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mLearning in the organizational innovation process

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Abstract

Mobile devices have connected seven billion users across the world (Sanou, 2015) reaching areas that go beyond the electrical grid (Nique and Smertnik, 2015). The ubiquity of mobile devices has created an advantage for organizations to leverage hardware compatible with reaching their target audiences. A strategic response is necessary to address the complexity of employing mobile technology for mobile learning (mLearning) in order to reach its full potential as a new learning medium (Peters, 2009). The purpose of this research study was to explore the process by which an organization adopted and engaged in an mLearning initiative.

Built on Rogers (2003) diffusion of innovation research, the case study reports on the contextual factors within the organization and department that informed the mLearning adoption process. The researcher gathered observational data over one-year through active participant-observation within an organization's technology solutions department. Serving as an instructional designer and gathering data as an academic researcher in the same setting allowed the researcher to gain an intimate view of the adoption process. To collect meaningful data the author used Activity Theory as a critical analysis lens and employed a research framework based on the stages of organizational adoption to understand the data in a longitudinal manner.

The findings of this study suggest that the initial adoption of mLearning in the organization studied did not reach sustainable implementation because 1) no clear champion for mLearning existed and; 2) an untested mLearning product was heavily relied upon even though it was being developed in parallel to the mLearning implementation efforts. Interest in mLearning at the organization continued, outside departments desired an mLearning learning management system (LMS) to deliver content as soon as possible. Yet the organization simply was not prepared to accommodate due to delays in the mLearning product development.

Keywords: Diffusion of Innovation, Technology Adoption, Activity Theory, Mobile Learning

MLEARNING IN THE
ORGANIZATIONAL INNOVATION PROCESS

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Doctor of Philosophy (PhD) in Instructional Design, Development and Evaluation

Syracuse University.
May 2016

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By

Micah J. Shippee

ACKNOWLEDGEMENTS

Merriam-Webster.com defines “Acknowledgement” as recognition or favorable notice of an act or achievement. I have often been told that the doctoral process is long and lonely. Long? Yes. Lonely? In reflection of the process... No. There are many people who have contributed to my growth as a student, a teacher, a researcher, a writer, and a doctoral student. I cannot rank or order the impact each that have brought to my life’s journey. Here is my feeble attempt to submit to the world my gratitude and recognition...

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Chapter One: Introduction

Introduction

Learning and technological innovation have progressed through history in both symbiotic and conflicting ways. A writing tool (technology) that can write more effectively and efficiently than a quill pen naturally finds a niche in learning environments. This form of technology is called, *safe technology* (Stead, 2006) since it improves existing product performance, thereby sustaining the ubiquity of the technology type. The adoption of technologies to support instruction and dissemination of instruction across distances is not new, over the past century, instructional technology media delivery devices were purposed to bring learning content to the user in the most effective and efficient ways possible (Reiser 2001). Reiser (2001) attempted to clarify discussions of instructional media by defining it as the physical means, other than the teacher, chalkboard, and textbook, via which instruction is presented to learners. Instructional media types shifted over time to match availability and consumer demands. A recent shift is toward the application of mobile technology to meet learning needs. For the purposes of this study, ‘mobile technology’ is used to describe handheld, smartphone devices. The mobile shift has led to multiple research studies on the value of mobile learning (mLearning).

In their meta-analytical research of trends in mLearning literature, Wu, Wu, Chen, Kao, Lin, & Huang (2012) found mLearning research studies primarily focused on the effectiveness of mLearning followed by literature on designing mobile systems for learning purposes. The instructional value of advancements in computer technology, particularly with regard to the increasingly multimedia capabilities, highlight the ease at which educators and instructional designers design learning experiences involving complex interactions between learners and instructional content (Reiser 2001).

The ubiquity of mobile devices has potential to influence learning and has created a new global paradigm of knowledge consumption and sharing (Isaacs, 2012). While mobile devices are a sustaining form of communication technology in many parts of the world, mLearning provides an emergent learning modality with access to many learners outside of the traditional educational context. The mLearning paradigm was defined by Quinn (2000) as the intersection of mobile computing and eLearning, with accessible resources wherever you are, strong search capabilities, rich interaction, powerful support for effective learning, and performance-based assessment. Quinn (2000) elaborated that mLearning was eLearning independent of location in time or space. Current researchers have continued to validate Quinn's (2000) definition through understanding mLearning as part of an evolutionary process in computer based learning (Peng, Su, Chou & Tsai, 2009; Sarrab, Elgamel & Aldabbas, 2012) by leading to effective facilitation of learning and a more motivated user group (Zurita & Nussbaum, 2007). Further research has focused on, and developed, the many mLearning affordances as perceived advantages, including more flexibility than formal institutions over time, space and place barriers (Traxler, 2010a). Additional mLearning literature has focused on the nature and conditions for the formal and informal affordances of mLearning, finding that effective mLearning has an established pedagogical goal that it fulfills (e.g. supporting or replacing face to face instruction); addresses cognitive functioning and individual user differences and preferences in using mobile devices (Sha, Looi, Chen & Zhang, 2012; Gedik, Hanci-Karademirci, Kursun & Cagiltay, 2012; Terras & Ramsey, 2012). Pedagogical studies on mLearning revealed the geographic nature of mLearning, highlighting a designer's need to consider space, environments of learning, and the mobility of the learner (Vavoula & Sharples, 2009; Sølvsberg & Rismark, 2012). mLearning is not simply an issue of the technology's availability and learner acceptance, but also of the

instructor, pedagogy, and organizational issues and challenges (Vogel, Kennedy, & Kwok, 2009). To address issues and challenges with mLearning, Vogel, et al. (2009) suggest organizations include workshops to train instructors working in mLearning to better understand the student-learning environment and to design more effective activities using mobile technology.

Statement of the Problem

The spread of mobile technology has created a digital platform of strategic significance to organizations (Yoo, Boland, Lyytinen, & Majchrzak, 2012). Feijóo, Gómez-Barroso, and Ramos (2015) found that the increasing demand for mobile data services would continue to challenge mobile operating companies for years to come. By the end of 2015 there were more than seven billion mobile cellular subscriptions (Central Intelligence Agency (CIA), 2013; Sanou, 2015). Current predictions forecast mobile phone penetration to rise from 61.1% in 2013 to 69.4% in 2017 with smartphone users accounting for a majority of mobile phone users in 10 of 22 countries (eMarketer, 2014). Current research explores the technology, the learner, and the learning design of mLearning, but does little to explore organizational issues and challenges in the adoption process (Yoo et al., 2012). This failure does not fully develop a fundamental step leading to mLearning deployment, that is, an understanding of the organization-level adoption process. The adoption of mLearning has the potential to fundamentally reshape organizational structures, policies, and deployment procedures creating a need for researchers to examine how organizations learn to carefully deal with issues and challenges in order to take full advantage of this new digital technology (Yoo et al., 2012).

Instructional designers and organizations could benefit from research that allows them to better explain, predict, and account for the organizational factors that impede or facilitate the

diffusion of products (Surry, 1997). Organizational theories that have assumed technology is static now must consider technology to be dynamically changing, and thus triggers consequent changes in organizational functioning (Yoo et al., 2012). Lanzolla and Suarez (2012) stated that research on mLearning must explore adoption and usage to gain a better understanding of long-term technology diffusion patterns. To fully understand the process of successful mLearning adoption, organizations need a clearer understanding of the challenges that may prevent full deployment of their efforts (Vogel et al., 2009).

The purpose of this study was to explore the process by which an organization adopts and engages in a mobile learning (mLearning) initiative. For instructional designers and organizations seeking to adopt mLearning, the results of this study suggest an informed process of adoption allowing better explanation, prediction, and accounting for potential challenges that will likely occur.

Research Questions

The research questions for this study asked:

- How does an organization progress through the mLearning adoption process? (Q1)
- How does an organization engage in mLearning initiatives at different adoption stages? (Q2).

These research questions explored the process by which organizations adopt and engage in mLearning initiatives.

Q1: How does an organization progress through the mLearning adoption process?

Rogers (2003) argued that innovations, like mLearning, could change an organization's structure at multiple levels. Lanzolla and Suarez (2012) provided examples of this change in an organization's technical layer, where a change in routines, process, and cognitive maps occurred

when new technology was initiated and implemented. The changing nature of the diffusion process is supported by other researchers who proposed that mLearning initiatives must be understood as organizational change (Ally, 2009; Cross & Dublin, 2002; Quinn, 2011).

Question 1 suggests the need to explore the five stages in the innovation process for organizations (*Agenda-Setting, Matching, Redefining/Restructuring, Clarifying, and Routinizing* stages) as described by Rogers (2003) (Figure 1.1 Five Stages in the Innovation Process in Organizations).

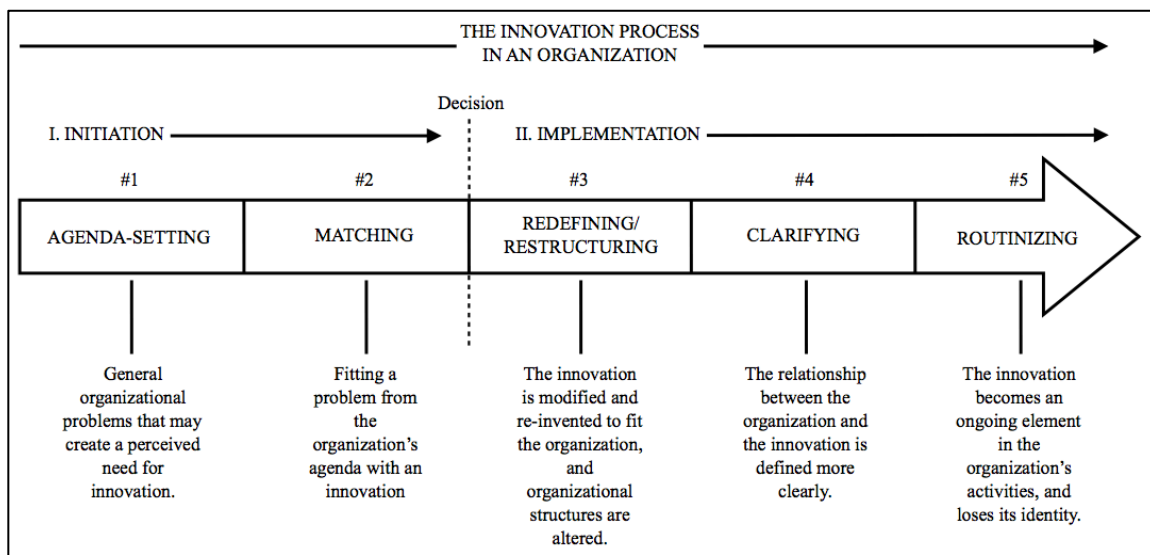


Figure 1.1 Five Stages in the Innovation Process in Organizations (Rogers, 2003)

At each stage of the adoption process, an organization will find areas where the innovation is a natural fit (thus initially exploring it for adoption) as well as challenges making full implementation difficult. With any emergent technology comes unforeseen problems, and the strategies used to address these problems can greatly inform future decisions. With mLearning these problems can include accessibility to the technology and to a network to transmit data. Yet, the affordances of learning anytime and anywhere make mLearning an appealing innovation for organizations. The literature reviewed for this study explored Bandura's (1977) research on self-

efficacy with the expectation that the themes associated with it might provide valuable insight into organizational adoption. However, much of the themes revealed in the data were associated with aspects of Diffusion of Innovation (Rogers 2003) both individual adoption themes and organizational adoption themes. Additionally, the barriers and challenges as well as the affordances of engaging in the innovation process were explored in this study.

Q2: How does an organization engage in mLearning initiatives at different adoption stages?

Engeström (1987) developed a descriptive framework for analysis of the human activity system suggesting that any observation (or study) of human activity must include analysis of subject, object, outcome, tools, community, rules, and division of labor. The activity theory (AT) system illustrates (Figure 1.2 Structure of human activity system) how the multiple variables in any activity are involved in the generation of a specified outcome. The AT system provides a critical lens to investigate the activity of innovation adoption within an organization (Q1). Use of the AT system to see what occurs at each of the five stages of organizational adoption (Figure 1.1) will allow for analysis of consistencies and contradictions in the process (Q2).

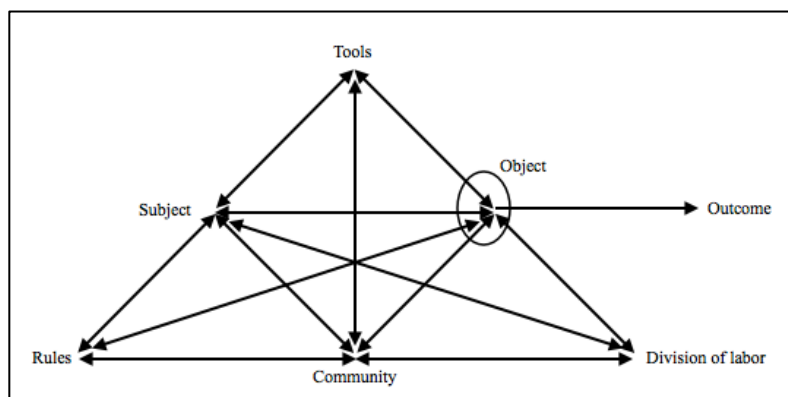


Figure 1.2 Structure of human activity system (Engeström, 1987 in Engeström 2001).

Thus, question 2 is further subdivided into questions regarding the activity system components that describe organizational engagement in mLearning at each of the five stages of the

organizational adoption process (Figure 1.1). The AT system component definitions and questions (Table 1.1) were adapted from Jonassen and Rohrer-Murphy (1999).

Table 1.1 AT System component definitions and questions

Component	Definition	Questions
Object	The effective and efficient instruction, includes a form and function that is likely to be modified as the activity unfolds. In an instructional design context, this may be a curriculum design, hypertext program, workshop, or videotape that is produced.	<ol style="list-style-type: none"> 1. What is the mLearning Demo course content? 2. What learning functions will the course have?
Tools	Design models and methods employed, including the physical apparatus and tools and reasoning that mediate the group's activity toward designing and developing instruction. In an instructional design context this may consist of the software production tools, project management system, or any other kind of tool that instructional designers use to transform the object.	<ol style="list-style-type: none"> 1. How is the project team communicating? 2. How is the project team collaborating? 3. What software is employed at this stage? For what purpose?
Subject	The individuals and work groups that would be formed in the organization to fulfill goals through the activity of instructional design and development. Individual actions include conducting a needs assessment, perform task analysis, and designing instructional interactions. In an instructional design context, this may be a single designer or a team consisting of designers, a manager, subject matter expert, and media producers.	<ol style="list-style-type: none"> 1. Who are the project team members? 2. How are their roles defined?
Rules	The inherent guide of the actions and activities acceptable by the community, with signs, symbols, tools, models, and methods that the community uses to mediate the process.	<ol style="list-style-type: none"> 1. What means (financial and otherwise) are acceptably accessible for completion of the project? 2. What methods are used to mediate the process? Outside of the Technology Office, what departments are used to support the mLearning efforts?
Community	Consists of the interdependent aggregate (e.g., designers within the organization, subject matter experts, designers within professional associations, customers) that share a set of social meanings.	<ol style="list-style-type: none"> 1. What is the nature of the team?
Division of Labor	Prescribed task specializations (designers, developers, producers) by individual members of groups within the community or organization.	<ol style="list-style-type: none"> 1. What are the tasks? 2. Who are the specialists for each of the tasks? 3. Who are the team members accountable to?
Outcome	The form of instruction that is developed and implemented.	<ol style="list-style-type: none"> 1. What form of the mLearning app is being produced? Native? Web-based? 2. How will the mLearning course be delivered? Does it employ a Learning Management System?

Methodology

The study's methodology was a single case study employing interviews, observations, documents, and artifacts to create a detailed description of the case that informs the research analysis for a specific organizational context. In the study the researcher assumes the roles of both active observer and one who is participating in the development of the mLearning. These roles immerse the researcher as both etic (outsider – observer/researcher) and emic (insider – participants) as defined by Headland, Pike, and Harris (1990). The advantage to this type of research is that the researcher's attention is drawn to different components of the study ensuring a more full picture is reported on (Morris, Leung, Ames, and Lickel, 1999). Lave and Wenger (2003) further this argument by employing their 'legitimate peripheral participation.' This is used to explain the importance of participation with experienced practitioners to understand a context and/or activity fully and to be able to more deeply reflect on the activity (Lave and Wenger, 2003).

According to Yin (2003), the case study is preferred in examining contemporary events and relies on many of the same techniques as historical research with the addition of evidence gained in direct observation and systematic interviewing. The purpose of this study was to explore the process by which organizations adopt and engage in mLearning initiatives, thus it was important to gather data from the case as it emerged.

Tan, et al (2012) encouraged researchers to explore mLearning adoption through a longitudinal approach, where variables and constructs were accessed at multiple points during the decision adoption process. The combination of real-time and regularly scheduled observations can provide understandings of how change occurs in the innovation process, this

includes observing key committee meetings and having informal discussions with key participants engaged in the innovation process (Van de Ven and Rogers 1988).

Research Theoretical Framework

Yin (2003) described a case study as a contemporary phenomenon within its real-life context that benefits from inquiry developed from theoretical propositions to guide data collection and analysis. The theoretical framework for this study incorporated both Roger's (2003) diffusion of innovation theory research as a processual guide, and Engeström's (1987) activity theory research as an organizing and analysis framework. Diffusion of innovation refers to both the process by which a new innovation (such as a practice or technology) is communicated, or *diffused*, to a target group and the process by which that target group adopts (or rejects) the new innovation (Andersen, 2011; Attewell, 1992; Jordan, Doherty, Jones-Webb, Cook, Dubrow & Mendenhall, 2012; Rogers, 2003). Diffusion of innovation research allows researchers to examine how practitioners are approaching new initiatives, how they are attempting to integrate new methodologies and technologies into local contexts, and what learning challenges they are facing and why (Andersen, 2011).

The diffusion innovation in organizations can be understood as a five-stage process (Rogers, 2003) (see Figure 1.1). This process includes two sub-processes (1) *initiation* and (2) *implementation* (Rogers, 2003). The initiation sub-process includes *Agenda-Setting* and *Matching that* explore why organizations perceive a proposed innovation as a solution and how they understand it to fit their needs. The decision to adopt separates initiation from implementation. The implementation sub-process includes *Redefining/Restructuring*, *Clarifying*, and *Routinizing* these stages, and informs the application of the innovation to the organizational

need and the organization's structure as an effective and efficient operation for implementing the innovation.

Activity theory helps researchers gain an understanding of how the addition of a learning technology into an existing learning situation changes the practices within that discipline, and serves as a useful function both for designing and implementing technology-based systems (Issroff & Scanlon, 2002). The contradictions that occur within and between the stages of this process can produce change and transformation in an organization's activity system. The activity theory's systematic approach to describing activity was employed at each of the five stages (Figure 1.1) identified by Rogers (2003). A comparison analysis within and between each stage was then completed to explore the process by which the organization adopted and engaged in mLearning initiatives.

Andersen (2011) found the participant-observer approach allowed for the researcher to watch the diffusion process organically unfold. The organization, in this study, "The Christian Network," (TCN)¹ was engaged in optional innovation-decisions, where the choice to adopt or reject mLearning initiatives was made by individuals, and departments, independent of the decisions by other members of TCN.

