2	3	4	5
audio conferencing	1	2	3	4	5
watching simulations	1	2	3	4	5
using simulations	1	2	3	4	5
Google Docs	1	2	3	4	5
Del.icio.us	1	2	3	4	5
Watching YouTube	1	2	3	4	5
Commenting on YouTube videos	1	2	3	4	5
Uploading videos to YouTube	1	2	3	4	5
other	1	2	3	4	5
Please indicate _____					

10. I do NOT participate in the above mentioned activities frequently because

11. I participate in the above mentioned activities frequently because

12. Indicate your level of agreement with the following statement: My online learning experiences are positive.

1 = strongly disagree

2 = disagree

3 = neutral

4 = agree

5 = strongly agree

13. My online learning experiences are NOT positive because

14. My online learning experiences are positive because

15. *Collaborative learning* refers to learning together within a small group. It is characterized by members working toward a common goal, exchanging ideas, and engaging in discussion.

Indicate the frequency with which you engage in collaborative learning using the response options below

- 1= never
- 2= occasionally
- 3=sometimes
- 4=often
- 5=always

16. Indicate your level of agreement with the following statement: My collaborative learning experiences are positive.

- 1 = strongly disagree
- 2 = disagree
- 3 = neutral
- 4 = agree
- 5 = strongly agree

17. My collaborative learning experiences are NOT positive because

18. My collaborative learning experiences are positive because

19. Indicate the frequency of your participation in the following collaborative learning activities using the response options below:

1= never; 2= occasionally; 3=sometimes; 4=often; 5=always

Problem-based learning	1	2	3	4	5
Team-based learning	1	2	3	4	5
Online Collaborative Learning Projects	1	2	3	4	5
other	1	2	3	4	5
Please explain _____					

(Adapted from Archibald, 2010)

Appendix F: SoAT Survey

Social software refers to Web 2.0 applications that allow individuals to interact and collaborate with each other online (Anderson, 2005; Beldarrain, 2006; Mejias, 2006). Examples of social software include social-networking sites (e.g., Facebook, Ning), wikis (e.g., Wikipedia, PB Wiki), blogs (e.g., Wordpress, Blogger), social bookmarking (e.g., Del.icio.us, Furl), grassroots video sharing (e.g., YouTube, TeacherTube), and microblogging (e.g., Twitter, Google Buzz).

Instructions: Read the descriptions of each of the six stages related to the adoption of social software. Choose the stage that best describes your adoption of social software.

	<p>Stage 1: Awareness I am aware that social software exists but have not used it; perhaps I'm even avoiding it. I am anxious about the prospect of using social software.</p>
	<p>Stage 2: Learning the process I am currently trying to learn the basics. I am sometimes frustrated using social software. I lack confidence when using social software.</p>
	<p>Stage 3: Understanding and application of the process I am beginning to understand the process of using social software and can think of specific tasks in which it might be useful.</p>
	<p>Stage 4: Familiarity and confidence I am gaining a sense of confidence in using social software for specific tasks. I am starting to feel comfortable using social software.</p>
	<p>Stage 5: Adaptation to other contexts I think about social software as a tool to help me and am no longer concerned about it as technology. I can use it in many applications and as an instructional aid.</p>
	<p>Stage 6: Creative application to new contexts I can apply what I know about social software in the classroom. I am able to use it as an instructional tool and integrate it into the curriculum.</p>

Adapted from Christensen, R. (1997). Effect of technology integration education on the attitudes of teachers and their students. Doctoral dissertation, Univ. of North Texas.

Survey available online <http://www.tcet.unt.edu/research/online/stages.htm>

Study based on Russell, A. L. (1995) Stages in learning new technology. Computers in Education, 25(4), 173-178.

