ROLE OF ONLINE TEACHING EXPERIENCE IN PEDAGOGICAL INNOVATION IN LIS EDUCATION: AN ACTIVITY-THEORETICAL ANALYSIS

Julia Khanova

A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the School of Information and Library Science

Chapel Hill
2013

Approved by:

Gary Marchionini

Evelyn Daniel

Michelle Kazmer

Barbara Moran

Javed Mostafa

ABSTRACT

JULIA KHANOVA: Role of online teaching experience in pedagogical innovation in LIS education: An activity-theoretical analysis
(Under the direction of Dr. Gary Marchionini)

The study explored the role of online teaching experience in pedagogical innovation in the area of Library and Information Science (LIS) education. Based on the data from interviews with 25 LIS faculty who have relevant experience and from the syllabi for their courses, the study provides evidence that transitioning courses to online modality leads faculty to incorporate new teaching methods, technology tools and resources into their overall pedagogical repertoire.

The study applied Activity Theory framework in a novel way to conduct multi-level analysis of the teaching activity with attention to both activity structure and its context. Both individual and institutional cases are described in detail, using unified Activity Theory-based vocabulary. This analytical approach allowed the discussion of individual and institutional factors that drive pedagogical innovation. The study links innovation to changes in actions that comprise the teaching activity and suggests that innovative pedagogies are more likely to develop in the context of asynchronous online teaching.

The study findings paint a rich picture of teaching activity continuously evolving through instructional mode changes. Common paths as well as variations are described, including discussion of pros and cons of online and face-to-face teaching and the ways they can be combined in various hybrid ("blended") instruction models for optimal teaching and learning experience. The analytical separation of individual and contextual factors provided

foundation for recommendations for practice aimed at both individual instructors and academic institutions.

DEDICATION

In memory of Deborah Barreau – my advisor, mentor, friend and inspiration

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Statement of the Problem

Online education is arguably the fastest growing segment of higher education in the United States with steady annual increases in the rates of online student enrollment (Allen & Seaman, 2010). Two thirds of the national higher educational institutions offer online courses and, increasingly, fully-online degree programs (Allen & Seaman, 2007). The student demand for online education is on the rise and this trend is projected to continue into the foreseeable future (Hussar & Bailey, 2008). A more recent Horizon Report produced jointly by EDUCAUSE Learning Imitative[1] and New Media Consortium[2] also lists the paradigm shift towards online and hybrid learning as one of the key trends in higher education and an important driver in the higher educational context (Johnson, Adams Becker, Cummins, Estrada, Freeman & Ludgate, 2013). Consequently, university faculty are increasingly likely to teach online in addition to or instead of teaching in a traditional on-campus classroom, yet we have very little understanding of the impact online teaching has on pedagogical practice in higher education.

Despite the relative novelty of online education, there is a substantial and constantly growing body of research that attempts to keep up with the rapid growth in this area. As

[1] www.educause.edu/eli

[2] www.nmc.org

online education is becoming more commonplace, the research agenda shifts from proving that online education is a viable option to a more focused examination of specific dimensions of online teaching and learning. Of those, the practical reality of online teaching remains significantly underexplored.

Most of the research on online education can be categorized as research about *online learning*. It is student-centered, focusing on the learning process, learning outcomes and learners' experiences in online courses. Comparing effectiveness of online learning to face-to-face learning in terms of academic achievement has been the major theme in this area with conclusive findings over the past decade that online learning outcomes are equivalent or superior to traditional classroom learning (Bernard et al., 2004; Means, Toyama, Murphy, Bakia & Jones, 2009). Student satisfaction with online learning and factors that contribute to it has been another important topic in online learning research. The main findings in this area are that students are generally satisfied with online learning, even if they rate the experience less positively than classroom learning (Mentzer, Cryan & Teclehaimanot, 2007) with cognitive/learning style affecting perception of online course experience for some students (e.g., Liu, Magjuka, & Lee, 2008; Simpson & Du, 2004) and quality of interactions with instructors and peers being main contributors to satisfaction with online learning (e.g, Kazmer & Haythornthwaite, 2001; Drouin, 2008). Course technology has been shown to be another significant factor in online learning experience for students, particularly the usability of the course platform (e.g., Liao, 2006; Sun, Tsai, Finger, Chen & Yeh, 2008; Wu, Tennyson & Hsia, 2010).

Technology is an integral part of online education and there is a growing body of research on eLearning technology – a set of software tools that are specifically designed or

adopted for educational purposes. Studies of eLearning technologies range from detailed examination of custom-built experimental systems or interfaces to broad reviews of patterns of use of widespread eLearning tools. The latter are comprised of Course/Learning Management Systems (CMS/LMS) (Morgan, 2003; West, Waddoups & Graham, 2006) and, increasingly, of the assorted common web technologies adapted for educational use (Conole & Alevizou, 2010; Crook et al., 2008). eLearning technologies are seen as having great potential for driving pedagogical innovation (Conole & Alavizou, 2010), but more research is needed into their impact on teaching practice.

Online teaching is probably the least explored area in online education research. Even those studies that examine specific instructional strategies and instructors' behaviors (e.g., Anderson, Rourke, Garrison & Archer, 2001; Blingaut & Trollip, 2003; Brinkerhoff & Koroghlanian, 2007) present their findings from the students' perspective. The faculty-centered studies more commonly address the factors affecting participation in online education (e.g., Birch & Burnett, 2008; Schifter, 2000, 2004; Shea, 2007). Most of the literature on online course development and teaching is prescriptive in nature (Xu & Morris, 2007), with a few research studies that are often framed from the administrative perspective (e.g., Covington, Petherbridge & Warren , 2005). The research on faculty experience of the process of online teaching and how it fits with their overall pedagogical practice is scarce.

Online education is driven by the interplay between technology, pedagogy, administrative and community factors (Andrews & Haythronthwaite, 2007). Administration drives the pedagogical priorities, educational delivery forms and thus institution-wide adoption and support of technology. Pedagogical innovation drives experimentation with and adoption of technology as well as administrative changes. Technology availability and

functionality drive administrative and pedagogical choices. Finally, current social and technology trends drive a lot of students' preferences and expectations as well as the definition of what learning is and should be.

As the prevalence of online education increases and new technologies emerge, the need for research in this area will continue to exist re-visiting previously examined topics and answering new questions. Examining the role of online teaching in driving pedagogical innovation is one of the questions that has not been addressed through research. This question ties together two main lines of eLearning research: online teaching and eLearning technology, with a focus on instructors as often neglected key players in educational system. Understanding online teaching from a faculty perspective and the impact it has on teaching culture and practice can be a useful contribution to both the theoretical discourse on online education and its practical implementation.

Preliminary Studies

This section provides brief summaries of the two studies that were conducted in order to explore online pedagogy from a faculty perspective and the factors that shape it. The emphasis is on the way the general research question has emerged from these studies as well as on the findings that support the overall approach to the present research.

The first study was conducted in the Fall of 2009 and focused on the process of conversion of courses previously taught face-to-face for online teaching with key findings presented in Kampov-Polevoi (2010). The participants were eleven faculty members from three universities teaching courses in a variety of subject areas at both undergraduate and graduate level. Extensive semi-structured face-to-face interviews were the main tool of data

collection with additional follow-up via email in some cases. The study explicated some of the specifics of the interplay between pedagogy, technology and institutional factors in shaping online course development and teaching. The findings suggest that institutional factors are the strongest drivers in selection and use of eLearning technologies, while decisions about course content, presentation format and pedagogical strategies are primarily driven by faculty with additional input by staff in various instructional support roles. That being said, most of the pedagogical and technological decisions were influenced by several interconnected factors, suggesting the need for a holistic approach to research in this area.

The second study (partially presented in Khanova, 2012; 2013) was conducted in 2010-2011 and attempted to examine the conversion of classroom courses for online teaching from the perspectives of all the players in the process: faculty, administrators, instructional technology and academic support staff. The research project was designed as a case study framed around the UNC Summer School initiative to expand online course offerings by providing support to faculty in converting their seated courses to online format. Participants included members of two faculty cohorts recruited for the project (2009-2010 and 2010-2011 academic years), instructional designers, administrators, academic and library eLearning support staff. Analysis of the study interview data confirmed the findings of the previous pilot project regarding the complexities of the interactions between different players and their roles, technology, organizational policy and other contextual factors in the process. This again underscores the importance of viewing the transitioning of teaching to an online format as a system of connected elements that requires holistic integrative analysis. Additionally, the divergent perceptions of the project by individuals in different organizational roles can be

seen as an indicator of the tensions in the system that are important to the understanding the process and its outcomes.

One important theme that emerged from the interviews with faculty participants in both studies was that of substantial changes to the course objectives, content, assignments and assessments in the process of conversion to online teaching format. Most significantly, the faculty consistently talked about the ways these changes affected their pedagogical thinking and about incorporating some of the modifications to the course for online teaching into their on-campus teaching. The reported changes range from major revisions to course content that are applied across all sections of the course (online and face-to-face) to addition of new learning objectives that emerged from the online teaching experience, to replacement of the "old" assignments with the "new" ones developed for the online course, to incorporating more web tools and resources in on-campus teaching. The latter includes replacement of classroom lecture with materials prepared for online course (in order to utilize class time for more intensive interactive teaching, an approach known as flipped classroom), inclusion of online discussion and collaboration tools to augment classroom instruction and an increase in the use of documents and media resources available on the open web (based on and expanding from those that have been used for the online version of the course).

These changes that range from slight modification to radical transformation of teaching of the course are motivated (a) by the desire to improve pedagogy and (b) by discoveries of new teaching methods and tools through exposure to online instruction. Faculty interviewed for the two studies described above consistently made statements along the lines of "my course is now better" (after online teaching). Moreover, many of the study participants talked about applying insights from the experience of converting and teaching

one of their courses online to other courses in their pedagogical repertoire. Clearly the experience of moving and teaching a course online can have a noticeable impact on the overall pedagogical practice of participating faculty.

Research Questions and Study Significance

As demonstrated in preliminary studies described above, online teaching frequently leads faculty to incorporate new teaching methods, technology tools and resources in their overall pedagogical repertoire and to modify their approach to teaching. In other words, online teaching can act as a powerful catalyst in the process of pedagogical innovation. This process does not occur in a vacuum, but is very much embedded in the contexts of the educational institutions with different cultures, technology infrastructure and policies, which have significant impact on the pedagogical practice of the faculty members. The overarching goal of the study was to examine in the context-aware way *the role of online teaching experience in pedagogical innovation in higher education.*

Specifically, the study was designed to answer the following questions:

1. *What changes to the course are typically made in transitioning it from face-to-face to online teaching and how do contextual (institutional) factors influence this process?*
2. *Which online teaching technologies, resources and teaching methods get incorporated into face-to-face versions of the course?*

Additionally, the study attempted to address the following question related to the two above and important for future work in this research direction:

3. *Do faculty see any pedagogical advantages in handling specific aspects of teaching a course in one format vs. the other (online vs. face-to-face)?*

In answering these questions the study aimed to make a meaningful contribution to our understanding of the contemporary pedagogical practice, and the place online technologies and teaching methods have in it. The knowledge gained from the study can be used to improve existing institutional policies and support mechanisms for online education. The study also provides a practice-based foundation for the development of guidelines to help faculty make better use of online teaching tools and methods in both virtual and traditional classrooms.

CHAPTER 2

REVIEW OF LITERATURE

Research on Online Teaching

As mentioned in the introduction, online *teaching* has received relatively little research attention to date, compared to online *learning* or *eLearning technologies*. The following sections summarize the existing research on faculty engagement in online education and faculty experience in developing and teaching online courses.

Instructor engagement in online teaching

One of the main foci of research about online teaching to date has been on the motivating and inhibiting factors of instructor engagement in developing and teaching online courses. These studies typically rely on a combination of surveys and interviews of faculty members and college administrators and are rather consistent in their findings with little change over time. The key motivators/inhibitors identified in early studies (Rockwell, Schauer, Fritz & Marx, 1999; Schifter, 2000) are very similar to those that emerged in more recent studies (Birch & Burnett, 2008; Lloyd, Byrne & McCoy, 2012; Shea, 2007). The motivating factors can be primarily described as personal or intrinsic, while the inhibiting factors are mostly extrinsic, or having to do with the institutional policies and practices.

Motivators include the desire to provide more learning opportunities for students, being seen as educational innovators by peers, love of technology, interest in learning new

technologies, and expansion of pedagogical skills, as well as a desire for new challenges and for change in academic routine (Birch & Burnett, 2008; Rockwell, et al., 1999; Schifter, 2000, Shea, 2007). More mature faculty members are particularly motivated by the new pedagogical opportunities online teaching presents (Shea, 2007). The more pragmatic motivators include scheduling flexibility and convenience (Birch & Burnett, 2008), which was cited as the top motivator in the survey by Shea (2007), particularly for female and part-time faculty. The Institutional emphasis on online education is also emerging as a significant motivating factor (Parthasarathy & Smith, 2009).

The role of the institution becomes much more prominent in discussion of the inhibitors of engagement in online teaching. Increased workload, or more specifically, the extra time commitment required to develop and teach online courses is the most frequently cited barrier to engagement in online teaching (Birch & Burnett, 2008; Lloyd et al., 2012; Rockwell, et al., 1999; Schifter, 2000; Schifter, 2004; Shea, 2007). The time investment is of greatest concern when it comes to the development of online course for the first time offering or course redesign, a factor that intertwines with the perceived lack of recognition of this extra effort by administrators (Shea, 2007). Harasim (2000) notes that the initial workload from new course preparation may indeed be considerable, but it reduces substantially by the second offering of the online course and becomes similar to that of teaching in a face-to-face classroom by the third offering. Yet, the need for the upfront time investment does act as deterrent for many instructors who do not want to take time away from research and other academic activities (Birch & Burnett, 2008).

The need to develop special skills for online teaching adds to the time burden (Birch & Burnett, 2008), and the lack of institutional effort to provide training and technical support

deter many instructors from engagement in online teaching (Lloyd, 2012; Rockwell et al., 1999; Schifter, 2000). Faculty want to have sufficient technical support as well as some additional compensation in order to venture into online teaching (Marek, 2009; Schifter, 2000; Schifter, 2004; Shea, 2007). The compensation can be in the form of a course release (for new course development), overload pay, funding for special software, assignment of graduate assistants to help with the course development and teaching and financial support for relevant professional development including cost of conference participation. Inadequate financial compensation, particularly for new course development or course redesign, emerges as the topmost concern especially for younger and non-tenured faculty (Lloyd et al., 2012; Shea, 2007). In a recent study of LIS faculty engagement in online teaching, course release was cited as the most desired form of institutional support, followed by availability of formal training in the form of courses and workshops, as well as IT infrastructure and financial issues (Marek, 2009). Availability of these forms of support correlates highly with faculty confidence in ability to teach online and satisfaction with this form of teaching.

Policies guiding tenure and promotion decisions have emerged as another external factor of engagement in online teaching. Some studies suggest faculty view online teaching as a distraction from other activities that are more likely to lead to tenure and promotion (Burch & Burnett, 2008; Lloyd et al., 2012) and rank this as a major inhibitor of online teaching, just below compensation and time concerns (Shea, 2007). Other studies identify tenure and promotion considerations as an important, but not the most significant factor in faculty decision to teach online (Marek, 2009; Schifter 2004). However, engagement in online course development and teaching is seen as taking the time away from other aspects of faculty productivity, such as research, publishing and service (Meyer, 2012)

In summary, engagement in online teaching is determined by a number of personal and institutional factors. The list of these factors is consistent over time with some variation in significance of certain "motivators" and "inhibitors" of online teaching. Online teaching can offer instructors substantial flexibility and expansion of their pedagogical repertoires, but at the cost of significant commitment of time and effort that may not receive adequate compensation and recognition. Institutional support of online teaching in various forms plays an increasingly important role as online education becomes more prevalent across higher education sector.

Developing and teaching online courses

From the preceding discussion of motivators and inhibitors of online teaching it is clear that the transition to online teaching from face-to-face classroom teaching involves substantial time and effort, as well as the development of new skills. It would seem logical that the nature of online course development and the teaching process should be the subject of research inquiry, but only a handful of published studies have addressed these issues. Course development has been addressed primarily in comparison of models (faculty-driven vs. project team-based) (Hawkes & Coldeway, 2002) or in more detailed analyses of collaborative project-based course development and the faculty role in the process (Chapman & Nicolet, 2003; Hixon, 2008; Xu & Morris, 2007). The other, overlapping line of research inquiry is the analysis of the main functions and tasks of online instructors and how those compare to the more traditional instructor roles (e.g., Conceicao, 2006; Coppola, Hiltz & Rotter, 2001; Liu, Bonk, Magjuka, Lee & Su, 2005).

Research suggests that both "lone-ranger" (Bates, 1997) and collaborative team-based course development can be successful depending on contextual factors, such as faculty skills,

scale of the effort (e.g., single course vs. entire program), as well as institutional administrative and technical support (Hawkes & Coldeway, 2002). Collaborative, project-based online course development is becoming more prevalent, especially for large-scale online programs, because the development process requires a variety of skills that are unlikely to all be present in one individual (Oblinger & Hawkins, 2006). The role of faculty in such efforts is often reduced to that of subject matter expert (Hixon, 2008), which may be incompatible with the tradition of academic culture. However, even with a team approach to online course development, faculty retain the role of course author (Xu & Morris, 2007).

The course designer role is just one of the many "hats" that faculty wear in online education. The 2005 study by Liu et al. examined the faculty perceptions of their key roles in online teaching using a four-dimension framework of pedagogical, managerial, social and technical roles. The respondents particularly emphasized their pedagogical roles: course designer, profession-inspirer, feedback-giver and interaction-facilitator. The course designer role was often seen in the context of "repurposing learning materials from the traditional classroom to online courses" (p. 34), and involved iterative refinement of course structure, material and assignment selection. The designer role is seen as tightly connected with both managerial (organizer and planner) and technical (media designer) roles.

The faculty experience of online teaching process is one of the least explored areas. In one of the earliest studies Coppola et al. (2001) attempted to understand the online instructional process by interviewing faculty members about their pedagogical approaches to teaching in the online format. The qualitative analysis of interviews with twenty faculty members revealed that instructors saw their role changing in online teaching environment. The main theme was a shift towards the Socratic Method of teaching with instructor acting as

a facilitator and mentor, guiding students through learning rather than direct teaching. This is echoed in by Conceicao (2006), who examined perception of online teaching experiences by ten faculty members from different departments of a large university, as well as in more recent study of nursing faculty by Passmore (2009). The substantial shift of teaching role from presentation of information to discussion facilitation is one of the fundamental differences observed between traditional and online pedagogy (Dziuban, Shea & Arbaugh, 2005; Harasim, 2000; Passmore, 2009). Another important difference between traditional and online teaching that is typically reported in literature is a significant increase in the volume and quality of interaction with students (e.g., Conceicao, 2006; Coppola et al., 2001; Dziuban et al., 2005). Finally, as the respondents in qualitative studies (Conceicao, 2006; Coppola et al. 2001) note, online teaching comes with a greater emphasis on the need to plan and structure the course much more tightly than for face-to-face teaching, paying greater attention to organization and storage of information.

The shift from direct instruction to facilitation of learning while particularly prominent in online teaching is not unique to online pedagogy. Rather, teaching online particularly harmonizes with this general trend in pedagogical thought and catalyzes the incorporation of current pedagogical theory into teaching practice.

Theory and Practice of Instruction

The discussion of pedagogy is impossible without a review of the history and the current state of its theoretical underpinnings and practical implementation. This section discusses theories of learning and instruction, as well as instructional design and instructional technologies with emphasis on research relevant to online education.

Theories of learning

The main goal of teaching is to facilitate learning. Formal teaching has a centuries old tradition much of it rooted in explicit or implicit beliefs about how people learn that translate into general approaches to, and specific methods of, instruction. Teaching practice is inseparable from theories of human learning, from the "model of the learner" – a generalized conceptual view of how a person learns (Bruner, 1985). Learning is commonly defined as a change in a person's thinking or ability that persists over time and cannot be ascribed to simple maturation (Bigge & Shermis, 1992; Gagne, 1985; Tarpy, 1997). Theories of learning vary in perspectives on this change with some focusing on learning as an overt behavior and others seeing learning as the acquisition of knowledge, or more broadly, a change in the mental associations in the learner (Ormorod, 1999; Tarpy, 1997).

Theorizing about learning goes back to antiquity. Early theories of learning were philosophical and speculative in nature and tended to focus on learning and the state of mind of an individual. They also differ substantially in their beliefs about the origin of human knowledge and, consequently, the recommendations for pedagogy. For example, the view of knowledge as inborn, rooted in the philosophy of Plato and Socrates, suggests the role of a teacher as somebody who simply helps the learners recognize what is innately in their minds by skillfully directed questioning (known as the Socratic method of teaching) (Biggie & Shermis, 1992; Kneller, 1958; Tarpy, 1997). Conversely, the view of human mind as *tabula rasa* and knowledge being acquired through experiences, based on the teachings of Aristotle and Locke, leads to an understanding of learning as the accumulation of knowledge, the "furnishing" of the mind (Bayles, 1961; Dewey, 1997). Teaching is seen as providing the proper furnishing of the mind by carefully selecting and presenting the content in a well-

structured sequence (Biggie & Shermis, 1992). The early philosophy-based theories of learning continue to influence current teaching practice: contemporary instruction frequently rests on the Aristotelian notion of the experiential nature of learning or uses the Socratic method of teaching regardless of instructor agreement with its philosophical underpinnings.

The developments in psychology and formal education in the 20th century have led to the emergence of several empirically based theories of learning. The classification of these theories varies from author to author, but most draw a clear line between Behaviorism and non-behaviorist learning theories, such as Cognitivism, Social Learning and Constructivism (e.g., Bigge & Shermis, 1992; Halpern, Donaghey, Lamon, & Brewer, 2002; Kop & Hill, 2008; Ormorod, 1999). The main principles of these theories and their influence on pedagogy are summarized in the following paragraphs.

Behaviorist theories of learning originate from animal behavioral research and see human learning as a behavioral response to stimuli presentation that can be trained and conditioned. This is based on Skinnerian operant conditioning in which different stimuli, or reinforcements, are presented in response to a behavior in order to promote or reduce the likelihood of this behavior in the future (Ormorod, 1999; Winch, 1998). The learner is seen as a passive responder to stimuli with the instructor having full control over and responsibility for student learning, which is achieved through the appropriate presentation of stimuli, that is, carefully structuring the instructional content, sequencing and pace (Hoadley, 2007; Palinscar, 1998). The main criticisms of the behaviorist view of learning are that it fails to account for the ways human learning is different from that of lower animals (Piaget, 1970) and for the knowledge acquisition that occurs regardless of consequences (Bruner, 1985). Contemporary thinking about teaching based on strictly behaviorist principles is that

it is suitable only for certain learning scenarios (Ormrod, 1999) and overall more appropriate in training (shorter-term acquisition of specific skills and abilities) than in education, which is concerned with long-term preparation of an individual for life (Winch, 1998).

Just as the developments in behavioral psychology have produced behavioral theories of learning, the developments in cognitive psychology underpin several learning theories characterized by a focus on understanding the process of learning and its meaning to an individual. These learning theories can be collectively labeled as cognitive-interactionist (Bigge & Shermis, 1992). One of the key foundations of these theories is the view of human knowledge as a product of the assimilation of reality into the mind based on the work of Piaget (1970). This assimilation of reality occurs through active processing of information from the environment and organizing it into cognitive structures or schemas. The contemporary understanding of this information processing and organizing rests, in part, on the assumption of dual-store nature of human memory, consisting of potentially limitless long-term memory store and limited capacity working memory that performs both short-term storage and information processing functions (Atkinson & Shiffrin, 1968; Baddeley & Hitch, 1974). The work by Vygotsky that emphasized social interaction as the key factor in human intellectual development and learning forms another important foundation of cognitive-interactionist theories of learning (Fosnot & Perry, 2005; Ormrod, 1999). An influential learning theory concept introduced by Vygotsky is that of the *zone of proximal development* (ZPD), which lies in the difference between actual development (ability to perform a task independently) and potential development – the extent to which an individual can perform a task with interactive help from a teacher or more capable peer (Vygotsky, 1978). The

concept of ZPD underpins several teaching methods from direct tutoring to various forms of building "scaffolding" to facilitate the learning process for students.

The notion of learning as a product of social interaction has been shaped into a formal *Social Learning Theory* (SLT) by Bandura (1976). The main postulates of SLT are that (a) learning is largely vicarious (based on observation); (b) information processing is based on a system of symbols and the human ability to visualize future events; (c) humans possess self-regulatory capacity (ability to control their behaviors). From these main postulates derives the idea that people serve as intentional and unintentional models of behavior. Learning occurs by observing and replicating modeled behavior. Bandura (1976) argued that modeling is the only way to teach complex skills from language acquisition to performing a surgery. These ideas form the foundation for many specific teaching methods (Ormrod, 1999), particularly those based on the notion of interactive peer learning by working in small groups, known as collaborative learning (Slavin, 1995).

Constructivism is arguably the most popular of the contemporary learning theories. It combines sociocultural (based on Vygotsky's work) and cognitive (based on the work of Piaget) perspectives on learning. Constructivism views knowledge as being subjective and constructed from multiple elements and thus "temporary, developmental, socially and culturally mediated" (Brooks & Brooks, 1993, p. vii). The construction of knowledge representations is based the individual's prior experiences, beliefs and existing mental structures as well as collaborative discourse with others (Jonassen, 1991). From constructivist perspective, learning combines the interpretive and reflective individual cognitive process with interaction with socio-cultural environment and its symbols and artifacts (Cobb, 2005; Fosnot & Perry, 2005; von Glaserfeld, 2005).

While there is a conceptual distinction between individual and social learning, the two interact and, over time, strengthen one another (Salmon & Perkins, 1998). Overall, contemporary discourse on learning is shifting from a focus on the formation of the individual's cognitive structures towards a focus on social forms of knowledge and the role of discussion in learning, converging on the unified *social-constructivist* view of learning (Palincsar, 1998). The interaction between the individual and social dimensions of learning is partially mediated by the students' self-regulating capacity that makes them active participants in setting learning goals and managing their own learning (Wolters, 2010). This is particularly true for adult learning, which is characterized by a high level of learner independence and self-direction (Merriam, 1993).

The theoretical discourse about online learning in higher education is largely based on the assumption of a high degree of student self-direction and motivation and tends to "cluster at the collaborative, constructivist and cognitivist end of the spectrum" (Haythronthwaite, Bruce, Anrews, Kazmer, Montagure & Preston, 2007, p.5). Constructivist learning principles and social learning theory based ideas (e.g., interaction as the key to successful learning) form the main theoretical foundations for both design of online instruction and research into online learning (Chen, 2007; Hill, Song & West, 2009) as well as the growing number of published guidelines for online teaching (e.g., Swenson & Taylor, 2012).

Much of online learning can be explained from the perspectives of existing learning theories, but the special role of technology in online education has prompted calls for expansion of existing theoretical models. Technology becomes both the tool of action on the world and the scaffold for such action while introducing new sets of symbols and affordances for knowledge construction (Salomon & Perkins, 1998). One of the theoretical models that

attempt to capture the role of technology is the co-evolutionary model of technology and learning proposed by Andrews and Haythornthwaite (2007). They argue that over time the use of technology changes the ways of learning, but that at the same time pedagogy pushes new uses of technology. Another theory that focuses on the role of computer and information technology in learning is *connectivism* (Siemens, 2004), which expands the socio-constructivist idea of knowledge residing not only with individuals, but with social entities and suggests that, in the digital world, knowledge can reside in non-human entities.

While useful for discussion of the role of technology in online learning, these and other theoretical models do not replace full-fledged learning theory because they cannot account for all the aspects of human learning (Kop & Hill, 2008). As Bruner (1985) observed, a learning theory or model can at best be an approximation of the reality of learning and different models can be useful under different conditions. Of existing theories and models, social constructivism is the most comprehensive theoretical base for understanding human learning whether on- or off-line. Despite its conceptual appeal and dominance in contemporary educational literature, social constructivism is difficult to translate directly into teaching practice. The need for structure in formal education requires approaches that lie somewhere in the middle of the continuum between radical social constructivism and pure behaviorism (Jonassen, 1991). Indeed, the research into online course development and teaching suggests that pragmatic online pedagogy combines socio-constructivist elements with those rooted in the behaviorist teaching tradition (e.g., Bellefeuille, 2006; Puntambekar, 2006). This is consistent with observations that incorporation of social-constructivist view of learning into teaching practice is impossible without radical pedagogical innovation (Palincsar, 1998; Salomon & Perkins, 1998). This

pedagogical innovation may be accelerated in online education through the impact of technology and the new ways of communication, distribution and construction of knowledge it affords.

Theories of instruction

If learning theories are concerned with understanding how learning occurs, theories of instructional design are concerned with how to facilitate the learning process and to achieve desired learning outcomes – the translation of learning theory into pedagogical practice. Instructional Design (ID) is a linking science connecting learning theory and the practice of instruction by prescribing methods for instructional development, implementation and evaluation (Reigeluth, 1983). Each of the ID theories and models offers a concrete set of recommendations for what should be done to achieve desired learning outcomes while describing some "instructional laws and regularities" (Landa, 1983).

Instructional theories are typically based on some learning theoretical foundation and their popularity and use in practice change with changes in the theoretical views of learning. The behaviorist view of learning that dominated instructional theory and practice from the middle of the 20th century through the 1970s (Reigeluth, 1983) has been replaced with instructional theories based on cognitive-constructivist ideas. While the purely behaviorist models to instructional design have fallen into disfavor, behaviorist prescriptions are embedded in much of the instructional design practice (Ertmer & Newby, 1993). The most prominent among the ID theories with behaviorist roots that continue to be very influential in ID practice and training is the *Gagne-Briggs Prescriptive Model of Instruction* (Aronson & Briggs, 1983).

Gagne's work bridges the theory of learning and ID theory. He developed a set of very pragmatic principles of instruction that are primarily based on behaviorist learning theory and informed by contemporary understanding of the structure and functioning of human memory (Bigge & Shermis, 1992; Gagne, 1985; Gagne, Wager, Goals & Keller, 2005). Combined with Briggs' work in developing instructional procedures (e.g., Briggs, 1968, Briggs & Wager, 1981), the Prescriptive Model of Instruction emerges as a broadly applicable framework for designing instructions (Aronson & Briggs, 1983).

The model covers five learning capabilities identified by Gagne (1975, 1985): intellectual skills (use of concepts and rules to solve problems), motor skills, verbal information (ability to state information), cognitive strategy (managing one's thinking and learning process) and attitudes. The main ideas of the model include: sequencing of instruction that is based on a hierarchy of prerequisite skills and the proposal of nine instructional events (strategies) to achieve learning objectives. These events include: (1) providing stimuli to *gain attention*, (2) *informing the learner of objectives* (to motivate and set expectations), (3) *stimulating recall of previously learned material*, (4) *presenting the stimuli materials* (new information) accompanied by (5) *providing learning guidance*, followed by (6) *eliciting performance* to verify retention and (7) *providing feedback to the learner* about performance, (8) *assessing the performance* and, finally, (9) *enhancing retention and transfer* of knowledge and skills (e.g., provide reviews) (Aronson & Briggs, 1983). These ideas about sequencing and structuring instruction can be applied to lesson plans and instructional modules for teacher-led, tutorial and to individual learning (Gagne, 1975) and they form the foundation for much of contemporary instructional design practice (e.g., Gagne et al., 2005).