TCN is a faith-based organization, of not-for-profit status, which participates in a broad scope of faith-based initiatives at an international level. Opportunities to observe and participate in their ongoing experience with the emergent mobile technology was made available with the

¹ To maintain confidentiality of the organization in this study, the real name has been changed to "The Christian Network" (TCN). The changed names were used for each informant and the organization and are used consistently throughout all documents and in this dissertation.

² To maintain confidentiality of the informants in this study, their real names have been changed. The changed names were used for each informant and the organization and are used

purpose to support the instructional designer researcher's quest to better understand instructional design concerns regarding the design, development, implementation, evaluation, and organizational management of instructional and non-instructional processes and resources intended to improve learning performance.

Significance of the Study

The ubiquity of mobile technology has surpassed traditional landline, desktop computer, and Internet accessibility in availability, with over seven billion subscribers globally ("Telephones - mobile cellular compares the total number of mobile cellular telephone subscribers," 2013; Sanou, 2015). Mobile connectivity has grown beyond the electricity grid in most emerging markets: the slow growth of grid access over the past ten years compared to the rapid expansion of mobile networks has widened the existing gap between access to mobile and access to electricity (Nique and Smertnik, 2015). The lines between Internet technology and cellular technology are disappearing (Johnson, Smith, Levine, & Haywood, 2010), yet the use of mobile devices to support organizational outcomes has remained nascent (Quinn, 2011; (Greenbaum Kasson, 2015) creating limited development of mobile learning offerings. In the Brandon Hall Group's 2013 Mobile Learning Survey, 27% of organizations reported there was absolutely no mobile interaction with learning and among the companies using mobile learning, only 58% are doing anything beyond limited mobile web access (Wentworth, 2014).

Summary of Dissertation Chapters

The purpose of this study was to explore the process by which an organization adopts and engages in a mobile learning (mLearning) initiative. mLearning uses mobile technology to aid in the learning, reference, and/or exploration of information useful to the user at that moment or in a specific context. Current mLearning research studies have focused on its support of effective

and efficient content delivery to devices already adopted by individual users. To realize the potential of mobile technology in supporting organizational objectives, mLearning was explored as a viable instructional design concept through investigations of the role of instructor designer, project manager, content areas specialist operating in parallel with trending organizational issues and challenges. The organizational adoption process for mLearning is likely to change organizational structure as the organization progresses through the initiation and implementation stages of adoption. Research is needed to examine how organizations change as a result of systematic contradictions revealed during the active engagement in mLearning initiatives. Design and development of mLearning at the organizational level occurs in an activity-system where successful adoption is achieved by actions that operate toward a common goal. To better understand the organizational activity of design and development it must therefore be observed and contextually analyzed to examine the kinds of activities that organizations engage in; who is engaging in that activity; what are their goals and intentions; what objects or products result from the activity, and the rules and norms that afford and restrict that activity within the larger community in which the activity occurs.

The dissertation is divided into five chapters and an appendix section. Chapter one provided a brief introduction to mLearning, the rationale for using case study research methods, statement of the problem, significance, and the research questions. Chapter two presents a literature review on the key aspects of this study namely a historical review of themes developed from adoption of instructional technology, the status of mLearning, diffusion of innovation, and activity theory. Chapter three describes the research methods including how the case was selected, the forms of data collection, how data were analyzed, the validation strategies used to increase the validity and reliability of the results, potential ethical issues, and the role and

background of the researcher. Chapter four presents the results of the case analysis through reported explicit details and emergent themes. The last chapter, chapter five, provides a discussion on the results of the study, the implications for theory development, practice, organizational structure, future research, the strengths and limitations of the study, a conclusion, the researcher's reflection, as well as the references used in all chapters of this dissertation. The dissertation ends with an appendix section that includes additional artifacts, references, copies of the internal review board approval from Syracuse University, and a copy of the informed consent form.

Chapter Two: Literature Review

Introduction

The purpose of this study was to explore the process by which an organization adopts and engages in a mobile learning (mLearning) initiative. mLearning uses mobile technology to aid in the learning, reference, and/or exploration of information useful to the user at that moment or in a specific context. Current mLearning research studies have focused on its support of effective and efficient content delivery to devices already adopted by individual users. To realize the potential of mobile technology in supporting organizational objectives, mLearning must be explored as an instructional design concept investigating the role of instructor and pedagogy, as well as, organizational issues and challenges. The adoption process for mLearning likely changes organizational structures as an organization progresses through the initiation and implementation stages of adoption. Research is needed to examine how organizations change as a result of systematic contradictions revealed during the active engagement in mLearning initiatives. Design and development of mLearning at the organizational level is explored as an activity-system where individual and group actions operate in the achievement of a common goal. The organizational activity of design and development must be contextually analyzed to examine the kinds of activities that organizations engage in asking; who is engaging in that activity; what are their goals and intentions; what objects or products result from the activity; and what rules and norms restrict the activity within the larger organizational community.

Review of Literature

This chapter is divided into three main sections. The first section develops a historical understanding of radio, a formerly trending technology, as it was deployed through distance learning efforts. A review of radio adoption into educational contexts identifies barriers,

solutions, and affordances that mobile, a like communication technology, may also encounter. This historical description provides a comparison framework from which to observe mobile technologies and is a historical representation of one of the technologies previously adopted by the case organization. The second section develops mLearning as a trending phenomenon. This section highlights the ubiquity of mobile devices, defines mLearning, describes the affordance of using mobile devices to deliver instruction, and explains mLearning design principles. The third section presents available literature, in the area of mLearning adoption in organizations, highlighting the need for continued scholarship in this area of study. The final section of this chapter focuses on the theoretical framework specifically developed to explore mLearning in organizations. The framework incorporates fundamental principles from Rogers' (2003) diffusion of innovation and Engeström's (1987) Activity Theory which are each developed through background review and current research findings, specifically their development, organizational implications, and instructional design applications.

Radio: The 20th Century's Ubiquitous Distance Education Instructional Media

Distance education programs have existed for over a century, however, instructional media has used in these programs changed from pencil and paper correspondence to real-time Internet courses (Galusha, 1998), with this change has come inevitable instructional design challenges. Instructional media, defined as the physical means by which instruction is presented to learners (Reiser & Gagné, 1983) includes multiple forms of technology. The initial advantages of early technological innovations (Reiser, 2001), highlighted their purported support of effective and efficient instructional content delivery.

In 1895, Guglielmo Marconi carried out the first experimental transmission of wireless signals over a distance of 400 and then 2,000 meters (Blin, 1997). Twenty-five years after

delivering audio-messages over long distances the instructional uses of radio technology began to develop and radio as a medium for distance learning began to be explored. In the 1930s industry and educational leaders predicted film and radio as the great catalysts of a revolutionary shift in instructional delivery.

The central and dominant aim of education by radio is to bring the world to the classroom, to make universally available the services of the finest teachers, the inspiration of the greatest leaders... and unfolding events which through the radio may come as a vibrant and challenging textbook of the air.

Benjamin Darrow, 1932

Founder of the Ohio School of the Air (Cuban, 1986)

Historically, cultural forces have pressured an educational perspective that embraces newer, trending technology, specifically in regard to film, radio, television, and eventually computers (Cuban, 1986). This pressure has come in cultural demands and also through community engagement. Parents and businesses in the 1920s supplied schools across the United States with radio receivers in an effort to integrate trending technology into their children's educational experience, however radio's initial adoption was delayed due to barriers including; poor battery life, poor reception, and uncertainty among educators of which policy routes to pursue (Cuban, 1986).

In 1947 the invention of the transistor, a tiny semiconductor device, led to the introduction of transistor radios that used dry cells, rather than vacuum tubes, and consumed

much less power, were more reliable, more inexpensive, lighter, and smaller than their predecessors (Vardhan, 2002). Moore's Law stated that the inevitable algorithmic growth of product and services capacity continues at a consistent pace, suggesting ever-receding technological limitations – and ever more unlimited capacity to implement organic processes that mirror human intelligence and emotions in service to ever more compelling interfaces and engines (Traub, 2004). Following the pattern predicted by Moore's Law, radios would continue to become smaller, more powerful, and more user friendly. By the end of the 1970s 70% of radio receivers were either portable or mobile (Vardhan, 2002). With better battery life and better reception the next barrier for educational institutions was that of answering the question: How to integrate radio technology into instruction?

Romiszowski (1974) found that the instructors often had no control over content and sometimes little to no notice about what the content would be. These ground level decision makers were hesitant to integrate technology within given educational contexts based on a lack of control over content delivery. Overtime, with increased scheduling and broadcast regulation, radio became more frequently used for instructional delivery.

A review of pedagogical shifts in radio technology's distance education programming have revealed the constant struggle to overcome the medium's one-way, synchronous only delivery. Romiszowski (1995) differentiated between delivery of *informational* and *instructional* media with Figure 2.1.

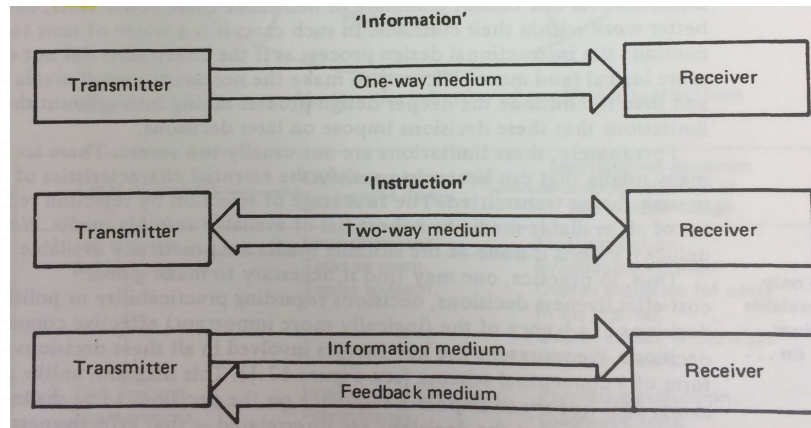


Figure 2.1 Instruction and Informing contrasted (Romiszowski, 1995)

In its original form, radio was a one-way communication medium whereby interaction with listeners was minimal. As a result, a radio program's pace was primarily that of the broadcaster (one-way, information), who found it difficult to gauge the listener's prior knowledge and attitudes, which are, critical to learning (Berman, 2008). To develop instructional value when using radio to replace teacher lecture, instructors began to include well-designed preparatory and follow-up materials (Romiszowski, 1974). These materials were packaged with visual and print materials and interactive elements that could be organized via listening groups (Berman, 2008). As materials to work with radio for instructional purposes became more effective, so too did radio broadcasts.

Interactive radio instruction (IRI) was developed in Nicaragua by a team from Stanford University in the early 1970s. The objective was to turn a typical one-way technology into a tool for active learning inside and outside of the classroom (Bosch, 1997). IRI efforts developed multiple techniques for using educational radio including how to function as a one-way medium used for instruction. Methodology was developed to combine the radio with the teacher to facilitate the scripted radio broadcast with a room of students through a *deferred response* dialogue (Friend, 1989). The success of the IRI programs in Nicaragua led to adoption in

Thailand, Dominican Republic, Bolivia, and Costa Rica (Friend, 1989). IRI programs/projects were developed for a variety of subject matter, audiences, and learning environments and were at least partially sustained through partnerships between ministries of education, ministries of communication and broadcasting (Bosch, 1997). IRI programs in Kenya and Papua New Guinea built on methodologies developed in initial IRI efforts and began to develop programs that employed inexpensive or easily accessible instructional materials that would be locally available (Friend, 1989).

Research on the adoption of radio technology for educational purposes regularly reported that the impact of governing bodies cannot be overlooked. Cases that show governmental interest in radio distance education reveal sustained efforts that were countered by governments that delayed licensing of frequencies and direct financing elsewhere (Bosch, 1997; Dagron, 2001). Policy makers began to explore ways of making cost-effective use of new technologies in vocational education and training with possible extensions at the higher levels of formal education (Perraton & Creed, 2000). For example, The Open University in the United Kingdom (OUUK) was established in 1969 with the objective of making education accessible to lower-income adults who would not normally have access to academic institutions. The OUUK's realization came from multiple efforts including educationalist and historian J.C. Stobart calling for a wireless university while working for the BBC in 1926. Governmental pressure from the Labour Party in 1963 called for a *University of the Air* in order to make education more accessible. Throughout its history, the OUUK continues to struggle with and against their native governmental authorities (The Open University, 2016).

By 2001 radio had been the most important medium for development and social change worldwide (Dagron, 2001). Radio technology has been deployed throughout the last century for reaching geographically dispersed groups often in need of cost effective educational support.

Mishra (2005) reviewed radio distance education research in India and surrounding countries and found that useful radio programs should; (1) form an integral part of the curriculum; (2) be broadcast at a time suitable for the target audience; (3) use drama or a story format; (4) use radio more for factual information than for explaining concepts; and (5) use radio-vision (radio-plus-visual) if the subject requires illustration.

Perraton and Creed's (2000) found that radio enriched basic education at costs more modest than television and computers, supporting basic education in three ways:

1. direct class teaching – substitutes for teachers on a temporary basis (For example IRI projects)
2. schools broadcasting – complements teaching and learning resources not otherwise available
3. general children's programming – provides general and informal educational opportunities

Hall (1973) studied adult education radio and proposed expanded development by African Universities of radio study groups for adult education citing the following advantages:

1. Formal schooling is becoming prohibitively expensive.
2. Large proportions of the population have had little or no access to formal schooling.
3. Formal schooling has not proved to be flexible and open to change.
4. The benefits of formal schooling are often lost in the unschooled environment of rural life.

5. Children in the schools are not in a position to put new ideas to immediate use.
6. Formal education has produced an ever widening gap between the educated and the uneducated.
7. Even the best formal schooling is inadequate for a lifetime's education.

The many affordances of radio as a technology did not come without strained diffusion efforts. Radio access is not a fully bridged gap in developing countries, only 1 in 4 Africans had a radio (Keane, 2005). In developing countries, the electrical grid had not completely provided needed power, in Africa alternative energy, and renewable resources, specifically solar energy, have been explored to power new technology in these developing countries (Thorpe, 1984; Keane, 2005). The infrastructure necessary to deliver electrical and broadcast needs was limited geographically and also politically. While governmental interest in distance education has led to sustainable efforts, bureaucracy delayed further infrastructural expansion (Bosch, 1997; Dagon, 2001).

As distance education is in a constant state of change the most significant influence on its evolution will not be technical development of more powerful devices, but rather the professional development of wise designers, educators, and learners (Dede, 1996). The historical review of barriers and solutions of radio for distance education reveal generalized themes, which can be applied to future instructional media (like mLearning).

Radio to Mobile: historically generated themes

While distance education has grown in leaps and bounds toward interactive learning, implementation of distance instruction through the introduction of eLearning technologies is still limited by infrastructure, buildings, and hardware ... mLearning technologies are a significant step beyond the limitations of desktop (or eLearning) computing (Traxler, 2010a). Accessibility

to cost-efficient and reliable equipment has delayed the full diffusion of these media at the rate desired by many stakeholders. Yet, with time, costs have been reduced and therefore increased accessibility to the desired technology. The reliability of the hardware to operate at an acceptable level (receive, send, and compute) is necessary for further adoption. In the case of radio and mobile technology, government interactions with policies toward infrastructure and implementation greatly affected initial adoption rates (Bates, 1990; Gruber & Verboven, 2001; Rouvinen, 2006; Berman, 2008; The Open University, 2016). Like the radio, instructional uses of mobile technology would not start to be investigated until approximately twenty-five years after the initial launch of the innovation with Martin Cooper's April 3, 1973 handheld, mobile telephone call to Dr. Joel Engel (Shiels, 2003). Today, 77% of the world's population subscribes to mobile networks and 90% of the world's population is able access mobile networks due to existing infrastructure (Quinn, 2012 as cited in Oller, 2012, p. 2).

The most current research on radio instruction focuses on the ability of this radio to reach audiences geographically dispersed. Yet, to be classified as instruction, the reach must both inform participants and allow for exchanges in communication (Romiszowski, 1995). The findings of Beckman (2010) highlight an important facet to the advantages of mobile learning to connect groups that are also culturally and socio-politically isolated. Beckman's (2010) findings fulfilled the predictions of Dede (1996) that stated new media enables new types of instructional experiences including synchronous, groups, presentation-centered forms of distance education led through networked channels of virtual communities. While mobile technologies offer one-way and two-way communication (both synchronous and asynchronous) and clearly more affordances than radio, more creative instructional solutions may come from the lessons learned in radio.

Ubiquity of Mobile

The mobile coverage global network covers more territory than the electrical grid (Johnson, Smith, Levine, & Haywood, 2010). Studies of developing countries show that the need to understand mobile devices as sources of learning transcends the use of mobile as an initial access point to that of the only access point. Approximately half of Africa's one billion people are not connected to an electrical grid (Zachary, 2009), yet the number of mobile subscriptions will have reached a projected 735 million by the end of 2012 (Isaacs, 2012). Landline, networked connections are no longer the primary points of media interaction and information dissemination. These studies have suggested a need to explore how mLearning can best be used in modern, developed societies, and point out a need to explore mLearning in a greater and more global perspective. Attewell (2001) defines a "digital divide" forming as a technology gap between "information haves" and "information have-nots" due in large part to disparities in access. While access has become less of a contributor to the gap, investigations into mobile learning initiatives in Africa and the Middle East have revealed that a lack of content developed for, or accessible by, mobile devices has created a major gap in an area reachable by mobile coverage (Isaacs, 2012).

mLearning

Mobile learning (mLearning), has been defined as "the intersection of mobile computing and eLearning: accessible resources wherever you are, strong search capabilities, rich interaction, powerful support for effective learning, and performance-based assessment. eLearning independent of location in time or space" (Quinn, 2000, para. 8). More current definitions of mLearning explain it as the "exploitation of ubiquitous handheld technologies, together with wireless and mobile phone networks, to facilitate, support, enhance and extend the reach of

teaching and learning” (MoLeNET, 2011, *What is Mobile Learning* section, para. 1). mLearning “is the use of mobile technology to aid in the learning, reference or exploration of information useful to the user at that moment or in a specific use context” (Feser, 2010, para. 3). Current research suggests mLearning supports effective and efficient deployment of content on devices already in the user’s hand offering the potential for huge cost savings (Blackwood, Roeger & Pettijohn 2012).

Zurita & Nussbaum (2007) found the use of handheld computers positively impacted participants’ social interactions and motivation when the mobile devices were wirelessly interconnected allowing for the teaching of content and strengthening communication among participants. These devices are ‘*always on*’ allowing for instant on-demand learning, anytime, anywhere (Agarwal, 2009).

mLearning differs from eLearning in that the individual no longer needs to make time for learning or prepare for it; rather the information they require is available as needed (DeGani, Martin, Stead, & Wade, 2010). The learning shift from eLearning to mLearning is a predictable transition in educational technology since historically, educational technology leverages innovation to match its needs rather than the technologies intended uses. Traxler (2010b) found that educational technology is ‘*parasitic,*’ in that it originally appropriated desktop computers that were intended for corporate business customers and now trying to appropriating mobile devices intended for individual lifestyle customers (Traxler, 2010b). With this transition comes a shift from pedagogy to heutagogy (Cochrane, 2010). Heutagogy is the study of self-determined learning, a form of informal learning, where personal tools (mobile devices) can support learner-defined inquiry (Kukulsa-Hulme, 2013). With mobile devices, learners have access to information nearly anytime and anywhere, how learners access content and use it is a new,

dimension in learning, a heutagogical approach, requiring an informed perspective for instructional designers. Peters (2009) states that to support a strategic response to the opportunities and demands of mobile learners, the education and training sector needs to be informed about the actual use of mobile devices at work and in workplace learning, about potential future trends in mobile learning.