Appendix G: W(e)Learn Instrument

Question	Strongly Disagree =1	Disagree =2	Not sure =3	Agree =4	Strongly agree =5	N/A
1. The facilitator helped promote an open atmosphere in which all voices were heard.						
2. The facilitator helped promote effective collaboration among learners.						
3. Opportunities were provided to learn <i>about</i> other learners.						
4. Opportunities were provided to learn <i>from</i> other learners.						
5. Opportunities to engage in collaborative online learning were provided.						
6. Learning activities built upon my previous knowledge and experiences.						
7. Learning activities stressed development of practical skills rather than acquisition of factual knowledge.						
8. Learning activities fostered joint problem-solving.						
9. Learning activities were applicable to situations encountered in the classroom.						
10. Learning activities fostered mutual trust and respect among learners.						
11. Content was applicable to a wide variety of teaching contexts (e.g., elementary, secondary, multiple teaching subjects, etc.).						
12. Content was consistent with my professional interests and needs.						
13. Content included consideration of policies and regulations relevant to teaching practice.						
14. Content included knowledge and skills necessary for effective teamwork.						
15. Activities in the course supported achievement of the learning outcomes.						
16. Course resources supported achievement of the learning outcomes.						
17. The facilitator provided useful feedback.						
18. My ability to <i>solicit</i> information from other learners has improved.						
19. My ability to <i>integrate</i> information from other learners when making decisions about curriculum design and evaluation has improved.						
20. My ability to express my ideas in an assertive yet respectful manner has improved.						
21. My ability to openly receive feedback from other learners has improved.						
22. My ability to respectfully resolve conflict with						

Question	Strongly Disagree =1	Disagree =2	Not sure =3	Agree =4	Strongly agree =5	N/A
other learners has improved.						
23. My ability to integrate input from other learners and the instructor has improved.						
24. I enjoyed the learning experience.						

(Adapted from MacDonald et al., 2009)

Appendix H: Interview Questions

The following are draft interview questions that may be revised to address emerging themes as data are collected.

Interview #1 (Right before the course completion)

General

1. Describe your overall learning experience with the learning activities using social software?
2. What was the most valuable aspect of these learning activities?
3. What did you like the most?
4. What did you not like?
5. How can these learning activities be improved?

Content

1. Describe your overall satisfaction with the collaborative learning activities (Did you like them? Enjoy them? Benefit from them?)
2. How did you find the content of the collaborative learning activities (probe with regards to authentic, relevancy, organization, length, depth, level)?
3. How, if at all, did the collaborative learning activities address the expected learning outcomes stated at the beginning of the activity?
4. In what ways were the collaborative learning activities relevant/not relevant to your personal and/or professional life?

Media

1. Describe your experience using the social software when completing the collaborative learning activities?
2. In what ways, if at all, did the use of social software promote a meaningful learning experience?
3. In what ways, if at all, did the use of social software present strong links between theory and practice?
4. In what ways, if at all, did the use of social software display information that was new to you?
5. In what ways, if at all, did the use of video clips present ideas and information that helped you understand assessment and evaluation methods?
6. In what ways, if at all, do you plan to use social software in your future teaching?

Service

1. How easy was it for you to access the collaborative learning activities?
2. How clear were the instructions for the collaborative learning activities?
3. What, if any, technical difficulties did you encounter (e.g., navigation between Blackboard and the social software)?
4. Do you have suggestions for the addition of support tools, services, and information on the learning activities to the course? If so, what? How would they impact your learning?

Structure

1. In what ways, if at all, did the collaborative learning activities address your learning needs?
2. In what ways, if at all, did the collaborative learning activities keep your interest?
3. In what ways, if at all, did the collaborative learning activities keep you motivated to learn?
4. In what ways, if at all, were the collaborative learning activities relevant to your learning and future practice?
5. In what ways, if at all, were the collaborative learning activities engaging?

Outcomes

1. What new knowledge and skills, if any, have you acquired as a result of participating in these collaborative activities? Describe how the knowledge and skills were learned?
2. What is your current understanding of social software and collaborative learning? How is this understanding similar or different from your understanding three months ago? If different, in what ways did the collaborative learning activities contribute to your current understanding?
3. What, if anything, did you learn in this course that you will share/have shared with your colleagues/classmates?
4. What, if anything, did you learn in this course that you will apply/have applied in your personal or professional life?
5. What value, if any, did the social software add to the learning activities? In what ways did it/ did it not enhance your learning?
6. How do you think social software can be best integrated into e-learning?
7. In what ways do you think the Share it! resources could be used after the course? Will you use it? If yes, in what ways? If not, please explain.
8. What was the best part of the collaborative learning activities?
9. What was your least favourite part of the collaborative learning activities?
10. What, if anything, was missing from this learning experience? Please give examples.
11. How could the collaborative learning activities be improved?