The view of learning from the information processing and cognitive structure perspective underpins several ID theories that emphasize instructional design based on utilization of the learners' existing mental structures, meaningful organization of information, and teaching cognitive strategies (Ertmer & Newby, 1993). The *Elaboration Theory of Instruction* is one such theory focused on organization of instructional content at the course level by explicating the principles of selecting and sequencing content to optimize achievement of learning goals (Reigeluth, 1983; Reigeluth 1999). Elaboration means continuous presentation of more detailed and complex version of what has been already learned. The theory calls for "specific example to general rule" sequencing for teaching skills or "general rule to specific example" sequencing for teaching domain expertise. Instruction is structured as a sequence of learning episodes that build upon each other by presenting progressively more elaborate concepts/principles/tasks and supporting content. Such structure is often seen in online courses.

Constructivist and social theories of learning in combination with developments in information technologies in the past two decades produced nothing short of a paradigm shift in instructional design theory (Reigeluth, 1999, Reigeluth & Carr-Chellman, 2009). Theorizing about best ways to deliver instructional content has been gradually replaced with theorizing on the best ways to facilitate knowledge construction and teaching problem solving as the most important higher-order skill (Jonassen, 1999). This is exemplified by Jonassen's work on designing *Constructivist Learning Environments (CLEs)* for teaching problem solving and concept development for ill-defined and unstructured domains. The CLE model offers a framework for developing question-, issue-, case-, project- or problem-based instruction that facilitates meaning-making (knowledge construction) by the learners.

This concentric model builds around a problem/project that is to be selected from the practice domain wrapped into a supporting structure of a collection of relevant cases, access to information resources and sets of cognitive tools. The latter include (1) knowledge representation tools, such as databases and modeling tools; (2) performance support tools, such as spreadsheet templates, that off-load repetitive tasks to free the learners to engage in higher order cognitive tasks, and (3) information gathering tools, such as search engines and intelligent information filtering agents, for support of project-related information seeking. Collaborative tools, such as email, discussion boards, and chats, support both co-located and distance work groups. The CLE model offers a unifying theoretical framework for several popular variants of problem/project-based instruction, such as Collaborative Problem Solving (Nelson, 1999) and has been used as a framework for designing online instruction (e.g., Morrison, 2003; Wang, 2009).

In the past decade, instructional theory development has compartmentalized to focus on developing theory and practice based guidelines for specific approaches to instruction (Reigeluth & Carr-Chellum, 2009), such as direct instruction (Kirschner, Sweller & Clark, 2006), discussion-based instruction (Murphy, Wilkinson & Soter, 2011) or problem-based learning (PBL) (Savery & Duffy, 1998). The utility of each approach depends on the instructional scenario, which includes the learning goals, the educational level and several other factors. Just like the theoretical views of learning have largely converged on social constructivism, instructional theory is converging on the set of general principles of instruction summarized by Merrill (2002):

- Learning is facilitated when learners are engaged in solving real-world problems.

- Learning is facilitated when existing knowledge is activated as a foundation for new knowledge.
- Learning is facilitated when new knowledge is demonstrated to the learner.
- Learning is facilitated when new knowledge is applied by the learner
- Learning is facilitated when new knowledge is integrated into the learner's world

These principles offer a pragmatic fusion of elements of behaviorist, cognitive and constructivist instructional theories and can be applied to the design of instruction for different approaches (see Reigeluth & Carr-Chellum, 2009 for details) and for both classroom and online instruction.

Instructional design and technology

Instructional Design as a practical discipline historically precedes the instructional design theories described above, originating in World War II military training (Reiser, 2001b). Instructional design or instructional system design (ISD) was originally developed for narrow and specific skills training, but has been subsequently applied to general educational settings (Gustafson & Branch, 2007). The key principle of this approach is viewing training as a system (Reiser, 2001b), a set of integrated elements, arranged in a sequence, so that the output of one step acts as the input for the next step (Dick, 1996). The instructional design process is similar to engineering or information Systems Analysis and is guided by the generalized ADDIE (Analysis, Design, Development, Implementation and Evaluation) model that represents the fundamental concepts of the ID process (Gustafson & Branch, 2007) and serves as a foundation for training ID professionals (e.g., Gagne et al., 2005; Morrison, Ross & Kemp, 2007). These systematic instructional design approaches are particularly dominant in developing training systems, but increasingly get applied in higher

educational setting with instructional designers playing an active role in developing online courses (e.g., Hixon, 2008; Xu & Morris, 2007).

Given its origins, it is not surprising that ID practice has been historically dominated by behaviorist instructional theories, particularly by Gagne's work, but the past two decades have seen a shift towards a constructivist view of learning and thus instructional design practice (Dick, 1996; Gustafson & Branch, 2007; Reiser, 2001b). This shift to a constructivist approach to ID has been accompanied by a number of other developments that significantly impact ID practice: (1) growth in the availability and use of electronic performance support systems (information bases, expert systems, task automation tools); (2) the rapid prototyping trend as applied to the production of instructional materials; (3) substantial increase in Internet-based learning (Reiser, 2001b).

Historically, the term *instructional technology* has been synonymous with *instructional media*, the "physical means via which instructions are presented to learners" (Reiser, 2007, p. 3), but the combination of rapid technological growth and development in educational sciences in the last decades of the 20th century have led to a broadening of the definition to include a full range of "technological processes and resources" that facilitate learning (Januszewski & Molenda, 2008). Instructional technology is thus an integral part of instructional design (Reiser, 2001a).

The role of technology in instruction, including the influence of media on the effectiveness of instruction and learning has been a subject of education research since the beginning of the 20th century (Clark, 1983). Despite the arguments that learning could be enhanced by use of instructional methods that take advantage of the capabilities of different media (Kozma, 1991), for most of the 20th century instructional technology had minimal

impact on instruction (Reiser, 2001a). Reiser notes that this pattern started to reverse in the mid 1990s due to a combination of factors: (1) rapid advances in digital technology and the emergence of the World Wide Web (WWW); (2) growing availability of these technologies for instructional purposes; (3) the interactive capabilities of new media; and (4) growing popularity of distance education via Internet in higher education. The above trends continued over the past decade with growing maturity of web-based tools, expansion in online course offerings as well as other e-learning options and corresponding expansion of IT infrastructure and its role in higher education accompanied by the emergence of new trends, such as the popularity of social networks (Brown & Green, 2010).

These technological developments have revived interest in social learning theories and the connection between media/technology and learning, coinciding with an increasingly constructivist tone of IDT discourse. From a cognitive-constructivist perspective, educational technology is not a vehicle for instruction delivery, but a collection of tools that support knowledge construction, social aspects of learning and that facilitate reflection (Jonassen, Howland, Marra & Crismond, 2008). The connection between technology and instructional practice, the co-evolution of technology and pedagogy, is particularly salient in the realm of online education.

Online technology and pedagogy

Initially, the discussion of technology in online education was dominated by two themes: use of media for instruction and Course/Learning Management Systems (CMS/LMS). Despite a plethora of guidelines for use of specific media for optimal sequencing and presentation of information (Fahy, 2004; Mayer, 2001, 2003), there is little research evidence of the impact of the use of specific media on learning outcomes (see

Means et al., 2009 for review of relevant studies). The research on CMS/LMS concentrated on adoption of these technologies by instructors and use of specific features in teaching practice, noting a dominance of preference for information delivery tools and functions (Conrad, 2004; Morgan, 2003; Dutton, Cheong & Park, 2004). Of the technologies designed for interactive and collaborative learning, threaded discussion tools were the only ones truly widely used (see Tallent-Runnels, 2006 for review), receiving corresponding research attention.

However, in recent years, evidence of a noticeable paradigm shift in the use of technology for education has emerged. Surveys of educators show growing interest in pedagogy dominated by problem-based learning and collaborative work and a declining role of lecture (information delivery) as an instructional strategy (Kim & Bonk, 2006). This is happening against the background of growing variety and ubiquity of Web 2.0 technologies that support user participation in social interaction, information aggregation and sharing, as well as collaborative knowledge creation and thus "harmonize with modern thinking about education" (Crook et al., 2008, p.4) that puts social constructivist learning as the cornerstone of pedagogical theory (Duffy & Bruns, 2006). The emerging practices of sharing, content production, communication and collaboration through blogs, wikis, social networks and media sharing sites (e.g., YouTube) as well as the abundance of online resources drive pedagogical changes (Conole & Alevizou, 2010).

At present, the discussion of the impact of Web 2.0 on pedagogy is largely theoretical, focusing on affordances of new technologies and their potential for re-defining higher education (e.g., Conole & Alevizou, 2010; Crook et al., 2008; Downes, 2005; Duffy & Bruns, 2006; Parker & Chao, 2007). Nevertheless, there is a growing body of literature

presenting evidence, albeit fragmented, from experimental and case studies of applications of these tools for instructional practice. These include studies of educational uses of wikis (e.g., Konieczny, 2007; Minocha & Thomas, 2007), blogs (e.g., Duffy & Bruns, 2006; Williams & Jacobs, 2004), Twitter (Ebner, Lienhard, Rohs & Meyer, 2010; Rath, 2011) and other technologies (see Crook et al., 2008 for examples).

The affordances of current web technologies for constructivist-social learning are obvious, but the emergence of eLearning 2.0 (Downes, 2005) and the evolution of Pedagogy 2.0 (McLoughlin & Lee, 2007) are still largely theoretical. While virtual teaching environments impose constraints on traditions (classroom lecture) modes (Jaffee, 2003), technology alone cannot create a shift from a knowledge transmission instructional model to a participatory knowledge building one (McLaughlin & Lee, 2007). As Beauchamp and Kennewell (2009) illustrate in their analysis of the use of a particular technology (electronic whiteboard) for instruction, there is a complex interplay between technological affordances and their utilization in teaching practice. While the "disjuncture between Web 2.0 technologies and current educational systems or teaching practices persists" (Conole & Alevizou, 2010, p. 43), there is general agreement in the field of education on the desirability of closure of this gap through changes in pedagogical practice.

This gap closure is impossible without better understanding of the co-evolution of online technology and pedagogy through research. Such research requires integrative and intensive approaches that account for the complexity of eLearning scenarios in a way the traditional methods of educational research cannot (Andrews & Haythornthwaite, 2007. Activity theory, described in the following section, offers one possible answer to the problem of lack of suitable methodologies to address the complexities of online education.

Activity Theory

Introduction to Activity Theory and its concepts

The term *activity theory* refers to the line of theoretical and research work that originated from 1920-1930s Russian/Soviet cultural-historical psychology and was further elaborated on by a number of contemporary scholars (Engestrom & Miettinen, 1999). The theory fits within a broader socio-cultural analysis approach, which is cross-disciplinary in nature and addresses the complexities of real-world problems by explicating "the relationships between human action, on the one hand, and the cultural, institutional and historical contexts in which this functioning occurs on the other" (Wertsch, 1998, p.24). Developed as an alternative and antithesis to Western behaviorism, activity theory has its roots in classical German philosophy, particularly Hegelian dialectics with its emphasis on the historical development of ideas, as well as in Marxist views of society and of consciousness as products of engagement in activities (Jonassen & Rohrer-Murphy, 1999; Wilson, 2008). The main conceptual framework of activity theory was developed by Leont'ev (1978, 1981) based on the ideas of his mentor and colleague Vygotsky. Conducting research to support the idea of a dialectic, mutually influencing relationship between consciousness and activity Leont'ev showed the mediating role of signs, tools and instruments used in activity (Zinchenko, 1995). As a result, Leont'ev formulated a number of principles that form a "coherent, if incomplete, framework comprising the foundations of activity theory" (Kaptelining & Nardi, 2006, p. 52).

There is a fine, but distinct line between cultural-historical psychology as represented by Vygotsky and activity theory as developed by Leont'ev (Kaptelining & Nardi, 2006; Zinchenko, 1995). While both share the idea of the mediated nature of human mental

functioning and interaction with the world, they differ in the main object of study. By expanding Vygotsky's concept of mediating tools from purely psychological tools such as words, signs and symbols, to include concrete tools and objects of human activity as mediators of the development of human consciousness, Leont'ev effectively shifted the focus from the study of consciousness to the study of activity itself (Zinchenko, 1995)

The two key concepts/terms of activity theory are *activity* and *object*. Since both words have multiple meanings in the English language depending on the context and domain of use, a terminological clarification is in order. Without clear understanding of the meaning of these terms in the context of activity theory, misapplication of the concepts or confusion with other common uses of these terms in everyday speech or in domains such as engineering and design is likely (Rogers, 2004). This can be particularly challenging since the foundational activity theory works were written in Russian with explicit reference to German equivalent terms, which presents difficulty in translating into other languages such as English (Kaptelinin, 2005).

Leont'ev uses the term *deyatelnost* rather than *activnost*, both of which are translated into English as "activity". The first means doing something consciously, "in order to transform something" (Kuutti, 1996, p. 41), whereas the latter can mean any active process. Leont'ev (1978) is careful to clarify that activity is not behavior, nor is it a response to a stimulus, but rather a process through which "mutual transfers between the poles subject-object are accomplished" (p.50). He further emphasizes that this productive activity, which is specifically human, is carried on with tools and is social in nature. The tools or instruments mediate activity and the connections between man and the world and with other

people. As such, activity is a system with structure and internal transitions and transformations which cannot be considered in isolation from the social context.

According to Leont'ev, activity cannot be objectless, but is always directed at some object to satisfy a human need. Object in this context refers not to a material object, but is used in a broader sense of the "target or content of thought or action" (Kaptlelinin, 2005, p.6). In his writing, Leonont'ev (1981) stressed that the term was used not in the general sense of a "thing", but in the sense of "something to which the act is directed" (p. 36). Emphasizing the dialectic, mutually-influencing relationship between the subject and the object, Leont'ev (1978) proposes a dual view of the object of activity: (1) something that exists by itself and transforms the subject and (2) product of activity of the subject.

Having clarified the terminology, the basic activity theoretical framework can be depicted as a triangle connecting subject and object through mediating artifacts.

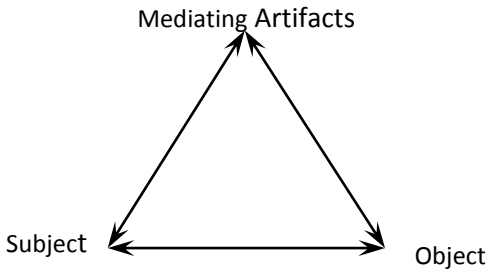

Figure 1. Basic Activity Theory diagram

This simple diagram clearly illustrates the connection between the main concepts of activity theory, which is not a predictive theory, but rather a descriptive framework for the study of human activity. This pictorial representation also emphasizes (by use of bidirectional arrows) the mutual transformation between subject and object in the process of

activity, which is "considered the key source of development of both object and the subject" (Kaptelinin & Nardi, 2006, p. 32). Kaptelinin and Nardi also note that the relationship between subject and object is asymmetrical because, unlike objects, subjects have needs and possess agency, that is "the ability and need to act" (p. 33). The subject's needs form the motives for activity. In fact "activity does not exist without motive" (Leont'ev, 1978, p. 62) and individual activities can be isolated for the purpose of analysis by the criterion of motives that elicit them.

Recognizing the complexity of activity, Leont'ev (1978) proposes the systemic-structured view of activity as comprised of goal-directed actions, which are subordinate to the overall activity and its motive. The actions in turn, consist of operations, which are performed to complete the actions under existing contextual conditions for attaining the concrete goals. Leont'ev illustrates the relationship between components of activity by a simple example of a person travelling from point A to point B. This action (directed by goal of reaching point B) can be motivated by different needs (reasons for wanting to reach point B) and thus be part of different activities. Different methods of reaching point B (operations) may be employed depending on conditions. It is the motive for the overall activity, sometimes unconscious or unclear, that differentiates between similar actions and operations. In the simplest form, the general description of activity and its motive/object answer the question of "why" something is being done, action and goal describe "what" specifically is being done and operations specify "how" something is done under certain conditions. Wilson (2006) offers a clear diagrammatic representation of this hierarchy:

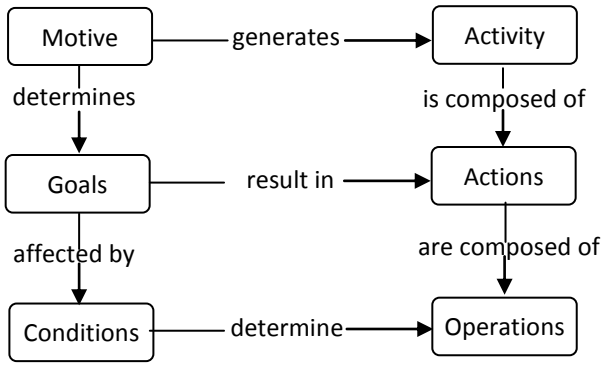

Figure 2. Hierarchy of Activity diagram (based on Wilson, 2006)

This view of the structure of activity is aimed at facilitating analysis of the systemic connections within the activity as a single unit of analysis, not as a means of decomposing it into smaller elements (Leont'ev, 1978). This structural view allows dealing with the dynamic nature of activity and its context, such as conditions changing, while the goal is fixed (Kaptelinin & Nardi, 2006).

The main conceptual principles of activity theory are summarized below (based on Kaptelinin & Nardi, 2006; Leont'ev, 1978 and Wilson, 2008):

- Activity is *object-oriented*, that is directed at a real object and is guided by an objective (motive).
- Activity is *mediated by tools*, which can include both physical tools and mental tools, such as language
- Activity is *hierarchical* in *structure* as described by Leont'ev (1978) and elaborated on above.

- Activity is *developmental*, reflecting the evolutionary nature of human interaction with the world and the importance of the cultural-historical context to understanding of human activity.

Evolution of Activity Theory

Activity theory is not a static set of postulates, but a developing framework in which some concepts get redefined and elaborated on (Kaptelinin, 2005). Engestrom (1999b) suggests that although Vygotsky's work was primarily focused on the consciousness of an individual, his introduction of the basic *subject – mediating artifact – object* model can be seen as the first stage in developing activity theory. This makes Leont'ev's work the second generation of the theory. Leont'ev (1981) regarded the view of an isolated human interacting with the objects in the world as artificial, so without changing Vygotsky's basic model, he expanded the conceptual framework to include collective activity with emphasis on the division of labor as well as the historical evolution of an activity. In the past decades, several expansions of activity theory have been proposed, most notably, the widely adopted Activity System developed by Engestrom (1999a, 1999b), which he considers to be a third generation of activity theory and described in greater detail below.

Engestrom's expansion of activity theory fits within the line of activity theoretical work that is sometimes referred in literature as cultural-historical activity theory or CHAT (e.g., Benson & Whitworth, 2007; Roth & Lee, 2007) and the two terms (activity theory and CHAT) appear to be used interchangeably in literature. Engestrom's model, which he calls the Activity System, is an attempt to express diagrammatically some of the concepts that have been introduced by Leont'ev around Vygotsky's basic mediation model (Engestrom, 1999b). Engestrom (1999a) saw a need for a model that more explicitly represented the

societal and collaborative nature of actions. The resultant diagram expanding the Vygotsky-Leont'ev triangle to include Rules, Community and Division of labor has become the most widely used activity-theoretical model.

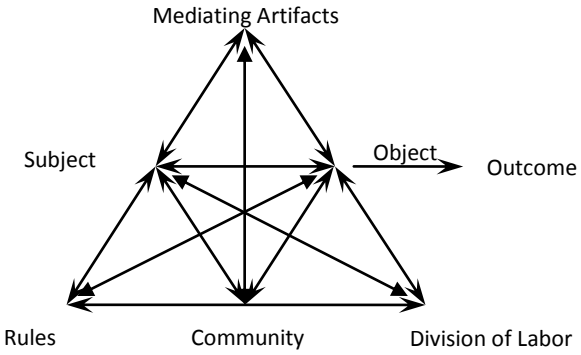

Figure 3. Activity System diagram (Engestrom, 1999a,b)

It is important to note that these concepts, particularly division of labor, have been elaborated upon by Leont'ev (e.g., 1981) in his writings, so Engestrom's expansion of the model is largely graphic rather than conceptual. Wilson (2008) clarifies that the rules can be formal or informal and set limits on activity being undertaken; community can mean immediate organizational unit or the broader society that a subject belongs to, while division of labor refers to task sharing and collaboration in performing the activity.

The more significant contribution of Engestrom (1999b) to the development of activity theory is introduction of the concept of contradictions in activity system, which he developed by going back to the Marxist foundations of activity theory. Four levels of contradictions in activity system are identified:

- *Primary contradictions*, which are tensions within the components of an activity, such as conflicting rules, incompatible instruments or other contradictions within each element of the activity system.
- *Secondary contradictions*, which are tensions between the components of an activity (e.g., stiff division of labor lagging behind possibilities presented by new tools).
- *Tertiary contradictions* develop as tensions rise between the "old" activity and the "new" activity as it evolves over time. These develop when a new, more culturally advanced object or motive is introduced in the dominant activity system, prompting changes.
- *Quaternary contradictions* are the ones that exist between different activity systems. This concept takes into account the existence of a network of "neighbor activates", such as rule-producing or instrument-generating activities, connected to the main activity system under analysis.

In the educational research literature, Engestrom's work is considered second generation activity theory, referring to Leont'ev's work as the first generation (e.g., Roth & Lee, 2007). Kaptelinin (2005) notes differences between Leont'ev and Engestrom versions of activity theory in the definitions of Subject and Object. For Leont'ev, the subject is the individual who carries out the activity, albeit embedded in the social context, while for Engestrom the community collectively carrying out the action is the subject. The object of activity according to Leont'ev is motive or need; whereas Engestrom sees the object as production – what is being transformed into an outcome. These distinctions, while theoretically important, get blurred in the practical applications of activity theory as will be

illustrated in the following sections of this review showing applications of Engestrom's activity system for both individual and collective subjects.

Applications of Activity Theory

Activity Theory is not a theory in the classical sense, but rather a descriptive tool for "interpretation of the individual, other people, and artifacts in everyday activity" (Nardi, 1996, p.8), a set of concepts for describing activity. As such, it offers a useful framework for any inquiry into practice and has been used in a number of fields of study such as ergonomics, educational psychology, computer-supported collaborative work (CSCW), computer-mediated learning, and human-computer interaction (HCI) (Wilson, 2008). Activity theory has been applied in different ways. In the most basic application, select activity theory concepts are included among the theoretical foundations in designing research, such as the study by Xu (2007) into interactive information retrieval or the recently published study of technology adoption by Sun (2012). The full set of activity theoretical concepts have been utilized in system development research (e.g., Collins, Shukla & Remiles, 2002; Kaptelinin, Nardi & Macaulay, 1999), including the design of instructional systems (e.g., Collis & Margaryan, 2004), although system-centered research tends to give primacy to tool mediation and related concepts. Finally, activity theory in the form of Engestrom's Activity System has been used as an integrative framework for the analysis of complex problem settings, such as Spasser's (2002) analysis of technology mediated practices in digital libraries, or a study of information sharing and trust in handling accidents on oil rigs (Ibrahim & Allen, 2012), as well as in a number of studies in educational context reviewed in greater detail below.

Considering the significance of Vygotsky's work in both educational psychology and as a theoretical antecedent of Activity Theory as well as the fact that Engestrom's Activity System has derived from his work in school education and workplace learning, it is not surprising that Activity Theory, particularly Activity System has become an increasingly popular framework for analysis of problems in educational settings. Many of these studies are framed as analyses of contradictions in the activity system or between systems. For example, Scanlon and Issroff (2005) use contradictions and tensions, particularly in the areas of rules and division of labor as explanations for observable behavior when analyzing several case studies evaluating the use of technology in higher education. Focusing on the view of learning (professional development) as a movement to a more culturally advanced activity through resolution of contradictions within the activity system, Forbes, Madeira, and Slotta (2010) present two studies of teachers' development of curriculum design capacity and pedagogical content knowledge. Examination of contradictions between connected activity systems can be a powerful analytical tool as demonstrated by Meyers (2007) in the study of school libraries that examines tensions between library activity systems and teacher activity systems. The study identified a number of contradictions between the two, such as lack of a common object ("student finding information" in the library system vs. "student using information" in the teacher system) that resulted in problems in the practice setting. The study findings were used to develop interventions to resolve contradictions and to create commonality of goals between the systems.

Another popular activity theoretical approach has been a comparative analysis of several activity systems. More often, these tend to place emphasis on the differences between the systems in the elements at the bottom of the activity system triangle (rules,

community and division of labor). Grossman and colleagues (1999) were able to demonstrate how the differences on those dimensions between the pre-service (coursework at a university) and in-service (student-teaching in a school) activity settings shape future teachers' appropriation of pedagogical tools. The practical implication of the study is in laying foundation for interventions on the setting level. A similar approach was used in a study by Baran and Cagiltay (2010), who compared two virtual communities of practice that different sets of pre-service teachers participated in. Both systems had an object of knowledge creation and sharing, but different community composition, division of labor and rules. Activity-theoretical analysis of these differences enabled the authors to draw conclusions about the relative effectiveness of each system in achieving the objective of activity.

Tool mediation as a central concept in activity theory makes activity theory a particularly suitable framework for research related to online education. For example, Berge and Fjuk (2006) analyzed the online meetings in web-based course using activity theory as a framework for distinguishing the roles of tools and rules in student activity and understanding factors of activity engagement. Focusing on mediating role of tools, Lloyd and Irvine (2005) used activity system model in analysis of the use of online teaching and learning environments by university faculty. The study used a broad concept of tools to include teaching tools, such as course management system (CMS) components, operational tools, such as training and support services, as well as intangible tools, such as pedagogical skills. A combination of analysis of contradictions and mediating role of technology has been applied as well, for example, by Benson and Whitworth (2007) who engaged in a broad comparison of CMS use in Higher Education between UK and USA. The approach enabled

the researchers to address questions such as how to describe the transformations that take place in educational workplace as a result of the dynamic relationships between technology and the stakeholders in an educational system.

In summary, activity theory offers a set of concepts, principles and vocabulary for the analysis of human activities accounting for contextual factors. It is a well-structured, yet flexible framework that can be applied to answering a wide range of practice-related questions, and that balances individual, socio-cultural and technological perspectives. Its applicability in education related research is strengthened by shared theoretical roots with currently prevailing theories of learning and instruction. Activity theory is particularly well suited as an analytical framework for the complexities of online education. The concept of mediating artifacts makes the theory a very good fit for for addressing the changes in people and activities as a result of interaction with technology, while the activity system structure enables integrated analysis of the context in which the activity is embedded.

CHAPTER 3

METHODS

Study Design

Overall research approach and scope of the study

The role of online teaching in pedagogical innovation that the study investigated is a complex and novel subject, suggesting use of an exploratory approach to research design with the goal to better understand this phenomenon. The main aims of an exploratory study are the discovery and analytical description of patterns within and around the phenomenon of interest. This calls for a structured, yet flexible research design with strong qualitative and interpretive analysis (Lincoln & Guba, 1985; Robson, 2002). Consistent with the tradition of education-related research, including eLearning, such analysis should recognize the role of context and account for contextual factors in the problem being studied (Hoadley, 2007).

As the preceding review of literature demonstrates, Activity Theory offers a solid theoretical foundation for studying a complex activity like online teaching, and Activity System in particular offers a well structured analytical framework for such research with its attention to the context of activity. It is thus appropriate that Activity System was used as the basis for the study design and as a framework for addressing the research questions. The study defined "teaching a course" as the activity analyzed and the technologies, resources and pedagogies that comprise the online teaching experience as mediating artifacts/tools.

This inclusive interpretation of mediating tools is consistent with the basic tenets of activity theory (Kaptelinin & Nardi, 2006; Leont'ev, 1978) and has been used by other researchers, who include both tangible (technology) and intangible (pedagogy, instructional theory) tools in their analyses (Benson & Whitworth, 2007; Collis & Margarian, 2004; Lloyd & Irvine, 2005). All elements of the activity system for the purpose of the proposed study can be represented by the following diagram:

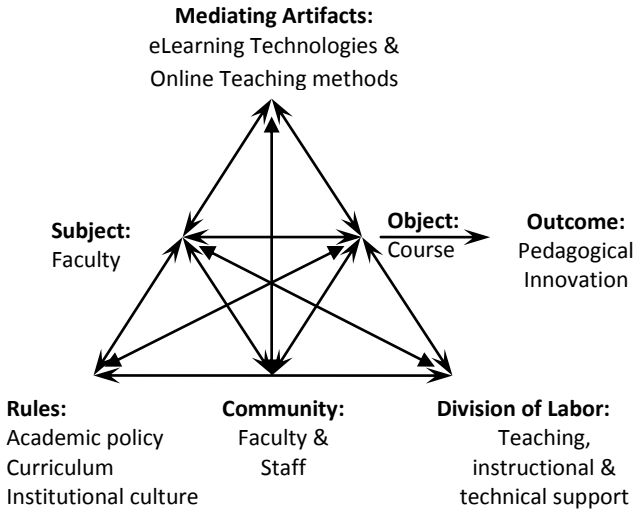

Figure 4. Application of Activity System diagram for the present study

Using activity theory as the study framework calls for a flexible multi-method research design and qualitative data analysis (Jonassen, 1999; Nardi, 1996). In terms of the general approach to research design, activity theory based studies are typically case studies: "empirical investigations of a particular contemporary phenomenon within its real life context using multiple sources of evidence" (Robson, 2002, p. 178). A "case" in a case study can be an individual person or other entity, such as a group of people, an organization, a period of time and so forth (de Vaus, 2002; Robson, 2002). For the purpose of the present investigation, the boundary of an individual case was defined by a faculty member teaching a

particular course. Additionally, in order to address the contextual factors, groups of cases from the same context (academic institution) were examined together.

The study focused on cases selected from teaching in the field of Library and Information Science (LIS) in the United States. Given that the majority of LIS programs in the US offer either select courses or entire degrees in online format (Marek, 2009) this area of higher education provided a good pool of cases of interest. Moreover, the interdisciplinary nature of LIS as a field (Saracevic, 1999) translates into significant variety in courses taught and thus the study findings might be transferrable to a wider range of higher educational scenarios.

Overview of the study design

The study consisted of two parts: a survey and a series of case studies. Such a two-phase study design is not uncommon (Robson, 2002) with the survey phase serving to establish some correlational patterns and provide a base for the selection of cases that display significant characteristics of the phenomena of interest (Miller & Salkind, 2002). The goal for Part 1 of the study was to capture the overall picture of involvement in online teaching by the study population and, more importantly, to provide the basis for selection of cases for detailed investigation. Part 2 of the study aimed to address the main research questions through Activity System framed case studies and additional qualitative analyses as outlined in the following sections.

The overall study design allowed room for the flexibility necessary and appropriate for exploratory nature of this research inquiry (Lincoln & Guba, 1985; Robson, 2002). It was anticipated at the start of the study that some adjustments to the plan might have to be made as the study unfolded, based on the reality of available data and the interactions with

research subjects. Any such adjustments were kept consistent with the general research plan and were guided by the desire to address the research questions in the best way possible, maximizing the use of available data.