Affordances of Mobile Devices to Deliver Instruction.

Technology affordance refers to an action potential, that is, to what an individual or organization with a particular purpose can do with a technology or information system (Majchrzak & Markus, 2012 in Yoo et al., 2012). mLearning's ability to facilitate, support, enhance and extend the reach of teaching and learning (MoLeNET, 2011) is reinforced in Sparrow, Lui, and Wegner's work (2011) which states "The internet has become a primary form of external or transactive memory, where information is stored collectively outside ourselves." mLearning's greatest potential is found in its ability to foster collaboration and deeply engage users in the process of learning (Johnson et al., 2010). 21st century researchers have described the development of a participatory culture as paramount for the success of future generations (Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006). This participatory culture can be defined as one that is: Comfortable with artistic expression and civic engagement; Supported in creating and sharing with others; Engaged in informal mentorship sharing and passing information and experiences as novices and experts; Appreciated as a contributor; and Socially connected (Jenkins et al., 2006). 21st century learners are part of this participatory culture and the widespread use of mobile devices has potential to inform the way content is delivered and curated.

mLearning Design Principles

Norman (2002) described the need for ‘good design’ in technological innovation, as a necessary principle. He states “The same technology that simplifies life by providing more functions in each device also complicates life by making the device harder to learn, harder to use. This is the paradox of technology. The paradox of technology should never be used as an excuse for poor design. It is true that as the number of options and capabilities of any device increases, so too must the number of options and complexity of the controls. But the principles of good design can make complexity manageable.” (Norman, 2002 p. 31)

mLearning must be understood as a user-experience (UX) activity developed with anticipated form, function, and meaning for potential adopters (Rogers, 2003). Some fields of study and practice refer to ‘fit’ rather than ‘meaning’ suggesting that ‘fit’ illustrates the connection to design concerns over the linkage between form and function and the user (Dumas & Mintzberg, 1991). This literature review and research study will use ‘meaning’ as a more consistent correlation to Rogers’ (2003) Diffusion of Innovation Theory.

Form is the directly observable physical appearance and substance of an innovation (Rogers, 2003). While form clarifies the mobile device as fitting into the palm of the user’s hand, form considerations also include the use of participants own devices, commonly referred to as BYOD (Bring Your Own Device), and therefore a wide range of operating system platforms must be considered, including Android, Apple iOS, and Blackberry.

Function is the contribution made by an innovation to the way of life of members of a social system (Rogers, 2003), the ‘fit’ at the product-user interface (Dumas & Mintzberg, 1991). The function of mLearning can be formal and informal learning. There are two types of mLearning: formal and informal. Formal is much like eLearning coursework viewed on a mobile

device, which are managed by an instructor in a planned setting. Informal incorporates more web 2.0 themes: two-way communication and social media. Informal's self-managed approach finds the learner using the technology to gather reference and performance support materials, content and courseware, and media-based content (Brink 2011; Wang & Shen, 2011). Formal and informal mLearning can be achieved through use of existing systems applications like iTunes U or Blackboard Mobile. With appropriate resources, further development can be done to create a custom, organizational specific, interface.

Meaning, is the subjective and frequently unconscious perception of an innovation by members of a social system (Rogers, 2003). The meaning mLearning brings to a given social system is developed contextually, defined by the organization implementing it and the users exploiting it. The most common researched contexts for mLearning are K-12 and Higher Education. Organizations seeking to deploy mLearning initiatives outside of K-12 and Higher Education are significantly less understood in the literature.

Mobile technologies are seen as the next instructional computing tool. The prevalence of 'Bring your own device days'(BYOD) in educational institutions that had previously barred use of mobile technology demonstrates a shift in practice. Some studies show that parents are supportive to the point of personally purchasing data plans to allow their student Internet access on their device (Evans, 2011) this is reminiscent of parents a century earlier attempting to provide access to radio technology in schools (Cuban, 1986). As early as 2011, 17 % of high school teachers said their students used personal cell phones for classroom assignments or activities (Grunwald & Lippincott, 2011).

Herrington, Herrington, & Mantei (2009) have summarized research studies on mLearning in higher educational settings and recommend incorporation of the following characteristics for designing mLearning (Table 2.1).

Table 2.1 Characteristics for designing mLearning (Herrington et al., 2009)

Characteristic	Defined
Real world relevance	Use mobile learning in authentic contexts
Mobile contexts	Use mobile learning in contexts where learners are mobile
Explore	Provide time for exploration of mobile technologies
Blended	Blend mobile and non-mobile technologies
Whenever	Use mobile learning spontaneously
Wherever	Use mobile learning in non-traditional learning spaces
Whomsoever:	Use mobile learning both individually and collaboratively
Affordances	Exploit the affordances of mobile technologies
Personalize	Employ the learners' own mobile devices
Mediation	Use mobile learning to mediate knowledge construction
Produce	Use mobile learning to produce and consume knowledge

According to Atkins et al. (2010), a gap exists in the available technology that enables connected teaching and the conditions necessary to leverage it. The gap in technology understanding influences program and curriculum development, funding and purchasing decisions about educational and information technology in schools, and pre-service and in-service professional learning. This gap prevents technology from being used in ways that would improve instructional practices and learning outcomes (Atkins et al., 2010).

Through a review of previous empirical studies, Hew and Brush (2007) found a total of 123 barriers to technology integration. The authors classified them into six main categories: (1) resources, (2) knowledge and skills, (3) institution, (4) attitudes and beliefs, (5) assessment, and (6) subject culture; lack of resources accounted for the greatest barrier to technology integration making up 40% of the literature reviewed. The category 'resources' included (a) technology, (b)

access to available technology, (c) time, and (d) technical support (Hew & Brush, 2007). mLearning has the potential to minimize the ‘resource’ category’s impact on technology integration due to the large number of users already with access.

Yet the availability of resources, like mobile devices, is not enough to significantly impact learning, a shift in pedagogy is also necessary. Cochrane (2012) explained that initial mLearning project implementations in a new setting, had a large learning curve for the participants that resulted in project failure or demonstrated no significant pedagogical difference. Cochrane (2012) reported on his own experience with mLearning as he expounded on three examples of mLearning projects (Table 2.2)

Table 2.2 Cochrane's mLearning examples (2012)

Project Description	Successes	Failures
<p>2008 Diploma of Landscape Design: followed two 'successful' mLearning projects (2006 and 2007) that were collaborations between a researcher and lecturer. The 2008 project included a second lecturer and a fieldtrip to Japan.</p>	<ol style="list-style-type: none"> 1. Highlighted the importance of a sustained community of practice (COP) around the project 2. Created participant eportfolios 3. Enhanced communication during fieldtrip to Japan 4. Expanded the reach of the mLearning COP by including a second lecturer from the department 	<ol style="list-style-type: none"> 1. Inappropriate choice of mobile device 2. Unforeseen limited Wi-Fi during the fieldtrip 3. Participants did not value the use cellular connectivity, preferring editing and uploading media via a desktop or laptop 4. Reliance on a limited number of sessions in a shared computer lab was not conducive to nurturing the COP 5. Lecturers defaulted to established workflows not maximizing mobile affordances, and therefore did not model the use of mobile tools 6. Lack of course integration of the project, as the project became an optional extra for voluntary participants
<p>Bachelor of Architecture 2009: Having heard about the previous mLearning projects, lecturers within the school of Architecture at Unitec wanted to create their own mLearning course (their first).</p>	<ol style="list-style-type: none"> 1. Collaborative partnerships were established that were built upon in subsequent projects in 2010 and 2011 2. Over a third of the course students voluntarily participated in project and established eportfolios 	<ol style="list-style-type: none"> 1. No course assessment integration 2. Several key lecturers refused to engage in the project 3. Lecturer presuppositions of student technology ownership were proven false, leading to inappropriate choice of supporting technologies
<p>Bachelor of Computing 2010: the department's first attempt at mLearning in an elective course.</p>	<ol style="list-style-type: none"> 1. Several student teams produced iOS applications 2. A collaborative partnership supplied the necessary hardware to run the course 3. Lecturer and student participants were exposed to the potential of mobile web 2.0 even though they did not integrate its use within the course 	<ol style="list-style-type: none"> 1. Lecturers defaulted to established pedagogies 2. There was no integration of mobile web 2.0 affordances in the course 3. No establishment of a supportive learning community beyond the face-to-face class time 4. No trusted collaborative partnership between the researcher and the course lecturers 5. There was no establishment of sustained exploration of mLearning in the department

Cochrane (2012) found, through these projects, that designing for pedagogical change enabled by technology was crucial for moving beyond the phenomena of no significant distance.

A need for more literature on mLearning adoption for organizations

Reiser and Dempsey (2007) define the field of instructional design as “encompassing the analysis of learning and performance problems, and the design, development, implementation, evaluation, and management of instructional and non-instructional processes and resources intended to improve learning and performance in a variety of settings, particularly in educational institutions and the workplace” (Reiser & Dempsey, 2007, p. 7). The increase of available mobile devices and, as Cochrane (2012) found, an increase in interest in mLearning projects has created a need for instructional designers to be prepared to design, develop, implement, evaluate, and manage mLearning in educational and workplaces contexts.

Instructional designers seeking to employ mLearning must not solely rely on the availability of the technology and user acceptance (including instructors) but also must focus on; organizational issues and challenges (Vogel, Kennedy, & Kwok, 2009). Rogers (2003) stated that the organizational process innovation adoption usually changes both the innovation and the organization. Further, the effects of an innovation usually cannot be managed so as to separate the desirable consequences from the undesirable (Rogers, 2003). Pervasive digital technology, while being rapidly adopted by organizations, is fundamentally reshaping them. These organizations must learn how to build and organize the digital platforms that are increasingly gaining strategic importance (Yoo et al., 2012).

Of paramount significance to the successful design and delivery of mLearning instruction is the organizational infrastructure (Terras & Ramsey, 2012) and communication within it (Gedik et al., 2011). The organization’s infrastructure and communication channels can be

analyzed as an Activity Theory (AT) system with *subject, object, outcomes, tools, community, division of labor,* and *rules* that operate as actions and interactions (Engeström, 1996). The coordination of the community of designers, subject matter experts, administrators, and the technical support team is what makes successful contributions to an mLearning project (Gedik et al., 2011). Within multiple levels of an organizational structure Lanzolla and Suarez (2010) suggested that different *community* members are likely to be responsible for making the adoption decision to use and implement new technologies. These members often include senior management and a technical layer of personnel. The technical layer tends to have a more conservative approach when it comes to technology, since when a new technology is adopted those in the technical layer have to go through a process of change in routines, process, and cognitive maps (Lanzolla & Suarez, 2012).

Lanzolla and Suarez (2012) called on researchers to explore the process of change associated with adopting new technology and to jointly consider adoption and usage to gain a better understanding of long-term technology diffusion patterns. They suggested that future research must deal with multiple, and sometimes conflicting, temporal logics implied by multiple digital and physical tools and their users (Yoo et al., 2012). This time oriented process can be better understood within Rogers' (2003) framework on the diffusion of innovation and through the descriptive lens of activity theory (Engeström, 1987).

Diffusion of Innovation

Background and Development. Rogers' (2003) diffusion of innovation (DOI) theory refers to both the process by which an innovation is communicated (diffused) and the process by which the innovation is adopted. DOI theory sets out to describe the patterns of adoption, explain the mechanism, and assist in predicting whether and how a new innovation will be successful

(Clark, 1999). Rogers' (2003) argument that innovations, like mLearning, change the organizational structure when they are initiated and implemented, is supported by other researchers who propose that mLearning initiatives must be understood as *organizational change* that lead to organizations allocating resources differently, re-organizing units, and communicating differently (Ally, 2009; Cross & Dublin, 2002; Quinn, 2011).

Definition of Diffusion and Innovation. Surry and Ely (2006) identified Rogers' Diffusion of Innovation (DOI) as perhaps the most important book related to the topic of adoption and diffusion. DOI researchers examine how practitioners approach new initiatives, how they attempt to integrate new methodologies with new technologies into their local contexts, and what learning challenges they are facing and why (Andersen, 2011). Rogers' (2003) book, now in its 5th edition, identifies the four elements to every innovation study; (1) Innovation, (2) Communication, (3) Time, and (4) Social System. Rogers (2003) describes these in greater detail through variables, adopter categories, and roles involved in determining the rate of adoption of innovations. In Figure 2.2 the variables innovation, communication, and social system are illustrated. Time as a key element in the rate of adoption is inferred as a longitudinal aspect of the diffusion process.

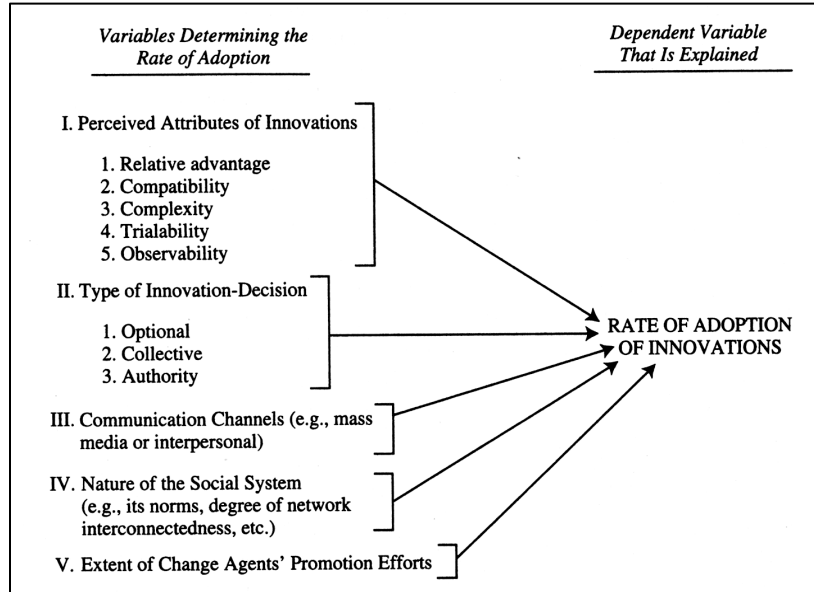


Figure 2.2 Variables determining the rate of adoption of innovations (Rogers, 2003).

An innovation is an idea, practice, or object that is perceived as new by an individual or organization. A communication channel is the means by which messages get from one individual to another. The nature of the information exchange relationship between a pair of individuals determines conditions under which a source will or will not transmit the innovation to the receiver and the effect of such a transfer. The time dimension involved in diffusion can be found in the innovation-decision process by which an individual passes from first knowledge of an innovation through its adoption or rejection; relative early/late adoption rate as compared to other members of a system; an innovation's rate of adoption in a system. A social system is a set of interrelated units that are engaged in joint problem solving to accomplish a common goal.

DOI theory includes five innovation characteristics: (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability, and (5) observability. According to multiple sources of literature (Lee et al. 2011; Rogers, 2003; Clarke, 1999) these characteristics can best be understood as follows. Relative advantage is defined as the degree to which an innovation is considered as being better than the idea it replaced and was found to be one of the best predictors

of the adoption of an innovation since the greater the perceived relative advantage of an innovation, the more rapid its rate of adoption will be (Rogers, 2003). Compatibility refers to the degree to which innovation is regarded as being consistent with the potential end-users' existing values, prior experiences, and needs. Complexity is the end-users' perceived level of difficulty in understanding innovations and their ease of use. Trialability refers to the degree to which innovations can be tested on a limited basis. Observability is the degree to which the results of innovations can be visible by other people. These characteristics are used to explain end-user adoption of innovations and the decision-making process. Rogers (2003) states up to 49% of the variance in the rate of adoption is explained in these attributes. In this study, these characteristics are used to understand innovation adoption in the decision-making process and how social systems engage in the activity of adoption (Activity Theory System. Engeström, 1996)

Adopter categories identified by Rogers (2003) are innovators, early adopters, early majority, late majority, and laggards and that each category can be illustrated on a bell curve on the basis of innovativeness (Figure 2.3 Adopter Categorization (and Definition) on the Basis of Innovativeness from Rogers, 2003, p. 281-285).

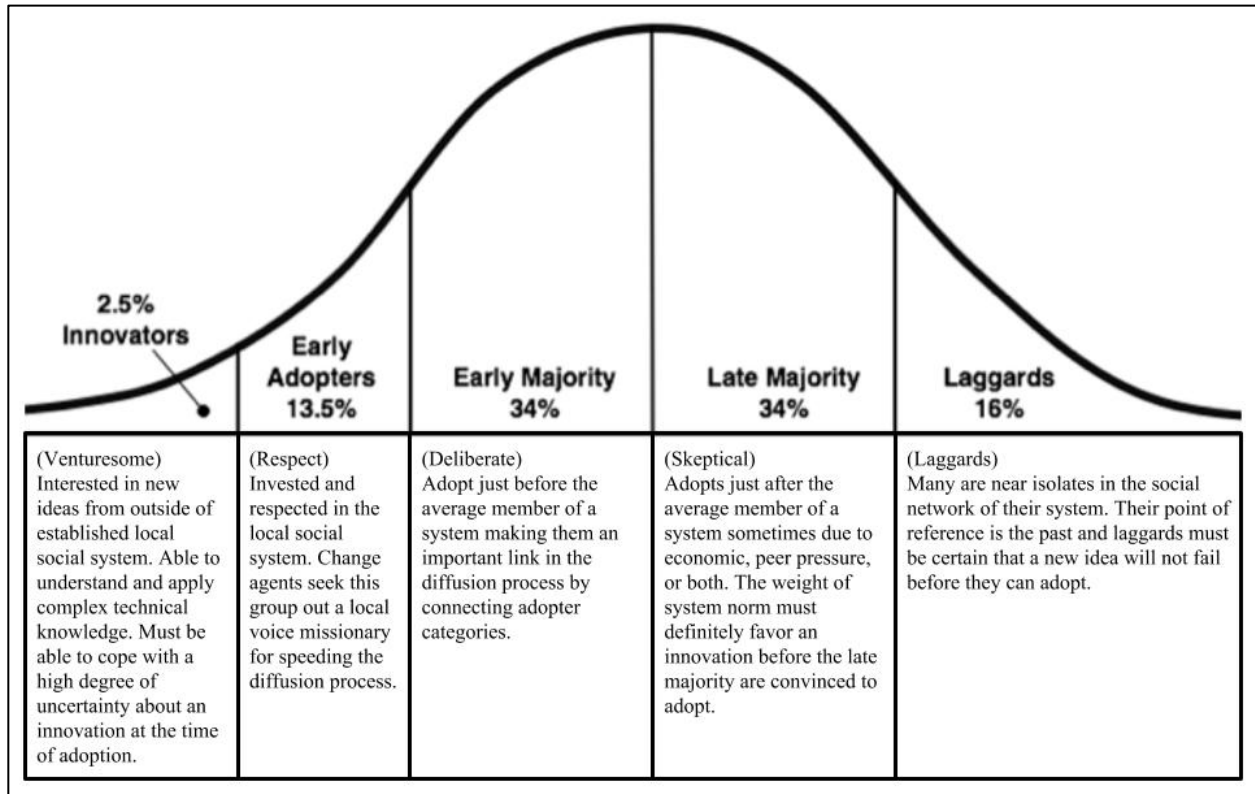


Figure 2.3 Adopter Categorization (and Definition) on the Basis of Innovativeness from Rogers, 2003, p. 281-285

Additional key roles defined by Rogers (2003) and Clarke (1999) includes *opinion leaders* who have informal influence and *change agents* who positively influence innovation decisions.