Interview #2 (Six months after the course completion)

1. What, if anything, that you have learned in PED3103 have you shared with your colleagues/friends? In general and specifically about social software.
2. What were the factors that had an impact on your willingness to share this information? In general and specifically about social software.
3. What, if anything, have you applied in your practice and/or personal life based on what you learned in PED3103? In general and specifically regarding social software.
 - a. If used in practice: What value, if any, did the social software add to your practice? In what ways, if at all, did it enhance your students' learning?
 - b. If used in personal life: What value, if any, did the social software add to your personal life? In what ways?
 - c. How can social software be used most effectively in your practice?

4. What were the factors that affected whether or not you applied your learning in your practice and/or personal life? In general and specifically about social software.
5. What is your opinion of the use of social software in education? Has your opinion changed from six month ago? If yes, how?
6. Is there anything else you would like to share about social software?

(Adapted from MacDonald et al., 2010)

Appendix I: Researcher Journal Template

Unit # : (Unit number and title)					
Activity: (Activity title)					
Date	Duration	Description of the task	Action taken by the researcher	Researcher reflection	Follow-up/ To-do
		i.e. identifying learning outcomes, writing instructions, testing social software, communicating with instructor	i.e. resources used, steps/procedure		

Adapted from Smith, M. (1999, 2006). Keeping a learning journal. *The encyclopaedia of informal education*. Retrieved from http://www.infed.org/research/keeping_a_journal.htm

Appendix J: Questions for Course Video Production

The presenter will briefly state her name, number of years of teaching experiences, including grades, subjects and schools taught, and her past and current positions.

Classroom Management (*Approximately 2 minutes in total for this set of questions*)

1. What do you know now that would have helped you with classroom management during your practicum teaching experiences?
2. What are the most important things for a beginning teacher to know about classroom management?
3. What is the most important lesson you have learned about classroom management and how has this affected how you manage behaviour in the classroom?
4. What tips do you have regarding classroom management for a beginning teacher just starting his or her career?

Assessment and Evaluation (*Approximately 2 minutes in total for this set of questions*)

1. What do you know now that would have helped you with assessment and evaluation during your practicum teaching experiences?
2. What are the most important things for a beginning teacher to know about assessment and evaluation?
3. What is the most important lesson you have learned about assessment and evaluation and how has this affected how you assess and evaluate students?
4. What tips do you have regarding assessment and evaluation for a beginning teacher just starting his or her career?
5. How do ensure you are fair and consistent when assessing students?
 - a. Are there any circumstances where you make exceptions?

Experiences and Advice (*Approximately 2.5 to 3.5 minutes in total for this set of questions*)

1. Can you tell us a brief story about a time where you think you handle a situation with a student that may have made a difference to his/her life?
2. Can you tell a brief story about a time where you wished you handled things differently with a student and her/his family? (these could be a teacher or principal perspective)

3. What is the most valuable lesson you ever learned in teaching?
4. What is the most important thing about being an effective teacher?
5. What is the most innovative pedagogy you have seen/practiced in teaching?(these could be a teacher or principal perspective)
6. If you were going to give a practice teacher some tips for being innovative, what would they be?
7. If you were going to give a practice teacher some tips for being effective and successful before heading into the practicum what would they be?
8. If you were hiring a teacher, what qualities would you look for?

Appendix K: The Researcher's Bulletin Board Posting on October. 7th, 2010

Hi all,

I see many of you have uploaded your documents into Google docs, congratulations!

Many of you might have experienced challenges, maybe frustrations, in using Google docs. I noticed that you were exploring the technology, sharing your experience/thoughts, and assisting each other one way or another - good job!

The question about why we are using Google docs was raised - good question. I think this question also applies to all social software used in the course. I will try to answer the question from three aspects: 1. The technology; 2. The context of education; and 3. The potential benefits to you.

1. Technology: GoogleDocs is a tool used by many educators and students for collaboration. It offers anytime anywhere access to your documents; it allows document sharing and collaborative editing; and it provides a central space for group work, within and outside a course offered by an institution. Like many social software and network platforms, Google Docs has its flaws and pitfalls. I hope you are not discouraged by the challenges of using the technology. Technology quickly changes and evolves. The social software used in this course are examples of this rapidly changing technology. As a teacher, you will need to select appropriate social software in your future practice. This experience will help you develop the required knowledge and skills to do this.