Part 1 – Survey of LIS Faculty

Participants

Participants for the first phase of the study were solicited from the population of full-time faculty members of American Library Association (ALA)-accredited schools within the United States offering online courses/programs. The LIS schools/programs that offer any online education options (a total of 44) were identified from the most recent ALA-published directory of accredited programs (American Library Association, 2011). The full-time faculty members of these programs were identified from the program web sites. Faculty members listed on the institutional web sites as "full-time faculty" or "core faculty" were included in the list, for a total of 750 people. The email addresses published on institutional web sites were used to invite these individuals to participate in the study.

Data collection

The main tool of data collection for this phase of the study was a brief electronic questionnaire (see Appendix A). This mode of survey administration combines respondents' convenience with the advantages of electronic surveys such as built-in skip patterns and quality control (Tourangeu, 2004). The questionnaire was designed (in terms of question order and skip/exit patterns) with the primary goal of identifying cases for Part 2 of the study and with the secondary goal of capturing some general patterns of engagement in online teaching by members of the study population. Each of the 750 prospective study participants

was sent an individual email invitation to participate in the study with an embedded link to the questionnaire. To maximize the response rate, the survey invitation emails were timed to arrive at recipients' mailboxes in mid to late morning mid-week during the academic session for most of the programs[3]. The questionnaire was left open for five weeks, with no new responses in the last 10 days the survey was open. No additional reminder emails were sent.

Data analysis

The quantitative data from the 315 questionnaires received was exported into Excel for further analysis. Of those, 20 questionnaires were incomplete and were excluded from further analysis, leaving 295 completed questionnaires. As this was exploratory research, the quantitative data from questionnaires was analyzed primarily by means of descriptive statistics, which are reported in Chapter 4.

The questionnaire data was further analyzed for the purpose of drawing the sample of cases for Part 2 of the study. The questionnaire was designed to identify a sub-population with pedagogical experience relevant to the main research questions: those individuals who have combined experience in transitioning a course from face-to-face to online teaching and who continue to teach in both formats. The final question on the questionnaire asked individuals if they would be willing to be contacted for a follow-up interview. The 58 individuals who answered affirmatively comprised the pool of potential cases for Part 2 of the study.

[3] Email invitations were sent on April 10, 2012, a Tuesday, falling about a month from the end of semester for schools running on semester schedule.

Part 2 – Case Studies

Participants

The 58 relevant cases that emerged from the survey data were sorted by the institutional affiliation of respondents to identify groups of cases from the same institution. The study aimed to account for contextual/institutional factors, and so analysis of several cases from the same institutional context was deemed necessary in order to identify any institution-specific patterns. There were 11 such groups of 3-4 respondents from the same institution for a total of 36 candidates for case studies.[4] One institutional group was excluded from the study due to the investigator's significant prior acquaintance with two of the three respondents, which could interfere with conducting interviews with these individuals in the same manner as with the rest of study participants and might create inconsistencies in data collection. Faculty members from the remaining 10 institutions were included in the recruitment effort.

Recruitment

The study recruitment aim was to have sets of at least three complete case studies from about five institutions. The prospective cases that emerged from the survey data included three institutional groups of four respondents and seven groups of three respondents. Assuming that not all prospective case-study participants would be available for the interviews, and that it might prove impossible to recruit all the members of each institutional group, making that group less valuable for the study analysis, recruitment emails were sent to all 33 potential case study participants.[5]

[4] The rest of the potential cases were from institutions with one (12 in total) or two (10 in total) respondents per institution.

[5] Case study recruitment was conducted in the new academic year, starting in August of 2012

Recruitment continued over a period of two months concurrently with data collection. In case of non-response to the initial recruitment email, a second message was sent. Timing of the latter was adjusted for the academic schedules of the prospective subjects' institutions (e.g., if non-response to the first recruitment email fell outside the academic term, the second message was sent about a week after the start of the academic session). In cases where at least two individuals from the same institution had responded with agreement to participate, additional effort was made to recruit the third/fourth participant by calling that faculty member's work phone number (obtained from the institutional web site) and leaving a voice mail with a last request for participation[6].

Data collection

Activity theory based case-studies typically mix several methods of data collection, most commonly, interviews, observations and documentary analysis (e.g., Forbes et al., 2010; Meyers, 2007; Spasser 2002). Although observations are possible in online education environment by monitoring online interactions and following the class discussion, the observations are more commonly employed in the analysis of physical settings. This study relied on combination of interviews and analysis of course syllabi for the purpose of methodological triangulation (Robson, 2002; Wildemuth 2009).

Interviews

The study used a semi-structured interview (see Appendix B for the interview schedule) as the main data collection instrument. This form of interview (often referred to in the literature as "qualitative") is most appropriate given the exploratory nature of the study (Lincoln & Guba, 1985) and it offers a good balance between flexibility and structure (Zhang

[6] Calls were timed to non-work hours in respect of subjects' right to refuse to participate in the study

& Wildemuth, 2009). Qualitative interview tradition calls for face-to-face interaction (Johnson, 2002), but this form of interview administration was not feasible due to the geographic dispersion of study participants. The telephone interview was chosen as the format that offers best support for interactive conversation between the researcher and the study participants, similar to that of face-to-face interaction, while also allowing for less obtrusive recording (Shuy, 2002). [7] The interviews were conducted by telephone via a landline and recorded using an Olympus VN-702PC Digital Recorder and a Radio Shack Multi-Phone Recording Control.

Of the 33 potential interviewees, eight did not respond to the interview invitations. A total of 25 interviews were conducted with subjects from 10 institutions over a period of six weeks. Each interview lasted from 21 to 66 minutes for an average of 42 minutes.

Course Syllabi

All interviewees were also asked to provide (via email) copies of course syllabi and assignment descriptions if not included in the syllabi for the courses discussed. For each case, this included a request for different syllabi versions, particularly the one prior to online course transition, the first online version, and the most recent face-to-face and/or online versions. The purpose of collecting these documents was two-fold: (1) methodological triangulation (Wildemuth, 2009) and (2) effectively extending the time frame that the study data covers. A relatively long research timeframe is one of the key methodological assumptions of activity theory (Jonassen, 1999, Nardi, 1996) with some studies extending over several years (e.g. Forbes et al., 2010). The pragmatic time constraints of carrying out

[7] While there has been growth in non-traditional modes of interviewing, particularly around issues related to distance education (Tierney & Dilley, 2002), including interviews conducted via instant messaging and email (Kazmer & Xie, 2008; Meho, 2006), the study used the more conservative telephone mode as guaranteed to be familiar and comfortable to all subjects.

the present study precluded such extended timeframe. Use of syllabi documenting course evolution over several semesters partially mitigated this constraint by offering a stable source of information reflecting the state of things in the past (Lincoln & Guba, 1985), which was complementary to the subjects' recollections shared in the interviews.

Syllabi were collected from 19 of the 25 subjects interviewed. One of the subjects interviewed refused to provide the syllabi citing intellectual property concerns, and the other four had no access to older versions and/or stated that there were no differences in syllabi versions.

Data analysis

Case selection

The goal of the study was to examine cases of a course teaching activity by the same instructor with transition to online teaching and continuing face-to-face teaching in order to address the changes to the course in the transition, as well as pedagogical impact of such a transition on face-to-face teaching. Additionally, in order to evaluate the contextual factors influencing this activity, the study aimed to examine cases in groups from the same institution. In the process of data collection it became clear that not all of the potential cases would be a reasonable fit for the study goals and research design, necessitating further refinement of case selection.

The structure of the Part 1 questionnaire was intended to ensure that all respondents selected for case studies would share certain common characteristics: (a) experience in the past two academic years in converting a course they have previously taught face-to-face to an online format, and (b) teaching or planning to teach the same course in face-to-face format (in parallel or interchangeably with online version). However, interviews revealed some

discrepancies between the questionnaire answers and the actual experiences of respondents. The examples of discrepancies include cases where (a) conversion to online format was not recent, but happened five or more years ago; (b) the converted course had been previously taught by a different instructor; (c) conversion occurred at a different institution than the interviewee's present context; (d) there is no plan to continue to teach the course face-to-face following online conversion; (e) the instructor is no longer a full-time faculty member at the institution (e.g., retired or moved to another institution).

The goal of having sets of cases in groups of three or more was another criteria for case selection. Only 13 cases of 25 were in groups of three or more. The other 12 cases were in groups of two individuals from the same institution. Applying individual case characteristics and group size criteria together, 16 cases were selected for detailed analysis. The table below summarizes the cases by institution and reasons for exclusion from the detailed case analysis.

Table 1. Inclusion/exclusion of cases by institution

Institution	Subjects Interviewed	Included in Case studies	Reasons for Exclusion
Institution 1	2	2	
Institution 2	3	3	
Institution 3	4	3	One case excluded: subject has left the institution and unable to provide syllabi
Institution 4	2	no	Incomplete data for one of two cases (no syllabi)
Institution 5	3	3	
Institution 6	2	no	One of the cases: new to the institution and no plans to teach face-to-face
Institution 7	2	2	
Institution 8	2	no	One case: subject retired; Other case: subject refused to provide syllabi
Institution 9	3	3	
Institution 10	2	no	One of the cases: new to institution, conversion to online occurred in previous institution
Totals	25	16	

Individual case analysis

The interviews for 16 cases selected for detailed analysis were fully transcribed. The printouts of the transcripts were used in analysis along with the printouts of corresponding course syllabi. The analysis followed the logical structure of the activity theoretical framework, its vocabulary and diagrammatic representation.

The transcripts were annotated and coded in several passes over the same printout to ensure completeness of coding. This included coding for Activity System analysis as well as annotating any statements on the influence of course format on pedagogy and subjects' general reflections and attitudes relevant to the study themes.

The coding scheme was based on the Activity System elements: *Subject, Object, Mediating Artifacts, Rules, Community and Division of Labor*. References to self and to the course taught were coded as *Subject* and *Object* respectively. All references to technology used in preparing or teaching the course as well as teaching methods were coded as *Artifacts*. References to institutional policy and culture were coded as *Rules*, while any mention of peers or support staff and their roles in course preparation and teaching were coded as *Community* and *Division of Labor* respectively. Arrows were used to code statements reflecting interactions between the elements. For example, a statement like "we have a course management system and we are obviously expected to use that" would be coded as *Rules* <--> *Artifact*. Two additional codes *Tension* and *Resolution* were used to notate statements reflecting tensions or conflicts within the Activity System and/or indicating how the tension was resolved. For example, a statement like *"all they could do in Panopto was show them my head for two hours… and I didn't just want to have a talking head"* would be coded as *Subject* <--> *Artifact* with *Tension* label, whereas a related reference to technology

selected by the subject instead ("it is just an mp3 file, it is very low tech, but it works") would be coded as *Resolution*. Finally, statements about the influence of online teaching on face-to-face teaching, or on pedagogical beliefs and attitudes were coded as *Outcomes*.

For each of the cases, the course syllabi provided by the subjects were arranged in chronological order and reviewed line-by-line to compare different versions. The changes in syllabi, if present, were notated and cross-referenced with interview content.[8] In cases of no differences, the absence of differences in syllabi and assignments was documented.

Activity System diagrams were constructed for each of the cases based on the interview and syllabi data, similar to the approach used in the study by Russell and Schneiderheinze (2005). The items coded in the previous step were mapped manually onto the printouts of blank Activity System diagrams. For every connection or interaction between the elements coded, an arrow was drawn with a brief verbal annotation explaining the connection. Jagged lines were used to denote tension (conflict) interactions. Key outcomes (influences on subsequent face-to-face teaching and/or on teaching other classes) were also marked on the diagram. An example of one such case diagram is presented in Figure 5 below.

Following Activity System diagram construction, short descriptions were written for each of the cases. These descriptions consisted of two parts: a narrative summary of the case highlighting its most salient characteristics, and an Activity Theory summary which expressed the gist of the case in activity theoretical terms (see Appendix C for an example of case description).

[8] Minor changes, such as updated readings, which are part of typical term-by-term course revision were ignored.

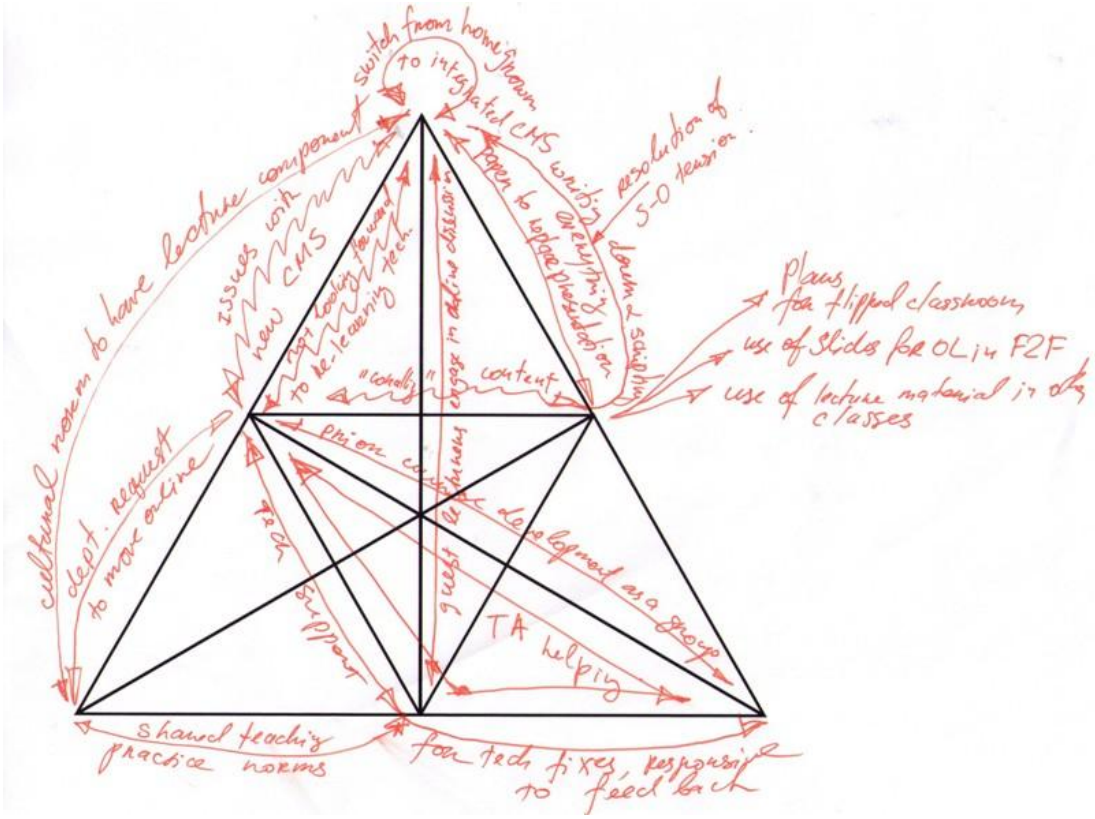

Figure 5. Activity System diagram for one of the cases[9]

"Meta-case" analysis

After individual analyses for cases from each of the six institutions were completed, the cases were analyzed together, as a group. This was accomplished by comparing the diagrams and case descriptions for the set of individual cases. Placed side-by-side, diagrams for a set of cases from the same institution revealed similar patterns of interactions between the system elements, including similarities in tensions and paths for resolution. Figure 6 below shows one such set of case diagrams.

[9] The diagram is included here to illustrate a tool/step of analysis process, not as a "final product" intended for presentation.

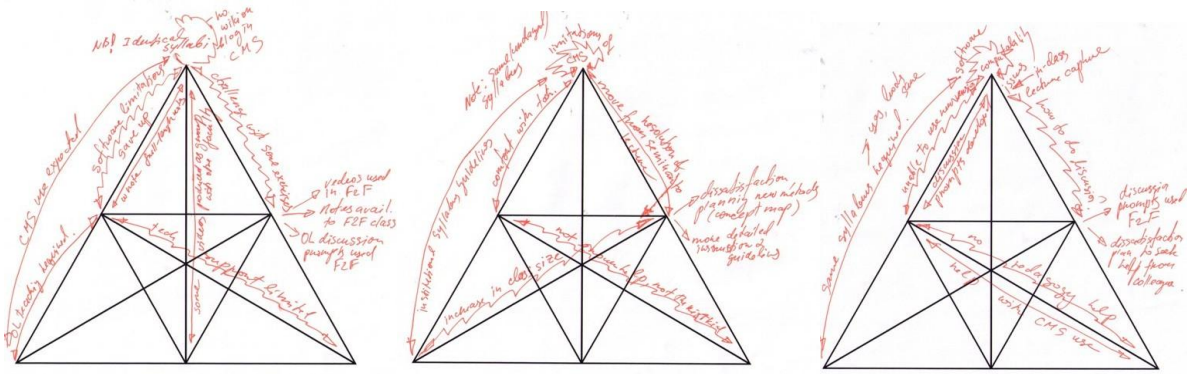

Figure 6. Set of Activity System diagrams from one institution

The descriptions of the case sets were reviewed and compared in conjunction with the diagram comparison, confirming the presence of similar themes and the salience of the same Activity System elements. Based on these observations, summary notes for each of the six institutions were written, with emphasis on the common characteristics of cases from the institution (see Appendix D for an example of institutional notes). This analysis also served as an additional tool of data triangulation by comparing the information provided by different individuals about the same contextual factors.

Hierarchy of activity analysis

In a separate analysis, related to above, each case was examined in terms of the hierarchy of activity. As explicated in Chapter 2, the Activity Theory framework includes the notion of an activity (teaching a course, in the present study) being comprised of discrete *actions* – components of the activity that answer the question "what is/has been done". Those actions are carried out differently under different circumstances. These circumstance-specific answers to the question "how something is/has been done" are called *operations*.

For the purpose of this study, actions were defined as common elements of teaching a course such as lecturing, guiding discussion, providing learning activities or exercises, giving demonstrations, administering tests and graded assignments. The focus was on the changes

in actions and operations as part of the evolution of the system from the "old" to the "new" state (Engestrom, 1999b). All references in interview transcripts and syllabi to such changes were marked.[10] These notations were converted to codes that designated the change as either "A" (action-level) or "O" (operation level). For example, if lecture was present in both online and face-to-face teaching of the course with the only difference being in-person lecturing vs. posting pre-recorded full-length lecture, the change was coded as operation-level. Conversely, if the action was changed between course formats in a substantive way, such as lecture being replaced with guided discussion or a new type of assignment created in place of a previously given assignment, these changes were coded as action-level.

The codes with corresponding brief explanatory annotations for all cases were combined into a single spreadsheet for comparison and pattern definition. These were cross-referenced with case analysis diagrams/descriptions to ensure data consistency. Finally, each case was coded for the absence or presence of any innovation in the face-to-face teaching of the course based on the outcomes documented in the previous steps of individual case analysis. This was done with the aim to identify any relationships between changes in the activity (operation-level, action-level or both) and pedagogical innovation.

Card sort

In the process of activity-theory based data analysis, it became clear that a different type of analysis would need to be performed in order to address research question #3 (faculty perception of pedagogical fit of face face-to-face vs. online format for different aspects of teaching a course). Since the question has to do with opinions and attitudes, a grounded theory based approach to examining interview data in search for common themes and

[10] This coding activity was done in a separate pass through the data, using the printouts used in previous stages of analysis.

patterns of statements seemed most appropriate. This was accomplished through a card sort analysis carried out as follows.

The interview transcripts were reviewed in several additional passes, marking statements containing comparative reflections on face-to-face and online teaching, attitudes towards online and hybrid instructions as well as visions of preferred teaching format combinations. These selected quotes were extracted from the transcripts and printed out on individual pieces of paper. Each quote was printed with a numeric code referencing the source to facilitate cross-referencing results of this analysis with case study findings.

To maximize the use of available data and to ensure the most comprehensive analysis possible, the data from interviews excluded from case studies was included in this analysis. The recordings of remaining interviews were partially transcribed using combination of summary note taking (for portions not directly relevant to card sort analysis) and verbatim transcription of all the statements that were used in the analysis.[11] The quotes from nine additional interviews were printed on individual pieces of paper, each containing references to the source interview.

This resulted in a combined set of about 220 quotes from 25 subject interviews that were subjected to iterative card sort following the procedures outlined in Lincoln and Guba (1986). Similar statements were grouped together and groups of statements were organized in clusters of thematically related groups following the constant comparison principle. The sorting was done in several iterations over a period of three days. The quote groups were physically arranged by thematic proximity (based on the investigator's judgment), forming a map of themes and concepts. Each group was given a label that reflected its main theme. A

[11] Quote selection/verbatim transcription was done in two passes through each interview recording to guard against missing relevant statements.

number of quotes that contained statements bridging two of the themes emerged in the sorting activity. Those were placed on the physical map and labeled accordingly. The photograph, capturing the final stage of the card sort "map" is included in Appendix E.

While the principal goal of the card-sort analysis of subjects' quotes was to address research question #3, this analysis was also helpful in addressing some of the aspects of research question #2 (dealing with online technologies and methods incorporated into face-to-face teaching).

Respondent validation

To ensure accuracy and credibility of reported findings, a respondent validation, also known as member checking (Lincoln & Guba, 1985) was performed during all interviews and in the process of data analysis. During each interview, the investigator periodically re-stated in summary form what participant has communicated to confirm the accuracy of understanding and non-distortion of respondent-intended meaning. Additionally, investigator-written case summaries, particularly those included in the dissertation document, as well as those from which a significant number of quotes have been used, have been shared with the respondents via email for validation and feedback. In two cases, where the respondent offered slight corrections and clarifications, the presentation of findings has been edited accordingly.

CHAPTER 4

RESULTS FROM PART 1 SURVEY

As was discussed in previous chapter, the survey portion of the study served two purposes: identification of general patterns of online education engagement and sample selection for case studies. This short chapter presents results related to the former.

The survey response rate was relatively high – 42 percent (315 out of 750), which can be taken as an indication of substantial interest among LIS faculty in the study topic. Eighteen additional faculty (of the 750 invited to participate) have responded directly to the investigator with explanations for why they would not take part in the survey. The most common explanations were "I am retired" and "I am an adjunct instructor", suggesting that the institutional web site information was out of date. There were also a few cases of faculty with non-teaching appointments, those with joint appointments and not teaching any LIS courses and, finally faculty who stated they did not teach online and thus did not feel qualified for the study.

The results reported in this chapter are based on the responses from the 295 individuals. The numeric data is presented in Table 2 below. The "OL category" column entries correspond to the ALA directory descriptions of: "100% online program available" (100%), "primarily online with some face-to-face courses required" (Mostly OL) and "primarily face-to-face with select online courses offered" (Some OL).

Table 2. Partial survey data – prevalence of online teaching

InstID	OL category	Total faculty	Responded	Have OL exp.	Recent conversion	Teaching in both formats
1	Some OL	9	2	0		
2	100%	9	6	6	5	3
3	100%	31	9	9	3	2
4	100%	16	7	7	5	2
5	Some OL	8	1	1	1	1
6	Some OL	16	7	5	5	4
7	100%	44	11	10	6	5
8	Mostly OL	14	6	6	1	1
9	Some OL	26	11	1	1	1
10	Some OL	8	5	5	5	
11	Some OL	9	3	3	1	1
12	Mostly OL	28	11	8	7	5
13	Some OL	16	5	0		
14	Some OL	10	9	7	7	3
15	Some OL	23	9	9	8	2
16	Some OL	15	6	5	5	2
17	100%	9	5	5	4	4
18	Some OL	4	2	2	1	
19	100%	17	8	7	5	3
20	Mostly OL	9	7	7	3	2
21	100%	8	4	4	4	4
22	Mostly OL	12	6	6	3	1
23	Mostly OL	24	8	5	4	3
24	Some OL	13	3	1	1	
25	100%	24	9	8	5	3
26	Mostly OL	20	10	3	3	1
27	100%	14	7	7	2	
28	100%	17	6	5	3	1
29	100%	9	1	1	1	
30	Mostly OL	10	3	1	1	
31	100%	47	14	14	6	5
32	100%	15	7	7		
33	100%	13	8	8	6	2
34	100%	24	8	2	2	1
35	Some OL	11	6	6	5	4
36	Mostly OL	22	11	11	6	3
37	Mostly OL	16	8	8	2	
38	100%	6	4	4	1	
39	100%	12	4	4	2	1

40	100%	39	15	13	10	7
41	100%	35	13	12	5	5
42	Mostly OL	7	3	3	1	
43	100%	17	3	3	2	1
44	Mostly OL	14	4	2	1	1
		750	**295**	**241**	**149**	**84**

The 295 faculty who completed the survey comprise just under 40 percent of the total study population and represent all of the 44 institutions included in the study. The number of respondents from each institution varied from one to fifteen individuals, which represents anywhere from 13 to 90 percent (Mean=42%, Median=41%) of the full-time faculty of each institution. More than 80 percent of the respondents (n=241), representing 42 of 44 institutions studied, reported having online teaching experience. This is not surprising – the text of the invitation to participate in the study directly referenced online pedagogical practice, so it is reasonable to assume that those with online teaching experience were more likely to choose to complete the survey than those without such experience. More importantly, the 241 faculty with online teaching experience at their current institution represent about a third of the total study population and also at least a third of the total faculty for most institutions (26 of 44). These results can be taken as indicators of the overall prevalence of online instruction in the LIS.

Moreover, the 149 respondents, who indicated that they have recent experience in converting courses from face-to-face to online modality, represent 41 of the 44 institutions. A reasonable interpretation of this finding is that there is an active, ongoing effort across the field to provide more online education opportunities for students. This interpretation is further strengthened by the following observation from the survey data: some of the highest percentages of the faculty with recent experience of transitioning courses online are from the

institutions that are listed in the ALA directory as having mostly face-to-face programs with only select courses available online (InstIDs 10, 14, 35) This suggests that some of the programs with limited online offerings are the sites of the most active growth in online teaching. Only 84 of the 149 survey participants who have recently transitioned one or more courses to online format have indicated that they continue or plan to continue to teach the same course face-to-face, meaning that the format change for the course was permanent.

The course topic/title information was collected only for the courses that faculty plan to teach in both online and face-to-face format. This sub-set of study data includes titles of over 200 courses taught by the 84 subjects (many of the subjects reported recent conversions of more than one course). These represent the entire breadth of the LIS curricula including both core courses and electives. Table 3 below lists the main course categories with a few illustrative examples of most common or representative courses for each. The categories are primarily based on the 2006 paper by Chu, who conducted content analysis of LIS curricula of ALA-accredited programs in the US – same as the present study.

Table 3. Variety of LIS courses taught online

Curricular Area	Example Courses	Courses used in case studies
Archives & Preservation	Archives and Special Collections Arrangement and Description Records management	Libr. & Archival Technology (Digital Libraries) Records Management
Information Ethics and Policy	Ethics and Information Information Policy	Seminar in Intellectual Freedom
Information Technology	Information & Communication Tech. Internet Fundamentals and Design Systems Analysis	Cybersecurity GIS
History-related	History of Libraries History of Books and Libraries	History of Books & Libraries
Libraries/Librarianship	Special Libraries Health Science Libraries School Library Media Center	
Management	Library Management Public Library Finance	Academic Library management
Organization of information	Indexing and Abstracting Cataloging and Classification Organization of Information	Organization of Information Information Organization

Resources & Services	Online Searching Information Storage & Retrieval Reference & Information Services	Readers & Reader Advisory Information Services
Resources & Services for Special Subject Areas	Government Information Sources Resources for Humanities Business Information Sources	Business Resources Health Information & Services
Resources and Services for Specific Groups	Resources and Services for Children Young Adult Literature Youth information services	Youth Services Community Engagement
Research in LIS	Research Methods Introduction to Research	Research Methods
School Library Media Centers	Administration of SLMC Learning Media and Curriculum	
Technical Services	Collection Development Selection & Acquisition of Materials	Collection Development

Additional course topics/titles not included in the table, but appearing multiple times in the survey data, are: Foundations of Library and Information Science, Information Literacy, and Information Behavior. Finally there is also a significant "long tail" of the course topics/titles, covering special or emerging areas. Altogether, these courses cover the entire LIS domain, so it is safe to state that there is hardly any LIS topic for which there has not been a course converted to online format at one or several institutions across the country.

In summary, the survey data demonstrates that online teaching is prevalent across LIS programs and is an actively growing trend. This is true for the entire variety of LIS curricular areas, including courses that are mostly theoretical, or mostly applied; that deal with general concepts or very special skills; and that range from introductory to advanced level. It is also noteworthy that the courses from each of the 16 cases presented in the subsequent chapters are distributed almost evenly among all but a couple of the LIS curricular areas (listed in the last column of Table 3). This should be taken as additional evidence that the study sample is indeed representative of the current picture of online teaching in LIS education.

The three subsequent chapters present findings from data collected and analyzed in part 2 of the study with each chapter dedicated to one of the three research questions.

CHAPTER 5

FINDINGS RELATED TO RQ1

This chapter presents the study findings that relate to the first of the three research questions: *What changes to the course are typically made in transitioning it from face-to-face to online teaching and how do contextual (institutional) factors influence this process?*

Approaches to Online Teaching

The specific changes to the course in transitioning to online teaching depend on the general approach to online instruction. Two such approaches emerged from the analysis of the study data: classroom emulation and creation of online learning environment. The two are typically mixed to various degrees, but, in most cases, there is clearly a dominant approach and it tends to be classroom emulation.

Classroom emulation

Classroom emulation can take different forms and can exist in both synchronous and asynchronous modes. One obvious form of face-to-face classroom instruction emulation is having synchronous class sessions supported by a video conferencing platform, such as Panopto, Adobe Connect or Blackboard Collaborate (formerly Elluminate). This enables the instructor to teach in much the same way as for the on-campus class, adjusting for the mediated nature of interaction with students and some extra burden of dealing with technology. While tools supporting synchronous online teaching afford methods of teaching and interaction with students that differ from what is possible in a face-to-face classroom, the study participants teaching synchronously did not appear to fully utilize such affordances,

except for allowing chat interaction during class. The extreme form of classroom emulation in synchronous online teaching is for instructor to conduct the on-campus class with online students participating simultaneously via video-conferencing software. While only one of the six institutions studied has an explicit policy requiring weekly synchronous sessions for online students as part of the way the online instruction is done within that program, there were cases in two other institutions of instructors choosing the synchronous session approach. They cite fit with their teaching style and belief in the superiority of live interaction (even if mediated) with students for quality of teaching and learning:

> *I mean, there's a much more rich environment when you're synchronous so that's why I like it. And there's more engagement of students with each other. It's just – it's just a richer environment. For me I have to work a little bit harder when something is asynchronous." (Subj231)*

> *[Synchronous approach allows for] class with interactions, with discussion, with PowerPoint which I can share my screen with Adobe Connect, a lot of the same if we would have done in person. (Subj81)*

Preserving already developed pedagogy can be a strong motive behind synchronous online classroom as the main online teaching mode. With this approach, the transition to online format avoids any transformation to the course pedagogy, and can be described as *"class [being] basically ported into an online environment to extend to students who couldn't physically be there."* (*Subj231*).