Change agents work to develop a need for change on the part of the client, establish information-exchange relationship, diagnose the client problem, develop an action plan, implement, and shift the client from reliance on the change agent, to self-reliance.

The innovation-decision process for individuals includes five main steps: (1) Knowledge, (2) Persuasion, (3) Decision, (4) Implementation, and (5) Confirmation; these steps are illustrated in Figure 2.4 A Model of Five Stages in the Innovation-Decision Process for Individuals from (Rogers, 2003). *Knowledge* refers to exposure to the existence of the innovation and an understanding of how it works. *Persuasion* is the forming of a favorable

attitude toward the innovation. *Decision* defines the commitment to the adoption.

Implementation puts the innovation to use. *Confirmation* provides reinforcement based on positive outcomes.

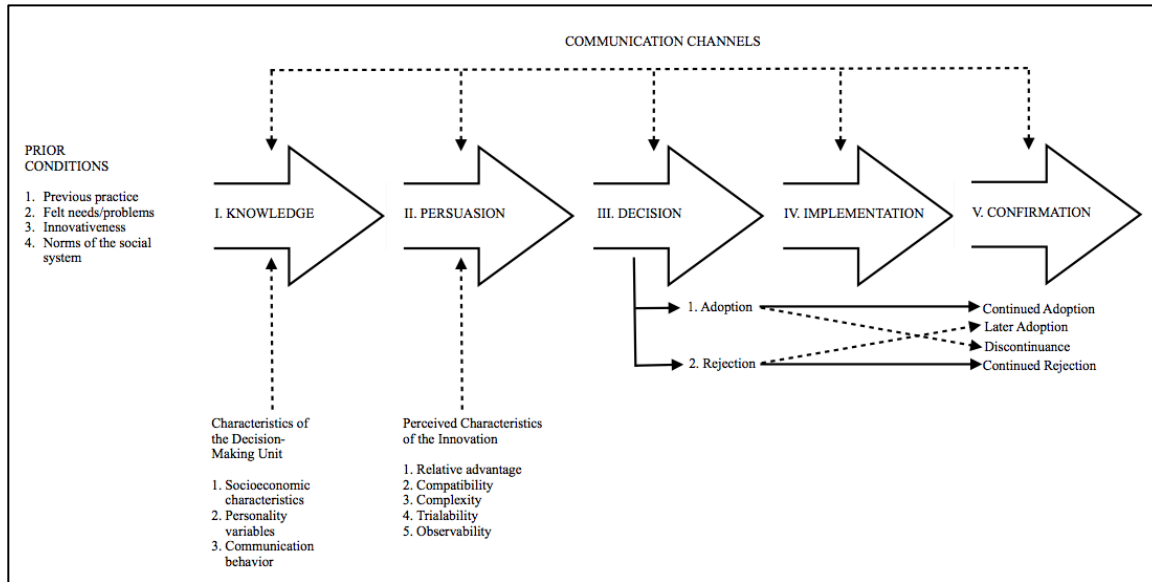


Figure 2.4 Five Stages in the Innovation-Decision Process for Individuals (Rogers, 2003)

The model shows the process that an individual passes through from first knowledge of the innovation, to forming an attitude toward the innovation (based on current knowledge), to a decision to adopt or reject (based on growing knowledge), to implementation of the new idea, and to confirmation of this decision.

Diffusion of Innovation in Organizations. Much of Rogers' work (2003) focused on the DOI to individuals (the focus of Figure 2.4), however Rogers (2003) defines an organization as a stable system of individuals who work together to achieve common goals through a hierarchy of ranks and a division of labor (Engeström, 1996). According to Rogers (2003) most organizations engage in opportunistic surveillance by scanning the environment for new ideas that might benefit the organization. If organizational members begin with a wanted outcome (Engeström, 1996) there is a good chance that the innovation will match some problems or object/goals

(Engeström, 1996) faced by the organization. According to Rogers (2003) perceived need can begin an innovation process, sometimes knowledge of an innovation, rather than the recognition of a problem launches the innovation process. Rogers (2003) identifies three types of innovation-decisions within organizations; (1) Optional innovation-decisions, (2) Collective innovation decisions, and (3) Authority innovation-decisions. An 'organization' can be defined as a stable system of individuals who work together to achieve common goals through a hierarchy of ranks and divisions of labor (Rogers, 2003). Innovation in organizations is typically more complicated since it involves a number of individuals, including champions and opponents of the new idea (Rogers, 2003).

Optional innovation-decisions: The choice to adopt or reject an innovation is made by an individual independent of the decisions by other members of a system. The individual's decision can be influenced by the norms of the system and by communication through interpersonal networks. (Rogers, 2003). An example of this may be an employee of an organization choosing to use a smartphone to communicate with other employees when away from the office, while others stick to using their desktop computers for email.

Collective innovation-decisions: The choice to adopt or reject an innovation is made by consensus among the members of a system. Once the decision is reached, each individual must act accordingly. (Rogers, 2003). An example of this may be like the above mentioned employee, except, however at a department level, where the technology group has decided to adopt smartphone communications to keep in contact during off hours, in support of other company employees with technical issues.

Authority innovation-decision: The choices to adopt or reject an innovation is made by a relatively few individuals in a system who possess power, high social status, or technical expertise. This type is one in which the organization’s employees must comply (Rogers, 2003). An example of this may be where upper-level leadership has decided all employees *will* adopt smartphone communications to keep in contact during off hours, for email and in support of other company employees with technical issues.

The DOI in organizations can be further understood through a five-stage adoption process (Figure 2.5). This process includes two sub-processes called initiation and implementation (Rogers, 2003). The initiation sub-process includes *Agenda-Setting* and *Matching* that focus on the perceived benefit organizations identify in an innovation. A decision to adopt moves an organization from the initiation sub-process to implementation. This next step includes *Redefining/Restructuring*, *Clarifying*, and *Routinizing* stages taking the application of the innovation through a process of standardization in the organization’s activities.

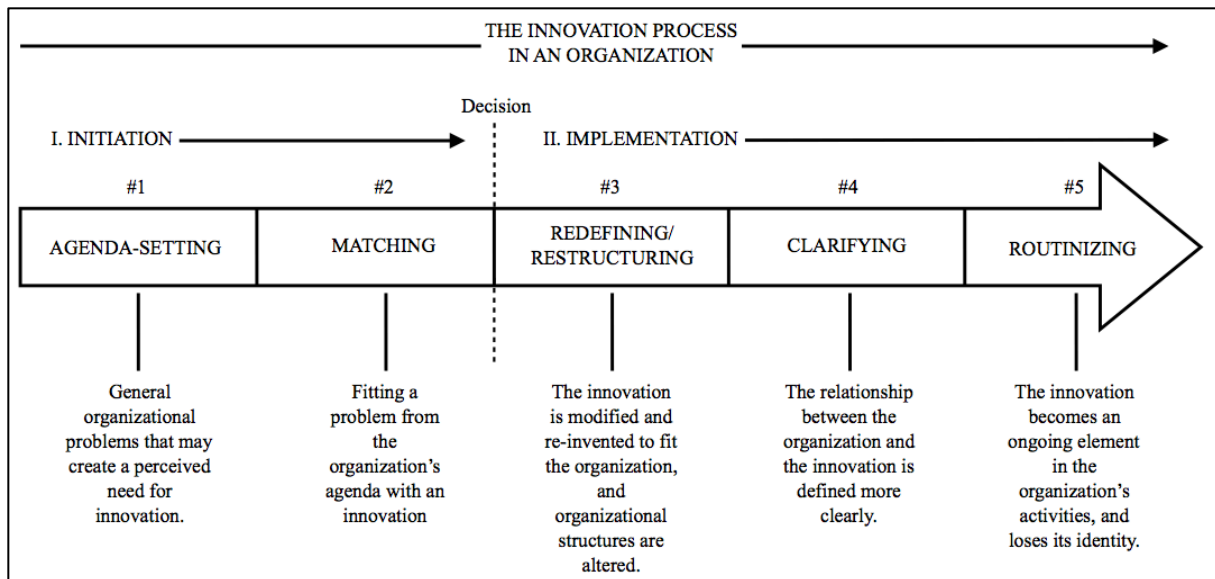


Figure 2.5 Five Stages in the Innovation Process in Organizations (Rogers, 2003)

1. Agenda Setting: *an innovation is identified to fit a perceived need.* The agenda setting stage may require an extended period of time often several years (Rogers, 2003).

As explored, multiple factors affect the initiation of mLearning work in organizations, however each organization goes about these efforts based on a perception of success. Bandura's (1977) research on self-efficacy explores one's perceived ability and how it relates to success through how much effort people will expend and how long they will persist in the face of obstacles and aversive experiences (Bandura, 1977). Along those lines, 'efficacy' can be defined as the conviction that one can successfully execute the behavior required to produce the outcomes (Bandura, 1977). Bandura goes on to explain that this differs from actually accomplishing the goal and that it is the belief of the possibility to achieve the behavior that will lead to the outcome. In the Agenda Setting stage, individuals must perceive that the innovation is needed for success in order to continue through the stages of adoption.

2. Matching: *the innovation's fit is assessed and design decisions are developed that allow this innovation to best meet the needs of the organization.* One of the key areas of investigation in this study is the matching stage where design decisions are made to help the innovation best meet the needs of the organization. Organizations seeking to deliver mLearning must identify successful strategies for adopting and deploying mLearning. The literature points to a need to develop teaching strategies for mLearning that focus on experiential elements (Pieri & Diamantini, 2009) like those offered through Web 2.0 services which must be explored to understand how to best provide a coherent environment for mobile learners (Gregson & Jordaan, 2009).

3. Redefining/Restructuring: *both the innovation and organization are expected to change.* New offices, job descriptions, and other changes can occur to support the innovation. Organizational changes are often underestimated (Rogers, 2003).

4. Clarifying: *once implemented the innovation takes on a more developed meaning as it relates to the organization.* Rogers (2003) stated that change agents more easily anticipate the form and function of an innovation for their clients than its meaning. Meaning is constructed over time through a social process of human interaction (Rogers, 2003). By the Clarifying stage, the developed-meaning an innovation has within the organization is based on how it is perceived by members of a social system (the organization).

5. Routinizing: *when the innovation is incorporated into an organization's regular activities sustainability becomes a factor.* If many of an organization's members participate in designing, discussing, and implementing an innovation, its sustainability over time is more likely (Rogers, 2003). Organizations need a clearer understanding of mLearning adoption as an innovative process in order to address challenges that may prevent effective and efficient deployment of mLearning initiatives (Vogel et al., 2009). Every innovation has a consequence in its adoptive population. For example, organizations that mandate use of smartphone communication for checking work email during off hours may find employees using smartphones for the same task and additional activities during work hours leading to a stronger demand on the bandwidth infrastructure and slower connectivity across a localized area.

Accounts of undesirable, indirect, and unanticipated consequences by the introduction of new technology demands change agents carefully understand the form, function, and meaning of an innovation. Rogers' (2003) defines each of these as critical to understanding consequences.

Diffusion of Innovation Theory in Research. Van de Ven and Rogers (1988), describe four requirements necessary to undertake research on the process of change, particularly on the innovation process. These requirements, stated below, were used to guide this research study:

1. a clear set of concepts about the object being studied
2. a systematic method for observing change in the object over time
3. methods for representing raw data to identify process patterns
4. a theory to make sense of the process pattern

First, a clear understanding of how change can be observed is required. Measurement of change implies a longitudinal study and rigorous methods for observing differences over time in the conceptual categories of the studied innovation (Van de Ven & Rogers, 1988). The categories employed by Van de Ven and Associates (1988) included: ideas (tools and objects), people (subjects and division of labor), transactions (rules), context (community), and outcomes (as judged by the institution). In this research study, the “five stages in the innovation process in organizations” (Rogers, 2003, p. 421) are employed to understand the longitudinal nature of adoption with Activity Theory (Engeström, 1996) as a critical lens to observe difference between the stages over time.

Second, a systematic method for observing change in the object over time must be established. The major focus of conducting research on the innovation process should include real-time observations of the process as it unfolds with regularly scheduled and intermittent field observations (Van de Ven & Rogers, 1988). This combination of real-time and regularly scheduled observations can best provide understandings of how change occurs in the innovation process. In this research study, Rogers’ (2003, p. 421) “five stages in the innovation process in

organizations” are observed individually through his prescribed definitions and through Activity Theory (Engeström, 1996) as a critical lens for real-time participant-observations.

Third, Van de Ven and Rogers (1988) suggest four basic steps for tabulating raw data, specifically in longitudinal qualitative data; (1) Chronological listing of qualitative events; (2) Coding chronological events into conceptual tracks; (3) Analyzing process patterns or cycles in activity tracks; and (4) Vocabulary for describing processual progression. In this research study, data were collected, sorted chronologically with Rogers’ (2003, p. 421) “five stages in the innovation process in organizations”, Activity Theory System (Engeström, 1996), and analyzed through the six-step process described by Jonassen and Rohrer-Murphy (1999).

Finally, a processual analysis of this data must be driven by an explicit theory of change processes (Van de Ven & Rogers, 1988). The DOI Theory proposed by Rogers (2003) develops five stages in the innovation process for organization, which, in this study, will inform the processual analysis of the data collected in this study. The changes (contradiction) that occur within and between each stage are described through the descriptive lens provided by Activity Theory.

Activity Theory

Activity Theory is rooted in the classical German philosophy of Kant and Hegel, which emphasized both the historical development of ideas as well as the active and constructive role of humans (Jonassen and Rohrer-Murphy, 1999). This philosophy provided the foundation for the more contemporary philosophy of Marx and Engels and the Soviet cultural-historical psychology of Vygotsky, Leontiev, and Luria (Kuutti, 1996) and served as the basis for Activity Theory. Activity Theory is a rich framework for studies of context due to its comprehensiveness and engagement with different issues of consciousness, intentionality, and history (Nardi, 1996). The

ability of Activity Theory to be employed within different contexts from various perspectives illustrates the strength of Activity Theory in this research study. Activity Theory is increasingly being used to study a variety of contexts, which involve technology (Issroff & Scanlon, 2002).

The first generation of Activity Theory centered around Vygotsky's (1978) work regarding the mediated act and its common triangular reformation, a three-part scheme that included a "middle term" to mediate between stimulus and response (Leontyev, 1979). Vygotsky's (1978) model illustrates the conditioned direct connection between stimulus (S) and response (R) transcended by "a complex mediated act" (Figure 2.6).

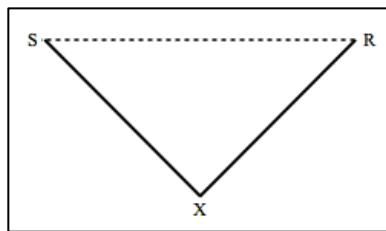


Figure 2.6 Vygotsky's model of mediated act (Engeström, 2001)

Vygotsky's idea of cultural mediation of actions is commonly expressed as the triad of subject, object, and mediating artifact (Figure 2.7) (Engeström, 2001). Objects became cultural entities and the object-orientedness of action became the key to understanding the human psyche (Engeström, 2001).

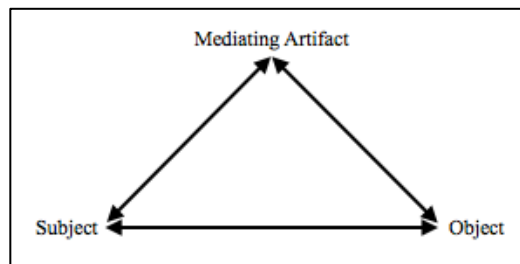


Figure 2.7 Vygotsky's model reformulation (Engeström, 2001)

This structure (Figure 2.7) is too simple to fulfill the needs of a consideration of the systemic relations between an individual and his environment in an activity (Kuutti, 1996), which led to Engeström's (1987) activity system.

Activity System

Building on Vygotsky's model reformulation (Figure 8) Engeström (1987) took the concept of activity theory a step forward focusing on the system created by the complex interrelations between the individual subject and his or her community. An activity system incorporates both the object-oriented productive aspect and the person-oriented communicative aspect of the human conduct (Engeström, 1996). Vygotsky's model reformulation (Figure 2.7) was then incorporated into Engeström's (1987) structure of human activity system (Figure 2.8) demonstrating individual and group actions embedded in a collective activity system (Engeström, 2001).

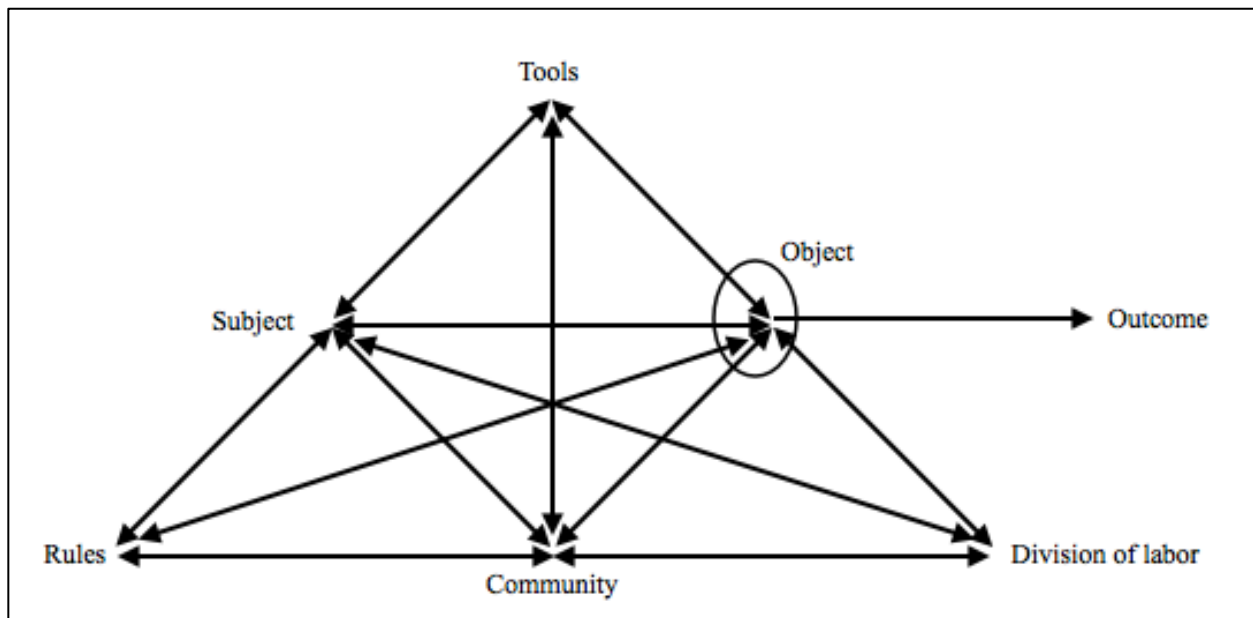


Figure 2.8 Structure of human activity system (Engeström, 1987 in Engeström 2001).

In Engeström's (1987) structure of human activity system (Figure 2.8) model, each component directs the researcher to elaborate on the context, (activity system) (Engeström, 1996), providing a more detailed description of the case being studied. The *subject* refers to the individual or subgroup whose agency is chosen as the point of view in the analysis (Engeström, 1996). The *object* refers to the "raw material" or "problem space" at which the activity is directed and transformed into (Engeström, 1996). The *object* is depicted with the help of an oval indicating that object-oriented actions are always, explicitly or implicitly, characterized by ambiguity, surprise, interpretation, sense making, and potential for change (Engeström, 2001). The object of activity is a moving target, not reducible to conscious short-term goals (Engeström, 2001). *Outcomes* are developed with the help of physical and symbolic, external and internal *tools* (mediating instruments and signs) (Engeström, 1996). The *community* comprises multiple individuals and/or subgroups that share the same general object (Engeström, 1996). The *division of labor* refers to both the horizontal division of tasks between the members of the community and to the vertical division of power and status (Engeström, 1996). Finally, the *rules* refer to the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the activity system (Engeström, 1996).