2. Context: The context of education has changed. You might have become familiar with the notion of the "Net generation" and the "digital natives". As teachers, we are facing students who might not know what life is like without PC and Internet - this is the reality. Many school boards are promoting the "21st Century Skills" and expecting teachers to use technology in their practice. In this context, it is inevitable for teachers to incorporate technology into their teaching, and many of them have been working on this. In the changing context of the 21st century education world, the purpose of using Google docs in this online course is to give you the exposure to using social software for teaching/learning.

3. Benefits: Again, having the exposure early on in your career and in an online course environment can be helpful for you to generate some thoughts around teaching in the 21st century. I am hoping that better teaching/learning ideas can stem from this experience, better tools can be found/used in the future, and more sharing and collaboration can take place. To the least extent, you can share your experience in using social software with colleagues and employers – innovation is the key. Later in the course you may wish to watch two experienced teacher's thoughts about innovation – very amusing video clips that may be useful for you to see the potential benefits of using social software.

Again, thank you all for the time and efforts that had gone into exploring Google docs.
Please feel free to contact me if you have any questions/concerns about using social software in this course.

Many thanks,
Researcher Name

(Posted 2010-10-07)

Research Question	How will the data be collected?	When will the data be collected?	How will the data be analyzed?
<p>the learning environment) of enriched learning activities coincide with the instructional intent?</p>	<p>Pre-course survey: Demographics + SoAT</p> <p>Course records including learner reflection</p> <p>Post-course survey: <i>W(e)Learn</i> Survey + SoAT instrument</p> <p>Interview #1</p> <p>Interview #2</p>	<p>Prior to using the enriched learning activities</p> <p>During course</p> <p>Immediately after completing all activities in the e-learning course</p> <p>Two weeks after the course completion, interviews</p> <p>Five months after the course completion</p>	<p>demographics, prior experiences and the response</p> <p>Identify interviewees and emerging interview questions</p> <p>More connection making between interview responses to the connections made prior to the interviews.</p>
<p>b) To what extent the learners' newly acquired knowledge and skills coincide with the instructional intent?</p>	<p>Researcher Journal</p> <p>Pre-course survey: Demographics + SoAT</p> <p>Course records including learner reflection</p> <p>Post-course survey: <i>W(e)Learn</i> Survey + SoAT instrument</p>	<p>Design stage of the course to before learners start the enriched learning activities</p> <p>Prior to using the enriched learning activities</p> <p>During course</p> <p>Immediately after completing all activities in the e-learning course</p>	<p>Making connection between the instructional intent, learner demographics, prior experiences and the response</p> <p>Identify interviewees and emerging interview questions</p>

Research Question	How will the data be collected?	When will the data be collected?	How will the data be analyzed?
	Interview #1 Interview #2	Two weeks after the course completion, interviews Five months after the course completion	More connection making between interview responses to the connections made prior to the interviews.
c) To what extent the unexpected learning outcomes were achieved and were unique to a learner?	Researcher Journal Pre-course survey: Demographics + SoAT Course records including learner reflection Post-course survey: <i>W(e)Learn</i> Survey + SoAT instrument Interview #1 Interview #2	Design stage of the course to before learners start the enriched learning activities Prior to using the enriched learning activities During course Immediately after completing all activities in the e-learning course Two weeks after the course completion, interviews Five months after the course completion	Making connection between the instructional intent, learner demographics, prior experiences and the response Identify interviewees and emerging interview questions More connection making between interview responses to the connections made prior to the interviews.
d) How, if at all/not at all, were the learners able to apply new knowledge and skills to their practice?	Course records including learner reflection Interview #1	During course Two weeks after the course completion, interviews	Evidence revealed through qualitative analysis of learner reflections and interview transcripts.