Classroom emulation can also be used as the main approach in online courses taught asynchronously. This is driven by several factors. One such factor is the desire to preserve equivalence between online and on-campus learning for the students, as summarized by one of the subjects: *"They're all getting the same degree. They need to get the same education."* (*Subj222*). It seems that one of the ways to ensure "the same education" is to design the online course to be as close as possible to its on-campus version. This approach can be

embedded in an institutional policy requiring equivalence defined as sameness between the face-to-face and online instruction:

> *And that's the school requirement that all our courses, regardless of whether they are taught online or on-site, have the same syllabus. The idea is that the students are getting the same kind of experience regardless of which format of the course they take. (Subj110)*

Such explicit policies or implicit norms translate into instructors feeling that they have to provide the same learning activities to online students as they do in the on-site class, even if they are challenging to implement in an online environment. For example, one of the interviewees talked about modifying instructions for in-class exercises so that they can be used in online class and running into difficulty with one of the exercises:

> *I still have one in-class exercise that I'm not doing in the online class. To be honest I'm still not really sure. I have to think of what to modify for that. But what it is, it's the kind of usability evaluation of a library catalog… so basically I just have to do some canned searches on a catalog and have one other person watch and see how they do it. And the necessity to have one other person watching kind of makes it more difficult to do online. (Subj263)*

In this case, the challenge is rooted in trying to do the exact same activity in an online class as the one done in face-to-face class rather than designing a different activity that would allow students to learn the same concepts and skills. The instructor recognizes that, noting that she wonders *"whether that [exercise] can be modified or whether it's just something that I should change completely for it to be the same"*. However, this idea of completely changing something for online teaching in order to keep it the same (in terms of learning objectives) does not appear to be one the majority of the faculty interviewed are comfortable with.

Another significant contributor to the dominance of face-to-face classroom emulation approach is the general prevalence of lecture-based teaching. While none of the subjects

interviewed mentioned any explicit institutional policy requiring the presence of a lecture component in a course (face-to-face or online), there appears to be an overall cultural expectation of including a lecture piece. This can translate into instructors feeling the expectation that in the online course "***there would be lectures*** [emphasis added], *that there would be discussions, that there would be deliverables from the students." (Subj95).* This "formula" for online teaching: lecture[12] plus online forum discussion plus papers or other assignments for students to complete, is present in all but a few cases studied. When the lectures are not delivered synchronously, as discussed above, they are made available to online students via the course web site. The format varies as will be explicated in the section on specific changes. What is worth noting, is that whether the individual instructors follow the institutional norms or personal preferences in the form of online lecture implementation, the notion of needing to have a lecture is so strong that the faculty continue to replicate lecture-based instructional practice in their online classes.

Online learning environments

Online learning environments, typically created within the institutional CMS, are present to some degree in all cases. Even courses taught via synchronous mediated class sessions have asynchronous learning environments associated with them that are used for storing course related information, assignment submission, asynchronous discussion boards and shared spaces for group work. The use of the CMS for general course administration regardless of course format has become a norm or even requirement in most institutions:

> *For all of our courses, we use an in-house course management system … And all of our courses already use that, so there's a lot of course administration that -- even if you're in a face-to-face course -- is handled through [CMS]. (Subj191)*

[12] Lecture of the same length/scope as the one that instructor would give in a face-to-face class.

> *I use the course website, as my syllabus… the only difference between an online course and a face-to-face course … is what I make visible and what I hide. So when it's face to face, all the discussion forums are hidden…; when it's an online course, the students see them and everything else is the same really. (Subj178)*

What differs from case to case is how much of that course space residing in Blackboard, Sakai, Moodle, or other CMS functions as the learning environment as opposed to an auxiliary tool. This can be illustrated with the use of discussion forums that have become a staple in online courses. For courses taught synchronously, the forum discussion tends to act as an addition to the class sessions, something that supplements student learning rather than representing a significant learning activity. That is, the forum may be used primarily to address course logistics, such as answering questions about assignments, or as one of the options available to the students for group work, rather than for concept discussion. In such instances, the discussion forum supports learning, but does not function as one of the main mechanisms for teaching and learning.

The online learning environments tend to be more developed in cases of asynchronous teaching, even when there is a significant degree of classroom emulation as discussed above. The CMS course shell[13] becomes the place where the recorded lectures and exercises along with other course materials and resources reside, as well as discussion forums, which become much more important to the teaching and learning process. The faculty put more emphasis on engagement in discussion and on developing specific discussion prompts that are tightly connected to the lectures and exercises, making the discussion a significant part of learning. Below is a sample description of such a discussion tied to learning exercise provided by one of the faculty interviewed:

[13] There was one case in the study of instructor opting to house the course site outside the institutional CMS

> *Like I give them a prompt and say "This week, were going to do an in-class exercise where you're going to look at old catalog cards and then summarize your findings and what's actually there on the card." And I have a set of all 3x5 catalog cards and some of them have little annotations and things that librarians made. So we analyze those, look at the structure then we talk about how a aacr2 is structured basically, and that's the prompts. (Subj263)*

The course spaces for online classes also typically include additional learning resources, such as links to websites of interest, online tools and tutorials, particularly YouTube videos that the faculty increasingly rely on as valuable educational resources.

The practice of housing the online course within the CMS space is often supported by or even mandated by the institutional policy (e.g., *"Everything had to be available through [CMS] for the online students" – Subj222*). While the specific CMS, as one faculty observes, *"constrains but also affords a lot of possibilities for how we organize course materials"* (*Subj252*), the richness of the online learning environment created for a particular course strongly depends on the pedagogical choices made by the faculty, their willingness to design online classes that do not attempt to mimic the on-campus class experience.

Of the 16 cases examined in-depth for this study, four cases (all from different institutions) highlight different approaches to creating asynchronous learning environments with one common characteristic – departure from a lecture-based classroom emulation model in favor of designed-for-online pedagogical solutions. These cases are discussed in more detail below.

Illustrative cases

Case 1 – "I wrote a book"

The Academic Library Management course was converted to online format as a part of an overall institutional move to offer courses online in response to student demand for

online instruction.[14] The transition was made easy by the fact that the faculty member teaching the course had written a textbook on the subject matter:

> *I've been teaching it for eight years and I finally wrote a book. I could use my own book, which naturally represented the stuff that I've been teaching... Since I knew the book was coming out, I knew that it would be much easier for me to convert it online… That kind of pushed me over the edge. (Subj191)*

The use of a textbook that organizes and presents this faculty's expertise on the subject freed her from the sense of needing to lecture – she concedes that if it were not for the new book, she would *"have to do more things like narrative PowerPoint and stuff".* With the book though, she was able to concentrate on guiding a reflective forum discussion as the main mode of teaching.

Consistent with the general departure from the lecture or lecture surrogate, which the textbook replaced, the subject also created a new assignment that fulfills the same learning objectives as inviting guest lecturers to present a practitioner perspective on the library management. In the online class, the students are asked to interview a library director or department head and write a report to be shared and discussed with the classmates. In activity-theoretical terms, the latter can be seen as an example of successfully resolving the tension between the existing mediating artifact (use of practitioners as guest lecturers) and the new state the system is evolving towards (asynchronous online learning environment) through creation of a new mediating artifact (development of the interview assignment). As this course teaching system evolved through its "new" (online) state, the innovation in the artifact became an integral part of the activity system and is now used in both online and face-to-face versions of the course. Overall, the successful transformation of the activity was

[14] The program at this institution does not include an online degree, but there is a move towards increasing online course offerings.

tightly connected to the output from another activity carried by the same subject – book writing, and it was that external connection that influenced the evolution of the teaching activity system for the course.

Case 2 – Course co-evolving with online tools

The teaching of this course on Digital Libraries has never undergone a conversion to online format per se, but has rather gradually evolved into a form that can easily be taught fully online. This evolution occurred over a number of years and has been shaped by the developments in the area of digital library technologies:

> *One of the things that changed the way I teach the class is that, particularly in the last 10 years, there was a tremendous amount of development in the open source environment in terms of various kinds of systems. And many of those systems are in fact comparable in structural and programming terms and in functional terms to the commercial systems. (Subj40)*

The most recent change in the teaching of the course has been a shift to cloud computing tools and applications, again in response to developments in technology and the opportunities those present for instructional purposes:

> *OCLC has been running Content DM or a version of Content DM in the cloud for about the last four years. And they make that available, they have an educational program and they make instances of Content DM available for instructional use. …Content DM in particular is viewed by academic librarians as a really important system, so being able to put students in the way of that system in particular has been a real plus. (Subj40)*

Guided by the belief that it is important to provide not just education, but training in practice-relevant skills for the students, the subject has designed the course to be assignment-driven, supported by the instances of digital archiving and library systems that he has built for the course. The assignments involve various digital library collection development and administration tasks. These learning experiences are supported by the readings, online discussion and audio-visual instructional materials produced by the instructor.

The latter has also evolved over time, shaped by the notion of a micro-lecture that provides just-in-time learning support. The production of these *"limited and focused learning objects"* has also evolved with the availability of various software tools designed for presentation narration, screen capture and combining various audio-visual materials in a seamless presentation. The use of these discrete learning objects in the course is a part of the subject's overall approach to teaching that shifts the students' focus from the instructor's persona to *"where it really belongs and where it is going to be most profitable"* – the course material. The result is the creation of a well-structured and dynamic online learning environment that scales for both hybrid and fully online instruction.

Analysis of this course teaching activity shows a system that is constantly evolving through a high level of interaction with other systems: the systems of open source DL software providers, cloud computing platforms, presentation/capture software. The subject is actively monitoring the developments in connected systems and is changing the object and the artifacts accordingly. This flexibility and openness to change reduces the potential for tensions and results in a system that is well balanced without becoming static.

Case 3 – A move away from distance classroom

This case involves two elective library courses, which have originally been taught through an institutional distance program delivered via compressed video, a technology that was not providing adequate quality to support course teaching. The latter served as the main impetus for moving the courses online. The subject had prior experience as well as some formal training in online instruction, which she had received as part of adjunct-teaching at a large university while pursuing her PhD. Following her belief in maximizing the 24/7 flexibility of the online learning environment, she redesigned the class from a traditional

lecture-based format to an online seminar format with emphasis on discussion in which she assumes a facilitating, rather than a direct instructional role:

> *The courses become more seminars because I'm not lecturing. I don't record them and have them streamed as video. I wouldn't watch such a thing. I totally don't assume that anyone else would want to. So my role is – there are forums every week and I created discussion questions. So for me that's been – looking through my lecture and saying why – what's the point of my lecture? What is it that I want them to get out of these? And then how can I, almost in a Socratic way, play those questions, what questions can I ask that will stimulate them to think about these things? (Subj178)*

The instructor keeps the online learning environment simple, relying on the functionality and structure built into the institutional CMS. The main mediating artifact in this teaching activity system is the subject's skill in using the Socratic Method of guiding discussion. The guided discussion becomes the main learning activity and the key component of the learning environment along with readings. While in many cases, the transition to online teaching produces tensions within the system that have to be resolved, here the transition to online teaching was a way to resolve the imbalances in the system that had been wrought with tensions produced by the existing rules and artifacts (institutional distance classroom program). The evolution of the activity system into the new form brought it to a state of equilibrium.

Case 4 – Supporting learners' exploration

The teaching of a reference course focused on business information resources has alternated between face-to-face and online instruction over the past five years in response to an institutional policy of shifting elective course offerings between the two modes. The two modes of the teaching activity have been co-evolving with online teaching influencing changes in the main pedagogical approaches used by the subject.

Teaching the course online introduced several challenges that were successfully resolved. One was to make sure that the learning resources used for class were the ones that were available electronically through the university, whereas before online teaching, the faculty partially relied on both electronic and print resources that were available to her through personal subscriptions or professional memberships. The other significant challenge was how to handle in-class demonstrations on resource use in the online environment. The evolution of that element of the course took several iterations and resulted in a complete departure from direct demonstration to scaffolding student exploration through audio tours of the key features of the information resources:

> *So before I may have shown them more in class and had a discussion, I moved more of that to their hands-on experiential piece. … [It is] now much more focused on 'here are several key aspects of the resource I want you to know upfront. Now, through the experience of the exercise I'm giving you as homework, I want you to explore more about the site, and then I am giving you explicit questions I want you to answer in the discussion forums and discuss them between you.'… I'm going to make conscious decisions about better ways to teach. And in this case, I did not want to show them a series of screenshots with circles and arrows. I wanted them to be exploring it live and have some guidance. (Subj260)*

The combination of using a select set of electronic resources along with "moving more of the responsibility for exploration onto the students" and developing more structured discussion prompts has not only defined the online learning environment, but also reshaped the face-to-face classroom teaching:

> *When you teach online, you are instructional but you are much more of a facilitator. So, utilizing that in the classroom – that it's not all going to be me up at the lectern and talking, and asking questions – I did definitely start moving more to an active learning experiential, even in the classroom. (Subj260)*

Effectively, the entire teaching activity has significantly changed over time through the changes in the main mediating artifacts (direct demonstration replaced with guided exploration). The evolution of this particular teaching activity has affected other teaching

activities by the instructor through the use of similar pedagogical strategies and course organization. In activity theoretical terms, the system evolution has produced a change not only in the object and mediating artifacts, but in the subject who is carrying out the activity.

Case discussion summary

The four cases presented above are different in terms of course subject matter, institutional context, as well as technology and teaching methods used, but they also have two common characteristics: (1) the pedagogical solutions for online teaching that do not attempt to emulate the face-to-face classroom, (2) and evolution of the teaching activity that happens through changes in mediating artifacts. The two are related because instructional methods constitute mediating artifacts of the course teaching activity, and departure from the on-campus classroom imitation is associated with changes in instructional methods. However, despite the overlap, these two dimensions warrant separate discussion.

As discussed earlier in this section, the key element of the face-to-face classroom emulation approach is the attempt to replicate lecture-based teaching in online course. The four cases described here in detail are distinct in their abandonment of the lecture recognizing that it is not a necessary or best way to teach online. Cases 1 and 3 are similar in replacing the lecture with a mix of independent learning through reading/assignments and knowledge building through guided discussion. Cases 2 and 4 are similar in replacing the lecture with hands-on exploration assignments supported by instructor-produced learning guides and supplemented with guided online discussion. The nature of the course, its educational objectives and whether it is more conceptual or skill based dictates the choice of main pedagogical methods. What unifies these four cases in terms of pedagogy is the shift from

direct instruction to facilitation of learning through construction of an online learning environment.

This transformation is enabled by changes in two kinds of mediating artifacts: tangible (software tools and information systems) and intangible (teaching methods used). As discussed above, the latter can take different forms and is an essential part of the successful transition to online teaching of the course to a state that is congruent with the nature of online education mode. The four cases described also illustrate the variety of tangible artifact changes that can occur in transition from face-to-face to online teaching. Cases 1 and 2 share the common characteristic of having a tangible mediating artifact (book and digital library software respectively) that originated in another activity system and is brought by the subject into the course teaching system. Cases 2 and 4 both include tangible artifact production by the subject specifically for the activity in question - instances of digital libraries and mini-lectures in Case 2 and audio guides to exercises in Case 4. In other words, the activity can evolve with support of tangible artifacts that exist outside the immediate activity system, those created within the system, or the combination of the two. Finally, as can be seen in Case 3, the role of tangible artifacts can be fairly small with the activity evolution largely dependent on the intangible artifacts (teaching method). Ultimately, it is up to the subject carrying out the activity to select the appropriate mediating artifacts, taking advantages of affordances of different technologies, resources and teaching methods. In all of the four cases, the subjects made active choices that differed from the "standard" approaches to online instruction at their respective institutions.

Online teaching approaches summary

It is tempting to view the main categories of approaches to online teaching as synchronous vs. asynchronous, and this is what many instructors do. However, the more important categorical distinction is between the attempt to replicate what happens in the face-to-face classroom in the online course and designing an online course that uses different teaching methods and learning activities to fulfill the same course objectives. This main distinction has been presented from a whole-system view of the teaching activity. The next section of this chapter presents the insights from a more detailed structure of teaching activity view that further illuminates those distinctions.

On the whole-activity level, the lecture-based classroom emulation appears to be the prevalent approach for both synchronous and asynchronous instruction. The difference between synchronous and asynchronous solutions is in whether the lecture exists in a separate software environment (typically accessible through a link from the main course shell), or is included as a part of the course learning environment in recorded form. The complexity, variety of purposes and features of the course learning environments fluctuates inversely to the prominence of the lecture component and overall attempt to replicate on-campus instruction. The balance between classroom emulation and online learning environment approaches varies from case to case and from institution to institution. The latter will be discussed in more detail in the section on the institutional context.

The four cases that do not attempt to mimic face-to-face lecture-based instruction and represent different paths and strategies to creating online learning environment have been discussed in depth. These cases illustrate a variety of technological factors influencing the pedagogical choices, as well as the importance of individual preferences and the pedagogical

flexibility of faculty. The interplay of these factors has been analyzed from the perspective of an Activity System framework. Following the hierarchy of activity analysis that provides a more granular view of the teaching activity, the presentation of the study findings will return to the whole activity view and will broaden to comparison between the systems from the same and different institutions, with the focus on contextual elements of the Activity Systems.

Changes in Action and Operations

The discussion of general approaches to online teaching and presentation of select cases in the previous section has began to introduce some of the specific changes to course teaching in the transition to an online format. This section expands the discussion of these changes based on the analysis of the structure of activity in each of the cases studied. The findings from the hierarchical breakdown of activity into its component actions and operations that describe the specific ways these actions are performed in a particular set of circumstances provide a more detailed and comprehensive picture of changes to teaching activity in transition. These findings also offer additional insight into the approaches to online teaching discussed in the previous section.

In each of the sixteen cases analyzed, the individual actions – answers to the question "What does an instructor do to teach the course?" – were identified. Each action in the teaching activity is operationalized in some form, adapting to the specifics of the teaching activity state. By their very definition, operations change with the change of circumstances and so operational changes to teaching actions can be expected in the transition between face-to-face and online format. The more interesting aspect of the activity transformation is

at the action level and whether or not there are any changes to the actions that comprise the course teaching activity.

When viewed from the perspective of a hierarchy of activity, the findings and discussion on main approaches to online teaching can be described, in many cases, as distinctions between action and operation level changes. The reproduction of lecture and other live classroom teaching methods in the online environment is an *operation-level change* – the same action is performed in a different form or medium, adapting to the teaching circumstances. *Action-level changes* include altering pedagogical methods, developing new learning objects, or substantially redesigning the course structure and the balance between component actions for the online class. This higher level change is required to move away from face-to-face classroom emulation. The latter, however, is more prevalent and can be described in terms of operational changes to the course teaching actions.

Operation-level changes

Table 4 below summarizes the commonly occurring operational changes in transition from face-to-face to online teaching.[15]

Table 4. Common operationalizations of teaching actions for online teaching format:

Action	Face-to-face operational form	Online operational form(s)
Lecturing	In-person, real-time	• Synchronous online session via video conferencing technology • Audio/video capture of in-class lecture • Separately prepared audio/video recording • Narrated slide presentation • Detailed textual notes
In-class exercises	In-person, real-time, immediate guidance/feedback to students often with verbal instructions	Asynchronous based on written instructions with guidance/feedback from instructor via email or other communication technology

[15] This is based on the study data, and should not be treated as a comprehensive list of all possibilities

Demonstrations	In-person, real-time, using computer/projector	• Real-time via video-conferencing technology • Pre-recorded by instructor using screen capture and narration tools • Use of existing demos from web sources (e.g., posted on YouTube)
Discussion	In-person, real-time	• Real-time during synchronous class session via conferencing technology (a/v or chat) • Asynchronous discussion forum
Presentations	In-person, real-time	• Real-time, orally with visuals via video-conferencing technology • Pre-recorded a/v presentation (e.g., YouTube format)
Written assignments	Papers based on individual or group research/project	Papers based on individual or group research/project (can have modified assignment guidelines)
Tests and quizzes	Paper based, manually graded by instructor	Online, automatically scored

Actions operationalized through synchronous video-conferencing technology supported sessions undergo no change other than the move from in-person to mediated interaction and thus do not require additional discussion. The findings on asynchronous operationalizations deserve further elaboration, though, as representing more significant and varied changes to teaching actions.

The asynchronous lecture action can take multiple operational forms, which are partially driven by the institutionally-provided and supported technology and by what the instructor sees as common practice (e.g., *"But then for the lectures, you had several options. And most of us used Adobe Presenter" – Subj95*). However, many of the subjects interviewed expressed different degrees of dissatisfaction with the "standard" way of preparing recorded lectures (e.g. *"…it was challenging for me, but I recorded my lectures and I feel really strange just talking at my computer*" *– Subj120*). This dissatisfaction with the process or dislike for the look and feel of the recorded lecture leads some faculty to opt for alternative formats to what they perceive as typical practice, as illustrated by the quotes below from the two subjects explaining their choice of detailed text notes ("kind of like the chapter in a textbook") and audio recording respectively:

> *Personally I don't like a [recorded] lecture of anything more than about 5 to 10 minutes, I get kind of bored. But I know some people are perfectly happy watching a half hour video as long as they're learning something. (Subj263)*

> *When I prepare the slide set for the face-to face-class, I also take a digital recorder with me to the face-to-face class and I record what I'm saying in class. And then the online students receive the same set of slides and the recording of what happened in class…. [It is] easy and the alternative that they offer to me was a video recording set-up using a thing called Panopto…And all they could do in Panopto was show them my head for two hours. So it's boring, very boring. So I got rid of the talking head. (Subj222)*

The two options for asynchronous demonstration of specific skills or resources are instructor produced mini-lectures, such as in Case 3 presented earlier or use of existing learning objects. Increasingly, faculty discover that there are plentiful learning objects suitable for their teaching activity freely available on the open web. In particular, a YouTube search often brings already existing high quality videos that can be easily incorporated into the online course (e.g., *"So, I found on YouTube some great illustrations of how to search Web of Science differently" – Subj120*).

The popular YouTube format also finds its way into operationalizing the presentation assignments, which are a staple in many courses as illustrated by this quote from one of the subjects:

> *In the last one I taught in person, people did oral presentations. And for this one, I require them to do one via YouTube… They had to do an instruction about something at the library, a brief instructional presentation. And I said they had to upload it to YouTube because pretty much, everybody has the technology to do that. (Subj191)*

Written assignments based on research or project work tend to be operationally similar regardless of teaching activity form – students write the papers and submit them to the instructor for grading and feedback. This is particularly true for individual written assignments. The papers that are products of group assignments are submitted the same way regardless of the teaching activity form, but the instructor may have to create additional

operational structures in support of group activity. These range from setting group work space in the course web space to providing very specific and structured guidelines to simplify the management of task distribution and work load for virtual group members.

The tests and quizzes were not commonly used in the cases studied – the combination of written assignments and discussion participation were far more prevalent forms of assessment of students learning, which is not surprising, given the graduate level of the courses. Part of the reason is that the scoring mechanisms in many CMS platforms are well suited only for multiple choice and true-false type questions only:

> *I tried fill in the blanks but the string match on [CMS] is not adequate and they would give the right answer and be told its wrong because they didn't have a period or they did have a period. (Subj178)*

Such types of tests are used by some of the subjects as short comprehension or reading completion checks embedded in the course module, but not as an important form of student assessment. As one subjects summed it up: *There's a place for that sort of thing [in large undergraduate courses], but in graduate school I don't do that." (Subj81).*

Of the common actions and their asynchronous operationalizations listed in Table 4, the online forum is the most ubiquitous, present to some degree even in the cases where the main mode of instruction is the synchronous session. This particular form of class discussion is not only a staple of online instruction, but is increasingly finding its way into face-to-face teaching, as will be discussed in the next chapter. Online forum discussion differs from in-class discussion in four important ways: (1) it is written, rather than oral; (2) it is time-delayed, meaning that discussion statements and responses can be separated in time by hours or days; (3) it spans several parallel threads over a course of a week (typical time frame for online course units); and (3) everybody has to participate. These differences have several

implications for teaching, including continuous discussion monitoring and guiding, development of specific discussion prompts and creating much more structure in the discussion than might be necessary in the face-to-face class. As one of the subjects observes:

> *I try to lead discussion intensive classes and so in class, the discussion would start in one place and run around, but that doesn't work [online] … So my online board tended to look a little bit more like structured conversations than free-flowing discussions like they are in class. (Subj288)*

An even more significant change is not in how the discussion is operationalized, but how important it can become in the overall teaching activity. If participation in an in-class discussion may be optional, in the online course discussion participation invariably becomes required and can become a more significant learning and learning evaluation action. This is well illustrated by comparing course syllabi for face-to-face and online versions of the same course. In one example, class participation is worth 10% of the course grade for face-to-face class, but forum discussion participation is worth 30% of the grade for the same course taught online. In this case, not only is the discussion action operationalized differently, but there is also a significant shift in the balance of actions that comprise the teaching activity.

Action-level changes

The frequent increase in importance of discussion in online teaching discussed above represents one type of action-level change – the shift in the balance of actions that comprise the teaching activity. Another type of action-level change is the introduction of a replacement action in place of the one that was a part of face-to-face teaching. The relacement of lecture with guided discussion, as in Case 3 presented earlier, is one example of such change. The most commonly occurring action-level change, however, is the introduction of new/replacement assignments that fit better with the online teaching and learning mode. The instructor may find it challenging to operationalize a particular action in

online format and opt for an operationally simpler solution. Here is how one subject explained her choice to replace the oral presentation with paper submission:

> *But it seemed that [for online class] it would be above and beyond to have them do a paper and to wangle a presentation and then to expect the other students in the class to watch for the presentation – it is a little too much. (Subj95)*

However, in avoiding operational challenges of one action subjects sometimes come up with ideas for new actions that support the object of the activity. This is well illustrated by the Case 1 presented earlier – in place of guest lectures, the subject has created a new assignment that asks students to conduct interviews with the types of individuals who would have been invited to guest-lecture and then to write interview reports. Another example of operational ease motivated action change is the replacement of a presentation assignment with the requirement that students create a poster. This is not just a change in what students submit and the instructor grades, but can evolve into a completely different teaching action, as illustrated by the following quote from one of the subject interviews:

> *But what they turn into me is a single PowerPoint slide, which has the contents of their poster on it then I take everybody's poster and create categories as if there were sections of a poster session. And the last class is an electronic poster session, and I pretend that I'm the expert going through the poster session critiquing what I see. (Subj222)*

Finally, new teaching actions are sometimes introduced by taking advantage of existing online resources. This is well illustrated by the Case 2 presented above. In another case, the subject teaching a course on research methods has incorporated the Human Research Ethics training modules[16] as a new component in the online class. These modules that are available online through the subject's institution, fit well operationally into the online course, but the introduction of this new component was prompted by the overall restructuring

[16] By CITI (Collaborative Institutional Training Initiative - https://www.citiprogram.org/).

of the course in transitioning to online form: *"I took the opportunity – I thought of moving online to try to further evaluate the course." (Subj120)*. This statement underscores how the transition to online teaching with its inevitable operational changes, which can trigger the action-level changes, ultimately results in changes to the overall teaching activity.

Institutional Context

When the activity of teaching a course undergoes a transition to online form, it is influenced by the institutional context, which includes the technology, the academic policy and culture, plus instructional design and technology support, interaction with peers, administrators and academic support staff and so forth. For the purpose of presenting study findings, the term "institution" is used to refer to both the academic unit (department/school) that offers the course discussed in each case and the academic institution (university) housing the LIS program. Thus institutional factors may reside at the academic unit level (e.g., departmental policy), or the academic institution level (e.g., CMS used university-wide), usually both. The distinction between the two levels will be made when necessary to explain a particular aspect of a case or a group of cases.

This section presents the findings from the analysis of the institutional "meta-cases" comprised of individual cases from that institution with emphasis on the contextual Activity System elements – Rules, Community and Division of Labor (the lower tier of Activity System diagram, repeated in Figure 7 below for reference), as well as any tangible mediating artifact, such as eLearning technologies that are a part of an institutional context – and their respective influences on the course teaching activity evolution.

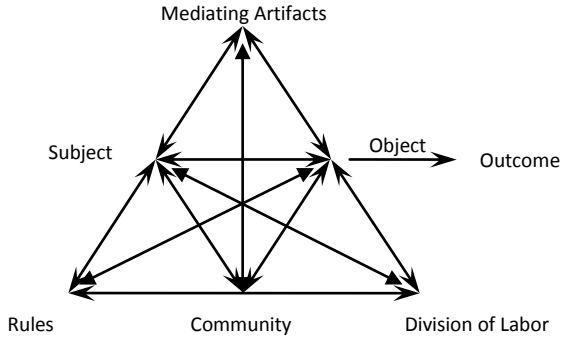

Figure 7. Basic Activity System diagram

The summary findings from each of the six institutional meta-cases are presented below, followed by cross-institutional patterns of the findings.

Institutional "meta-cases"

Institutional case 1

This program is in the process of making its LIS degree program available fully online. In preparation for this official move, an effort is being made to make all of the current courses available in an online format. Aside from the overarching goal of offering the degree online, no explicit rules exist to guide the transition to online teaching, nor is there any mechanism in place to divide the labor and to support faculty in the process. A university provides and supports a full-featured CMS as well as Adobe Connect for both running synchronous distance sessions and for producing pre-recorded lectures (e.g., for replacement of in-class sessions or for inviting a guest-speaker for an online class). These two tools become the default mediating artifact for teaching activities, but this is not codified as an explicit rule and faculty are free to choose an alternative platform. Not surprisingly, in both cases from this institution, the faculty chose the "standard" platform options, which come with adequate technical support. No dedicated instructional design support at is provided at departmental level and the support from university-based Center for Teaching

and Learning is limited to specific how-to assistance on technology with overall focus on support for large undergraduate courses. A gap exists between the level of support needed by faculty in the program and what is available to them. This tension is partially offset by the presence of peer support in the form of consulting with faculty colleagues. In fact, subject-community connection is one of the two strongest interactions in the activity systems for the cases from this institution with the other being subject-mediating artifact interaction.

The relative absence of explicit rules affords the freedom in evolution of teaching activity – in both cases from this institution, faculty made significant changes to the content of the course or teaching methods. However, the lack of adequate instructional design support results in a limited set of solution to the pedagogical needs of online teaching. In one case in particular, the subject expressed dissatisfaction with some of the technology-pedagogy solutions – an issue she does not feel she can easily resolve within the present context. Overall, this institutional context is characterized by adequate basic technology, but a lack of explicit rules or sufficient division of labor to support the transition to online teaching. As a result, subjects have the freedom of pedagogical decision making combined with the full burden for figuring out pedagogical solutions, although healthy interaction with community of peers partially alleviates the latter.

Institutional case 2

This institution has a long established online program with well defined online teaching policies. These include mandatory on-campus sessions and weekly synchronous sessions for all online courses. The technology is in place and the faculty receive sufficient training and ongoing support. Support is not limited to just technical issues, but includes pedagogical and instructional design consultations from school-based Instructional Design

and Technology unit staff, who are familiar with the LIS education domain and can offer solutions tailored to the specifics of each course. Additionally, there is a culture of peer support and consultation. The high quality of support was noted by all interviewees in the institution.