Activity Theory in the Instructional Design Process

Jonassen and Rohrer-Murphy (1999) explain a useful instructional design process that exemplifies the activity theory model (Table 2.3) using the premise that knowledge is socially constructed based on the intentionality, history, culture, and tool mediation used in the process.

Table 2.3 Instructional design process exemplifying the activity model (developed from Jonassen & Rohrer-Murphy, 1999)

Goal	Solve a skill-knowledge problem by designing, developing, implementing, and evaluating instruction (effective and efficient instruction)
Subject	The individuals and work groups that would be formed in the organization to fulfill goals through the activity of instructional design and development. Individual actions include conducting a needs assessment, perform task analysis, and designing instructional interactions. In an instructional design context, this may be a single designer or a team consisting of designers, a manager, subject matter expert, and media producers.
Object	The effective and efficient instruction, includes a form and function that is likely to be modified as the activity unfolds. In an instructional design context, this may be a curriculum design, hypertext program, workshop, or a videotape that is produced.
Tools	Design models and methods employed, including the physical apparatus and tools and reasoning that mediate the group's activity toward designing and developing instruction. In an instructional design context this may consist of the software production tools, project management system, or any other kind of tool that instructional designers use to transform the object.
Community	Consists of the interdependent aggregate (e.g., designers within the organization, subject matter experts, designers within professional associations, customers) that shares a set of social meanings.
Rules	The inherent guide of the actions and activities acceptable by the community, with signs, symbols, tools, models, and methods that the community uses to mediate the process.
Division of Labor	Prescribed task specializations (designers, developers, producers) by individual members of groups within the community or organization.
Outcome	The form of instruction that is developed and implemented.

Jonassen and Rohrer-Murphy (1999) explained that ‘activity’ is a historically developed phenomenon, evolving over time within a culture, to understand the dynamics of a particular situation, it is necessary to grasp the changes or evolutions of that situation over time. For example, the ways of doing instructional design have changed as new technologies and learning theories evolve and are shared in the instructional design community (Jonassen and Rohrer-Murphy, 1999). Additionally, the authors state that from an Activity Theory perspective, the

process of instructional design or any activity can only be understood by analyzing its historical development (Jonassen and Rohrer-Murphy, 1999). Instructional design skills, like all higher mental functions, are internalized forms of activity that are common to the community in which an individual acts. Activity Theory focuses on the centrality of activity in a cultural theory of cognition (Jonassen and Rohrer-Murphy, 1999).

Between the components of an activity system, continuous construction is going on. Participants not only use instruments, they also continuously renew and develop them, whether consciously or not. They not only obey the rules, they also mold and reformulate them (Engeström, 1996). According to Jonassen and Rohrer-Murphy (1999), nearly every instructional design project is adjusted, reconceptualized, and renegotiated during the design and development process.

Jonassen and Rohrer-Murphy (1999) work with designing constructivist learning activities created an applicable set of six steps that are necessary to describe how Activity Theory may be used as a framework for determining the components of the activity system: (I) clarify the purpose of the activity system, and understand the subject and the relevant context in which activities occur, (II) analyze the activity system, defining in depth the components (subjects, objects, community, rules, and divisions of labor), (III) analyze the activity structure, defining the activity by decomposing it into types of components and operations, (IV) analyze the tools, focusing on those that provide direct and indirect communication among subject, community and object, (V) analyze the internal subject-driven context bounds that are essential to the dynamics that exist among the components of the Activity Theory framework and (VI) analyze the activity theory dynamics, which requires stepping back from the system described and assessing how components affect each other (analysis of the interrelationships that exist

within the components of the system). Zurita and Nussbaum (2007) depict Engeström's (1987) work and Jonassen and Rohrer's (1999) six steps as Figure 2.9.

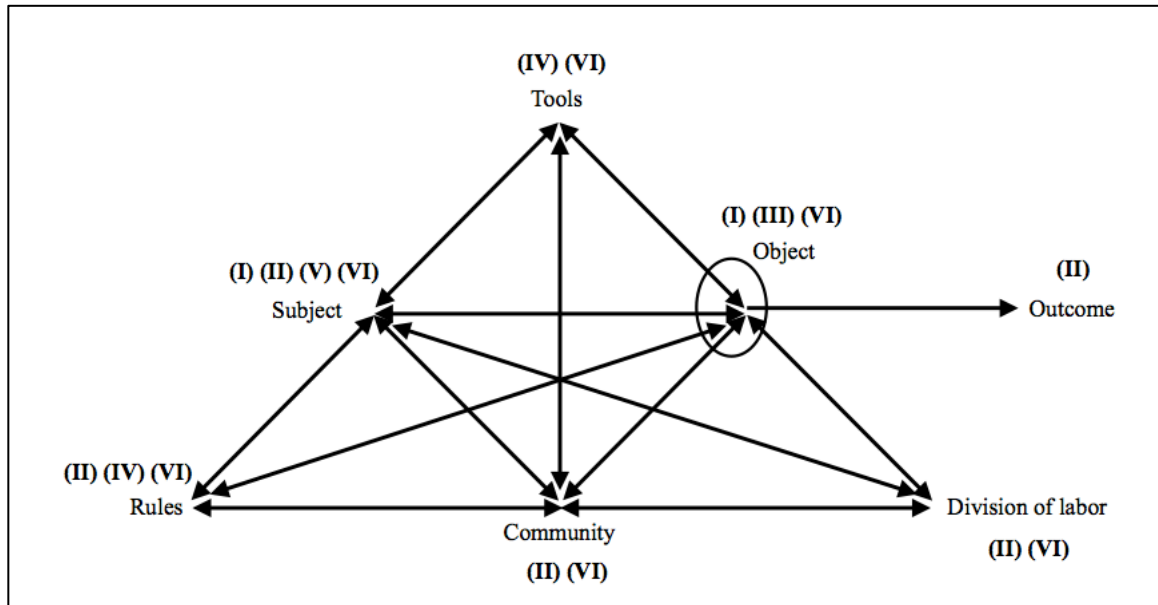


Figure 2.9 Six Steps to determine components in the activity system

Engeström (2001) developed five principles to summarize Activity Theory; unit of analysis, multivoicedness, historicity, contradictions, and expansive cycles. These principles summarize Activity Theory, and direct the lens through which an activity can be described.

Unit of analysis. Because the context is included in the unit of analysis, the object of the research is always essentially collective, even the main interest is in individual actions (Kuutti, 1996). A collective, artifact-mediated and object-oriented activity system, seen in its network relations to other activity systems, is taken as the prime unit of analysis (Engeström, 2001).

Multi-voicedness. Activity systems have multi-voicedness, they are always a community of multiple points of view, traditions and interests (Engeström, 2001). The division of labor in an activity creates different positions for the participants, the participants carry their own diverse histories, and the activity system itself carries multiple layers and strands of history engraved in

its artifacts, rules, and conventions (Engeström, 2001). It is the source of trouble and a source of innovation, demanding actions of translation and negotiation (Engeström, 2001).

Historicity. Activity systems take shape and get transformed over lengthy periods of time (Engeström, 2001). Their problems and potentials can only be understood against their own history (Engeström, 2001). History itself needs to be studied as local history of the activity and its objects, and as history of theoretical ideas and tools that have shaped the activity (Engeström, 2001). The principle of historicity argues that history of activity systems helps understand their problems as well as their potentials (Murphy & Rodriguez-Manzanares, 2008) because parts of older phases of activities often stay embedded in them as they develop (Kuutti, 1996).

Contradictions. Contradictions take on a central role as sources of change and development (Engeström, 2001). Contradictions are not the same as problems, or conflicts; they are historically accumulating structural tensions within and between activity systems (Engeström, 2001). Contradictions can result in tensions but also transformation (Murphy & Rodriguez-Manzanares, 2008). The primary contradiction of activities in capitalism is that between the use and exchange value of commodities (Engeström, 2001). This primary contradiction pervades all elements of activity systems. When an activity system adopts a new element from the outside (for example, a new technology), it often leads to an aggravated secondary contradiction where some old element collides with the new one (Engeström, 2001). Such contradictions generate disturbances and conflicts, but also innovative attempts to change the activity (Engeström, 2001). Data-driven historical and empirical analyses of specific activity systems under scrutiny are guided by the notion of contradictions (Engeström, 1996). Contradictions have been described as “unfit within elements, between them, between different activities or different developmental phases of a same activity” (Kuutti, 1996. p. 29). As

contradictions arise between the novel object and traditional instruments, these contradictions are the moving force behind disturbances and innovations, and eventually behind the change and development of the system (Engeström, 1996).

According to Engeström (1987) any activity system has four levels of contradictions that must be attended to in analysis of a learning and work situation. Barab, Evans, and Baek (2004) explain these four levels as follows:

Level 1: Primary contradictions arise within each node of the central activity under investigation; this contradiction emerges from tension between use and value exchange.

Level 2: Secondary contradictions arise between the constituent nodes (e.g. between the Subject and the Tool) of the central activity system.

Level 3: Tertiary contradictions arise between the object/motive of the central activity and the object/motive of a culturally more advanced form of the central activity.

Level 4: Quaternary contradictions arise between the central activity and adjacent activities, for example, instrument-producing, subject-producing, and rule-producing activities.

Expansive cycles. Possible expansive transformations can occur in activity systems (Engeström, 2001). Activity systems move through relatively long cycles of qualitative transformations (Engeström, 2001). As the contradictions of an activity system are aggravated, some individual participants begin to question and deviate from its established norms (Engeström, 2001). In some cases this escalates into collaborative envisioning and a deliberate collective change effort (Engeström, 2001). An expansive transformation is accomplished when

the object and motive of the activity are reconceptualized to embrace a radically wider horizon of possibilities than in the previous mode of the activity (Engeström, 2001).

Diffusion of Innovation and Activity Theory as a combined theoretical framework

Activity Theory provides a language (and conceptual framework) for describing and understanding the changes and difficulties (and some iterations) found in the diffusion of innovation in organizations process by suggesting a consideration of the range of factors that impact an organizational adoption of an innovation. The contradictions between elements, between different activities, and/or between different developmental phases of a single activity (Kuutti, 1996) inform a greater understanding of the process and changes undergone by an organization adopting a new innovation and thus informs future organizational efforts. Activity Theory and the concept of activity are particularly suitable and rich to be used as the starting point in studying contextually embedded interactions (Kuutti, 1996) and will be explored as the innovation progresses through the innovation process in an organization (Figure 2.10).

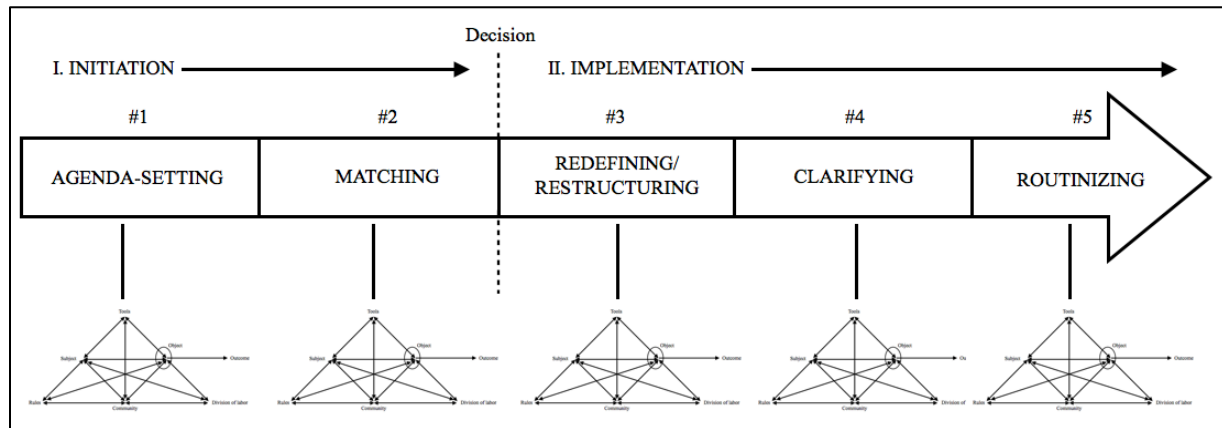


Figure 2.10 Activity in the organizational innovation process

Conclusion

The spread of mobile technology has created a digital platform of strategic significance to organizations (Yoo, Boland, Lyytinen & Majchrzak, 2012). Current research does explore the technology, the learner, and the learning design of mLearning. Current literature however does little to explore organizational issues and challenges in the mLearning adoption process. Thus there is little evidence or guidelines to support the understanding of the fundamental steps leading to successful mLearning deployment at an organization level. In other words, there is very little understanding of the organization-level adoption process. The adoption of mLearning is fundamentally reshaping organizations along unforeseen fault lines creating a need for researchers to examine how organizations learn to carefully deal with those fault lines in order to take full advantage of this new digital technology (Yoo et al., 2012). The purpose of this study is to explore the process by which a case organization adopts and employs mLearning initiatives. The results of this study will seek to inform the instructional design community and organizations interested in mLearning adoption, as well as adoption of future technology innovations, as a manageable process whose factors, if better understood, can be addressed to support successful outcomes.

Chapter Three: Methodology

Introduction

The purpose of this study is to explore the process by which a case organization adopts and engages in a mobile learning (mLearning) initiative. mLearning uses mobile technology to aid in the learning, reference, and/or exploration of information useful to the user at that moment or in a specific context. In order to achieve the proposed insights and answer the research questions an organization, defined by Rogers (2003) as a stable system of individuals who work together to achieve a common goal through a hierarchy of ranks and divisions of labor, was identified.

Current mLearning research studies have focused on its support of effective and efficient content delivery to devices already adopted by individual users. To realize the potential of mobile technology in completing organizational learning objectives, mLearning must be explored as an instructional design concept. Within an organization, learning initiatives are influenced by both instructor and pedagogy and are affected by organizational issues and challenges. Design and development of mLearning at the organizational level occurs in an activity-system where individual and group actions operate in the achievement of a common goal. The organizational activity of design and development must be contextually analyzed examining the kinds of activities that organizations engage in asking; who is engaging in that activity; what are their goals and intentions; what objects or products result from the activity; and what rules and norms restrict the activity within the larger organizational community. This study uses a qualitative research strategy, specifically, a case study method that employed a participant-observer approach, to provide a rich contextual analysis.

Research Design

A qualitative case study methodology was chosen since it is the preferred method in examining contemporary events and relies on many of the same techniques as history research with the addition of evidence gained in direct observation and systematic interviewing (Yin, 2003). Early on, the opinion of the researchers was that this study was best explored as a diffusion of innovation case study (Rogers, 2003) which would be built on Rogers' work (2003) rather than developing the researcher's own model like in a Grounded Theory research study. Early on in the data collection process the researcher perceived many parallels to Rogers' five stages of organizational adoption (Rogers, 2003) therefore the researcher continued with this as a primary framework bolstered by Engeström's Activity Theory (2001).

This case study follows ethnographic traditions found in anthropological research studies where the researcher assumes the role of participant-observer as an attempt to adopt the perspective of the respondents by sharing their day-to-day experiences (Rogers, 2003). This approach leads to a thick accounting and analysis of people's activities, interactions, and the way those are coordinated (DeVault, 2007). Yin (2003) stated that the advantages of participant-observation as a research methodology include accessibility to otherwise inaccessible groups, an insider-perspective (emic) of a phenomenon, and the opportunity to manipulate events or situations that can produce a greater variety of situations for the purpose of collecting data.

Andersen (2011) found the participant-observer approach allowed for the researcher to watch the diffusion process organically unfold and recommended that researchers interested in this process consider a research approach that positions them as a consultant. Participant-observation is a mode of observation where the investigator may take on a variety of roles within a case study situation and may participate in the events being studied (Yin, 2003). These roles

include observing participants to see how they meet and interact (etic perspective), as well as, entering into conversations with some or all of the participants (emic perspective) (Becker, 1958). Yin (2003) explores the relative advantages and disadvantages of participant-observation as illustrated in Table 3.1.

Table 3.1 Advantages and Disadvantages of Participant-Observation (Yin, 2003)

Advantages	Disadvantages
The most distinctive opportunity is gaining access to groups that are otherwise inaccessible to scientific investigation.	The investigator has less ability to work as an external observer and may have to assume positions contrary to the interests of good scientific practice.
Ability to perceive reality from the viewpoint of someone “inside” the case study rather than external to it.	Likely to follow a commonly known phenomenon and become a supporter of the group or organization being studied
Opportunity to manipulate events or situations that can produce a greater variety of situations for the purpose of collecting data.	The participant role may simply require too much attention relative to the observer role.

This research study employs participant-observation as an approach to exploring mLearning as an innovation being adopted by an organization. Throughout chapter four the Author’s Notes and presented data illustrate the researcher’s bias as it became relevant during the data collection process. Rogers (2003) gives credence to participant-observation as preference for anthropologists seeking to gather diffusion data directly for their informants. Additionally, Engeström (2001) explains Activity Theory through past research and within the context of ongoing research that he is conducting therefore approaching his work as a participant-observer. This research study uses the participant-observation approach because it has been found in both Diffusion of Innovation and Activity Theory research traditions.

Informants

A qualitative researcher conducting a participant-observation engages in a three-stage sequential process of data collection and analysis in which each stage includes both observation and analysis (Becker, 1958), see Table 3.2.

Table 3.2 Three-stage sequential process of data collection and analysis

Participant-Observation Stages (Becker, 1958)	Researcher Activities	Timeline
One: involves the researcher entering the field and becoming familiar with its organization in order to identify problems and concepts that give promise of yielding the greatest understanding of the organization. Additionally, at this stage the researcher identifies informants who will best serve to inform an understanding of the phenomenon.	<ol style="list-style-type: none"> 1. Gather initial contextual data 2. Initial interview with Project Manager (Andy Schmid) 3. Create Organizational Audit 4. Identify informants 	January 2012
Two: is to check the frequency and distribution of the phenomena.	<ol style="list-style-type: none"> 1. Participate as an Instructional Designer on mLearning Demo Course Project 2. Through observation at each stage of data collection: (a) complete AT system chart; (b) complete stage analysis; (c) complete research reflections 	February 2012- January 2013
Three: is the final stage of analysis in the field and it consists of incorporating findings into a generalized model of the part of the organization under study.	<ol style="list-style-type: none"> 1. Data analysis and synthesis of findings. 2. Review of additional literature to understand emergent themes. 	January 2013 – January 2016

These stages suggest a longitudinal approach to participant-observation, a parallel discussion in diffusion of innovation research recommendations (Tan et al., 2012; Van de Ven & Rogers, 1988).

Preliminary contact with an organization and a project team was made in order to identify a suitable context for this research study. In accordance with Syracuse University's Institutional Review Board's (IRB) ethical guidelines this research study was found "exempt" from federal

regulation (Appendix 1). The proposed informants in this study are all consenting adults over the age of 18 and personal information was been kept confidential.

In order to gain site access for research purposes at The Christian Network (TCN), an access letter was requested and granted from TCN's legal department (Appendix 2). Specific informants who are highlighted in the study were asked for their consent for the researcher to, confidentially, use their interactions as data in the research study (Appendix 3). The IRB Exempt Status, the access letter, and the consent letter all identify January 30, 2012 as the start date of the research study.