Research Question	How will the data be collected?	When will the data be collected?	How will the data be analyzed?
	Interview #2	Five months after the course completion	
<p>e) In what ways did the use of social software impact the learners' achievement of the learning outcomes?</p>	<p>Researcher Journal</p> <p>Pre-course survey: Demographics + SoAT</p> <p>Course records including learner reflection</p> <p>Post-course survey: <i>W(e)Learn</i> Survey + SoAT instrument</p> <p>Interview #1</p> <p>Interview #2</p>	<p>Design stage of the course to before learners start the enriched learning activities</p> <p>Prior to using the enriched learning activities</p> <p>During course</p> <p>Immediately after completing all activities in the e-learning course</p> <p>Two weeks after the course completion, interviews</p> <p>Five months after the course completion</p>	<p>Making connection between the instructional intent, learner demographics, prior experiences and the response</p> <p>Identify interviewees and emerging interview questions</p> <p>More connection making between interview responses to the connections made prior to the interviews.</p>

Appendix M: Data Collection Timeline in the Context of Teacher Education Program

Teacher's Education Program	Time	Data Collection
	June - August, 2010	<ul style="list-style-type: none"> • Researcher journal <i>-instructional design and production of social software enriched activities</i>
Fall semester started	September 7, 2010	<ul style="list-style-type: none"> • Researcher journal resumed <i>-learner support through course instructors</i> • Course records (online) <i>-learners' participation, reflections, and postings</i>
The online course started		
Unit 5, Lesson Plan (GoogleDocs) started	October 6, 2010	<ul style="list-style-type: none"> • Course records <i>-in learning management system (LMS) and GoogleDocs</i>
Unit 5 continued	October 7, 2010	Research ethics approval granted
		<ul style="list-style-type: none"> • Researcher journal resumed <i>-direct learner support</i> • Participant recruitment • Course records <i>-in LMS and GoogleDocs</i>
Unit 5 completed	October 12, 2010	<ul style="list-style-type: none"> • Pre-SoAT Survey • Course records <i>-in LMS and GoogleDocs</i>
Unit 7, Classroom Management (Del.icio.us)	October 20-26, 2010	<ul style="list-style-type: none"> • Course records <i>-in LMS and Del.icio.us</i>
1st Practicum (4 weeks)	November, 2010	n/a
Unit 12, Assessment and Evaluation (TeacherTube/YouTube)	December 6-10, 2010	<ul style="list-style-type: none"> • Course records <i>-in LMS and TeacherTube/YouTube</i>
The online course completed	December 13, 2010	<ul style="list-style-type: none"> • Post-SoAT Survey • Researcher journal completed • Course records completed
Fall semester completed		
	December, 2010 – January, 2011	<ul style="list-style-type: none"> • Interview #1
Winter semester started	January 4, 2011	
2nd Practicum (4 weeks)	April, 2011	<ul style="list-style-type: none"> • Interview #2 • Data collection completed
Winter semester and Teacher Education Program completed	May, 2011	

**Appendix N: Post-course W(e)Learn Survey Results on Participants’
Experiences in the Course (N = 25)**

Questions on Learning Experience	Strongly agree	Agree	Not sure	Disagree	Strongly disagree	N/A	Total number of answers	Mean
Opportunities were provided to learn from other learners.	8	15	0	2	0	0	25	4.16
Opportunities to engage in collaborative online learning were provided.	6	15	1	3	0	0	25	3.96
Learning activities stressed development of practical skills rather than acquisition of factual knowledge.	2	13	3	6	1	0	25	3.36
Learning activities fostered joint problem-solving.	0	9	9	6	1	0	25	3.04
Learning activities were applicable to situations encountered in the classroom.	1	14	5	4	1	0	25	3.4
Learning activities fostered mutual trust and respect among learners.	2	12	3	4	2	2	25	3.35
Content was applicable to a wide variety of teaching contexts (e.g., elementary, secondary, multiple teaching subjects, etc.).	3	14	6	1	1	0	25	3.68
Content was consistent with my professional interests and needs.	5	9	4	6	1	0	25	3.44
Content included knowledge and skills necessary for	0	13	3	6	3	0	25	3.04

Questions on Learning Experience	Strongly agree	Agree	Not sure	Disagree	Strongly disagree	N/A	Total number of answers	Mean
effective teamwork.								
Activities in the course supported achievement of the learning outcomes.	2	13	4	5	1	0	25	3.4
Course resources supported achievement of the learning outcomes.	4	10	5	5	1	0	25	3.44
My ability to solicit information from other learners has improved.	3	9	6	6	1	0	25	3.28
I enjoyed the learning experience.	1	4	5	9	5	1	25	2.46

Appendix O: Female and Male Participants' Pre-course Stages of Adoption of Technology (N = 25)

	Pre-Course SoAT 1-3	Pre-Course SoAT 4	Pre-Course SoAT 5-6
Female	7	3	6
Male	8	0	1
Total	15	3	7