Faculty are expected to teach in both formats (online and on-campus), so there is a certain fluidity to format transition. The rules (online teaching policy) and mediating artifact (technology infrastructure) interact to enable a practically tension-less transition to online teaching of a given course. However, this aspect of institutional context also prevents any significant pedagogical modifications as online teaching is made to mimic classroom teaching. Online education in this institution is designed to bridge distance, but maintains the real-time element of face-to-face instruction, which reduces the necessity of pedagogical changes.

The Activity Systems for the three cases from this institution show strong connections between all elements of the system and very few lines of tension. Any tensions are minor and get resolved within each system, mostly through community/division of labor and mediating artifacts (including both technology and instructional methods). In this institution, the contextual elements are very influential in shaping the teaching activities and preclude significant pedagogical change in the transition to online teaching. The key components of the institutional context reside at the departmental level and the structure of connections between the system elements is well balanced to support the subjects in carrying out the activity within the program context. Consequently, the faculty appear to be satisfied with the teaching activity and its various forms.

Institutional case 3

The institution has a large online program with more online than face-to-face students, according to the faculty interviewed. The subjects also note the limitations of technology and instructional design support infrastructure as well as policies that constrain the online pedagogical choices. Yet, the environment does not appear to be adequate to support the faculty in online teaching and the subjects do not sound completely comfortable and satisfied with the state of things. The activity systems for all three cases from this institution are strikingly similar and reveal a number of conflicts that hinder the healthy evolution of the activity through teaching format changes.

One source of tension is the policy requiring the same syllabus for both online and on-site courses. This rule-object tension results in faculty trying to reproduce in online course what they do in the classroom, rather than developing new approaches that would be better suited for online environment. At the same time, faculty are not allowed to include synchronous elements in the teaching of an online course, which further reduces the pedagogical options. The negative influence of these rigid rules is compounded by the absence of dedicated instructional design support. While technical support and training on how to use the eLearning technologies are available, no help is provided with pedagogical issues. Nor is there an established culture of peer consultation and support that could override some of these tensions. Finally the main institutional CMS used for online teaching is described by the subjects as having limited functionality. In absence of sufficient IDT support, it is difficult for faculty to attempt to resolve this problem through use of alternative or additional technology artifacts.

The Activity Systems for all three cases from this institution are in a state of disequilibrium produced by the tensions among the system elements highlighted above. The subjects are continuing to struggle to resolve these conflicts and are not well satisfied with the state of their teaching activities in online form. In one of the cases, the subject is reluctantly accepting the status quo, while in two others the subjects are actively thinking about ways to resolve the tensions produced by the transition to online teaching. Their plans are tentative and neither of the subjects sounds totally confident that they will be able to find resolutions. Overall, the institutional context has a built-in conflict between rigidity of policy and the combination of inadequate technology and support infrastructure, leaving subjects unduly burdened by the challenges of moving the teaching activity into online form.

Institutional case 4

Unlike the institutional cases discussed above, which are comprised of very similar individual cases, this one is made up of cases that appear so different they might have come from different institutions. There are some striking similarities in the individual case diagrams though that help explain how significantly divergent variations of teaching activity can exist in the same institutional context. The Activity System diagrams for all three cases from this institution are top-heavy with strong interactions between subject, artifacts and object. All three are similar in total absence of community and division of labor elements – none of the subjects mentioned interaction with faculty peers or support staff as part of transitioning their courses to online format. The institution offers an online degree program and this represents the only rule in all three Activity Systems, although it plays out differently. In one of the cases, there is a conflict between this rule and the subject, who did not wish to teach online, but felt "a pressure that was not refutable" to do so. In two other

cases, the subjects were interested in online teaching, so the rule did not present a conflict for them. The common mediating artifacts include Blackboard CMS use (required) and Panopto technology for lecture capture (optional). In all three cases subjects have decided against the latter: two specifically mentioned dissatisfaction with the "talking head" effect, and the third prefers tools that fit better with the way he teaches the course.

Not surprisingly, given the weakness of contextual factors, the individual teaching activities developed along very different paths. In case of the reluctant online instructor, the Activity System is wrought with tensions between subject and mediating artifacts (both the technology and the pedagogical interaction), and the only resolution acceptable to the subject is to effectively roll back the teaching activity to the pre-online state. She believes she will be able to do so with some of the program changes in the future and looks forward to it. In the two other cases teaching activity has successfully evolved through the online transition, but the institutional context had little influence on the process. In both cases, the activity evolution was driven by the subjects' characteristics and by the mediating artifacts (technology and resources) from outside of the institutional context. In one of these cases (described in detail in the previous section), the teaching activity exists almost entirely independent of the institutional context. In the other, the institution plays the role of provider of access to outside information resources. The two cases are pedagogically different, and these differences can better be explained by individual characteristics of the subjects in combination with object characteristics (course subject matter).

It is reasonable to conclude that the contextual elements in this institution are weak and have marginal influence on the teaching activity as it evolves through different formats. On the one hand, this means unrestricted pedagogical decision making for faculty with

freedom to use outside resources and tools. On the other hand, it means absence of any support and incentives for faculty who are not interested or unskilled in online teaching. Thus, the success or failure in the teaching activity evolution depends almost entirely on the individual subject and his or her ability to take advantage of the lack of institutional influence without being hindered by it.

Institutional case 5

The distinguishing feature of this institutional context is the existence of a long-running distance program relying on compressed video for teaching students at remote sites. This technology artifact is perceived by the faculty as a poor fit with the teaching activity due to its inflexibility and unreliability. This artifact created tensions in the teaching activity systems, which the subjects resolved by moving to online teaching. The institution presently also offers Adobe Connect as an alternative technology to support distance instruction, in addition to a full-featured CMS which is used in all teaching activities regardless of format. Other than the technology platform and the institutional culture of offering synchronous distance education, there are no rules related to teaching activity format transitions, so faculty are free to follow the synchronous classroom tradition or to choose different approaches to online instruction. The two individual cases from this institution represent both solutions: one follows the synchronous distance classroom approach, and the other (described in more detail earlier in the chapter) is taking the asynchronous learning environment approach. The community and division of labor elements are absent from Activity System diagrams of both individual cases.

In both cases, the institutionally available technology platform is the only contextual influence on the teaching activity, although it contributes significantly to successful evolution

through format changes. This success also rests on the subjects' knowledge and experiences gained in other institutional contexts. Both subjects have prior training in online pedagogy and experience with online teaching that they received before entering the present institutional context. The influence of prior contexts on the present teaching activity appear to be rather strong against the background of present weak institutional context and can better explain the differences in the teaching activity systems, than any of the current contextual factors.

Institutional case 6

This institution has a long-established online degree program and a culture of teaching in both online and face-to-face formats. Other than the expectation that faculty should be prepared to go back and forth between the teaching modalities, there are no explicit rules in place that would affect the teaching activity. There are, however, many structures to support the online teaching that free the faculty from concerns about technical logistics and allow them to focus on the process of instruction. In each case, a student assistant or a staffer is available to deal with the technical aspects of teaching the course such as preparing and uploading materials to the course website, running equipment to record class sessions or to monitor interactions with remote students for synchronous sessions. Additionally, instructional design experts are available to help faculty select pedagogical solutions and technology tools that match their needs or preferences (e.g., to teach synchronous or asynchronously).

At the time of study, the institution was in transition from an in-house collection of eLearning tools to an integrated CMS, which created some problems around use of the new technology. That being said, the faculty are open to change and feel that it comes with

adequate support and responsiveness to their feedback about needed improvements in the new CMS.

The Activity Systems for the three cases from this institution show strong connections among all system elements and appear to be well-balanced. Each has a number of lines of tension with corresponding paths for resolution, often along the same lines, such as subject-mediating artifact tension being resolved by alternative subject-artifact interaction facilitated through division of labor. These satisfactory resolutions are enabled through the combination of flexibility in online teaching policies with sufficient technology support and well structured division of labor. The specifics of each case, its tensions and paths of resolution are as different as the subjects engaged in the teaching activities: one subject chose to teach face-to-face and online classes at the same time with the extension of classroom to distance students via technology, another (discussed in more detail earlier in this chapter) developed an asynchronous learning environment, while their third colleague opted for a solution that integrates pre-recorded lectures into the online learning environment. Overall, the institutional context is supportive of the teaching transition through modality changes without being prescriptive. This accommodates the individual preferences of faculty and results in the successful evolution of teaching activities.

Discussion of contextual influences

As noted at the beginning of this section, eLearning technology infrastructure is one of the obvious contextual influences on the teaching activity in transition between face-to-face and online forms. This infrastructure is comprised primarily of the institutional CMS paired with a video and/or desktop capture technology that shape the operational level of the course teaching activity. The CMSs have become such a staple of all institutional contexts

and their core features and functions are so similar that it is reasonable to discount their influence on the teaching activity for the purpose of this discussion. Faculty comments about using the institutional CMS suggest that they treat it as an integral component of the technological environment they operate in – similar to the tone one would expect in the comments about the institutional email platform or the operating system on the departmental computers. The subjects note some specific features, but there is nothing in these comments to indicate that the CMS has a significant influence on how they carry out the evolving teaching activity beyond the organizing structure of the online course environment. There was one exception to this general observation in case of institution 3 presented above – the CMS was judged by faculty to be lacking in necessary features and functions for online instruction. In this one institutional case, the CMS appears to have a negative, constraining influence on the teaching activity.

The video and desktop capture tools that are part of the institutional technology infrastructure have a more pronounced influence on the teaching activity, chiefly in the form of "standard" solutions for specific aspects of teaching (most notably, the lecture component). Many of the subjects interviewed made statements along the lines of "and for lecture we use [Adobe Connect, Blackboard Collaborate, Camtasia]". The tool becomes part of institutional culture and the default pedagogy-technology bundle. The affordances and constraints of the specific video conferencing and capture tool shape the form of the lecture delivery. Only in one case (institution 6 described above) are there several institutionally supported tools available to offer a variety of choices for online instruction.

The institutional technology infrastructure is not static. It undergoes regular changes in response to changes in the eLearning technology market. The short-term impact of these

changes on teaching can be negative – there may be a learning curve to mastering a new tool, as articulated very well by one of the subjects:

> *I'm not looking forward to having to do it on a new, you know, technology and, you know, relearning that whole, okay which button do I push? Am I really recording the slide move at the right time? (Subj95)*

The changes to one part of technology infrastructure can disrupt the use of the tools faculty have grown to rely on. For example, at one of the institutions, the routine operating system upgrade to faculty computers rendered the version of Camtasia they *"very much come to rely on" (Subj110)* unusable due to software compatibility issues, which caused frustration for all the instructors teaching online that semester.

While these changes in technology may introduce temporary challenges, the faculty see the overall trend over time as progressive improvement and new technology offering better support for online teaching. Statements along the lines of "tools have become much better" are a recurring theme in interviews across multiple institutions. Seeing technology evolution as having a positive impact on teaching helps faculty accept the short-term inconvenience of adapting to change, something they get used to as part of teaching activity, as illustrated by the following quote: *"The tools have changed four times since I started doing this, so I am pretty comfortable with the idea that I am going to have to learn new tools."(Subj252)*

Although institutional technology infrastructure may be the most salient contextual element and the one that certainly influences the teaching activity, the strength of its influence of these mediating artifacts depends on the combination of the rules, community and division of labor elements of the activity system. Table 5 below summarizes the main

findings regarding presence/absence of the three contextual elements in activity systems from each institution based on the case data from each setting[17]

Table 5. Relative presence of contextual elements of activity systems by institution

	Rules	Community	Division of Labor
Institution 1	No	Yes	No
Institution 2	Yes	Yes	Yes
Institution 3	Yes	No	No
Institution 4	No	No	No
Institution 5	No	No	No
Institution 6	No	Yes	Yes

As can be seen from the table, the patterns of relative presence/absence of each of the three contextual components of the activity system are different for all but two institutions (4 and 5 that are similar in having overall weak contextual elements). The presence or absence of each element should not be taken as a direct indicator of its influence, or whether the influence is positive or negative. For example, weak rules or lack of division of labor can have substantial influence by affording decision making freedom or by constraining the available solutions respectively. The latter is a negative influence, while the former is positive. Likewise, strong rules can have both positive and negative influences as elaborated below. It is the interplay of contextual elements that creates the environment that is conducive to successful transition of teaching activity between face-to-face and online formats, constrains it, or is a "mixed bag".

One of the surprising findings is that while all institutions studied have a strong online teaching presence, with four offering fully online degrees, only two (2 and 3) have

[17] Yes/No are not absolute values, but rather summary qualitative judgments of relative salience of each element in that institutional context.

clear sets of policies that define online teaching. In the case of Institution 2, well-defined rules are accompanied by an established community of peers and staff who have active roles in the development and support of the teaching activity. The three elements are tightly connected among themselves and with the activity, which exists in that context. The resultant activity systems are stable and allow transition without tension between face-to-face and online states. In case of Institution 3, strong rules exist in isolation from other contextual components and, as discussed above, lead to unbalanced activity systems wrought with tensions that do not find easy resolution within the present context. Comparison of Institutional cases 2 and 3 shows that strong rules can have both positive and negative influences on the teaching activity depending on the presence or absence of the other contextual elements. One apparent influence of strong rules is in the uniformity of the approaches to online teaching within that context. Analysis of cases from Institution 2 reveals not only identical approaches, but identical operationalizations of teaching actions, which can be explained by the combination of policy, technology infrastructure and division of labor within the community. The three cases from Institution 3 also show the same patterns of main approaches, however since each subject carries out the activity as a solo effort, the operational solutions for specific actions differ, such as use of different formats form of the asynchronous lecture delivery.

In the other four institutions, policies are limited to the general expectation of online teaching and, perhaps, the requirement to use a common CMS. The absence of explicit or strong implicit rules is off-set by the presence of community and/or division of labor in two cases (institutions 1 and 6), while institutions 4 and 5 share uniform near-absence of contextual elements. It is not surprising, that cases from institutions with weak rules show

greater diversity of approaches to online teaching as well as variability in how similar approaches might be operationalized. The valence of the influence of absence of rules is overall somewhere between neutral and positive. Perhaps due to the prevalence of a culture of faculty autonomy in teaching, subjects' comments regarding weakness of rules suggest they see this as either insignificant or helpful influence.

The infrequent presence of a healthy community and division of labor in the institutional contexts is another unexpected finding of the study. This is particularly surprising for institutions with established online degree programs. The strength of community and division of labor elements of the institutional activity system has a clearly positive influence on the individual teaching activities. Subjects from institutions with these characteristics consistently comment on the helpfulness of these systems of support in transitioning their courses to online mode as illustrated by select quotes below:

> *We are very fortunate to have an instructional technology and design staff…. the level of support we get here is not just troubleshooting when something goes wrong, but actually figuring out how to make something go right, if you will, to look ahead. (Subj252)*

> *Yes, we do share experiences. Like the instructors who worked with [new CMS] last year as beta testers … And then as people come in and start to teach online, they do get this support from the online learning team, and then the other instructors … (Subj95)*

> *And the instructional technology staff assist instructors with, you know, what are some of the best practices for operating which has become an increasingly complex courseware system…. [Additionally] we have the two conference calls each semester and instructors as a group have a [CMS-based space] where we talk with each other and share resources. So the school doesn't tell you exactly how it is you translate the course but there's a lot of peer interaction. (Subj183)*

The influence of the absence of interaction with colleagues and instructional specialists playing an active role in course development and teaching support can have either an insignificant or a negative influence on the teaching activity. Where faculty feel

dissatisfied with the support they receive and feel the need for instructional help, the absence of these components hinders online teaching, a consistent theme in interviews with faculty from Institutions 1 and 3. If faculty have limited knowledge of the possible technology-pedagogy solutions, the choices they make in transitioning to online teaching tend to be limited to what they are familiar with. There is a clear need for instructional design support that is geared to the instructional level with sensitivity to subject matter. As one subject from the institution with well established program-level IDT support notes:

> *I don't see how the IT staff would have enough of the commitment to the content of the educational program to be able to be flexible and responsive in content related ways without – without having affiliation with a specific program. (Subj252)*

However, the following quotes from subjects from two different institutions are representative of the more common state of things with instructional design support and training:

> *There is nobody, in our school that's there to support, you know, what we do. (Subj120)*

> *I went to one and a half workshop on leading effective group discussions online. And yeah that wasn't really useful for me because it was at too basic a level, it was for people who had really never done any of that before and it was for people who are teaching primarily undergraduate students. (Subj110)*

Not only do the subjects feel the lack of support in choosing online teaching strategies, but also in selection of tools that could fit with a teaching activity. As one subject who has invested a lot of personal time and effort in exploring online teaching tools and practices notes, most of his colleagues *"don't have time or the inclination to go hunting for tools that are better suited for online education."* (*Subj40*).

The weakness of community and division of labor elements does not always have a negative influence. It can have no appreciable influence at all as in cases from Institutions 4

and 5. However, in each of those cases, there were strong influences from outside the institutional context of activity and it was the strength of those influences that reduced the negative impact of weak institutional context elements.

The relative overall weakness of contextual elements of the activity systems across institutions is the truly unexpected finding of the study. Only one institution can be described as having well-developed rules, community and division of labor. The only consistent contextual influence across all institutions is through technology artifacts. The technology component of the institutional environment is influential in how teaching activities are operationalized. However, in most cases, the more substantive, action-level changes seem to develop independently of the immediate context and can be better explained by the combination of characteristics of individual subjects and influences from outside the institutional context.

CHAPTER 6

FINDINGS RELATED TO RQ2

The previous chapter has been devoted to an extensive discussion of the different kinds of changes to the teaching activity in transitioning a course to online format. It was noted that many of these changes are technical adaptations that are specific to the online form of the teaching activity. However, the transition to online form can also introduce permanent, modality-independent changes to the teaching activity. This chapter presents the study findings that address research question #2: *Which online teaching technologies, resources and teaching methods get incorporated into face-to-face versions of the course?* The focus is on enduring changes to the teaching of the course that have been triggered by moving the activity into online form, *which "automatically forces you to think in a new way or in a different way about how you are going to try to accomplish the goals and objectives of the class" (Subj40).*

It is worth noting that some of the cases included in the study do not fit the scenario of a course taught previously face-to-face being converted to online format for the first time with a subsequent plan to teach in both formats. Although that was the target scenario for the study, interviews with the subjects have revealed a number of different scenarios (refer to the Case selection section of Chapter 3 for examples of variations). The study included a few cases of a course undergoing several format conversions back and forth between face-to-face and online teaching, so that the most recent conversion, is not the first of its kind. This

complicates drawing conclusions about format conversion influences on pedagogy as some of the changes to the course teaching have developed over multiple iterations. However, the faculty interviewed generally were able to attribute certain pedagogical changes to one of the format conversion instances, making clear statements about a particular aspect of teaching the course originating from an online version, even if not the most recent one.

The discussion of findings regarding changes to face-to-face teaching starts with the macro-changes, the ones that describe the more general, whole-activity level modifications, followed by the presentation of findings about changes to the components of the teaching activity.

Whole Activity Changes

Content and structure changes

Periodic revisions of the course content in order to keep it current and relevant is an integral part of teaching activity. The format transition provides an extra impetus for such revision – the mere act of creating an online course shell and preparing materials that would populate the shell produces a compelling opportunity to do a full revision of the components and structure of the course, something that can be described as *"corralling the content of the course"* (*Subj95*). Several subjects interviewed emphasized the need for advanced preparation and planning of the entire course, the *"construction of the totality of the course experience"* (*Subj36*). They contrast this advanced planning with the more improvisational nature of face-to-face teaching that allows the instructor to *"just show up to class with the new material to present"* (*Subj263*) and more easily adjust what gets covered in each class session. For online teaching, however, *"you have to have a pretty good design structure*

that's going to cover the entire quarter" (*Subj260*) and be much more thorough in course sequencing as well as in scripting of every online lesson/module.

It is not surprising that after investing time and effort into revising the content and structure of the course, the faculty make that change permanent, with corresponding updates in the syllabus for the face-to-face version of the course. The increase in structure that characterizes online teaching is reflected not only in the overall course content and sequence, but also in the individual actions that comprise the teaching activity as will be discussed later in this chapter.

Interaction with students

Interaction with students is an essential part of teaching and it changes substantially in the online version of the course in terms of both the structure and the flow. Faculty find that they have to be more explicit and detailed in spelling out course expectations and assignment instructions as well as providing more frequent and formal feedback to students. The outcome of this is an increased awareness of student needs that are independent of the course format. As one subject noted in talking about providing better assignment explanations and feedback to students:

> *I think that I'm probably more mindful of what students need to feel like they can successfully manage the class - for onsite students as well as online students. That's a change. (Subj84)*

Other subjects shared similar observations about incorporating more explicit guidelines and formal feedback into their face-to-face teaching as something that improves learning. For example, one instructor talked about his former face-to-face practice of just assigning a course project and informally inquiring about progress during the course being replaced with a requirement for scheduled intermediate updates in online course and written feedback to

students. He concluded *"that this formal feedback is beneficial to students"* and plans to *"take more formal status reports"* (*Subj123*) in his face-to-face classes.

The use of online tools for structuring course interaction with students can also improve the communication efficiency, as one instructor observes:

> *In online class, I set a discussion thread for them to post their original ideas [for a term paper]. I do this in on-campus class as well – it would take me two hours to go around the class asking. (Subj233)*

Approach to teaching changes

The previous chapter presented several cases of instructors changing their approach to teaching from direct instruction to facilitation of student learning as a part of transitioning to an online modality. While the lecture-based approach is quite prevalent in online teaching, there is also evidence of a shift in the overall approach and the understanding of the instructor role in graduate teaching. When this shift occurs, facilitated by the online transitioning of a course, it tends to translate to the face-to-face classroom. Examples of this in the study data include:

- the Socratic-style of discussion leading (e.g., Case 3 presented in Chapter 5);
- the abandonment of direct lecture and demonstrations in favor of scaffolded exploration (e.g., Case 4 presented in Chapter 5);
- the greater emphasis on student interaction with course content (e.g., Case 2 presented in Chapter 5);
- the heavier reliance on learning objects (e.g., short demo videos produced by faculty or found on YouTube originally for online class);

More generally, online teaching leads instructors to see students as capable of being more independent and self-reliant in learning. The move from direct instruction and expecting

students to rely on their own thinking and on each-other to find solutions to learning challenges is *"more beneficial for students in the long run than come into class and have [instructor] sit beside and direct them" (Subj128*)

It appears that when faculty use the transition to online teaching of a course as an opportunity to break away from the old habits of face-to-face instruction, they find that they like the new ways of teaching and those changes get incorporated into the overall teaching activity across all forms.

Teaching Activity Component Changes

Re-use of teaching materials

As was noted above, the transition to an online form increases the overall structure and scripting of the course. This is particularly pronounced in the lecture component of the teaching activity and it frequently translates into face-to-face teaching:

> *I actually use a lot of the slides that I prepared for online in the face to face class. I use them to kind of structure my lectures, to make sure I don't miss important points. (Subj95)*

The above quote illustrates that what gets incorporated and re-used is not just the artifact (slides), but the structure and logic behind the artifact production, the effort to ensure completeness and comprehensiveness of topic coverage. In other words, the production of the artifact for an online course can reshape the lectures for on-site teaching through increased structure and reduction of the ad-hoc *"you walk into the classroom, and away you go"* (*Subj233*) approach to teaching.

Another form of re-use of lecture materials prepared for online course is inclusion of those recorded lectures or course notes as supplemental learning materials for the face-to-

face students as well as an alternative to class attendance as illustrated by these statements from subject interviews: *"They're just there [on the course site] and I tell students if you have to miss the class for some reason, read the notes"* (*Subj263*); or *"We record and make archives so the students who miss the class have something can come back to"* (*Subj217*). Finally the lectures and other materials prepared for online class afford replacement of face-to-face class sessions with online activities for the times when the instructor is unable to teach in-person (e.g., due to illness or planned travel). Re-use of lecture and other online teaching materials is one of the paths towards hybrid teaching which will be discussed in detail in the next chapter.

Increased use of electronic resources

The lecture recordings and notes prepared by instructor are not the only course materials that tend to flow from the online environment into the face-to-face classroom. Online teaching forces the instructors to put additional effort into identifying and collecting various resources, such as topical web sites, digital libraries and reference databases, web-based software tools, videos (e.g. YouTube), and so forth. The fact that these resources are typically linked from the course web space residing in the institutional CMS, which is used for on-campus classes as well, facilitates incorporation of these new learning objects and tools into the face-to-face teaching:

> *I would certainly say the online class helped me to do a better job on my [CMS] space for my classes because I am now a lot more conscious about getting electronic resources in my face-to-face class.* (*Subj217)*

New assignments

In every case where one or several of the course assignments were re-designed for online course, the new/modified assignment got incorporated into the face-to-face version of

that course as well, becoming a permanent part of the teaching activity. This includes a number of cases of traditional in-class presentation being replaced with virtual presentation (e.g., using popular web platforms such as YouTube or Vimeo) or a poster. In one case (presented in the previous chapter), this evolved into a virtual poster session that bridges across face-to-face and online sections of the course. Faculty believe that developing virtual presentation skills is something that benefits students and fits well with what they may be expected to do in their professional lives. Also, similar to the way preparing online course and online teaching materials forces instructors to think through the content and carefully script the course and the information presentation, the online presentation assignments force students to put more thought and effort into structuring and delivering their presentations. This is well illustrated by the explanation one subject gave for incorporating Jing presentations into face-to-face class following the online experience:

> *Face-to-face students would ramble on… would not have thought it through as much, whereas doing something in Jing, they have to have specific time limit and they have to practice and figure out what they are going to say. So I started making my face-to-face students do Jing presentation as well. (Subj256)*

Other examples of assignments developed originally for an online course include requirements for students to blog, use Twitter for class communications, or create a course wiki that accumulates student-built knowledge over multiple semesters and across teaching formats. The common thread in these new assignments and the reason for making the change a permanent part of the teaching activity is that these assignments provide students with practical Web 2.0 technology skills and the opportunity to experience information sharing and communication in digital mediated form. The latter is seen by instructors as essential for soon-to-be information and library practitioners, who *"need to be comfortable sharing their voices in an open public platform"* (*Subj128*) and be prepared to provide *"the same services*

through media throughout their careers that we have always done face-to-face" (*Subj81*).

A different type of assignment change that finds its way into face-to-face instruction involves revisions to assignment instructions or new assignments that put more responsibility for the assignment-related decision making onto the students. A good illustration is an assignment from a class with a service learning component, for which the instructor used to provide a set of organizations on which to base the assignment, but now expects students to make their own selections. The assignment calls for students to help connect a community organization that works with youth with a traditional information organization, like a school or public library. Asking students to identify such an organization in their community and to develop a relationship with the organization started as a logistical solution to the geographic dispersion of the online class population, but emerged as something that has added pedagogical value in the instructor's view:

> *That creative process of thinking through [organization selection and practical arrangements] is really educational for them in that it forces them to think not only about the assignments and what the requirements are, but about what they want their professional identity to be. (Subj252)*

To summarize, the assignment changes are characterized by (a) heavier use of digital mediated formats, (b) requiring a higher level of independent learning by students, as well as (c) greater emphasis on real-world applications and relevant professional skills development. These changes are not only congruent with the nature of online teaching and learning environment, but are seen by faculty as overall better aligned with the objectives of the teaching activity and, ultimately contributing to better preparation for professional practice.

Online discussion

As was noted in the previous chapter, the use of the online discussion forum is probably the most ubiquitous feature of online courses. It is thus not surprising that this

component of the teaching activity is most frequently mentioned as influencing face-to-face instruction. The translation from the online experience comes in two forms: (a) changes to the structure and content of in-class discussion based on the online forum discussion experience, and (b) direct use of online discussion forums in the face-to-face courses.

The previously noted overall increase in structure that permeates all levels of the online teaching activity manifests itself very clearly in online forum discussions. Many of the subjects talk about having to develop well structured and articulated discussion prompts for an online class and then using them in face-to-face instruction, as illustrated by the following representative interview comment:

> *I guess I started off with the discussion prompts in the online class. And then I started using them more and more in the onsite class because they really do work. (Subj263)*

Similarly, the more thorough and formal guidelines for how to contribute to a discussion developed for an online course get incorporated into face-to-face teaching as a way to increase the thoughtfulness and depth of discussion:

> *The class discussion component has been refined and geared much more to parallel the more formal requirements of online discussion: setting us some of the boundaries, some of the criteria of what constitutes a substantive discussion point in class that is connected to literature that students are supposed to read and so on. This has been very important and instructive for on-campus teaching. (Subj233)*

Just like with online discussion, these changes help move the discourse *"beyond just 'what my reaction is, what do I like about it'"*(*Subj110*), and raise it to a higher level of analytical reflection.

When commenting on the quality of discussion in online forums, the faculty note two important features of online course discussion: the increase in time allotted for participation and the fact that everybody in class participates. The latter is enabled by the former:

In face-to-face class a couple of people will dominate [discussion], but online everybody has to participate, and people can take time to phrase their responses and then post them… Instead of talking for three hours once a week, we are talking for seven days. (Subj254)

Discussions online are actually more thorough than the discussion in an onsite course. I think it is because you have more time for discussion, because you have a week usually, whereas in onsite class you have two hours or however long the class lasts as maximum allowed time during which people can discuss. (Subj263)

These observations from the online teaching experience lead instructors to include online forums in their face-to-face classes. The forums can be used both as augmentation of the in-class discussion and as a way to reduce the distinction between online and on-campus forms of the teaching activity in cases when the instruction is done in both modes in the same academic term. In several cases, instructors used the online discussion forums as one of the mechanisms of blending face-to-face and online teaching:

They do everything that the face-to-face students do. I mean if there's a discussion board, I blend them all into the same discussion board. (Subj22)

We use the asynchronous discussion board as an important supplemental tool and the discussion groups are blended so you have a combination of online and on-campus students in the groups. (Subj40)

To summarize, the experience of leading online discussion helps instructors improve the face-to-face class discussion. Also, online discussion forums contribute to hybridization of online and face-to-face teaching both within same course section (by adding online discussion to augment classroom teaching) and across sections (by using online forum as the common element between face-to-face and online sections of the same course). In-depth discussion of hybridization of teaching will be presented in the next chapter.

Chapter summary

While much of online teaching is shaped by face-to-face practices, the study provides evidence of a reverse influence with the online teaching experience re-shaping some of the face-to-face teaching. These influences can be seen not only in the adoption of online technologies and resources, but also in changing teaching methods and approaches. In terms of technology, what gets adopted is not so much a particular software tool or sets of tools, but rather the notion of communicating through the media as a way to teach and learn skills that have direct application in information and library practice setting.

The idea that there are equally viable or even better ways to communicate information to the students than direct in-person presentation of information by the instructor (i.e., in-class lecture) shows growing acceptance. Online teaching in its asynchronous form forces the alternative solutions in different variations (from a direct full-length lecture, just not in-person, to a complete switch to non-direct forms of instruction), and thus expands the instructors' views on how they can teach the same course. Following this logic, it comes as no surprise that the further the online course teaching departs from in-class teaching, the more of the changes developed in the transition become incorporated into all forms of the teaching activity. Subjects teaching online via synchronous class sessions report minor if any changes to their face-to-face instruction. Conversely, the few subjects who developed their online courses without replicating the lecture report the most fundamental changes to their overall teaching practice.