TCN's Technology Office agreed to allow the researcher to engage as both a participant and researcher-observer in their ongoing mLearning project initiatives. As an experienced instructional designer, the researcher was familiar with designing instructional solutions for a variety of industries. Researcher bias and perspectives were addressed in the later results of this study. The researcher was introduced, and identified, as both a volunteer consultant on mLearning and a researcher on mLearning adoption working with a project team at TCN. Initially, gaining access was successful due to the researcher's common faith background and identified status as a Christian. The researcher felt this would help him be more of an insider, however, the more work with TCN was continued, the more the researcher realized his Christian status allowed access to a Christian culture with it's own vocabulary and norms that he needed to become familiar with. Much of these understandings are developed in the contextual analysis early in Chapter 4. Along with self-identification as a Christian, the researcher also identified as both a social studies teacher and turnkey technology trainer (K-12), which brought an additional way of viewing the site and data. As a social studies teacher the researcher was interested in the historical, geographic, economic, political, and social aspects of the site and data. These five

themes are used in social studies to understand a more full context within which events occur. As a turnkey technology trainer for his K-12 school district the researcher was accustomed to working with people interested in adopting new technology. In this setting he was constantly working along side people who are engaged in adoption both individually and organizationally. The researcher as a Christian, a teacher, and a technology trainer, was like any researcher, a complex individual who came to the research site with assumptions (about learning and adoption) and perspectives that are discussed in the Author's Notes in chapter four. The Technology Office served as the primary point of contact for the researcher, their role as project managers connected the researcher with an mLearning project and a project team.

The Technology Office was a department that served to support initiatives that required technological support stating they existed “to help Operations teams build capacity”(data source: TCN website) in order to achieve the goals of the organization. Their philosophy was to “centralize the complexity; decentralize the control” (data source: TCN website) with a belief in local ownership of content supported by the Technology Office who offered support in development and deployment. Prior to the start of this research, the staff at the Technology Office had implemented an mLearning course: *The Missionary Training Project* used by students in Africa.

The informants in this research study included a project team, with the addition of the researcher as the team's instructional designer (Table 3.2). Informants worked with the researcher, both on- and off-site, for one year January 30, 2012 to January 30, 2013. The team worked off-site for most of the project communicating via email, cloud based documents, and conference calling. During the study, the entire project team was together on-site for one week

from April 9-13, 2013. The team's names², demographics, experiences, and team function are listed in Table 3.3.

² To maintain confidentiality of the informants in this study, their real names have been changed. The changed names were used for each informant and the organization and are used consistently throughout all documents and in this dissertation.

Table 3.3 Project Team

Informants	Demographics	Experience	Team Function
Andy Schmidt, Project Manager 1, Subject Matter Expert (SME)	mid-40s white male lives in Southern U.S.	Member of the Technology Office who had past successful experiences with mLearning (Missionary Training Project).	TCN employee. Content and user group advisor.
Laurin Graves, Project Manager 2, Technology department staff member	mid-20s white female lives in Southern U.S.	Experienced in eLearning and multiple web applications.	TCN employee. Content advisor
Nicholas Tred, Project Manager 3, Technology department staff member	mid-40s white male lives in Southern U.S.	Experienced in traditional video production for instructional purposes.	TCN employee. New to the Technology Office. Project manager.
Aaron Crescent, Video producer	mid-40s white male lives in Midwestern U.S.	Experienced in traditional video production.	Volunteer-professional (married to a TCN employee). Video Production lead.
AJ Fortune, Video assistant	early-20s white male lives in Midwestern U.S.	Experienced in traditional video production.	Volunteer-student. Video editing specialist.
Micah Shippee, Instructional designer and dissertation researcher	mid-30s white male lives in Northeastern U.S.	Experienced instructional designer.	Volunteer and doctoral student.

The researcher's journal of observations and project informant interviews, email conversations, collaborative documents, and conference call conversations (Table 3.4) make up the set of data used to describe and understand the processes by which the case organization adopted and engaged in an mLearning initiative. Informants allowed the researcher to use email communications, collaborative documents, and conference call conversations from January 30, 2012 through January 30, 2013 for this study. All information was kept confidential since only

the participant and the researcher knew which responses were in anyway linked to individual informants. Specific findings by person were kept confidential.

Table 3.4 Data Types

Type	Defined
Participant-observation	The researcher will serve as the volunteer instructional designer (participant) and researcher (observer) in the innovation process. A research journal (RJ) was kept in the form of observational notes during or immediately following context specific activities (face-to-face and off-site). The RJs compiled total 248 pages, however, RJ dates are used to reference them throughout the remainder of the study. Research reflections (RR) were similar to RJs but were used following initial data collection to identify emergent themes and concepts. RRs are also referenced in this study with dates.
Interviews	Conducted with the project manager and subject matter expert at each stage of the study using the activity system component questions as an interview guide (Appendix 5. Interview Guide 2). Six interviews were in the form of regularly scheduled, individual and group, appointments via phone, video chat, email, and face-to-face. Focused interviews were used to corroborate certain facts (Yin, 2003). In February 2012 interviews were held with the original project manager (Andy Schmid) and are geared toward introducing mLearning at TCN. April 2012 interviews and meeting were focused on subject matter expert needs and wants assessment. October and November (2012) interviews are with the final project manager (Nick Tred) and are geared toward clarifying project directions. Interview data is primarily in the form of exploratory notes, email correspondence and RJs provide triangulation of the interview data.
Conference calls	Nine conference calls (approximately 45 minutes) were conducted via Skype, Facetime, Google hangouts, and traditional phone. These calls occurred, most frequently, early in the study when the adoption perceptions were most discussed. As the mLearning project team grew, the number of participants in the phone call grew (generally 2-6 people). For conference calls, pre-meeting agendas sent by informants regarding group face-to-face, phone calls, and video chats. Meeting notes also include the follow-up meeting notes produced by informants. These are triangulated by the email discussions that preceded and followed the actual meetings.

Type	Defined
Organizational Documents	<p>Organizational Documents used in this study are from the TCN general information website (and several other sites)³, created by TCN staff, and TCN departmental content. Organizational Documents served as raw data for this study and were generated by TCN, the Technology Office, and the mLearning project team.</p> <p>The TCN general information from their website and several others were used to investigate the cultural-social, economic, and historical contexts at TCN, this data totaled 123 pages. TCN staff content included blogs by several participants: Andy Schmid (46 pages) and Laurin Graves (18 pages), which provided triangulatory data and insights into their background during and prior to the research study. The TCN departmental content primarily was generated from the Technology Office. in an effort to initiate the innovation process before, during, and after established process deadlines. Documents were collaboratively developed during face-to-face meetings as well as via cloud computing in the form of email and Google docs (asynchronous collaboration). These are found as Figures and Tables throughout this study in the form of artifacts that were created by the organization staff are in the form of instructional materials either transformed, or meant to be transformed, for mobile devices. These artifacts represented as Figures both finished and near-finished products generated by the participants as ready for a mobile platform including:</p> <ol style="list-style-type: none"> <li>1. Project Plans - project plans were generated with detailed descriptions of the initiatives, including project purpose, design activities, and timelines for completion. <li>2. Design Artifacts – design artifacts included illustrations of mobile application (app) screen icons, app design wireframes, and scripts for video production portions of the lessons. <li>3. Multimedia - video was produced with actor, script, and green screen (while on site), and video edited and transformed for a mLearning delivery. <li>4. Communications and artifacts generated by the “Technology Office” that specifically illustrate the informants division of labor (AT) within the TCN community.
Emails	<p>491 emails communications occurred within the data collection time, the length of the emails will vary from brief messages to multi-page documentation of the different phases of the design process. Emails with informant name and date of contact are referenced in the remaining chapters.</p>

³ In order to maintain confidentiality, this content is not APA cited, nor actual word-for-word quotes. However, to acknowledge documentation from these websites, quotation marks are still used.

Data Collection Procedures

The protocol explains the context and agenda from which mLearning adoption, a contemporary phenomenon, was investigated by defining how the study was bounded in time, organization, program, and situation. To ensure sufficient resources and maintenance of data collected, multiple forms of data collection were employed and available to be used if needed. On- and off-sight, a tablet computer (iPad) was used for project notes and reflective journaling via password protected digital notebooks (Noteshelf and Evernote). Standard pen and paper notes were available as a backup to the digital devices. Any time these standard notes were used, they were later photographed via tablet or smartphone and inserted into the digital notebooks. On-sight project team whiteboard brainstorming, wireframes, and planning sessions were also photographed and added into the digital notebooks. Off-sight data collection was followed by designated daily blocks of time to reflect on the daily experiences and organize data. On-sight data collection reflection and organization occurred during evenings in a private setting. To prepare for the possibility of losing digital and cloud-based files, hardcopies of printable data were printed and copies of all files (including multimedia files) backed up to an external hard drive. During all data collection, both on- and off-sight, contact was sustained via email and phones calls with the dissertation advisor. These communications involved the content of the project and the data collection process.

The arrangement of data collection activities follow the organizational innovation process (Figure 3.1) described in the literature review and revisited below. The specific data collection process timeline was illustrated in Figure 3.2 Data Collection Procedures.

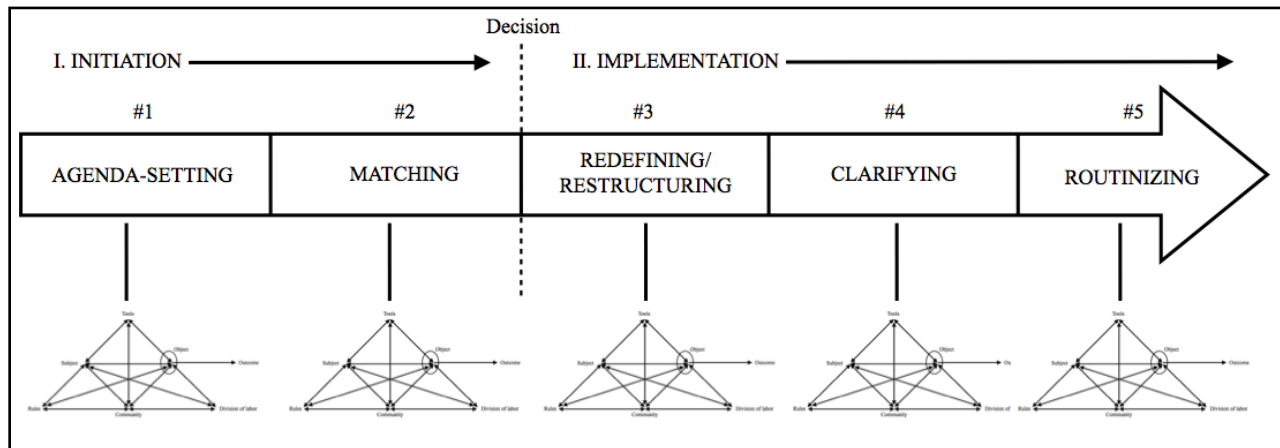


Figure 3.1 Activity in the organizational innovation process

This process identifies key stages in organizational adoption. During each of these stages, TCN Technology Office project managers (PMs) were interviewed to better understand the project as an activity system. The PM data, combined with participant-observations, and other types of data (Table 3.2) were employed at each stage to complete an activity system-based lens of how the organization was engaging in the adoption process. This framework illustrated the mLearning demo course project team’s interacting components at each stage of the adoption process.

The data collection process timeline was conducted for one full year from January 2012 to January 2013. Set dates were not scheduled for stage-specific data collection (Figure 3.1) since the adoption process evolves at unpredictable rates of time. However, the data collection procedures were organized and illustrated in Figure 3.2. This procedure began with what the researcher identified as: Initial Contextual Data, which was the collecting data for describing the research site context and both organizational and historical. Data for context was collected from an interview with the PM (Appendix 4. Interview Guide 1) and TCN organizational documents. This data was used in the creation of an organizational hierarchy. Stage specific PM interviews employed the activity system component questions (Table 3.5) through an interview guide

(Appendix 5. Interview Guide 2). As a naturally evolving, phenomenon, the ready access to the PM and participant-observations were fundamentally critical to the data collection process.

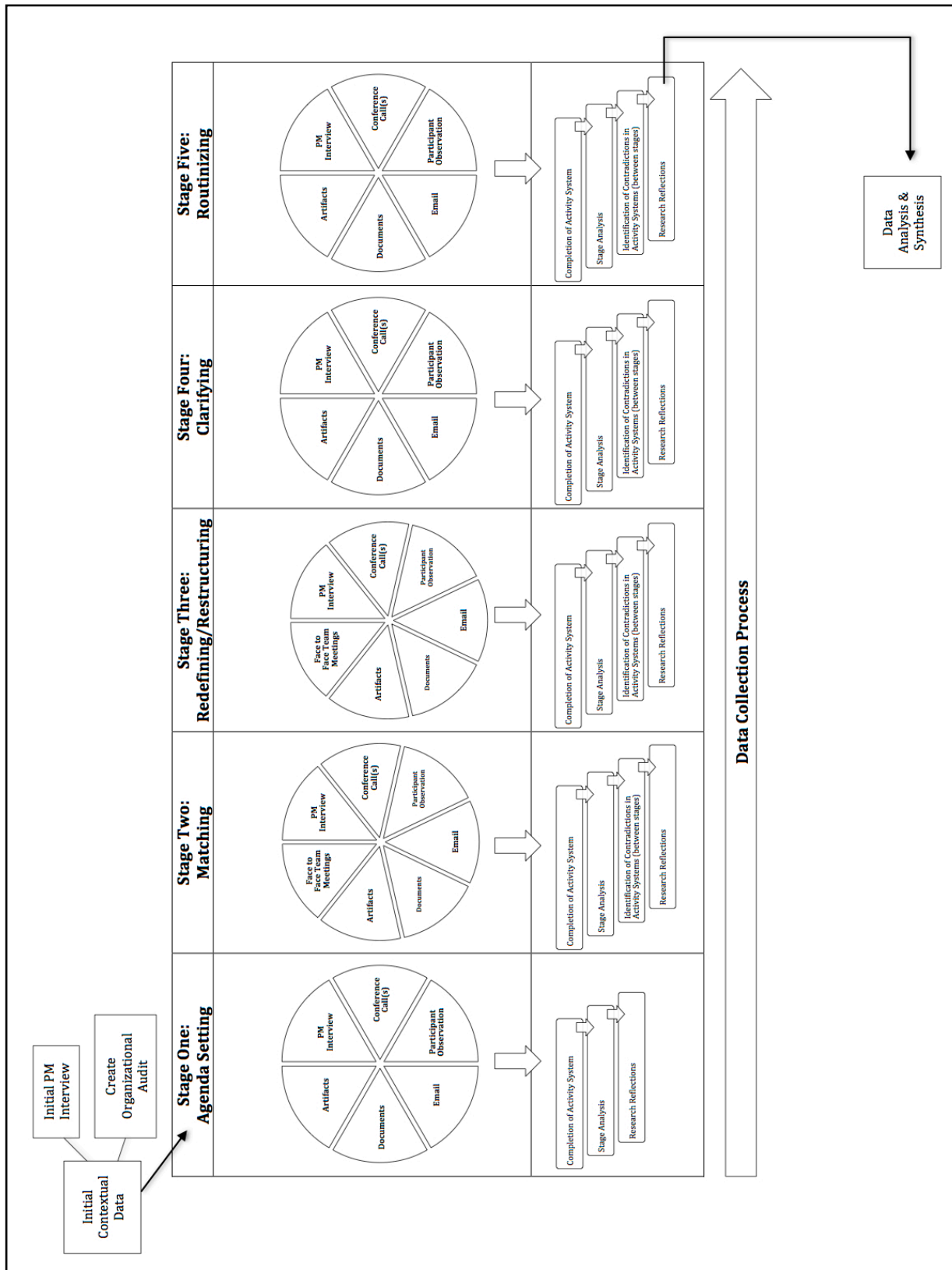


Figure 3.2 Data Collection Procedures

Data Analysis

To analyze and interpret the data collected, the four data analysis steps suggested by Van de Ven and Rogers (1988) were followed:

1. The raw data events and activities were chronologically pieced together into one coherent narrative.
2. The chronology was used to identify corresponding conceptual research categories (stages) as illustrated by the activity of the organizational innovation process (Figure 2.9). These activity stages served as a guide for analysis.
3. Analysis of visible process patterns specifically exploring cycles (recurrent themes) and breakpoints (contradictions), and/or transition. The completion of the activity system component questions (Table 3.6) at each stage identified the changes (contradictions) that occurred.
4. Stage-specific vocabulary (Table 3.4) was used for describing processual progression that follows the activity in the organizational innovation process. At each stage (Table 3.5) the activity system component questions (Table 1.1) were employed to guide PM interviews and will be used to investigate all other data types (Table 3.3).

Table 3.5 Stage Description and Location

Stage	Stage Description	Location
Stage one: Agenda-setting	At the initiation level of the project data collected examined TCN's perceived need for an mLearning demo course as the innovation that would meet their needs.	Off-Sight
Stage two: Matching	Data collected at this stage began once the agenda-setting stage was completed and the role of mLearning was set to match the organization's agenda.	Off-Sight & On-Sight
Stage three: Redefining/Restructuring	Once the implementation level of the project was reached, data collected at the redefining/restructuring stage began. At this point the mLearning demo course was modified and reinvented to fit the organizational needs.	Off-Sight & On-Sight
Stage four: Clarifying	Data collected at this stage developed the implementation level of the mLearning demo course and how it was more clearly defined in TCN.	Off-Sight
Stage five: Routinizing	Finally, when the innovation becomes an ongoing element in TCN's activities it's effect (if any) on the organizational structure (hierarchy) would have been explored.	Off-Sight

Case study questions

The research questions for this study asked:

- How does an organization progress through the mLearning adoption process? (Q1)
- How does an organization engage in mLearning initiatives at different adoption stages? (Q2).

These research questions are designed to explore the process by which organizations adopt and engage in mLearning initiatives. Investigation of these questions required a methodology that identified criteria for identification of progression through each adoption stage and a framework for describing the engagement, or activity, within each stage.

To answer Q1 the researcher examined the data through Rogers' (2003) five stages in the innovation process in organizations (Figure 1.1). From the beginning of the study the researcher perceived there was a strong connection to the adoption research conducted by Everett Rogers (2003). Initially, Rogers' work with individual adoption was explored as a possible way to inform the data analysis, but as the study progressed it became clear to the researcher that the

data was revealing more of an organizational adoption process. However, Rogers (2003) illustrates organizational adoption as seemingly linear in his left-to-right organizational adoption model, however, the data was demonstrating a more real-life iterative example of adoption. With this in mind the researcher tried to explore another framework that might use to better understand the data. The most serious consideration was given to the design based research model (Amiel & Reeves, 2008), which would have been an acceptable way to investigate the mLearning course development process but did not adequately inform a clearer understanding of adoption at the organizational level. Engeström's Activity Theory System (2001) provided a critical lens which supported an in depth analysis of each stage's activity in adoption, including how iterative the nature of adoption was as the Technology Office would review what they knew and learned as they progressed with adoption.

Each stage describes the steps taken by an organization adopting an innovation. Once the criteria for a stage was satisfied the organization advances to the next stage (Table 3.6). Stages one and two (Agenda-Setting and Matching) are part of the initiation sub-process where the information gathering, conceptualizing, and planning for the adoption of innovation leads up to the decision to officially adopt. Stages three, four, and five (Redefining/Restructuring, Clarifying, and Routinizing) are part the implementation sub-process when the decision to adopt has been made and the stages will then consist of events, actions, and decisions involved in putting the innovation to use.

Table 3.6 Stage Identification and Criteria for completion

Stage Identification	Criteria
Agenda Setting: the organization identifies a problem.	<ol style="list-style-type: none"> 1. Identify and prioritize needs and problems. 2. Search the organization's environment to locate innovations of potential usefulness to meet an organizational problem.
Matching: a problem from the organization's agenda is fit with an innovation, and this match is planned and designed.	<ol style="list-style-type: none"> 1. Decision-makers determine the feasibility of the innovation in solving the organization's problem. 2. Decision-makers decide to accept or reject an innovation.
Redefining/Restructuring: an innovation has been adopted and now is re-invented to more closely fit within the organization's needs and structure.	<ol style="list-style-type: none"> 1. The innovation is re-defined to explain how it can fit organizational needs. 2. The organization re-structures to fit the innovation to find it a home.
Clarifying: as the innovation is put into more widespread use, the idea gradually becomes clearer to the organization's members.	<ol style="list-style-type: none"> 1. Innovation is employed within the organization. 2. More members of the organization seek to use the innovation.
Routinizing: the innovation becomes incorporated into the regular activities of the organization and losses its separate identity.	<ol style="list-style-type: none"> 1. The innovation is a seamless part of daily operations. 2. The innovation's adoption is organization-wide.

At each stage of the process, failure to initiate or implement an innovation was a real possibility, as with any emergent technology comes unforeseen problems, and the strategies used to address them can greatly inform future decisions.

Within each stage the organization engaged in activities that effect adoption. Q2 described each stage by examining the organizational activities through employment of Engeström's (1987) Activity Theory (AT) System, a descriptive framework, or analytical lens, used to investigate human activity. The AT system illustrated how multiple components were involved in the generation of a specified outcome. Initially AT was employed as a framework to better understand the cultural-social, economic, and historical context in which mLearning was being designed and developed (Figure 3.3)

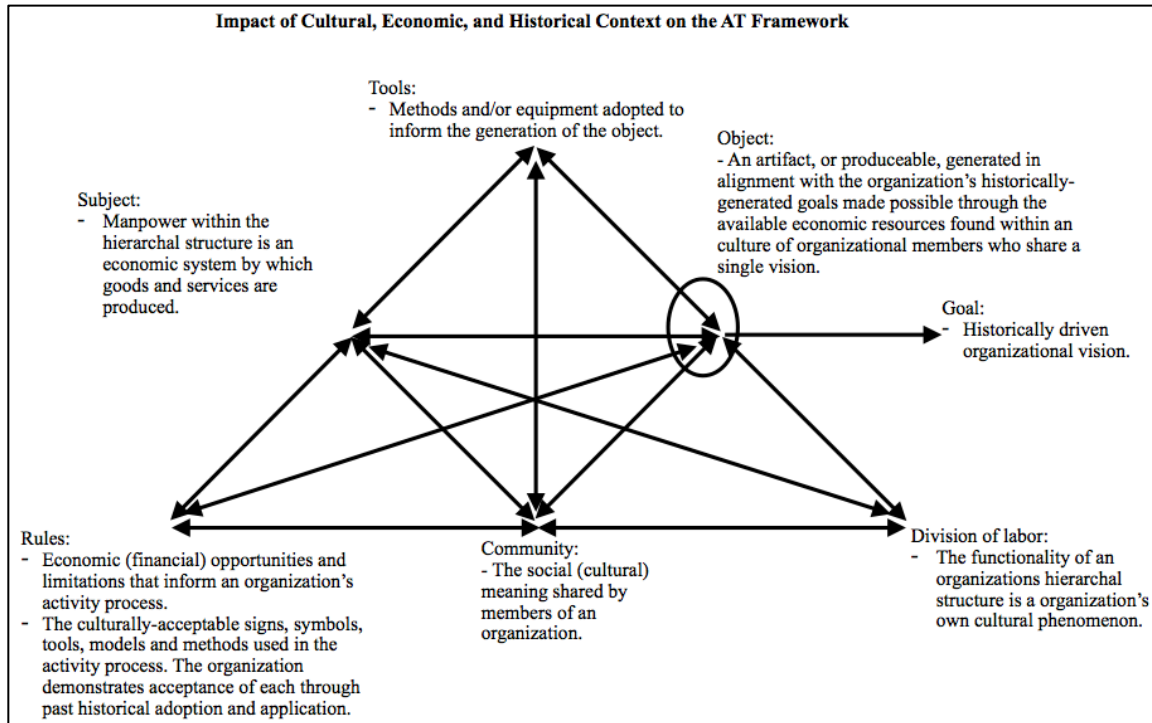


Figure 3.3 Impact of Cultural-Social, Economic, and Historical Context on the AT Framework

Once the context was established at TCN, the case study explored mLearning at TCN as interactive components in AT. Q2 is subdivided into questions (AT components), which described organizational engagement in mLearning at each stage of the adoption process. The activity system component questions (Table 3.7) were adapted from Jonassen and Rohrer-Murphy (1999).

Table 3.7 Activity System component questions

Object	<ul style="list-style-type: none"> • What is the mLearning Demo course content? • What learning functions will the course have?
Tools	<ul style="list-style-type: none"> • How is the project team communicating? • How is the project team collaborating? • What software is employed at this stage? For what purpose?
Subject	<ul style="list-style-type: none"> • Who are the project team members? • How are their roles defined?
Rules	<ul style="list-style-type: none"> • What means (financial and otherwise) are acceptably accessible for completion of the project? • What methods are used to mediate the process? Outside of the Technology Office, what departments are used to support the mLearning efforts?
Community	<ul style="list-style-type: none"> • What is the nature of the team?
Division of Labor	<ul style="list-style-type: none"> • What are the tasks? • Who are the specialists for each of the tasks? • Who are the team members accountable to?
Outcome	<ul style="list-style-type: none"> • What form of the mLearning app is being produced? Native? Web-based? • How will the mLearning course be delivered? Does it employ a Learning Management System?

The interactivity of these components is used to structure the findings chapter (chapter 4) using the six steps identified by Jonassen and Rohrer-Murphy (1999): (1) Clarification of the purpose of the activity system, (2) Analysis of the Activity System, (3) Analysis of the activity structure, (4) Analysis of the Mediators, (5) Analysis of the context, and (6) Analysis of Activity System Dynamics. Chapter 4: Findings will be outlined first as follows:

1. The case study organizational context
 - a. Cultural-Social Context
 - b. Economic Context
 - c. Historical Context
2. Stage One: Agenda Setting
 - a. Step 1: Clarification of the purpose of the activity system
 - b. Step 2: Analysis of the Activity System

- c. Step 3: Analysis of the Activity Structure
 - d. Step 4: Analysis of the Mediators
 - e. Step 5: Analysis of the context
 - f. Step 6: Analysis of Activity System Dynamics
3. Stage Two: Matching
 - a. Steps 1-6
 4. Stage Three: Redefining/Restructuring
 - a. Steps 1-6
 5. Stage Four: Clarifying
 - a. Steps 1-6

Validation Strategies

The validation strategies in the research study's design uses Yin's (2003) four categories, or tests; (1) Construct validity, (2) Internal validity, (3) External validity, and (4) Reliability.

Construct validity. During data collection, the researcher gathered evidence from multiple participants, sources, and data types as illustrated in Figure 3.2 (Data Collection Procedures) and Table 3.4 (Data Types). The multiple sources of evidence provided multiple measures of the phenomenon addressing potential problems in construct validity (Yin, 2003). The longitudinal nature of this study allowed the researcher to establish a clear chain of sequential evidence.

Internal validity. Yin (2003) describes two primary concerns with internal validity in case studies: (1) only a concern for causal relationships in which the researcher is trying to determine whether event x led to event y; (2) making inferences about an event or causal relationship whenever something is not directly observed. This research study was designed to anticipate the conditions by which an organization might progress through the various stages of adoption (of an

innovation). By establishing a systematic data collection process (AT system) that operates in an established five-stage adoption framework the researcher has designed a study that reduces the ‘inferences’ used to answer the research questions.

External validity. External validity deals with the problem of knowing whether a study’s findings are generalizable beyond the immediate case study (Yin, 2003). The research study design employed a theoretical framework developed by combining Rogers (2003) five stages in the innovation process in organizations (Figure 2.4) with Engeström’s (1987) the descriptive lens for examining activity systems (Figure 2.7). This research design model: Activity in the organizational innovation process (Figure 2.9) can be generalized to other research studies exploring the detailed, organizational adoption of innovation process.

Reliability. Reliability of a research study is found in the repeatability, by a later researcher, using the same case and procedures yielding the same findings and conclusions (Yin, 2003). The research study steps were operationalized in Figure 3.1 (Data Collection Procedures), Table 3.3 (Data Types), and Table 3.5 (Stage Identification and Criteria for completion) creating a step-by-step description with enough clarity that the same case study might be replicated. These operational steps are in alignment with Yin (2003) who stated that a way of approaching the reliability problem is to make as many steps operational as possible. The data collection types, procedures, and analytical identification of stages in this study are able to be gathered by another researcher seeking to replicate the same case study.

Additionally, to bolster credibility of the findings, the researcher employed suggested strategies from Yin (2003), Creswell (2007), and examples from the current study (Table 3.8)

Table 3.8 Credibility Strategies and Examples

Yin (2003)	Creswell (2007)	Current Study Examples
Chronological sequencing will allow the researcher to trace events over time to investigate presumed causal events.	Prolonged engagement and persistent observation.	Data were gathered from January 2012-January 2013
Triangulation really occurs when more than a single source of evidence has supported the data, events or facts of the case study.	Triangulation through multiple sources and different sources.	Data were gathered in the form of research journaling, observations, interviews, email communications, and organization documents.
To increase reliability of the case study, maintain a clear chain of evidence.	Clarifying researcher bias.	Chain of evidence was maintained and organized within the AT framework. Additionally, insider or emic status was discussed in the Author's Notes throughout chapter 4.
Evidence should be produced so that the reader has confidence in the researcher and so that the reader is able to independently conclude whether the researcher's interpretation is valid.	Provide rich, thick description that allows readers to make decisions regarding transferability (to other settings).	The narrative provided in chapter 4 contained multiple types of data in varying lengths as evidence for the reader.

Summary

Chapter three described the research methods including how the case was selected, the forms of data collection, how data were analyzed, and the validation strategies used to increase the validity and reliability of the results. Additionally, chapter three has introduced the participating organization, TCN, which represents an organization whose ongoing experience with the emergent, mobile technology, was analyzed to better understand;

- How does an organization progress through the mLearning adoption process? (Q1)
- How does an organization engage in mLearning initiatives at different adoption stages? (Q2).

As an instructional designer the resources available to TCN coupled with their willingness to allow the researcher to engage with them as both volunteer participant (instructional designer)

and observer (researcher) provided the researcher with a promising opportunity to explore the instructional design process at an in-depth level.

In chapter four, the researcher has chosen to adopt a first-person narrative, this style is particularly useful in expounding on a participant-observation experience (Yin, 2011). Chapter four consists of; a) The case study organization context (including organizational documents from prior to the participant-observation research start and concludes with the researcher beginning with TCN's Technology Office), b) "Stage One: Agenda Setting," c) "Stage Two: Matching," d) "Stage Three: Redefining/Restructuring," and e) "Stage Four: Clarifying." Chapter four's sections are used to present results of the case analysis through reported explicit details and the themes that emerged from them. Author's Notes are included in chapter four to highlight observations and reflections noted during the various data collection and analysis activities at TCN. To further develop the findings, this chapter will provide quotes from the study informants and relevant, applicable literature. The last chapter provides a discussion on the results of the study, the implications for theory development, practice, organizational structure, future research, the strengths and limitations of the study, a conclusion, and the researcher's reflection of this dissertation.

Chapter 4: Findings

This chapter starts by developing the context at TCN through describing the cultural-social, economic, and historical influences (that existed at TCN prior to my research study) that impact their adoption efforts. This contextual understanding is meant to provide a more meaningful starting point for the stages of adoption explored during my participant-observation experience.

As described earlier, current research does little to explore organizational change issues and challenges related to the process of adopting mLearning. As a participant-observer I worked with TCN as an instructional designer and gathered research data during my work experience. This study therefore describes my observations of how TCN dealt with issues and challenges that occurred in an mLearning adoption initiative. Data, in the form of organizational documents, interviews, participant-observations, and personal journal notes and reflections, were gathered through a yearlong process with a goal of gaining a clear, first-hand picture of the organizational adoption of mLearning at TCN. The data collected comprised hundreds of pages pertinent to both participant (instructional designer) and observer (researcher) perspectives. The instructional design data that informed the mLearning demo course product development demonstrates the intimate (insider) knowledge I gained. Yet, I experienced, first-hand, Yin's (2003) disadvantages of this research style specifically becoming a supporter of the organizational efforts and that the participant role required a great deal of attention relative to the observer role.

The case study organizational context

This section reports on the historical context of TCN prior to the beginning of my data collection experience. This section serves to provide an understanding of the organization's structure and stakeholders, as each played a role in informing the adoption process.

These data are organized and examined through a descriptive lens of the Activity Theory system (Engeström, 1987), which provided a framework for an in-depth understanding of mLearning at each of the five stages of the organizational adoption process (Rogers, 2003). Thus, the purpose of this section of chapter four is to explain the cultural, economic, and historical context of the research site at TCN and how each of these aspects fundamentally informed the adoption and activity of the mLearning initiative.

TCN was investigated through the Activity Theory (AT) framework. Aspects of cultural-social, economic, and historical content were examined as a social system; each aspect was a constant influence on the achievement of the design and development of an mLearning demo course (OBJECT).

The cultural-social system at TCN contained interrelated units (SUBJECTS with guidance and support from COMMUNITY) that were engaged in joint problem solving to accomplish a common GOAL: Christian evangelism supported with mLearning. Part of TCN's shared meaning was the mutual use of signs, symbols, tools, models, and methods as culturally acceptable in achieving their goals (RULES). These signs, etc. were primarily represented in the AT framework as TOOLS such as Knowledgey's mobile learning management system. Integrated throughout the study at TCN were efforts to provide broad understanding of mLearning (RULES) to TCN's various departments (COMMUNITY). All work at TCN was initiated through known product distributors, like Knowledgey, and in-house experts, like PMs and SMEs (DIVISION OF LABOR). At TCN I witnessed efforts to bring known, in-house resources and support to complete the content for the mLearning demo course. These resources included video recording and production equipment from the film department with several

experts helping with the setup and advising production for a project outside of their own department at TCN (data source: RJ 4.11.12).

The economic system (contextualized within RULES), by which the Technology Office and TCN (SUBJECT with COMMUNITY) worked to produce an mLearning demo course (OBJECT), was occupied by informants (SUBJECTS) that operated within TCN's organizational hierarchy (DIVISION OF LABOR). The hierarchy was divided up into groups (departments) of common interest.

Each department had its own financial resources (RULES) to employ personnel and TOOLS deemed useful in producing a specific departmental OBJECT that leads to TCN's GOAL: Christian evangelism. An understanding of the history of TCN's activity systems will help to describe the problems and successes in past adoption activities, which informed mLearning adoption as well.

The organizational context section that follows will explain in more detail, based on observational data, the TCN's vision (GOAL) and how past practices of leveraging technological innovation (OBJECTS) through the adoption of methods and equipment (TOOLS) yielded successful and unsuccessful results. A description of TCN's past practice of adoption (movement toward goals) will help to inform a better understanding of the mLearning adoption process central to this study.

Cultural-Social Context.

The cultural-social context of an organization illustrates how an organization understands the world around it. This exploration into the cultural-social context of TCN examined how TCN defined and perceived itself, who the stakeholders in the mLearning initiative were at TCN, how they are organized and work together, and how TCN's Technology Department explained its role

in achieving the overall goal of TCN, and specifically the goal of mLearning. TCN's cultural-social context was examined through document analysis (data source: secular and Christian news sources), conversations with TCN employees (data source: PM and SME interviews), and additional online research at TCN's website (specifically regarding leadership and finances).⁴

Author's Note: My status as a Christian allowed for site access, however, my career as both a social studies teacher and turnkey technology trainer (K-12) also brought my own way of viewing the data. As a social studies teacher I was interested in the historical, geographic, economic, political, and social aspects of the data. These five themes are used in social studies to understand a more full context within which events occur. As a turnkey technology trainer for my school district I am accustomed to working with people interested in adopting new technology. In this setting I am constantly working along side people who are engaged in adoption both individually and organizationally.

When my research study began, TCN had through an organization-wide email, that they had just completed a two-year, domestic name change (re-branding) process that they considered a success (data sources: Andy Schmid – during Team Conference Skype – Audio only 3.13.12) While this was reported to the mLearning project team on 3.13.12 it is worth noting that it was not made official until May 2012 (data source: Andy Schmid – Blog Post 5.29.12). TCN dropped their original name and would now be using “The Christian Network” (TCN). The name change account demonstrated how TCN understood it's cultural-social context in the world around it as illustrated within the AT framework (Figure 4.1)

⁴ These pieces of anecdotal evidence are not based on detailed observational data of the mLearning initiative, rather they are data from a review of historical documents and conversations with informants about previous TCN operations. This context is developed to explain how, and provide an example of how,

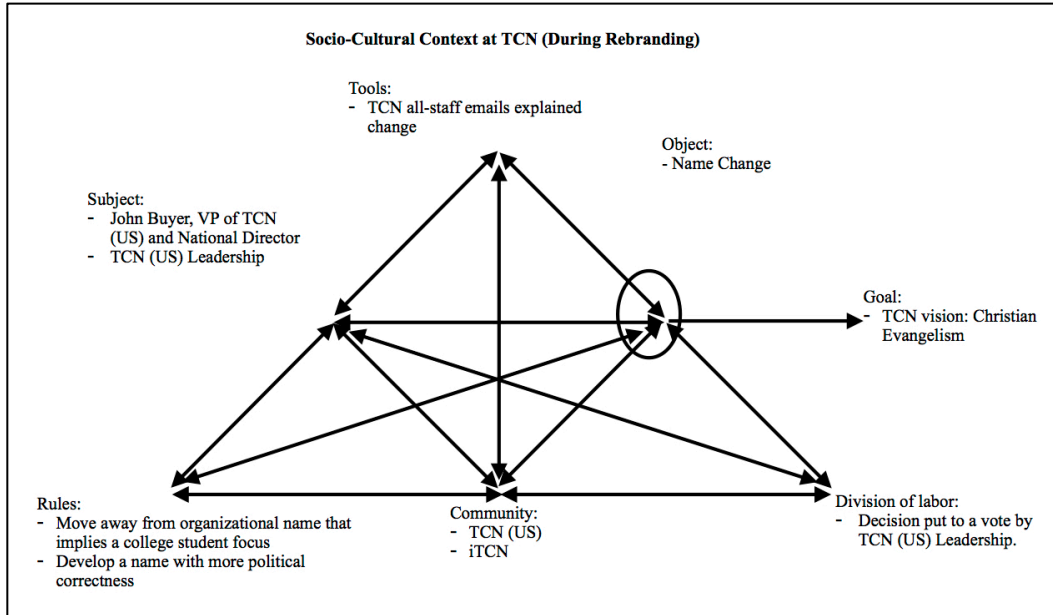


Figure 4.1 Socio-Cultural Context at TCN (During Rebranding)

TCN’s GOAL was maintained through decisions made by the US Leadership DIVISION OF LABOR within the RULES of the COMMUNITY. Upon further investigation in a Christian news website and a secular news source (data source: ABC news website 7.23.11)⁵ I found reports that as of July 2011 approximately 95% of TCN’s international affiliates (iTCN) had already made the change to the new name (data source: Christian news website 7.19.11)⁶. The Christian news website stated “The change will be implemented in the U. S., since leaders of TCN international operate as individual organizations.” (data source: Christian news website 7.19.11)⁷. ABC news interviewed John Buyer, the VP of TCN U.S. and National Director (Area Team Leader), Buyer reported that TCN US had decided to change the name for two reasons: 1) The original name defined the organization as limited to college students (DIVISION OF

⁵ No further citation is given since it would lead directly to TCN’s actual, confidential identity.