The results of the analysis of the hierarchy of activity – whether the changes to the course in transition to online instruction were operational or action-level – show that action-level changes invariably get incorporated into the face-to-face teaching as well. Perhaps the willingness to consider action-level change, such as replacing a lecture with a guided

exploration/discussion or changing some of the course assignments, is an indicator of an instructor's openness to pedagogical innovation. For these individuals, the challenge of transitioning the teaching activity to an online form becomes an opportunity to move the pedagogy forward, to align it better with contemporary information and technology environment.

The action-level changes are more dramatic and more salient, but operational changes also alter the overall pedagogical practice, albeit in much subtler ways. Operational changes that allow the same action to be performed in different modes add flexibility to the teaching activity. For example, a face-to-face class can be switched to a mediated online session as needed, which happened in one of the cases, when the campus was closed due to emergency. This is not a pedagogical change per se, but it certainly adds a level of flexibility to the teaching activity.

A greater level of flexibility and higher level of pedagogical change is afforded by using asynchronous online lessons as alternatives to face-to-face classroom on select occasions. The main motivation may be convenience (e.g., a scheduling conflict as a result of professional travel), but the outcome is the expansion of teaching/learning options and ultimately lays the foundation for more substantial change, such as hybrid instruction or a flipped classroom model. The latter will be discussed in detail in the next chapter, but what is worth noting here is that it is the work done in operationalizing the course teaching activity for the online modality that enables a hybrid or flipped classroom to be considered as a pedagogical option. Te online transition acts as a catalyst by making the instructors come up with new answers to already answered pedagogical questions or even posing new ones. This is very well expressed in the following statement by one of the subjects interviewed:

> *Online classes compel me to take a fresh look at what I'm doing and what I want students to accomplish and also to examine the options in terms of what's the best way for somebody to learn this. And I like the online approach because I think it tends, for me at least, to make the need for those questions and the questions themselves clearer. (Subj40)*

The depth of the questions and the innovativeness of answers vary, but the transition to online form makes some of those questions unavoidable. While the influences from online teaching onto overall teaching activity range from very minor changes to a complete overhaul of the approach to teaching the course, they are present to some degree in most of the cases studied. Except for two cases – an instructor completely porting the course into online form via synchronous media and another instructor not planning to teach online in the future – every subject interviewed reported some lessons learned and pedagogical changes already made or planned following transition to online teaching modality. When study participants decide to make permanent changes to the teaching activity across the teaching modes, they do so because they see the changes as pedagogical improvements – better ways to teach, better ways for students to learn, or better alignment with the trends in LIS professional practice.

CHAPTER 7

FINDINGS RELATED TO RQ3

This chapter presents study findings related to the Research Question #3: *Do faculty see any pedagogical advantages in handling specific aspects of teaching a course in one format vs. the other (online vs. face-to-face)?*

It was a part of the study design to seek cases of instructors moving courses from face-to-face to online format and continuing or planning to continue to teach in both modes. What was not a part of the study design or an anticipated finding is that there would be multiple cases with a long history of switching between the instructional modalities in the same course. For a number of the cases studied, the affirmative answer to the survey question "Have you had any experience in transitioning a course from face-to-face to online (hybrid) teaching in the two previous academic years?" does not mean the course has been only taught face-to-face prior to the recent format conversion. Rather, there is a back and forth pattern of teaching in both modalities over a number of years. The following quotes from interviews provide illustrative examples of such patterns:

> *Well, in the last eight years, I have pretty much alternated between teaching [the course] in a face-to-face classroom and some distance format. (Subj81)*

> *[The course] was moved online five years ago and I taught online for two semesters, then stopped teaching online, but then recently got back to teaching it online and face-to-face. (Subj306)*

The prevalence of ongoing alternation between the teaching modalities is, perhaps, one of the reasons that some faculty feel comfortable with both modes of instruction to the point of being unable to state a preference for one or the other, seeing no difference between the two types of classes (e.g., "*The only difference is that one group comes and sits in class and the other group watches it on the computer." – Subj36*).

However, most faculty interviewed do see distinctions between the face-to-face and the online forms of the teaching activity, noting that both have their relative advantages and disadvantages. This chapter presents the common threads regarding pros and cons of the online mode of instruction (relative to the face-to-face classroom). This is followed by a summary finding from subjects' reflections on the best ways to leverage the advantages of both teaching modalities for an optimal teaching and learning experience (as seen by instructor).

Pros and Cons of Online Teaching

While some faculty have a strong pro face-to-face teaching bias, and a few prefer the online modality, at least for the specific courses discussed, the majority view can be summarized by the following quote from one of the faculty interviewed for the study: *I just think that [face-to-face and online modes] both have pros and cons, and to me they really balance each other out." (Subj191).*

Some of the prevailing beliefs about the benefits of online modality have been already discussed in the previous chapters, but are worth re-stating here:

- It offers flexibility in terms of time (for asynchronous courses) and place (for both synchronous and asynchronous courses) for both students and instructors.

- It facilitates independent learning because it is "*easier to link things and have [students] discover stuff for themselves in an online environment than it is in an onsite environment."* (*Subj228*).
- Learning materials, such as instructor notes, tutorials and recorded lectures (including guest-lectures), as well as links to various additional web resources are continuously available to students for review.
- The extended time frame of the class session (particularly for asynchronous courses)[18] facilitates deeper engagement with the course material, chiefly through discussion.

The benefits of the extended timeframe of an online lesson compared to an on-campus lesson have been discussed earlier primarily in relationship to the use of online discussion forums. However, this is not the only advantage of week-long vs. two to three hour-long class sessions. One such advantage is in the instructor's ability to introduce new material and relevant resources continuously, as noted in this comment from an instructor who regularly updates the course "webliography" with relevant links and media resources:

> *Online students are very attentive to what I post [on course site] daily, whereas the in-person students may only pay attention when they come to class. (Subj123)*

Another advantage is that it avoids the situation of a student being unprepared for the class on a given day due to illness or some other circumstance in his or her personal life. One of the subjects illustrated this well with the following example:

> *If I am teaching on a Tuesday night and somebody had a fight with their boyfriend on a Monday night and they did not prepare for the class and they come in and they are*

[18] Even courses taught via synchronous sessions are typically embedded in week-long lesson modules that reside in the CMS and include some learning materials and activities that students can interact with beyond the timeframe of the synchronous session.

> *not ready – that's it. They miss out; they don't get the full benefit from the class, whereas a unit in online class endures for an entire week. (Subj228)*

The above quote is also a good illustration of the faculty being sensitive to the reality of students' lives outside of academic environment. This heightened awareness of the bigger picture of students' lives in online course can be explained by a couple of factors. One is the overall increase in one-on-one interactions between instructor and each student through email or other means because the students "*do not have to stand in the crowd and try to get instructor's attention"* (*Subj36*) as they do in the face-to-face classroom. Another factor, noted explicitly by several of the faculty interviewed, is that online students tend to be older than their on-campus counterparts, often with full-time jobs, families and other obligations. The combination of the increase in one-on-one student-instructor interaction with the complexities of the lives of more mature students results in students being "*much more open about personal and family matters that might interfere with the course*" (*Subj254*). The more personal view of students can be even more pronounced in courses taught synchronously via video conferencing technology that places the interaction with the students directly in the context of their lives:

> *We see each other in our home environment. That is, their kids come up and look at the camera and their pets walk across the keyboard. And you get a much more personal view of the class. (Subj81)*

The faculty quoted above also noted that the more personal view is bi-directional – the students see her in her home environment as well, which is very different from the on-campus interaction in the faculty's office.

While faculty see the higher level of one-on-one student-instructor interaction in the online environment as highly beneficial to students, they also note the extra time cost for the faculty (e.g., *"it takes a heck of a lot more time because you are expected to be on-call 24/7"*

– *Subj254*). The desire to keep the time burden for the instructor to a reasonable level has direct pedagogical implications, such as imposing constraints in terms of course assignments that reduce the need for negotiation of specifics with each individual student. For example, a subject who likes to give students flexibility to make a course assignment fit with their work or internship environment by offering high level of personalization, finds working out the details with all of her online students via email (vs. quick after class conversations in on-campus class) too time consuming and so "*had to kind of streamline some of the assignments to make them more generic*." (*Subj95*).

Course interactions for instructors are, of course, not limited to individual communication with students. Faculty attribute the larger portion of the time burden of online teaching to the effort they have to put into engaging with the whole class via online discussion, facilitating discussion engagement, building the sense of community, ensuring that instructor presence is felt throughout the course. Faculty contrast this need for regular and ongoing attention to the class, the "*always poking at people and answering questions*" (*Subj95*) with on-campus interaction with students which is bound by the class and office hours time. Most subjects interviewed made some observations about these factors making online teaching more time consuming than face-to-face teaching (e.g., *"Building that interaction and engagement is very time consuming and it is hard work that takes 2.5 times more time." – Subj233*). Although extra time spent on online teaching is generally seen as a negative characteristic of this mode of instruction, some of the faculty also note that a balanced tradeoff exists between overall time spent and the flexibility in how that time is distributed.

The interaction with students during course teaching is not the only contributor to the additional time cost of transitioning the teaching activity to online mode. The extra time needed to prepare the course for online teaching is another component of the overall time burden on the instructors. As was discussed in the previous chapter, online teaching requires greater attention to the structure and sequence of lessons, and advanced preparation of course materials, particularly if this includes production of recorded lectures and demos. Not only does it take time to produce these materials, but making changes to them requires substantially more time than changes to in-person teaching as the materials may have to be completely re-produced to incorporate the changes:

> *I think online classes are far more demanding – the preparation for online class is much more extensive from having to record lectures. If you make any changes in the class, you are going to have to go back and reflect all those changes in any lecture materials that may address that. And it takes me a long time to do those recordings… (Subj84)*

In addition to the course/lesson content revisions, the re-production of course materials can be triggered by a change in the technology platform in use at the institution. Especially in absence of adequate technical support, this can be perceived as unduly burdensome to the faculty:

> *I mean, I am very open to new technologies, but when I have to recreate the same material because the technology is changed, that can get a little frustrating. (Subj260)*

Whether it is course preparation, instructional engagement or individual interaction with students, online teaching is seen by all subjects as more time consuming.

While time is one of the biggest concerns in terms of the faculty experience of online teaching, subjects interviewed for the study also note a number of pedagogical disadvantages to online instruction. One of those is the already mentioned above reduction in ability to

personalize the assignments. The other is having to give up some of the learning experiences that can only be done in-person, such as certain hands-on exercises or field trips. For example, one subject lamented the inability to take her online reference class to the reference desk at the university library for collective hands-on exploration as she would do with her face-to-face class. Similarly, the loss of in-person presentation practice is seen as a disadvantage.

Group work is another area where many subjects see online environment as introducing additional challenges. While "*the infrastructure [for online group projects] has been refined over years" (Subj233*), including CMS group spaces, wikis and other collaborative tools, the common problems with group work dynamics are more pronounced in the online environment. The following quote expresses the typical opinion regarding online group work:

> *Well, every time I tried, I find that group projects backfire even worse in the online environment than they do in a face-to-face class. (Subj120).*

The not uncommon solution is to avoid collaborative assignments and switch to individual assignments instead. The faculty attribute the group work challenges to the loss of immediacy that exists in face-to-face interaction where members of the group bounce ideas off each other and benefit from the instructor's timely intervention when conflicts arise.

The loss of immediacy of interaction is an important characteristic of online environment that affects not just group work, but the overall discourse, particularly the discussion component of the course. As was already noted in previous chapter, online discussion tends to be more structured and formal compared to face-to-face discussion, which is more spontaneous:

> *[In-class] discussion is much more dynamic and people are able to feed off each other, whereas online it tends to be more stilted, more formalized. (Subj178)*
>
> *Clearly in onsite environment you have the back and forth between the students, it is a little bit easier to banter with people, the people are a bit more casual. (Subj183)*
>
> *They are much less inclined to respond immediately, so the energy of discussion is much more suppressed in online environment. (Subj84)*

The loss of immediacy in online environment is offset by the greater opportunity for reflection by students and "*time to think through what they want to say*", but "*the bubble of engagement is lost*" (Subj84). However, one of the subjects, who teaches via synchronous sessions, expressed an opposing view, noting the increase in the intensity of discussion engagement via chat:

> *The biggest difference is the speed of the discussion because in the face-to-face environment only one person can talk at a time or it sounds like chaos, whereas in the online environment multiple people can be chatting at one time. We can go a lot faster in an online class actually. (Subj252)*

This comment is rather the exception to the prevailing theme of loss of immediacy and spontaneity in online discussion as it relates to the more commonly used asynchronous forums.

While the loss of the "bubble of engagement" in online discussion is seen as a disadvantage of online teaching, the increased quality and depth of discussion (addressed in more detail in the previous chapter) are seen as advantages. There is also an important connection between the latter advantage and the disadvantage of the time burden on the faculty. Those instructors who make critical comments about online discussion quality or about online students in general having an "online mentality" of minimal engagement are the same instructors who may not be investing the kind of time and energy it takes to model and facilitate good discussion. The following quote from one such subject is rather telling:

> *I was never sure that the discussion online was as rich and interesting as in onsite class primarily because I couldn't - I mean, people are being present in the online discussion all the time, so if things got a little off-track or repetitive and boring, it would be sometimes a couple of days before I could get into that – and so I couldn't redirect their discussion as quickly as I could with the onsite class. (Subj110)*

Contrasting the "couple of days" before engaging with online discussion with some of the observations about the need for continued daily involvement with the course presented earlier in this chapter it is reasonable to conclude that there is a link between the two of the most salient pros and cons of online teaching: time cost (a disadvantage) and discussion quality (an advantage).

To summarize, there are a number of pros and cons to online teaching. The main disadvantages are:

- time cost to instructor;
- loss of spontaneity and immediacy of class discussion - the "bubble of engagement";
- loss of in-person student presentations;
- loss of hands-on group exercises and field-trips;
- increase in group work challenges;
- possible loss of more individualized assignments.

The main advantages of online teaching are:

- flexibility for both students and instructor;
- increase in the quality of discussion;
- facilitation of student self-directed learning;
- exposing students to modes of interaction useful in the future professional lives.

The balance between the pros and cons of online mode of teaching depends on the instructor and the institutional environment (as was discussed in Chapter 5), as well as the nature of the course. The next section presents findings on faculty beliefs regarding what makes a course more or less suited for online teaching.

Course Fit for Online Instruction

Many of the study participants made comments about the relationship between the nature of the course, in terms of subject matter or core instructional approach, and the ease of transitioning the course to online teaching format. In terms of the nature of the course, the faculty seem to draw a distinction between courses that are primarily focused on teaching specific skills and courses that are more conceptual and theoretical. Some believe that more technical, skill-focused courses are better suited for online teaching (e.g., "*learn XML that way, learn HTML this way, learn database design that way – any practical stuff" – Subj288*), while more discursive courses should be taught face-to-face. Another subject, who teaches several diverse courses, noted that for a course dealing with web design, he prefers an all-online model, but would not want to do the same for a course on school libraries because in that area *"so much of what we do with those students(in terms of their progression through the program, field experience and all that) depends on us getting to know them well, that I would not want to give up the face-to-face completely"* (*Subj128*), and would prefer a hybrid, if not fully face-to-face, teaching modality. The latter is echoed in the comments from a subject from a different institution, who stated:

> *We have a very successful library instruction course taught online. It beats me how they do that online. I cannot do it online" – Subj222*

The opposing view is that "*classes that are more discussion oriented are better online" (Subj120)*, while skills based courses that require a lot of exercises and instructor's guidance are better suited for face-to-face teaching, at least in terms of what students can learn directly from the instructor as an expert. This sentiment is echoed by a faculty who teaches a course on GIS online, but observes that *"it is a technical course so there was always a kind of reservation about trying to [teach it online]"* (*Subj217*), noting that he finds it much more challenging to provide the same level of hands-on instructional guidance for practice lab exercises for online students. A colleague from another institution agrees, noting that online instruction is constrained by technology to be somewhat unidirectional, whereas to support learning of specific skills in an online course, there is a need for *"interactive tools where you make changes to something and then see what actually happens if you make the changes"* (*Subj263*).

The role of adequate tools and resources in making online teaching of a course feasible is something several of the study participants emphasized in their comments. For example, a faculty who teaches several subject-specific reference courses, notes that she could not easily move them online until there was an accumulation of *"a critical mass of resources available electronically"* (*Subj256*). Similarly, her colleague, who teaches a number of courses in health and medical librarianship, stated that what made online teaching feasible for her was the historically early availability of digital resources in the health sciences. The use of web-based digital library and archiving tools is the foundation of a course on digital libraries that is taught interchangeably in either online or hybrid form (refer to chapter 5 Case 2 for details).

While availability of digital tools and resources can be seen as the objective factors supporting the teaching of a particular course in online format, a lot depends on the instructor's subjective view and teaching style. For example, the above referenced instructor of a digital library course firmly believes that "*in LIS education the main objective should be the transfer of useful knowledge and skills, and that more theoretical approaches are commonly ineffective"* (*Subj40*). This view shapes how he designs and teaches his courses with emphasis on practical exercises and limited discussion. Conversely, another study participant (teaching courses in youth-oriented librarianship) prefers to teach in a "very qualitative" style of dynamic conversation with her students, which she applies to online teaching as well and notes that "*there is no way you could teach programming the way I teach – that wouldn't work"* (*Subj183*). Both of these individuals feel that they are successful as online instructors – they teach online and across modes of instruction in a way that fits their style and pedagogical preferences. These different styles require different teaching tools and methods, but so long that there is a match between the mediating artifacts of teaching activity and the subject-object interaction, it would seem any type of course can be successfully taught online.

Hybrid Teaching – Practice and Vision

All 25 subjects interviewed were asked to reflect on what they saw as the optimal distribution of course teaching activity across the face-to-face and online format regardless of whether or not there was any element of hybridization in their current teaching. Only one participant stated she would prefer to teach one hundred percent face-to-face and two others[19]

[19] These cases are from interviews excluded from detailed case analysis presented earlier

could not envision the course not being fully-online, citing wide (including international) geographical dispersion of the institution's students. Another subject expressed a very negative view of hybrid instruction:

> *I would not do that – I think hybrid is one of the worst things you could do – you should be fully-online or fully in-person. I think hybrid tends to bring the worst out of each environment. I'd never do a hybrid…. In hybrid environments students get very, very lazy… at least this has been my experience with the undergraduates – they get very mercurial engagement in what you are trying to teach. (Subj123)*

Finally, two subjects made statements to the effect that they did not see any difference between the formats and thus could not state which components of teaching activity they would prefer to be face-to-face or online. To quote one of them:

> *It is not the delivery method, but the conscientiousness and professional ability of the instructor that make a difference. The technologies that we use simply amplify the abilities, the desire, the enthusiasm, the motivation that the instructor already has. (Subj36)*

With the above exceptions, the majority of the study participants see hybrid teaching as a good way to leverage the relative advantages of each of the face-to-face and online modes of instruction for an optimal teaching and learning experience. The general consensus is that face-to-face introductions of class members would be beneficial in terms of class community building. Group work and discussion, as well as some technical demonstrations and exercises *"where it would be beneficial to have somebody wandering around and answering questions" (Subj263)* are best suited for face-to-face mode. *"Everything else can go online" (Subj263),* which includes reading, reflection, independent project work and viewing lectures and other materials prepared or selected by the instructor.

Flipped classroom model

The flipped classroom is an emergent idea and something many of the faculty interviewed for the study are interested in exploring. The flipped classroom model is

generally seen as an expectation that students would explore learning materials (lectures, demos, readings) prior to class session and then come to class prepared to engage in in-depth discussion or practical application exercises. While the expectation of reading in preparation for class is common in most traditionally taught courses, the key feature of a contemporary flipped classroom vision is that the lecture or its equivalent is made available to the students online and students are expected to familiarize themselves with those materials prior to class session. Instructors then use their face-to-face time with students for deeper engagement with the subject matter. This model is seen as a better match for students' needs, *"not time wise, but in terms of their intellectual interests"* (Subj95), and is a part of a growing recognition that in-class lecture may not be the best way of teaching:

> *I think I would endeavor to operate under some version of the flipped classroom model. I don't think I would go back to just giving lectures. I think I would try and deliver a lot of the material asynchronously and us the classroom for discussion and for collaborative assignments – not just the traditional sort of 'sage on the stage' stuff. (Subj40)*

The goal is:

> *to maximize the interactive time in the classroom. So rather than you lecture and then they ask questions, you have them watch the lecture as part of their homework and come prepared with the questions so that you can spend more time discussing. (Subj260)*

The flipped classroom approach, as well as other hybrid teaching scenarios, is based on the idea that the information delivery part of teaching (and its corollary information receiving and processing for students) is best handled online. Whereas the sense making and application components are better handled through immediate classroom interaction. While there are some differences of opinion among the study participants regarding the advantages and disadvantages of placing the sense-making (discussion) part of teaching and learning in

either online or face-to-face mode, there is a clear consensus that information presentation is best done online.

Hybrid instruction envisioned

While the flipped classroom model can be used with the traditional on-campus course scheduled to meet every week, it can also be part of a hybrid course that is structured with less frequent face-to-face meetings, such as in this vision presented by one of the study participants, who currently teaches an online course in the fully asynchronous mode:

> *One scenario I can think of is if everyone were to come to [campus] for one week out of the month for one class period. And in that class period could do a lot of the discussion. And then the remaining three weeks of the month would be working on assignments… and doing the readings in preparation for the next time that we met. (Subj178)*

This flipped/hybrid classroom models offer uniform distribution of different teaching and learning activities throughout the academic term. Other models that faculty believe would work well split the course term into distinct face-to-face and online portions with various schedules based on the specifics of the course. The three patterns most commonly suggested by the study participants are:

1. face-to-face – online;
2. face-to-face – online – face-to-face; and
3. online – face-to-face – online.

The first is influenced by exposure to the LEEP program at the University of Illinois, which some of the study participants had either as doctoral students or part-time instructors. The idea is to bring students to campus at the start of the semester for some intensive learning activities as well as community building (e.g., *"bringing the students on campus for even something as short as the weekend at the beginning of the class would help establish*

relationships" – Subj84). The second model, was most frequently mentioned by study participants as something that would work well by providing the students with the introduction to the course and engagement in discussion of more complex concepts (e.g. *"all those contextual issues, social, political and economic related to publishing" – Subj306*). The course could then move into online mode for independent study and work on assignments, followed by a final face-to-face session for presentations and other course wrap-up activities. The third model can offer the advantage of allowing students to start by exploring the course material and thus gaining more from the subsequent face-to-face discussion (e.g., *"getting into the material, getting started and then I'd have a face-to-face session maybe the third week of the semester" – Subj252*). This would be followed by a return to online mode for independent learning, work on assignments, and an online discussion made better by community building and trust established during the face-to-face interactions.

Hybrid instruction practiced

All of the models of mixing online and face-to-face instruction in the same course discussed above represent "in the perfect world" visions. The practical reality of hybrid or blended instruction, as it is reflected in the study data, differs significantly from this vision. The study participants who described their teaching of the course as hybrid typically meant not mixing of online and face-to-face elements within one course section, but rather some sort of common element across two course sections (online and on-campus) taught during the same academic term. This cross-section blending can be either synchronous or asynchronous.

The first is, essentially, a distance classroom extension approach, which has been discussed at some length in Chapter 5, and can be illustrated by the following quote:

> *I have taught it as a hybrid course whereby I lectured to about 25 students and I had up to 15 students who remoted in from their homes through software called Elluminate…and I had a graduate assistant who manned the computer, and what they did – they would text the GA and she would raise her hand as if she were a student in the class and ask their question for them. (Subj315)*

This approach is meant to "*blur the distinction between online and classroom as much as possible"* (*Subj231*), and it can be argued that "hybrid teaching/learning" is a less appropriate way to describe it than the term "distance teaching/learning."

The use of the term "hybrid" is probably more appropriate for scenarios that blend asynchronous activities across on-campus and online course sections. The most frequent way of achieving this cross-section hybridization is placing online and on-campus students into the same online discussion forum (as was described in previous chapter), but can also include mixed (online and on-campus) project groups:

> *They do everything that the face-to-face students do. I mean if there's a discussion board, I blend them all into the same discussion board. They have group projects, I just include them along with everybody else and I don't make any distinctions between the online students. There's one grade book. It's one discussion set. The university considers it two sections. But I merged the sections, yes. (Subj222)*

If in a distance classroom extension scenario, the real-time class session becomes the common denominator of course section hybridization, with this approach, the common denominator is the online component of the course. This is particularly well illustrated by one of the cases, in which the syllabi for both face-to-face and online versions of the course have a section titled "learning methods", which is broken down into "synchronous learning" and "asynchronous learning". The language for the "asynchronous learning" section is identical in both syllabus versions and includes reading and homework assignments, use of

online learning modules, and participation in class discussion through the course CMS site. Although the syllabus for the course in which synchronous learning occurs face-to-face does not identify the course as a hybrid or blended course, it clearly is.

This is probably the most common path for hybridization of instruction – inclusion of online elements in a course that is taught on campus. The proportion of online components varies, but there are clear indications in the study data that some level of hybridization is present in most cases. The analysis of both interviews and syllabi collected as part of the study suggests that transitioning the teaching activity to online format contributes to growth in the use of online teaching across both modes of instruction. This growth may be incremental, but the trend appears to be in the direction of more teaching and learning occurring online.

CHAPTER 8

DISCUSSION & CONCLUSIONS

Online teaching is an increasingly common and growing part of college teaching. This study used LIS programs to take an in-depth look at the role of online teaching technologies and methods in faculty practice with attention to the institutional context and its impact on the teaching activity. The study data provides clear indications that online teaching is ubiquitous across the LIS programs with a third of current full-time LIS faculty engaged in online instruction. Not only is online teaching prevalent in the field, but there are ongoing efforts to increase online course and program offerings (41 out of the 44 institutions surveyed have faculty with recent experience in transitioning courses to an online modality). Thus the study findings offer a solid basis for discussion of the role of online teaching in pedagogical practice.

Current and Emergent Trends in Online Education

Hybridization of teaching

The rapid growth in online and hybrid learning models is one of the key general trends in higher education (Johnson et al., 2013). The study findings are consistent with this trend, demonstrating not only the prevalence of online teaching, but presence of some online elements across all instructional modalities. Even courses categorized as face-to-face typically rely on the use of a web-based CMS platform which acts as a repository of teaching

materials and other course-related documents, as well as a tool for communication and assignment submission. Much of the course information and communication flows online through web-based technologies, regardless of course teaching modality. Not only is information, such as readings, pushed to students through the CMS, but the discussion of subject matter increasingly straddles physical classroom and virtual learning environment for face-to-face courses.

Blending on-campus and online course sections (either through distance classroom extension, or through online discussion and group work) is the most common current practice. These practices may be driven more by the instructors' desire to manage the teaching load better than by pedagogical considerations. However, when asked to envision a pedagogically optimal mix of online and face-to-face components in a course, study participants presented a variety of hybrid models differing from their current practices. The flipped classroom model is one that is clearly gaining popularity, with its idea of delivering information online so students can study independently in preparation for class and using classroom time for in-depth discussion and highly interactive group learning activities. Flipping the on-campus classroom effectively makes the course a hybrid one.

Other visions include variably structured sequences of face-to-face and online sessions tailored to the needs of a particular course. Although the majority of study participants see pedagogical benefits in hybrid instruction, no single hybrid model or set of models emerged from the study. The common themes are: (a) there are pedagogical benefits to distributing teaching and learning across face-to-face and online modalities, and (b) there

is an optimal distribution for every course.[20] What is optimal depends on a combination of the course taught, instructor's pedagogical beliefs and preferences, as well as available technology and other factors of the teaching environment. In activity theoretical terms, the optimal hybrid model is the one that allows for a healthy balance in the teaching activity system. This requires a well-chosen set of tools (both technology and teaching methods) that mediate the interaction between the subject (instructor) and object (course), as well as a combination of rules (policies and organizational culture), community interaction, and division of labor within the institution supporting the teaching activity. Bridging the gap between the vision of optimal hybrid instruction and current practice can be achieved only through adjusting the entire activity system, which requires a high degree of flexibility from individuals and the institution, and a high degree of interconnection between the system elements.

As instructors and academic institutions continue to adapt to the opportunities and challenges presented by an increase in the online component in teaching, the line between online and face-to-face instruction continues to blur. It is hard to imagine a course that would not include some online components, and this study confirms that there is a significant penetration of online elements into on-campus courses. For the past two decades, educational discourse was framed in terms of online versus face-to-face instruction; it may now be more appropriate to talk about a continuum of hybrid and fully-online teaching.

[20] This is based on the assumption that there are no serious practical obstacles to students coming to campus, such as wide geographic distribution of class participants. In the latter case, a fully-online model is the most suitable.

View of instruction as synchronous or asynchronous

A different and perhaps more appropriate framing of the discourse on contemporary pedagogy is to discuss teaching and learning activities as synchronous versus asynchronous, rather than online versus face-to-face or hybrid. In terms of pedagogy (i.e., the specific actions of the instructor), teaching students who are sitting in front of the instructor in the classroom and teaching them via robust videoconferencing software have more in common than the latter and teaching students asynchronously by creating online learning environments complete with discussion forums, learning guides and collections of resources.

At present, technology still imposes some limitations on the flow of mediated synchronous course interaction. For example, simultaneous speaking by more than one person or immediate interruption of the speaker, which frequently occur in face-to-face discussions, are not well supported by current technology – the virtual microphone has to be passed around in a more formal and structured fashion. Likewise, the number of video feeds simultaneously displayed on the screen is typically limited to far less than the typical number of class participants. These limitations notwithstanding, many study participants note that videoconferencing technologies have seen a dramatic improvement in recent years and continue to evolve towards increasingly seamless, real-time interaction. It is reasonable to suppose that in the near future, the technology will develop to fully support a synchronous 'bubble of engagement' via media in much the same way it occurs in face-to-face setting.

Another factor that may contribute to a future increase in the use of mediated synchronous interaction in teaching across different modalities is the growing prevalence of mobile technology, with people increasingly relying on smart phones and similar devices for interactions with others and with information. This trend is well illustrated by a recent Pew

Research report (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013) on the use of technology by teens that documents high cell phone adoption rates, growing use of smartphones, and an emerging generation of "cell-only" internet users. Similarly, some study participants noted the increasing reliance on mobile technology by LIS students and commented on the implications of this trend for the preferred mode of participation in course interactions.

While technology developments afford an increasing array of synchronous teaching solutions, pedagogical innovation (i.e., new approaches to accomplishing the same educational objectives) is much more pronounced in asynchronous modes of teaching. Synchronous online teaching essentially allows instructors to continue to teach the way they have become accustomed to in the physical classroom (Pullen, 2012). Conversely, the nature of asynchronous teaching requires some level of pedagogical change, and compels instructors to consider not only new ways to deliver content, but also novel designs for the active learning process (Jaffee, 2003). Much of the literature on online pedagogy emphasizes the role of technology as a driver of pedagogical change (e.g., Andrews &Haythornthwaite, 2007; Conole & Alevizou, 2010; Jaffee, 2003). While technology certainly plays an important part in shaping online teaching practice, this study demonstrates that pedagogical innovation takes place not so much from specific technologies, but arises from thinking through the answers to the question: "What would be the best way for students to learn?" As discussed above, some recent developments in technology actually enable continuing old teaching practices. In other words, technology *per se*, or merely moving a course online do not necessarily force a pedagogical change, especially in synchronous instruction as it is practiced by the study participants.

Innovative changes in teaching happen in the arena of teaching methods, rather than in using specific technologies. For example, an instructor may decide that it is pedagogically advantageous to have students prepare virtual presentations. This teaching method change can be supported by a variety of current technologies, and, in fact, instructors often leave the choice of technology to the students. Technology affords pedagogical change, but cannot on its own create a shift from the old-school transmission of knowledge model of instruction (McLaughlin & Lee, 2007). It is a shift in teaching mode, not just to an online format, but to an *asynchronous* online modality, that acts as a catalyst of innovation and creates the impetus for instructors to evaluate their teaching approaches and consider action-level changes in teaching activity, departing from the traditional information-transmission model of instruction.

One of the pedagogical changes associated with teaching online that is well documented in the literature is the shift in beliefs from a teacher-centered transmission of information model of instruction to student-centered instruction, which places more responsibility for learning onto the students (e.g., Conceicao, 2006; Jaffee, 2003; McQuiggan, 2012; Tallent-Runnels et al., 2006). The findings of the present study are consistent with these observations and add further evidence of the connection between these changes in pedagogical beliefs and the emergence of sustained innovation (i.e., applied in different modalities and for different courses) in teaching practice. In all cases of clear innovation documented in the study, instructors made a conscious shift in their teaching roles towards facilitating student learning, while reducing reliance on lecturing in favor of developing learning activities supported by various learning objects and tools.

The MOOC trend

A discussion of contemporary online education would not be complete without considering Massive Open Online Courses (MOOCs), which are seen by many as one of the most significant and transformative current changes in education (Johnson et al., 2013; Hyman, 2012). A MOOC is a large-scale (thousands of students) web-based course offered free of charge and consisting of lectures prepared by leading experts in the subject matter, accompanied by automated assessments and peer learning (discussion forums, study groups, peer grading). The concept gained popular recognition in 2011 after the much publicized launch of Stanford University's *Introduction to Artificial Intelligence* course taught by Google's Peter Norwig and Sebastian Thrun, which attracted over 50,000 students (Markoff, 2011). While educators debate the merits and pitfalls of the MOOC model[21], universities continue to partner with companies such as *Udacity* (www.udacity.com), *Coursera* (www.coursera.org), and *edX* (www.edx.org) to offer an increasing number of courses to world-wide student audiences. Recently, several LIS courses have been offered through *Coursera*, taught by professors from ALA-accredited programs.[22]

In light of the study's findings, the MOOC trend can be looked at in two ways. On the one hand, it can be seen as a repackaging of the old lecture-based instructor-centered model. It can be argued that there is little difference, other than scale, between a MOOC and a "standard" online course built on the model of recorded lecture + assignments + forum discussion, examples of which can be found in the present study. As such, it offers little in

[21] Articles and blog posts in publications such as *Chronicle of Higher Education* (www.chronicle.com) or *Inside Higher Ed* (www.insidehighered.com) are too numerous to cite individually.

[22] Examples include courses from UNC-Chapel Hill and University of Washington. See www.coursera.org for details.

the way of pedagogical innovation, though novel in its scale of delivery and access to learning opportunities. On the other hand, MOOCs can be treated as massive collections of high quality learning objects and resources made available to instructors for inclusion in their courses. According to Johnson et al. (2013), the latter is closer to the original conception of MOOCs as a diverse set of content contributed by experts aggregated into a central repository and made available for "remixing". MOOCs as learning object collections, rather than packaged semester-long courses, would fit well with the variety of hybrid instruction models and could contribute to innovative teaching practices. Many of the study's participants talked about either finding assorted learning objects (e.g., instructional or concept elaboration videos) on the open Web or creating them for their courses. Some also commented on the time and effort required to locate or produce these materials and resources. In addition to micro-lectures that could be incorporated in a variety of courses, MOOCs also often contain interactive online exercises and self-scoring tests. Developing these items takes substantial technical expertise and time that the majority of college professors do not have. Many LIS courses, particularly those dealing with specific technology skills could benefit from incorporating various interactive learning tools that are presently missing, according to some of the study participants.

MOOCs as vast learning object libraries can become important contributors to the quality and diversity of online instruction, freeing instructors from the burden of producing learning resources and thereby being able to concentrate on interacting with students. In addition, the greater availability of high quality learning objects can be a significant driver of pedagogical innovation, enabling a greater variety of hybrid teaching and learning models. The MOOC trend, as well as the overall growth in diversity and availability of web-based

learning resources, creates new challenges and opportunities for LIS education and practice. Building and using these massive digital libraries will require the expertise of well-trained LIS professionals and suggests the need for a greater emphasis in LIS education on digital libraries and working with a burgeoning variety of resources, as well as preparing graduates to bridge the gap between educators and these continuously-changing teaching resources.

Study findings and existing online education literature

As noted above, the study findings are largely consistent with existing literature which notes that online teaching tends to lead to shifts in instructor role and greater student-centeredness of teaching. The study also finds little support for the notion that technology in itself is a driver of pedagogical change. The following paragraphs summarize other common themes in the online education literature that have been confirmed/expanded or contradicted by the study findings.

There is a consensus in the online education literature that teaching online is more time consuming than face-to-face teaching, with intense effort required from instructors for both course preparation and teaching (Birch & Burnett, 2008; Conceicao, 2006; Lloyd et al., 2012; McQuiggan, 2012; Shea, 2007). This theme generally overlaps with the observation that teaching online involves significant advance planning and preparation compared to face-to-face teaching. Study findings are consistent with both of these themes. Faculty interviewed for the study observed that online teaching required additional effort in course design, with careful attention to structure and sequencing as well as preparing teaching materials (such as pre-recorded lectures). The greater intensity of engagement with the course, ~~i~~ncluding a high level of interaction with students, was also noted by most study participants.

The study findings not only support the observation that there is a "disjuncture between Web 2.0 technologies and current educational systems or teaching practices" (Conole & Alevizou, 2010, p. 43), but also offer some explanations for its persistence. One explanation is in the combination of certain academic policies, such as those requiring the same syllabus for both online and on-campus versions of the course with the persistence of a lecture-based model of teaching. One or both of these situations were present in many of the cases studied and are obviously incompatible with innovative pedagogies, regardless of available technologies. For example, even if a Web 2.0 tool, such as a wiki or a blog, is available as a part of an institutional CMS and even if an instructor sees the value in using the tool for an online course, this may not be possible due to existing policy. Similarly, emphasizing lectures takes the focus away from participatory knowledge-building approaches afforded by Web 2.0 technologies. The desire to mimic face-to-face interaction, rather than focus on different modes of interaction better aligned with and supported by current web technologies is another reason for the continued gap between what technology affords and pedagogical practice. Part of the problem is that the majority of college faculty neither have the time, nor are encouraged by the institutional culture to find tools better suited for web-based interaction and explore different pedagogical options associated with the use of those tools. With few exceptions, study participants relied on institutionally-provided and supported "staple" technologies for teaching online courses.

Bridging the technology-pedagogy gap requires instructional support from the institution. While purely technical support with the use of institutional CMS platform and videoconferencing tools is generally available and adequate, support in finding alternative technology-pedagogy solutions is lacking. It is well recognized that college teaching practice

is largely influenced by instructors' own experiences as students (see McQuiggan, 2012 for review), which leads to replication of teaching methods (e.g., lectures). It is not reasonable to expect individuals to create innovative pedagogical solutions without exposing them to ideas of what is pedagogically and technologically possible. In the absence of such exposure and help applying pedagogical innovation supported by available technology, the formulaic approach to online teaching of recorded lecture + written assignments + discussion forum will persist.

The limitations of the above "formula" for online instruction are obvious and are, in part, rooted in online course development approaches. The vast majority of the study participants stated that preparing a course for online teaching had been an individual effort. This contrasts with the picture of team-based course development that is often presented in the literature as being a prevalent and expanding approach (Hixon, 2008; Oblinger & Hawkins, 2006; Xu & Morris, 2007). When faculty members act as "lone-rangers" (Bates, 1997) in online course design and teaching, most would naturally gravitate to familiar and institutionally "standard" approaches. Few would venture into pedagogical and technological experimentation, particularly if this is not encouraged by institutional policy or not adequately supported in terms of instructional design and technology staff or faculty training. To quote one of the study participants, *"instructors need to be outfitted with tools that they can use in order to create various kinds of learning objects. ... but no such tool set exists, … and most institutions that are offering online programs that aren't doing that and that's a mistake"* (Subj40).

Lack of adequate technology training has been cited in the literature as one of the barriers to online teaching (Birch & Burnett, 2008; Lloyd, 2012; Marek, 2009; Schifter,

2000). While the study findings confirm that faculty desire improvements in instructional design and technology support, this is hardly a barrier to online teaching engagement. With institutions increasingly requiring teaching in both classroom and online modes, teaching online is no longer a choice, but a necessity. Study participants consistently pointed to institutional requirements or expectations for online teaching. This suggests that the entire line of barriers-to-faculty-engagement-in-online-teaching research is losing relevance and should be reframed as 'factors of faculty satisfaction with online teaching engagement'. The present study suggests that these factors include a mix of personal and institutional characteristics. Based on the study, satisfaction with online teaching can be attributed to either individual curiosity and desire to experiment with technology and pedagogy combined with freedom in decision making, or a well-defined institutional online teaching policy combined with dedicated instructional design and technology support, as well as interaction with peers. Conversely, most dissatisfied faculty voices come from institutions where the online teaching mandate is strong, but the culture of peer support is weak and instructional design support is lacking. These observations indicate directions for future research, as well as suggestions for practice.

Methodological Contributions: Application of Activity Theory Framework

The study relied heavily on Activity Theory and Activity System as the foundation for research design and analysis of study findings. The common applications of this theoretical framework in research have been discussed at length in Chapter 2. What distinguishes the present study from related work is the breadth of the application of activity

theoretical concepts and use of the entire range of the activity theoretical models for multi-level problem analysis, as elaborated below.

Combining Activity System and hierarchy of activity analysis

The majority of research studies based on Activity Theory utilize a sub-set of activity theoretical concepts and models. Owing to its roots in education research, Activity System (Engeström, 1999a, 1999b) has been a popular choice of analytical framework for studies on education-related topics (e.g., Forbes et al., 2010; Lloyd & Irvine, 2005; Russell & Schneiderheinze, 2005; Scanlon & Issroff, 2005). In the areas of HCI and systems analysis research, the hierarchy of activity analysis (breakdown of activity into actions and operations) is frequently employed (Bardram & Doryab,2011; Bedny & Harris, 2005; Collins, Shukla & Remiles, 2002). In discussing activity-theory based design of learning environment, Jonassen and Rohrer-Murphy (1999) include suggestions based on both component-of-activity and activity-context views. These guidelines have been applied in some design-focused research (e.g. Uden, 2007). However, I am not aware of any published studies that combine hierarchy of activity and the activity system as ways to analyze teaching practice to increase the richness of study findings. In the present study, the construction of activity systems for each case was followed by the analysis of the hierarchy of actions and operations that comprise the activity. The latter provided a detailed explanation of how the changes in the system occur, distinguishing between action-level and operation-level changes in system evolution from the "old" to the "new" state. On the other hand, keeping the entire system of activity in mind allows for a better explanation of the influence of various system elements on discrete actions that comprise the activity and how those actions are operationalized. The combination of these two levels of analysis offers a truly holistic view

of activity, while highlighting the nuances of interconnections between the components of activity and the elements of activity system.

The addition of hierarchy of activity analysis, uncommon in education-related studies, allowed identification of pedagogical innovation as an action-level change in the teaching activity. This insight underscores the significance of non-tangible mediating artifacts (e.g., pedagogical beliefs and teaching methods) in teaching activity evolution and contributes to framing future research in the area of pedagogical innovation. Embedding the hierarchy of activity analysis in the analysis of the activity system illuminates the role which different elements of activity context play in shaping activity structure. Such a two-level analysis of activity can prove useful in other studies seeking to analyze various complex activities and their contexts.

Analysis of sets of Activity Systems

Analysis of sets of Activity Systems for cases from the same institution employed in the study added a third layer of analysis focused on elements of the institutional context. This type of analysis differs from the approaches used in prior research. A comparison of Activity Systems among several cases has been used (e.g., Russell & Schneiderheinze, 2005) as well as comparison of Activity Systems for different contexts (e.g., Baran & Cagiltay, 2010; Grossman et al., 1999). The present study introduced the "meta-cases" based on an analysis of sets of related individual cases. These "meta-cases" broaden the scope of analysis by looking for similarities of patterns in systems of different activities carried out in the same context. This approach enabled analytical isolation of institutional influences on teaching activities and allowed discussing them in more general terms. The findings from this third

level of analysis can transfer not only to activities within the same context, but to activities in different contexts that display similar system patterns to the ones studied.

Such application of activity theory – combining two levels of case analysis, individual and instructional – may prove useful in a number of research and practice projects concerned with organizational influences on activity. In the present study, this approach provided a foundation for developing recommendations for practice at the institutional level.

Study Limitations

The study, by design, was limited to LIS education. While there is a sufficient topical variety in this field to support transferability of the study findings to other areas of education, their applicability may be limited to graduate professional education. Some study findings may be specific to this educational level and not be as applicable to teaching undergraduate courses.

The study design was based on the assumption of a one-time conversion of a course previously taught face-to-face to online format – a scenario that emerged from the preliminary studies described in Chapter 1. However, in a number of cases in this study, the course underwent several transitions of format over the years. Thus, the most recent conversion may not have been the first and may have contained "legacy" pedagogical solutions from previous iterations. Another assumption (and inclusion criterion for the study) was that the conversion to online mode would be recent (within the last two academic years). However, in some cases, the interviews revealed that the transition to online teaching of a course discussed actually dated back five years or more. These unexpected patterns have complicated identification of instructional mode change influences in some of the cases.

Moreover, they resulted in lack of uniformity of activity evolution scenarios with many cases differing from the researcher's expectation.

The flexibility built into the study design allowed the researcher to overcome this limitation and adapt the analysis to real-world complexity. While having a set of cases that follows the same sequence of transitions would have made the task of data analysis easier, it also would have resulted in a less rich and diverse data set. The greater than expected variety of patterns of evolution of teaching activity may also explain the innovation-catalyzing effect of the transition to online teaching being less pronounced than in preliminary studies. It should not be surprising that the pedagogical innovation effect from the most recent instructional mode transition is modest in cases of multiple mode transitions, with the online form of teaching activity being not as novel for some of the study participants. In these cases, the main impact of format change may have occurred earlier or may have been distributed over multiple instances of transitioning from face-to-face to online teaching, and back.

From the perspective of Activity Theory, incremental innovation can be seen as a part of continuous evolution of the activity. However, the study represents a snapshot in time. This limitation has been partially offset by analysis of different past versions of course syllabi and through interview questions aimed at gathering both recollections of the past and future plans. Despite these efforts to effectively extend the research time frame, the study findings are nevertheless limited compared to those that could be obtained from a longitudinal study.

The number of cases analyzed for the study is a fraction of all instances of online teaching in LIS education and may not reflect all the existing practices. Further studies with

larger sample sizes would be needed to capture the entire pedagogical range within the discipline.

The above limitations notwithstanding, the study findings paint a rich picture of the role of online teaching in pedagogical practice, and highlight aspects of the transition to online mode that act as drivers of pedagogical innovation. The study also identified a number of common patterns of tensions in activity systems that appear to hinder the evolution of teaching activities. These findings provide a reasonable foundation for developing the recommendations for practice presented in the following section.

Recommendations for Practice

The changes in teaching modality between face-to-face (or, rather, hybrid with limited online components, as discussed earlier in this chapter) and fully-online should not be seen as one-time transformations, but rather stages in the continuous evolution of teaching activity. Adoption of this view by both instructors and institutions is essential to achieving optimal pedagogical solutions that overcome challenges, and fully leverage the opportunities of each mode of instruction. Below are specific recommendations for individual instructors, as well as educational institutions.

Recommendations for instructors

- The course, particularly when it undergoes a transition of format, should not be viewed as a final product, but rather an evolving entity.
- From the above follows that course design should be modular and flexible, consisting of smaller, individual components that can be easily modified to better meet students' learning needs in future iterations of the course and fit well with

different instructional modalities. Producing full-length lectures is incompatible with these ideas. Putting effort in developing micro-lectures and non-lecture teaching materials would be more appropriate and useful in the long-term.

- When moving courses to an online teaching mode, it is important not to attempt replicating classroom teaching, but to be open to exploring alternative solutions that best achieve the learning objectives of the course in the new modality. This exploration should be guided by the question "what is the best way for students to learn ____, given the available technology and learning resources".
- It is essential to accept that the role of the instructor in higher education continues to change, particularly since the advent of fully-online and hybrid modes. The shift from conveying information to facilitating learning does not diminish the significance of faculty in the educational process. However, individual instructors should recognize that, in addition to their domain expertise, they need to invest in developing pedagogical expertise and be open to adopting new teaching methods.
- Engaging in open and active discussion with faculty peers, as well as consulting with experts in pedagogy and instructional design should be the norm, not the exception. Instructors will benefit from extra effort in building a peer community and seeking external expertise when those are not readily present in the institutional environment.

Recommendations for academic institutions

The recommendations for institutions are related to those for individual instructors, as they are guided by the same key ideas that teaching activities differ from each other and are

constantly evolving with each format conversion being just an iteration in a continuous process.

- The institutions should recognize that there is no "one size fits all" model for online or hybrid instruction. This means ongoing critical evaluation of established policies and practices, and having a willingness to modify the ones that do not fit well with all or some of the current teaching activities.
- Institutions in the early stages of moving into online teaching would particularly benefit from taking a systems view of teaching activity and use that as a guide for building a healthy online education ecology, complete with flexibility in policy and infrastructure.
- While it may not fit with the current practices of academic institutions, there is pedagogical value in moving away from defining courses as online or face-to-face, and instead allow and encourage a variety of hybrid instructional models. Leveraging the relative advantages of face-to-face and online modes can both promote learning and increase faculty satisfaction with the teaching experience.
- Faculty development efforts should go beyond just providing training in specific technologies, but include ongoing opportunities to develop pedagogical expertise and explore new pedagogical solutions.
- Technology support should be expanded beyond providing a basic infrastructure of institutional CMS and a few additional "standard" tools. Institutions should invest in developing collections of various educational technology tools and resources, as well as educating faculty about the variety of available technological solutions for specific pedagogical needs.

- For programs with extensive and expanding online course offerings, it is essential to provide dedicated IDT expertise to program faculty. Faculty need IDT consultants who have sufficient understanding of the domain (e.g., ILS) as well as knowledge of pedagogical solutions appropriate for different levels of education and desired learning outcomes.
- In addition to providing instructional design and technology support, institutions should also foster collaboration among the faculty on pedagogy through structuring and rewarding peer support and sharing expertise.

To summarize these recommendations in Activity Theory terms, the successful evolution of teaching activities within the institution requires flexibility in rules combined with developing community and having an appropriate division of labor, as well as increased diversity of mediating artifacts. For individual instructors, the emphasis is on selection of mediating artifacts, both tangible and intangible, which best supports student learning and openness to changing how the teaching activity is carried out.

Future Research

This exploratory study not only offers new perspectives on the pedagogical practice, but also raises questions for future research. Some of these questions can be seen as extensions of the current study to different environments; others emerge from the study findings. Several possible directions for future research are presented below.

The study findings revealed a number of patterns of problems surrounding teaching activities. These findings could be used to develop interventions at both individual and institutional levels. The multi-level, Activity Theory-based analysis used in the study serves

as a foundation for intervention development, as well as a framework for evaluating the intervention outcomes. This model could also be used by other researchers to analyze a problem of interest, develop solutions, and evaluate the effectiveness of any solutions that have been implemented.

The data for the present study came primarily from institutions with a long-established online teaching presence. It would be interesting to conduct a similar study that focused explicitly on institutions still in the early stages of developing online offerings. First, the patterns of findings may be different for institutions that do not have "legacy" policies and practices, and that are well-positioned to take advantage of the most novel technologies and pedagogies. This would be analogous to well-documented differences in technology adoption between developed and developing nations, with the latter using more modern technologies in more innovative ways. Second, studying the institutions that are just beginning to build their online teaching ecologies can present opportunities to influence the development of such ecologies, using activity theoretical analysis of the context as the basis for recommendations.

One of the interesting findings of the present study is the variety of visions for hybridizing instruction that emerged from faculty interviews. Studying hybrid instruction in terms of different models adopted and their fit with various teaching scenarios seems to be a fruitful and useful area for future research. For example, a study could be developed that compares applying similar models to teaching different courses or, conversely, variations of hybrid approaches to teaching similar courses could be analyzed. These studies could be framed from the perspectives of instructors, students or institutions, as well as some combination of these.

The present study has been conducted with mindfulness of practice applications. The future studies, such as the ones outlined above, could continue this strong orientation towards practice.

Conclusions

The present study contributes to existing research on online teaching by presenting a detailed analysis of teaching activity as it evolves through instructional mode changes. This exploratory study highlights the role of online teaching in pedagogical practice and identifies the elements of teaching activity evolution that propel pedagogical innovation, with a definition of innovation as action-level change emerging from the study findings. The study represents a novel application of Activity Theory concepts and models to the analysis of a complex activity (college teaching across different modalities) with attention to both structure and context of activity. This analytical approach can be applied in a number of future studies situated in different problem domains.

The study findings emphasize the need for a greater variety of teaching models to be developed and implemented. The significance of changes in methods of teaching, rather than eLearning technologies, as pathways to pedagogical innovation are illustrated and analyzed. A separate analysis of institutional contexts provides useful insights into the role institutions are playing – or can play – in pedagogical innovation and provides a solid foundation for practical recommendations as well as several potential avenues for practice-relevant research.

Appendix A – Questionnaire for Part 1 of the Study

1. How many years of LIS teaching experience do you have?

2. How many years have you been teaching at your current academic institution?

3. Have you taught an online or hybrid (mostly online with a few face-to-face sessions) course at your current institution?

   Yes or No

   [If No, skip to end of survey]

4. Have you had any experience in transitioning a course from face-to-face to online (hybrid) teaching in the two previous academic years?

   Yes or No

   [If No, skip to end of survey]

5. What was the course topic/subject area? (please list course title)

6. Are you continuing or planning to continue to teach that course in face-to-face format as well?

   Yes or No

   [If No, skip to end of survey]

7. Would you be willing to be contacted for an interview about your experience in teaching a course in both online (hybrid) and face-to-face formats?

   If yes, please provide your email and/or phone number.

Thank you - End of Survey

Appendix B - Interview Questions for Part 2 of the Study

At the start of interview investigator will obtain **verbal consent for audio recording**: "With your permission, I would like to audio record this interview. Do I have your permission?"

Note: Given the flexible nature of the study design, it is impossible to list precisely the questions that will be asked of the participants. Moreover, the questions would vary depending on the answers given by each subject to the initial questions. Below is the list of some general questions that will be addressed in each interview:

General information about the [course name] (course subject/title will be identified from data collected in the survey).

How long have you been teaching the course before moving it online?

Is this a required course for the program?

What prompted you to move the course online?

Probe to clarify the individual vs. institutional motivation.

Are there any **explicit policies** in your school that guide development and teaching of online courses?

If necessary, probe/give examples, such as synchronous/asynchronous requirement, main platform, inclusion of particular teaching methods, etc.

Probe for availability of peer support and expertise sharing; technical support and skills training

Were there **other people actively involved** in the process of conversion or was this just your effort?

Probe to disambiguate institutional rules and policies vs. individual preferences.

If other people participated in the process, probe for their job roles/skills/role in course development.

Were there any **changes to the course content** (scope/topics)?

Probe for rationale for content revisions and where it came from (i.e. instructor decision vs. suggestion from instructional design expert/colleague, etc.).

What **technology tools** were used for the online course?

Main platform

Why chosen?

Probe for familiarity with the platform and support available.

Probe for impact on course development/teaching decisions

Additional tools for development

Probe for: reason for use, technical skills needed, support, etc. and impact of tool(s) on course design decisions

Additional tools for instruction

Probe for: reason for use, technical skills needed and related issues, support, etc. and impact of tool(s) on pedagogical decisions

If necessary, probe to clarify the connections between course development/teaching decisions and technology tools used.

Were any **new teaching materials developed** for the course (such as content introductions, virtual presentations, links to online resources, etc.)?

Probe for details on kinds of materials, format, rationale for decisions, judgment of effectiveness.

Were there any **changes to assignments or development of new assignments**?

Probe for details with focus on reasons for changes; clarify if technology, policy or pedagogical beliefs were the main driver; judgment of pedagogical effectiveness.

Have you made or plan to make any **changes to the face-to-face version of the course** after having taught it online?

Probe for changes to content, utilization of new materials, use of new assignments, etc.

For each change, probe for rationale and judgment of effectiveness

Have you made or plan to make any **changes to other courses** you teach based on the experience teaching the course online?

Probe for specific elements and rationale

Reflecting on the experience of teaching the [course name] course in both face-to-face and online format, are there any additional thoughts/comments that you would like to share?

Probe from notes taken during interview.

If you could teach the course in hybrid format that mixes online and face-to-face components, which elements of the course would you prefer to be online and which would you rather teach in a face-to-face format to best meet objectives of the course?

Probe for clarification, if necessary.

Appendix C – Example of an Individual Case description

The Collection Development course, which is an elective in several tracks and requirement for School Media track, was moved online in response to institutional policy. The faculty had prior experience with teaching online in the institution, so she was familiar with the course platform and prevailing practices. The conversion of this course was primarily a solo effort, but prior courses have been "more of a group effort" and there was also practical help from a grad assistant, a typical practice at the institution. The latter was focused on the technicalities of presenting the course materials and resources in the web-based format.

The subject does not seem to be particularly interested in technology – her focus is clearly on the subject matter, on course content and structure. She relies on what is standard technology at the institution at the time, and expresses resentment of having to adapt to technological changes. The main challenge in conversion was the move from somewhat unstructured and spontaneous lecturing in the subject in which "everything relates to everything" to more of a linear structure of information presentation with careful scripting of each lecture. Additionally, subject had to reduce some flexibility in assignment choices for students, making rules more strict and generic – not feasible to deal with each individual student, given the time/effort required in the online class. For logistical reasons, the presentations were replaced with formal papers in the online class. Another conversion element was the pre-recording of guest lectures, which used to be part of the course and request to guest lecturers to participate in class discussion for that week as well.

After investing time in scripting the entire course and preparing structured lectures complete with slides and narration, the subject is now using the scripts and slides in her face-

to-face classes as well, including utilizing some of the "canned" lectures for other classes with thematic overlap. Additionally, she plans to experiment with the flipped classroom model, making lecture review part of students' homework and focusing class time on discussions, etc.

AT analysis

The activity system for this case is very interconnected with clearly identifiable links between all the elements. There are a number of lines of tension, but all have resolutions within the system. For example, rule-artifact interaction (introduction of new CMS) produces tension between subject and artifact, but there are mechanisms in the rules and division of labor to resolve the tension (fixing problems in the technology implementation, providing support to faculty). The contextual elements are well connected with rules/community/division of labor structures supportive of the overall activity.

In this particular case, the main tension in the system transition to online mode was between the artifact and the object – the subject had to restructure her approach to teaching to make it compatible with online delivery. She successfully resolved that tension by modifying her approach to teaching and the results of that effort produced significant outcomes: use of the new structure in the face-to-face class, reuse of lecture materials in other classes and plans for classroom flipping.

The Activity System Diagram for this case is presented in Figure 5 on p.50

Appendix D – Example of Institutional "Meta-case" notes

The institution has a large online program (more online students than face-to-face students, according to the subjects), yet, the environment does not appear to be adequate to support the faculty in online teaching and the faculty interviewed do not sound completely comfortable and satisfied with the state of things. The main factors that hinder the quality of online teaching experience are:

- There is a policy requiring same syllabus for both online and onsite courses, which results in faculty trying to reproduce in online course what they do in the classroom, rather than developing new approaches that would be better suited for online environment.
- This is further aggravated by absence of dedicated instructional design support. The technical support and training on how to use the system are available, but there is no help with pedagogy and domain-specific instructional design support. Nor is there a culture of peer consultation/support in developing pedagogical solutions
- The institutional course platform is criticized by faculty as having limited functionality, yet there does not appear to be any help available with figuring out alternative/additional means and faculty are left to utilize what they are already familiar with.

The activity system diagrams for all cases appear roughly the same – tensions between subject/rules, object/artifacts and within artifacts with tight (and rigid, based on subjects' commentary) interaction between rules and artifacts with community and division of labor elements being minimally present. The activity systems for all cases studied are in the state of disequilibrium and all three subjects are continuing to struggle with the search of solutions

to the tensions in the system. The environment does not appear to be conducive to pedagogical innovation – almost by design, there is little that gets changed in the teaching of the course. There is some influence of online teaching on the face-to-face teaching, more as refinement of pedagogy (e.g. better discussion prompts, more detailed assignment instruction, inclusion of more digital resources), then in pedagogical change. Most importantly, the faculty did not sound happy with online teaching experience.

Appendix E – Physical Concept Map from Card Sort Analysis

REFERENCES

Allen, I.E. & Seaman, J. (2007). *Online nation. Five years of growth in online learning.* Needham, MA: Sloan Consortium.

Allen, I.E. & Seaman, J. (2010). *Learning on demand. Online education in the United States, 2009*. Needham, MA: Sloan Consortium

American Library Association. (2011). *Library & Information Studies. Directory of Institutions Offering Accredited Master's Programs.* Chicago, IL: ALA

Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks, 5*(2), 1-17

Andrews, R. & Haythronthwaite, C. (2007). Introduction to e-learning research. In R. Andrews & C. Haythornthwaite (Eds.), *The SAGE Handbook of E-Learning Research* (pp. 1-52). Los Angeles, CA: Sage

Aronson, D.T. & Briggs, L.J. (1983). Contributions of Gagne and Briggs to a prescriptive model of instruction. In C.M. Reigeluth (Ed.), *Instructional-design theories and models: An overview of their current status* (pp. 75 – 100). Hillsdale, NJ: Lawrence Erlbaum Associates.

Atkinson, R.C. & Shiffrin, R.M. (1968). Human memory: A proposed system and its control processes. In K.W. Spence & J.T. Spence (Eds.), *The psychology of learning and motivation: Advances in research and theory* (Vol. 2, pp. 89-195). New York, NY: Academic Press.

Baddeley, A.D. & Hitch, G.J. (1974). Working memory. In G.A. Bower (Ed.), *The psychology of learning and motivation* (Vol. 8, pp. 47-89). New York, NY: Academic Press.

Bandura, A. (1976). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall~~, Inc~~.

Baran, B. & Cagiltay, K. (2010). The dynamics of online communities in activity theory framework. *Educational Technology & Society*, 13(4), 155-166.

Bates, A.W. (1997, June). Restructuring the university for technological change. Paper presented at *What Kind of University*, a conference sponsored by The Carnegie Foundation for the Advancement of Teaching, 18-20, June, London, England, UK. Retrieved from: http://cclp.mior.ca/Reference%20Shelf/PDF_OISE/ Bates_Restructuring%20University.pdf

Bayles, E.E. (1961). Sketch for a study of the growth of American educational thought and practice. *History of Education Quarterly*, 1(3), 43-49.

Bedny, G. & Harris, S.R. (2005). The Systemic-Structural Theory of Activity: Applications to the study of human Work. *Mind, Culture and Activity*, *12*(2), 128–147

Bellefeuille, G. (2006). Rethinking reflective practice education in social work education: A blended constructivist and objectivist instructional design strategy for a web-based child welfare practice course. *Journal of Social Work Education, 42*(1), 85-103.

Benson, A. D. & Whitworth, A. (2007). Technology at the planning table: Activity theory, negotiation and course management systems. *Journal of Organizational Transformation and Social Change*, *4*(1), 65-82

Berge, O., & Fjuk, A. (2006). Understanding the roles of online meetings in a net-based course. *Journal of Computer Assisted Learning*, *22*(1), 13–23.

Bernard, R, Abrami, P.L., Lou, Y., Borokhovski, E, Wade, A., Wozney, L., Wallet, P.A., Fiset, M., & Huang, B. (2004). How does distance education compare with classroom instruction? A meta-analysis of the empirical literature. *Review of Educational Research, 74*(3), 379–439.

Beauchamp, D., & Kennewell, G. (2010). Interactivity in the classroom and its impact on learning. *Computers and Education, 54*(3), 759-766

Bigge, M.L. & Shermis, S.S. (1992). *Learning theories for teachers*. New York, NY: Harper Collins.

Birch, D. P. & Burnett, B.M. (2008). Interactive multimodal technology mediated distance education courses: The academic's perspective. *Japanese Journal of Educational Media Research*, *15*(1), 43-60.

Blignaut, A. S. & Trollip, S. R. (2003). Measuring faculty participation in asynchronous discussion forums. *Journal of Education for Business, 78*(6), 347-353.

Briggs, L. J. (1968). *Sequencing of instruction in relation to hierarchies of competence*. Palo Alto, CA: American Institutes for Research

Briggs, L. J. & Wager, W W (1981). *Handbook of procedures for the design of instruction*. Englewood Cliffs, NJ: Educational Technology Publications

Brinkerhoff, J. & Koroghlanian C.M. (2007). Online students' expectations: enhancing the fit between online students and course design. *Journal of Educational Computing Research, 36*(4), 383-393

Brooks, J.G. & Brooks M.G. (1993). *In search of understanding: The case for constructivist classrooms*. Alexandria, VA: Association for Supervision and Curriculum Development.

Brown A. & Green, T. (2010). Issues and trends in instructional technology: Growth and maturation of web-based tools in a challenging climate; social networks gain

educators' attention. In M. Orey et al. (Eds.), *Educational Media and Technology Yearbook 35* (pp. 29-43). New York, NY: Springer

Bruner, J. (1985). Models of the learner. *Educational Researcher, 14*(6), 5-8.

Chapman, D. & Nicolet, T. (2003). Using the project approach to online course development. *Technology Source, March/April 2003*. Retrieved from: http://technologysource.org/ article/using_the_project_approach_to_online_course_development

Chen, S. (2007). Instructional design strategies for intensive online courses: An Objectivist-Constructivist blended approach. *Journal of Interactive Online Learning, 6*(1), p. 72-86.

Chu, H. (2006). Curricula of LIS programs in the USA: A content analysis. In C. Khoo, D. Singh & A.S. Chaudhry (Eds.), *Proceedings of the Asia-Pacific Conference on Library & Information Education & Practice 2006 (A-LIEP 2006), Singapore, 3-6 April 2006* (pp. 328-337). Singapore: School of Communication & Information, Nanyang Technological University.

Cobb, P. (2005). Where is the mind? A coordination of socio-cultural and cognitive constructivist principles. In C.T. Fosnot(Ed.), *Constructivism: Theories, perspective and practice*. New York, NY: Teachers College Press.

Collins, P. Shukla, S., & Remiles, D. (2002). Activity theory and system design: A view from the trenches. *Computer Supported Cooperative Work, 11*, 55-80.

Collis, B. & Margaryan, A. (2004). Applying activity theory to computer-supported collaborative learning and work-based activities in corporate settings. *Educational Technology Research and Development, 52*(4), 38–52.

Conceicao, S.C.O. (2006). Faculty lived experiences in the online environment. *Adult Education Quarterly, 57*(1), 26-45.

Conole, G. & Alevizou, P. (2010). *A literature review of the use of Web 2.0 tools in higher education* (Report). Open University. Retrieved from: http://www.heacademy.ac.uk/ assets/EvidenceNet/Conole_Alevizou_2010.pdf

Conrad, D. (2004). University instructors' reflections on their first online teaching experiences. *Journal of Asynchronous Learning Networks, 8*(2). Retrieved from: http://www.aln.org/ publications/ jaln/v8n2/v8n2_conrad.asp

Coppola, N., Hiltz, S.R., & Rotter, N. (2001). Becoming a virtual professor: Pedagogical roles and ALN. *Proceedings of the 34th Hawaii International Conference on Systems Sciences.* Los Alamitos, CA: IEEE Computer Society Press.

Covington, D., Petherbridge, D., & Warren S. (2005). Best practices: A triangulated support approach in transitioning faculty to online teaching. *Online Journal of Distance*

Learning Administration, 8(1). Retrieved from: http://distance.westga.edu/~distance/ojdla/ spring81/covington81.pdf

Crook, C., Cummings, J., Fisher, T., Graber, R., Harrison, C., Lewin, C., Logan, K., Luckin, R., & Oliver, M. (2008). *Web 2.0 Technologies for Learning: The current landscape – opportunities, challenges and tensions* (Becta Report). Retrieved from http://partners.becta.org.uk/upload-dir/downloads/page_documents/research/web2_technologies_learning.pdf

de Vaus, D. (2002). Editor's introduction: Social surveys - an overview. *Social Surveys*, (v.1, pp. iv-xliv). Thousand Oaks, CA: Sage Publications.

Dewey, J. (1997). Democracy and education: An introduction to the philosophy of education. New York, NY: Free Press

Dick, W. (1996). The Dick and Carey Model: Will it survive the decade? *Educational Technology Research and Development, 44*(3), 55-63.

Downes, S. (2005). e-Learning 2.0, *ACM e-Learn Magazine, 10*. Retrieved from http://dev.elearnmag.org/archive.cfm?aid=1104968

Duffy, P. & Bruns, A. (2006). The use of blogs, wikis and RSS in education: A conversation of possibilities. In *Proceedings of Online Learning and Teaching Conference 2006*, 26 September, 2006 (pp. 31-38). Brisbane, Queensland, Australia: Queensland University of Technology.

Dutton, W., Cheong, P. & Park, N. (2004).The social shaping of a virtual learning environment: The case of a university wide course management system. *Electronic Journal of e-Learning 2*(1), 69-80.

Drouin, M.A. (2008). The relationship between students' perceived sense of community and satisfaction, achievement, and retention in an online course. *The Quarterly Review of Distance Education, 9*(3), 267–284

Dziuban, C., Shea, P., & Arbaugh, J. (2005). Faculty roles and satisfaction in ALNs. In÷ S. R. Hiltz & R. Goldman (Eds.), *Learning together online: Research on asynchronous learning networks* (pp.169-190). Mahwah, NJ: Lawrence Erlbaum Associates.

Ebner , M., Lienhard, C., Rohs, M., & Meyer, I. (2010). Microblogs in higher education – A chance to facilitate informal and process-oriented learning? *Computers and Education, 55*, 92-100.

Engeström, Y. (1999a). Activity theory and individual and social transformation. In Y. Engeström, R. Miettinen,&R.-L. Punamäki (Eds.), *Perspectives on activity theory* (pp. 19–52). New York, NY: Cambridge University Press.

Engestrom, Y. (1999b). *Learning by expanding: ten years after* (F. Seeger Trans.). Retrieved from http://lchc.ucsd.edu/MCA/Paper/Engestrom/expanding/intro.htm

Engeström, Y.,& Miettinen, R. (1999). Introduction. In Y. Engeström, R. Miettinen,&R.-L. Punamäki (Eds.) *Perspectives on activity theory* (pp. 1–16). New York, NY: Cambridge University Press.

Ertmer, P. A. & Newby, T. J. (1993). Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. *Performance Improvement Quarterly, 6*(4), 50–72.

Fahy, P.J. (2004). Media characteristics and online learning technology. In T. Anderson & F. Elloumi (Eds.), *Theory and practice of online learning* (pp. 137-171). Athabasca, Alberta, Canada: Athabasca University. Retrieved from: http://cde.athabascau.ca/online_book/

Forbes, C.T., Madeira, C.A., & Slotta, J.D. (2010). Activity-theoretical research on science teachers' expertise and learning. *ISLS '10: Learning in the Disciplines. Proceedings of the 9th International Conference of the Learning Sciences,*Chicago, IL, 29 June- 2 July, 2010, Volume 1(pp. 651-658), *International Society of the Learning Sciences*. ~~651-658~~

Fosnot, C.T. & Perry, R.S. (2005). Constructivism: A psychological theory of learning. In C.T. Fosnot (Ed.), *Constructivism: Theories, perspective and practice* (pp. 8-33). New York, NY: Teachers College Press.

Gagne, R.M. (1975). *Essentials of learning for instruction*. Hillsdale, IL: The Dryden Press.

Gagne, R.M. (1985). *The conditions of learning and theory of instruction*. New York: Holt, Rinehart and Winston.

Gagne, R.M., Wager, W.W., Golas, K.C. & Keller, J.M. (2005). *Principles of Instructional Design*. Belmont, CA: Thomson/Wadsworth

Grossman, P.L., Smagorinsky, P., & Valenica S. (1999) Appropriating tools for teaching English: A theoretical framework for research on learning to teach. *American Journal of Education, 108* (1), 1-29

Gustafson, K.L. & Branch, R.M. (2007). What is instructional design? In Reiser, R.A. & Dempsey, J.V. (Eds.), *Trends and issues in instructional design and technology* (2nd ed.,pp. 11-28). Upper Saddle River, N.J.: Pearson/Merrill Prentice Hall.

Halpern, D.F., Donaghey, B., Lamon, M., Brewer, W. (2002). Learning theory. In *Encyclopedia of Education*. Retrieved from: http://www.encyclopedia.com/doc/1G2-3403200370.html

Harasim, L. (2000). Shift happens: Online education as a new paradigm in learning. ~~*The*~~ *Internet and Higher Education, 3*(1–2), 41–61.

Hawkes, M., & Coldeway, D. O. (2002). An analysis of team vs. faculty-based online course development: Implications for instructional design. *The Quarterly Review of Distance Education, 3*(4), 431-441

Haythornthwaite, C., Bruce, B.C., Andrews, R., Kazmer, M.M., Montague, R.A., & Preston, C. (2007). Theories and models of and for online learning. *First Monday, 12*(8-6). Retrieved from: http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm /article/ view/1976/1851

Hill, J. R., Song, L., & West, R. E. (2009). Social learning theory and Web-based learning environments: A review of research and discussion of implications. *The American Journal of Distance Education, 23*(2), 88-103

Hixon, E. (2008). Team-based online course development: A case study of collaboration models online. *Online Journal of Distance Learning Administration, 11*(4). Retrieved from: http://www.westga.edu/~distance/ojdla/winter114/hixon114.html

Hoadley, C. (2007). Learning sciences theories and methods for e-learning research. In R. Andrews & C. Haythornthwaite (Eds.), *The SAGE Handbook of E-Learning Research* (pp. 139-156). Thousand Oaks, CA: Sage ~~Publications~~.

Hussar, W.J. & Bailey, T.M. (2008). *Projections of education statistics to 2017*. Washington, D.C.: National Center for Education Statistics, U.S. Department of Education.

Hyman, P. (2012). In the year of disruptive education. *Communications of the ACM, 55*(12), 20-22.

Ibrahim, N.H. & Allen, D. (2012). Information sharing and trust during major incidents: Findings from the oil industry. *Journal of the American Society for Information Science and Technology, 63*(10), 1916-1928.

Jaffee, D. (2003). Virtual transformation: Web-based technology and pedagogical change. *Teaching Sociology, 31*(2), 227-236.

Januszewski, A. & Molenda, M. (Eds.) (2008). *Educational technology: A definition with commentary*. New York, NY: Lawrence Erlbaum Associates.

Johnson, J.M. (2002). In-depth interviewing. In J.F. Gubrium & J.A. Holstein (Eds.) *Handbook of interview research: Context and method* (pp. 103-120). Thousand Oaks, CA: Sage ~~Publications~~.

Johnson, J.M. & Weller, C.M. (2002). Elicitation techniques for interviewing. In J.F. Gubrium & J.A. Holstein (Eds.), *Handbook of interview research: Context and method* (pp. 491-514). Thousand Oaks, CA: Sage ~~Publications~~.

Johnson, L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A., & Ludgate, H. (2013). *NMC horizon report: 2013 higher education edition*. Austin, Texas: ~~The~~ New Media Consortium.

Jonassen, D. (1991). Objectivism versus constructivism: Do we need a new philosophical paradigm? *Educational Technology: Research and Development, 39(3),* 5-14.

Jonassen, D. (1999) Designing for constructivist learning environments. In C.M. Reigeluth (Ed), *Instructional design theories and models: A new paradigm of instructional theory* (Vol. 2, pp. 215-239). Mahwah, NJ: Lawrence Erlbaum Associates.

Jonassen, D., Howland, J., Marra, R.M., & Crismond, D. (2008). *Meaningful learning with technology*. Upper Saddle River, NJ: Pearson Prentice Hall

Jonassen, D. & Rohrer-Murphy, L. (1999). Activity theory as a framework for designing constructivist learning environments. *Educational Technology Research and Development, 47*(1), 61–79.

Kampov-Polevoi, J. (2010). Considerations for supporting faculty in transitioning a course to online format. *Online Journal of Distance Learning Administration, 13*(2). Retrieved from http://www.westga.edu/~distance/ojdla/summer132/kampov_polevoi132.html

Kaptelinin, V. (2005). The object of activity: Making sense of the sense-make. *Mind, Culture and Activity, 12*(1), 4 -18

Kaptelinin, V. & Nardi, B. A. (2006). *Acting with technology: Activity theory and interaction design*. Cambridge, MA: MIT Press.

Kaptelinin, V., Nardi, B.A. & Macaulay, C. (1999). The Activity Ckecklist: A tool for representing the "space" of context. *Interactions, 6*(4), p27-39.

Kazmer, M. M. & Haythornthwaite, C. (2001). Juggling multiple social worlds: Distance students on and offline. *American Behavioral Scientist, 45*(3), 510-529.

Kazmer, M. M. & Xie, B. (2008). Qualitative interviewing in Internet studies: Playing with the media, playing with the method. *Information, Communication, and Society 11*(2), 115-136.

Kim, K. & Bonk, C. (2006). The future of online teaching and learning in higher education: The survey says.... *Educause Quarterly, 29(*4), 22-30

Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist, 41*(2), 75–86.

Khanova, J. (2012). Moving courses online as a catalyst of pedagogical innovation: An activity theory-based view. *Proceedings of the American Society for Information Science and Technology, 49*(1), 1-4.

Khanova, J. (2013). Faculty experience of online teaching. In A. Sigal (Ed.), *Advancing library education: Technological innovation and instructional design.* Hershey, PA: IGI-Global.

.

Kneller, G.F. (1958). *Existentialism and education*. New York, NY: Philosophical Library, Inc.

Konieczny, P. (2007). Wikis and Wikipedia as a teaching tool. *International Journal of Instructional Technology and Distance Education, 4*(1). 15-34

Kop, R. & Hill, A. (2008). Connectivism: Learning theory of the future or vestige of the past? *International Review of Research in Open and Distance Learning, 9*(3). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/523/1137

Kozma, R.B. (1994). Will media influence learning? Reframing the debate. *Educational Technology Research & Development,* 42(2), 7-19.

Kuutti, K. (1996). Activity theory as a potential framework for human–computer interaction research. In B. Nardi (Ed.), *Context and consciousness: Activity theory and human–computer interaction* (pp. 17–44). Cambridge, MA: MIT Press.

Landa, M.D. (1983) The Algo-Heuristic Theory of instruction. In C.M. Reigeluth (Ed). *Instructional-design theories and models: An overview of their current status* (pp. 163-212). Hillsdale, NJ: Lawrence Erlbaum Associates.

Leont'ev, A. N. (1978). *Activity, consciousness, and personality* (M. J. Hall, Trans.). Englewood Cliffs, NJ: Prentice Hall.

Leont'ev, A. N. (1981). *Problems of the development of the mind*. Moscow, Russia: Progress.

Liao, L.F**.** (2006). A Flow Theory perspective on learner motivation and behavior in distance education. *Distance Education, 27(*1*),* 45-62.

Lincoln, Y.S. & Guba, G.G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage.

Liu, X., Bonk, C.J., Magjuka, R.J., Lee, S., & Su, B. (2005). Exploring four dimensions of online instructor roles: A program level case study. *Journal of Asynchronous Learning Networks, 9*(4), 29-48.

Liu, X., Magjuka R.J., & Lee, S. (2008). The effects of cognitive thinking styles, trust, conflict management on online students' learning and virtual team performance. *British Journal of Educational Technology, 39(5),* 829-846.

Lloyd, S.A., Byrne, M.M., & McCoy, T.S. (2012). Faculty-perceived barriers of online education. *MERLOT Journal of Online Learning and Teaching, 8*(1), 1-12.

Lloyd, M., & Irvine, S. (2005). Digital pedagogy: Finding the balance in an online learning and teaching environment. In H. Goss (Ed.), *Balance, fidelity, mobility: Maintaining the momentum? Proceedings of the 22nd Annual Conference of ascilite* (pp. 375-378). Brisbane, Queensland, Australia: Queensland University of Technology.

Madden, M., Lenhart, A., Duggan, M., Cortesi, S. & Gasser, U. (2013). *Teens and technology 2013*. Washington, D.C.: Pew Internet & American Life Project

Marek, K. (2009). Learning to teach online: Creating a culture of support for faculty. *Journal of Education for Library and Information Science, 50*(4), 275-291

Markoff, J. (2011, August 15). Virtual and artificial, but 58,000 want course. *New York Times*. Retrieved from http://www.nytimes.com/2011/08/16/science/16stanford.html?_r=0

Mayer, R. E. (2001). *Multimedia learning*. New York, NY: Cambridge University Press.

Mayer, R.E. (2003). The promise of multimedia learning: Using the same instructional design methods across different media. *Learning and Instruction,13,* 125–139.

McLoughlin, C. & Lee, M. (2007). Social software and participatory learning: Pedagogical choices with technology affordances in the Web 2.0 era. In *ICT: Providing choices for learners and learning. Proceedings of ascilite Singapore, 2-5 December 2007*. Retrieved from http://www.ascilite.org.au/conferences/singapore07/procs/mcloughlin.pdf

McQuiggan, C.A. (2012). Faculty development for online teaching as a catalyst for change. *Journal of Asynchronous Learning Networks, 16*(2), 27-61

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009) *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. Washington, D.C.: U.S. Department of Education.

Meho, L. I. (2006). E-mail interviewing in qualitative research: A methodological discussion. *Journal of the American Society for Information Science & Technology, 57*(10), 1284–1295.

Mentzer, G. A., Cryan, J., & Teclehaimanot, B. (2007). A comparison of face-to-face and Web-based classrooms. *Journal of Technology and Teacher Education, 15*(2), 233–246.

Merriam, S.B. (1993) (Ed.). *An update on adult learning theory: New directions for adult and continuing education*, 57. San Francisco, CA: Jossey-Bass.

Merrill, M.D. (2002). First principles of instruction. *Educational Technology, Research and Development, 50*(3), 43-60.

Meyer, K.A. (2012). The influence of online teaching on faculty productivity. *Innovations in Higher Education, 37*, 37–52

Meyers, E. M. (2007). From activity to learning: Using cultural historical activity theory to model school library programmes and practices. *Information Research, 12*(3). Retrieved from http://informationr.net/ir/12-3/paper313.html

Miller, D.S. & Salkind, N.J. (2002). *Handbook of research design and social measurement* (6th ed.). Thousand Oaks, CA: Sage.

Morgan, G. (2003). *Faculty use of course management systems*. Boulder, CO: EDUCAUSE Center for Applied Research. Retrieved from: http://net.educause.edu/ir/library/pdf/ ers0302/rs/ers0302w.pdf

Morrison, D. (2003). Using activity theory to design constructivist online learning environments for higher order thinking: A retrospective analysis. *Canadian Journal of Learning and Technology, 29*(3). Retrieved from: http://cjlt.csj.ualberta.ca/index.php/ cjlt/ article/ view/ 87/81

Morrison, G. R., Ross, S. M., & Kemp, J. E. (2007). Designing effective instruction. Hoboken, NJ: ~~J.~~ Wiley.

Murphy, K.P., Wilkinson, I.A.G. & Soter, A.O. (2011) Instruction based on disussion. In R.E. Mayer & P.A. Alexander (Eds.) *Handbook on Learning and Instruction* (pp. 382-407). New York, NY: Routledge.

Nelson, L. M. (1999). Collaborative problem solving. In C. M. Reigeluth (Ed.), *Instructional design theories and models: A new paradigm of instructional theory* (pp. 241-267). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Nardi, B.A. (1996). *Context and consciousness: Activity theory and human–computer interaction* (pp. 69-102). Cambridge, MA: MIT Press.

Oblinger, D. G., & Hawkins, B. L. (2006). The myth about online course development. Educause Review. Retrieved from http://net.educause.edu/ir/library/pdf/erm0617.pdf

Ormorod, J.E. (1999). *Human Learning* (3rd ed.). Upper Saddle River, NJ: Prentice Hall.

Palinscar, A.S. (1998). Social constructivist perspectives on teaching and learning. *Annual Review of Psychology, 49*, 345-375.

Parker K.R. & Chao J.T. (2007). Wiki as a teaching tool. *Interdisciplinary Journal of Knowledge and Learning Objects 3*, 57–72.

Parthasarathy, M. & Smith, M.A. (2009). Valuing the institution: An expanded list of factors influencing faculty adoption of online education. *Online Journal of Distance Learning Administration*, *11*(4), Retrieved from: http://www.westga.edu/~distance/ ojdla/ summer122/parthasarathy122.html

Passmore, D. A. (2009). *A phenomenological study of nursing faculty's experiences in transitioning from a classroom to an online teaching role* (Doctoral dissertation, University of South Florida). *Graduate School Theses and Dissertations*. Retrieved from:
http://scholarcommons.usf.edu/etd/2130

Piaget, J. (1970). *Science of education and the psychology of the child*. New York, NY: Orion.

Pullen, J. M. (2012). Pros and cons for teaching courses in the classroom and online simultaneously. In *ItiCSE '12: Proceedings of the 17th ACM Annual Conference on Innovation and Technology in Computer Science Education*, Haifa, Israel, 3-5 July 2012 (pp.180-185). New York, NY: ACM.

Puntambekar, S. (2006). Analyzing collaborative interactions: Divergence, shared understanding and construction of knowledge. *Computers & Education, 47*(3), 332-51.

Rath, L (2011). The effect of twitter in online learning environment. *ACM eLearn magazine*. Retrieved http://dev.elearnmag.org/archive.cfm?aid=1944486

Reigeluth, C.M. (1983). *Instructional-design theories and models: An overview of their current status*. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Reigeluth, C.M. (1999). *Instructional-design theories and models: A new paradigm of instructional theory*. Mahwah, N.J.: Lawrence Erlbaum Associates.

Reigeluth, C.M. & Carr-Chellman, A.A. (2009). Understanding instructional theory. In C.M. Reigeluth, & A. A. Carr-Chellman~~, A.A.~~ (Eds), *Instructional-design theories and models: Building a common knowledge base* (pp. 3- 26). New York, NY: Routledge.

Reiser, R. (2001a). A history of instructional design and technology. Part 1: A history of instructional media. *Educational Technology Research & Development*, 49(1), 53–64.

Reiser, R. (2001b). A history of instructional design and technology. Part 2: A history of instructional design. *Educational Technology Research & Development*, 49(2), 57–67.

Reiser, R. (2007). A history of instructional design and technology. In R. A. Reiser~~, R.A.~~ & J. V. Dempsey~~, J.V.~~ (Eds.), *Trends and Issues in Instructional Design and Technology* (2nd ed.). Upper Saddle River, NJ: Pearson/Merrill-Prentice Hall.

Robson, C. (2002). *Real world research: A resource for social scientists and practitioner-researchers*. Oxford, England, UK: Blackwell ~~Publishers~~.

Rockwell, S. K., Schauer, J., Fritz, S. M., & Marx, D. B. (1999). Incentives and obstacles influencing higher education faculty and administrators to teach via distance. *Online Journal of Distance Education Administration*, *2*(4). Retrieved from: http://www.westga.edu/~distance/ojdla/winter24/rockwell24.html

Rogers, Y. (2004). New theoretical approaches for HCI. *Annual Review of Information Science and Technology, 38,* 87–143.

Roth, W-M. & Lee, Y-J. (2007). Vygotsky's neglected legacy: Cultural-historical activity theory. *Review of Educational Research,77*(2), 186-232.

Russell, D. L. & Schneiderheinze, A. (2005). Understanding innovation in education using activity theory. *Educational Technology & Society*, *8*(1), 38-53.

Salmon, G, & Perkins, D. N. (1998). Individual and social aspects of learning. *Review of Research in Education, 23*, 1-24.

Saracevic, T. (1999). Information science. *Journal of the American Association for Information Science, 50*(12), 1051-1063

Savery, J.R. & Duffy, T.M. (1998). Problem based learning: An instructional model and its constructivist framework. In R. Fogarty (Ed.) *Problem Based Learning* (pp. 73-92). Arlington Heights, IL: SkyLight Professional Development.

Scanlon, E. & Issroff, K. (2005). Activity theory and higher education: Evaluating learning technologies. *Journal of Computer Assisted Learning*, 21, 430-439.

Schifter, C. (2000). Faculty participation in asynchronous learning networks: A case study of motivating and inhibiting factors. *Journal of Asynchronous Learning Networks, 4*(1), 15- 22.

Schifter, C. (2004). Compensation models in distance education: national survey questionnaire revisited. *Online Journal of Distance Learning Administration,* 7(1). Retrieved from http://www.westga.edu/~distance/ojdla/spring71/schifter71.html

Shea, P. (2007). Bridges and barriers to teaching online college courses: A study of experienced online faculty in thirty-six colleges. *Journal of Asynchronous Learning Networks, 11*(2), 73-128. Retrieved from: http://www.sloan-c.org/publications/jaln/v11n2/ pdf/

Shuy, R.W. (2002). In-person vs. telephone interviewing. In J.F. Gubrium & J.A. Holstein (Eds.) *Handbook of interview research: Context and method*. Thousand Oaks, CA: Sage.

Siemens, G. (2004). Connectivism: A learning theory for the digital age. *eLearnspace.* Retrieved from http://www.elearnspace.org/Articles/connectivism.htm

Simpson, C., & Du, Y. (2004). Effects of learning styles and class participation on students' enjoyment level in distributed learning environments. *Journal of Education for Library and Information Science, 45*(2), 123-136.

Slavin, R.E. (1995). *Cooperative Learning: Theory, research and practice*. Needham Heights, MA: Allyn &Bacon,

Spasser, M. A. (2002). Realist activity theory for digital library evaluation: Conceptual framework and case study. *Computer Supported Cooperative Work, 11*(1/2), 81–110

Sun, J. (2012). Why different people prefer different systems for different tasks: An activity perspective on technology adoption in a dynamic user environment. *Journal of the American Society for Information Science and Technology, 63* (1), 48-63.

Sun, P.-C., Tsai, R. J., Finger, G., Chen, Y.-Y & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education 50*, 1183-1202

Swenson, P. & Taylor, N.A. (2012). *Online teaching in the digital age*. Thousand Oaks, CA: Sage Publications.

Tallent-Runnels, M.K., Thomas, J.A., Lan, W.Y., Cooper, S., Ahern, T.C., Shaw, S.M, & Liu, X. (2006). Teaching courses online: A review of the research. *Review of Educational Research, 76*(1), 93–135.

Tarpy R.M. (1997). *Contemporary learning theory and research.* New York: The McGraw-Hill Companies.

Tourangeau, R. (2004). Survey research and societal change. *Annual Review of Psychology, 55*, 775–801.

Uden, L. (2007). Activity theory for designing mobile learning. *International Journal of Mobile Learning and Organization, 1*(1), 81-101

von Glaserfeld, E. (2005). Introduction: Aspects of constructivism. In C.T. Fosnot (Ed.), *Constructivism: Theories, perspective and practice*. New York, NY: Teachers College Press.

Vygotsky, L.S. (1978). Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.

Wang, Q. (2009). Designing a web-based constructivist learning environment. *Interactive Learning Environments, 17*(1), 1- 13.

Wertsch, J. (1998). Mind as action. New York, NY: Oxford University Press.

West, R., Waddoups, G., & Graham, C. (2006). Understanding the experience of instructors as they adopt a course management system. *Educational Technology Research and Development, 55*(1), 1-26

Wildemuth, B.M. (2009). Existing documents and artifacts as data. In B.M. Wildemuth (Ed.) *Applications of social research methods to questions in information and library science* (pp. 221-231). Westport, CT: Libraries Unlimited

Williams, J.B. & Jacobs, J. (2004). Exploring the use of blogs as learning spaces in higher education sector. *Australian Journal of Educational Technology, 20*(2), 232-247.

Wilson, T. D. (2006). A re-examination of information seeking behaviour in the context of activity theory. Information Research, 11(4). Retrieved from InformationR.net/ir/11-4/paper260.html

Wilson, T.D. (2008). Activity theory in information seeking. ARIST 119-161

Winch, C. (1998). *The philosophy of human learning*. London, England, UK: Routledge.

Wolters, C. (2010). Self-regulated learning and the 21st century competencies. In *Research on the 21st century competencies: An NRC planning process on behalf of the Hewlett Foundation.* Retrieved from: http://www7.nationalacademies.org/dbasse/ Wolters_Self_Regulated_Learning_Paper.pdf

Wu., J.-H., Tennyson, R.D. & Hsia T.-L. (2010). A study of student satisfaction in blended e-learning system environment. *Computers and Education, 55*, 155-164

Xu, H. & Morris, L. V. (2007). Collaborative course development for online courses. *Innovative Higher Education, 32*(3), 35-47

Xu, Y. (2007). The dynamics of interactive information behavior, Part I: An activity theory perspective. *Journal of the American Society for Information Science and Technology, 58*(7), 958–970.

Zhang, Y. & Wildemuth, B.M. (2009). Unstructured interviews. In B.M. Wildemuth (Ed.), *Applications of social research methods to questions in information and library science* (pp. 221-231). Westport, CT: Libraries Unlimited.

Zinchenko, V. (1995). Cultural-historical psychology and the psychological theory of activity: Retrospect and prospect. In J. V. Wertsch, P. del Rio, & A. Alvarez (Eds.), *Sociocultural studies of mind* (pp. 37–55). Cambridge, UK: Cambridge University Press