⁶ No further citation is given since it would lead directly to TCN’s actual, confidential identity.

⁷ No further citation is given since it would lead directly to TCN’s actual, confidential identity.

LABOR); and 2) The original name used a phrase intended to describe evangelistic work, but in recent years the name had become politically incorrect having a warlike connotation (RULES) (data source: ABC news website 7.23.11)⁸. According to Buyer, “the decision to change the name officially was unanimous across all of TCN’s U.S. leadership” stating that the new name, The Christian Network, better reflected TCN’s global activities (COMMUNITY) (data source: ABC news website 7.23.11)⁹. In another source, Buyer stated that it was “more important that the organization is effective at proclaiming Jesus, than it is important to have the name of Jesus in the name of the organization.” (data source: FoxNews website 7.21.11)¹⁰ Eve Light, retired cofounder of TCN, stated “We want to remove any obstacle to people hearing about the most important person who ever lived... Jesus Christ.” (GOAL) (data source: TCN Public Relations Website).

Author’s Note: Early in my work with TCN I began to explore the concept of branding to understand how it might impact our mLearning project. My interest in branding came from a response to one of my project team emails: I asked for clarification about the focus of the mLearning demo course (data source: Team Email – 2.13.12) in response, team member, Aaron Crescent, replied ‘we need a production statement for the demo course’ (data source: Aaron Crescent – Team Email 2.16.12). I began the next few days to simply Google search for articles that centered on developing a focus for a product and I found a site that explained ‘brand’ development: “Relatively speaking, a strong brand influences its target audience and works overtime to engage those who may not have been targeted at all. A successful brand self-promotes, stimulates a unique experience, breathes loyalty, and offers consistency in the quality of the service it offers.” (Reyes, 2010) (data source: RJ 2.27.12).

⁸ No further citation is given since it would lead directly to TCN’s actual, confidential identity.

⁹ No further citation is given since it would lead directly to TCN’s actual, confidential identity.

¹⁰ No further citation is given since it would lead directly to TCN’s actual, confidential identity.

TCN covers a broad scope of Christian ministries, or departments, ranging from junior high through college and seminary studies, the latter to prepare missionaries and pastors for service. TCN has over the past 60 years built an international presence in 191 countries with about 25,000 staff members (data source: Christian news website 7.19.11)¹¹. Within each country's TCN there are departments (or ministries) that each have their own mission statement and individually choose how to achieve their departmental goals. The international TCN (iTCN) operates as a collection of individual organizations from many countries with one common mission: to be "a loving people who help people to Jesus Christ." (data source: TCN –About us website accessed 4.9.13)¹²

Author's Note: The individual nature of each organization in the collection of organizations in iTCN can be thought of as a confederacy, which is a league or alliance with a mutual goal. In this structure each department would engage in an optional innovation-decision, which would allow them to adopt innovations at the departmental level rather than as a top-down decision, representing the authority innovation-decision (Rogers, 2003).

For the purposes of this case study, the name TCN will be employed to identify both the U.S. and the international branches of the organization. This decision to use TCN only is due to my position as a participant-observer with TCN's Technology Office where we worked with both iTCN globally and TCN (US) domestically. Through the department of Global Operations, the Technology Office regularly interacted with TCN's U.S. and international departments. See TCN's organizational hierarchy in Figure 4.2.

¹¹ No further citation is given since it would lead directly to TCN's actual, confidential identity.

¹² No further citation is given since it would lead directly to TCN's actual, confidential identity.

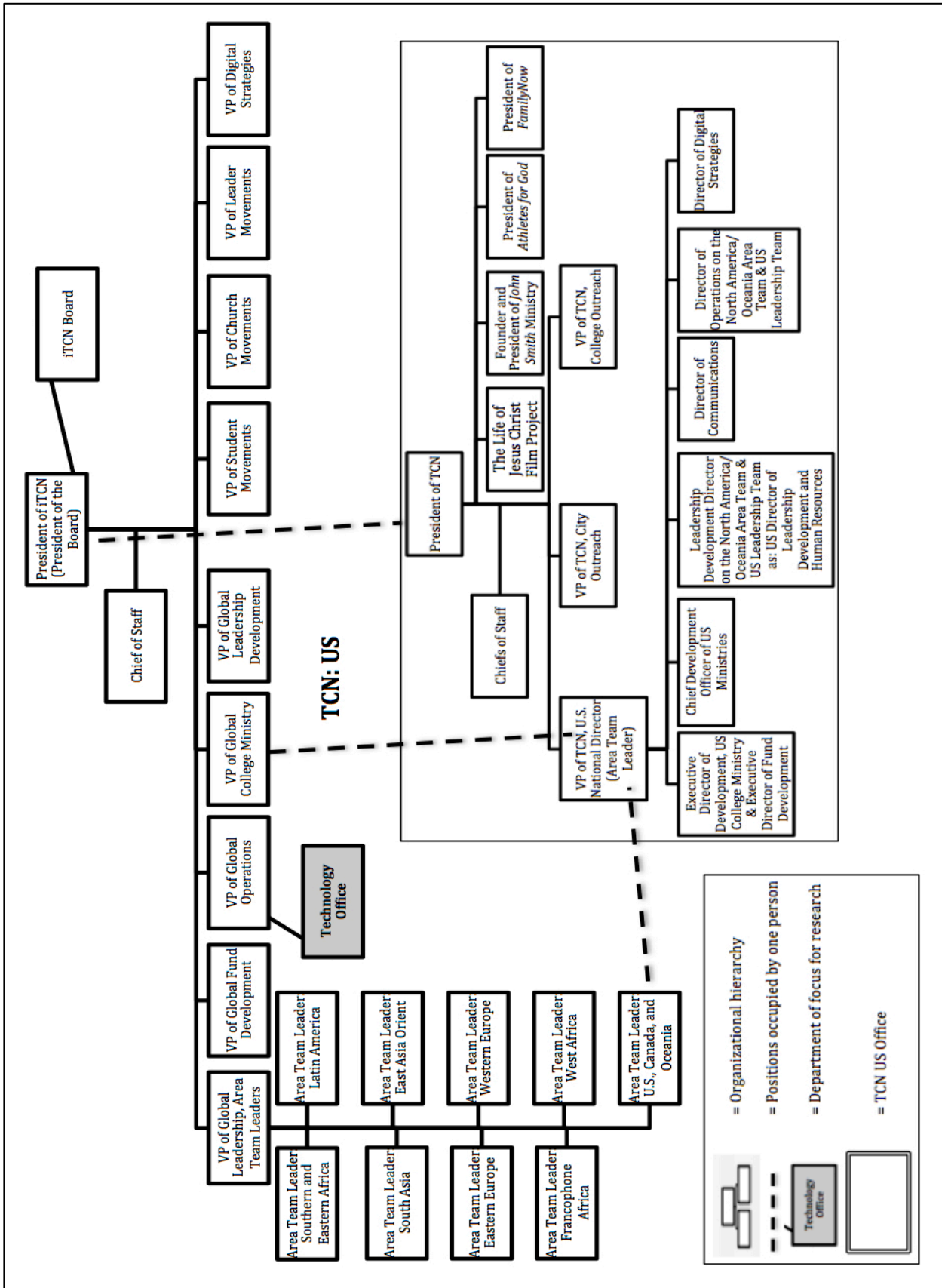


Figure 4.2. The International Christian Network organizational hierarchy

The organizational hierarchy (Figure 4.2) illustrated reporting lines at TCN that implied changes, like rebranding, occurring from the top-down. While the decision for the TCN (US branch) to change its name was decided by the US leadership, other examples of localized decision making can be found in each department where they can choose to achieve their organizational goals in a manner they see as a best fit for their context.

Author's Note: During my efforts to explore what mobile learning platforms were being used in the various departments at TCN, I found (in the iTunes Store) two apps that were sponsored by iTCN Australia. These two apps contained TCN content that was already being used in TCN print material. When I asked Andy if the Technology Office had produced these he explained that they had not and that each department had the ability to choose to adopt any resources they wanted in order to achieve their goals. (data source: RJ 3.3.12)

There were several instances at TCN in which one person holds more than one position, for example, the offices of iTCN President and TCN President are held by one person, Doug Stevenson. Also, John Buyers, served as the VP of Global College Ministry and the Area Team Leader for the U.S. and Canada, as well as the VP of TCN, U.S. National Director.

In reviewing the biographies found on the TCN website, I discovered that the international and domestic TCN staff members came from a variety of backgrounds providing them with an equally diverse sets of skills. For example one of TCN's current Vice Presidents, Rob Garnet, shared with me (data source: Rob Garnet - Interview 4.11.12) that he had been involved in instructional design work before he began his work at TCN. I followed up with him by connecting on LinkedIn and discovered that Rob holds a PhD in Computer Science from Pennsylvania State University from 1972. Initially, Rob had conducted research at Bell Laboratories for several years and then held a 25-year career as an entrepreneur where he headed three companies. Presently, in his VP role, Rob leads a department at TCN called *Leader Movements* that engages leaders in the workplace to live, work, and grow in the Christian faith.

Author's Note: The Leader Movements department was one international department at TCN that I was involved with during my participant-observation experience at TCN. Sharon Richards, from The Leader Movements, would provide a rich example of how departments at TCN were interested in leveraging mLearning to achieve their goals (data source: Sharon Richards interview 4.9.12).

The Technology Office. The Technology Office is the department at TCN where the study was situated. They were a division of Global Operations, a ministry that supported technological initiatives. The Global Operations website stated that they exist “to help TCN teams build capacity so that people the world over can know someone who truly is a Christian.” (data source: TCN Global Operations website accessed 4.8.14) A Technology Office website article by written by Laurin Graves, a Technology Office staff member, reiterated the point to ‘build capacity’ through an explanation by the VP of Global Operations as follows:

Building capacity is like building the road so that the fast cars can run. . . . In one sense, we continue to pay attention to what our staff and our department needs, but on another side, we want to be proactive for coming needs. Where should we build the road so the departments can run fast?

Organizational Document 4.1 Explanation of Global Operations (data source: Laurin Graves – Article written for Global Operations website 3.27.13)

The Chief Technology Officer, John Penny led the Technology Office under the direction of the VP of Global Operations. John directed project managers in the deployment of each product within specific projects. The Technology Office’s philosophy posted on their website states they work to “consolidate the complexity; distribute the control” (data source: TCN Global Operations website accessed 4.8.14). In ‘distributing control,’ the Technology Office shared resources across project lines to maximize project efficiency in cost and manpower, for example during video taping for the mLearning demo course project files, experts from a TCN Film

department (contacted by Nick Tred) offered to lend a hand in the setup and production (data source: RJ 4.11.12).

The organizational hierarchy at TCN illustrated how authoritative, top-down, decision-making might have occurred but this structure must be understood as a loose confederacy of departments that often operated independently of each other. TCN's Technology Department existed to support other departments in achieving their focus in the overall goal of TCN. The Technology Office's solutions were not mandatory, other departments can choose to adopt their own innovation, therefore the Technology Office must persuade other departments to adopt the innovations they offer. The adoption process at TCN exists within a cultural context but also unfolds within a economic context of the people and money available to each department.

Economic Context.

TCN leverages both personnel resources and financial means to achieve their common organizational goal. TCN's economic system is divided up into groups (ministries or departments) of common interest or skill set. Examples of these are found in the organizational hierarchy (Figure 4.2) and include departments that specialize in families, colleges, and athletes. Each department has it's own personnel and financial resources. Each ministry or department therefore chooses how to implement tools and personnel they have to produce an object or program to support their ministry or departmental goals. The economic context at TCN's is illustrated within the AT framework (Figure 4.3)

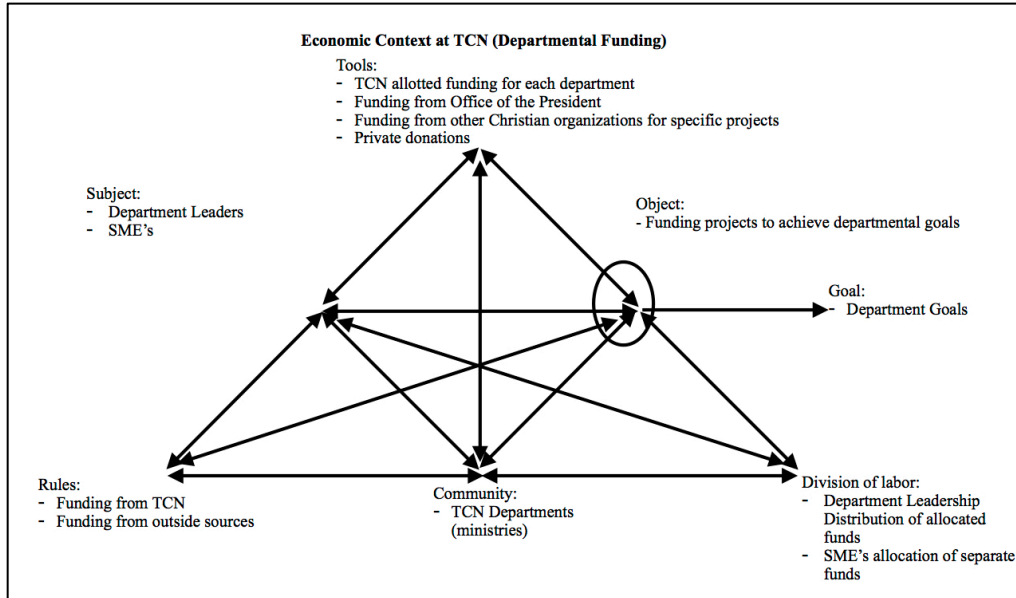


Figure 4.3 Economic Context at TCN (Departmental Funding)

Data that informed my understanding of TCN’s economic context were developed through an examination of their organizational website (data source: TCN Financial Information website accessed 4.3.14) and conversations with Technology Office staff (data sources: Andy Schmid – Email 4.7.14, 4.10.14, 4.13.14 and Nick Tred – Email 2.13.14).

Each international organization and each individual department at TCN makes it’s own decision on whether or not to adopt new innovations as a means to achieve their goals.

Author’s Note: As I began to determine how TCN was organized and how the stakeholders participated in the work and decision-making, I realized that at the time of this study, TCN’s departments were engaged in an optional innovation-decision to engage in mLearning projects. Andy shared with me how several departments, discussed in the next chapter, were coming to the Technology Office with requests to learn about how mLearning might help them achieve their goals. Andy said that this was the reason the mLearning Demo Project was so important. The project would explain how mLearning works but also be used to persuade other departments about the usefulness of mLearning in achieving their goals (data source: Andy Schmid - Phone Interview 2.10.12).

Andy explained that time and money were shared by departments through strategy leaders, SMEs, and the Technology Office. An example of this came in a project introduced to Nick Tred

and Andy Schmid involving a North African Christian organization looking to mobilize content. Nick shared with me that they contacted him and were willing to spend \$5000 to cover his cost of travel to North Africa to meet with them as well as to pay for a subscription to a mobile learning management system (LMS) that Nick was considering (data source: Nick Tred Facetime Interview 10.5.12). Although the International Christian Network organizational hierarchy illustrated reporting lines at TCN that implied funding occurred from the top-down, TCN actually functions as a type of confederacy where departments can be sought out by other Christian organizations for support.

Other sources of funding were found in private donations to the individual departments or the Technology Office and came in multiple forms. For example, one SME, Sharon Richards was working to get outside funding for mobile phones to be used in her mLearning project (CWI project referenced later in this study). Sharon shared (data source: Sharon Richards - Interview 4.9.12) that she was looking to get funding from Christian business leaders who shared her vision. The TCN annual budget allocated to the Technology Office for product and project development are distributed annually and come from administrative charges from each donation to the organization, further each department had full discretion over how the funds were spent (data source: Andy Schmid - Email 4.7.14).

Author's Note: I was unable to uncover the exact amount of this financial allotment and the logic behind how it is divided up. However, on two occasions Andy referenced that the Technology Office was funded by the President's Office. He stated that: "This was a general annual funding. We had discretion to use the funds as we saw fit." (data source: Andy Schmid - Email 4.7.14)

The Technology Office website illustrated their specialization in several products. These products include a) Google search support, b) free website building support, c) identity management for TCN online resources, and d) a social management program to track

communication with ministry supporters. Most recently, the Technology Office added mobile learning to their list (data source: Global Operation home website accessed 4.8.14). The specific mLearning support offered by the Technology Office is discussed in the next section in TCN's history of Christian evangelism is aligned with their story of the adoption of technological innovation.

Historical Context.

The purpose of exploring TCN's historical context was to examine how, over time, TCN has grown as an organization and parallel with this growth has adopted technological innovations to support their organizational goal. To better understand the history of TCN data were collected from their organizational website (data source: TCN Overview website accessed 4.9.13 & TCN Newsroom – Historical Fact Sheet accessed 4.9.13), outside Christian news (data source: Christian news 3.11.03 accessed 4.9.13) along with conversations with the Technology Office staff (data source: Nick Tred – Interview 4.11.12).

TCN was founded in the United States in the early 1950's on the campus of a west-coast university. The founders Bob and Eve Light focused their efforts on the development of training programs in Christian evangelism for college students. Within 10 years, TCN was active on 40 U.S. campuses and in 3 other countries. In the 1960's TCN extended their programs to include high school students, military personnel, and athletes. By the end of the 1960's TCN was active in 25 countries. In the early 1970's TCN held large-scale conferences; one in the U.S. was attended by 80,000 attendees and another in South Korea was attended by 300,000. The purpose of the conferences were to train participants in Christian evangelism. In the late 1970's TCN released *The Life of Jesus Christ* (TLOJC), a large-scale film project, across the U.S. in an effort to go beyond evangelism training and actually evangelize. This effort was implemented through

a technology innovation, film. At the end of the 1970's TCN was active in 71 countries. In the 1980's TCN held a global, training conference that linked 97 countries together by using modern communications technology, through a satellite telecast. This effort also demonstrated adoption of a technology innovation, satellite telecasts. By the end of the 1980's TCN was active in 93 countries. At the start of the 1990's TCN moved it's headquarters from the west coast to the southeastern U.S. to a plot of land donated to the organization. After 8 years of development of the new property, TCN officially moved into its current headquarters. In the late-1990's TCN held another international satellite-connected conference that leveraged 4,100 satellite downlinks... a further indication of adoption in the later phases of routinizing (Rogers, 2003). Also at this time TCN changed their annual U.S. staff conference to an annual international staff conference bringing TCN leaders from around the world together in one place. This conference would allow international TCN leaders to share accounts, encourage one another, and exchange effective evangelism techniques. In 2000, Bob Light announced his successor to be Doug Stevenson, a former VP at TCN and TCN U.S. National Director. To date, Stevenson holds the position of President of TCN and President of iTCN (President of the Board). By the start of my participant-observation data gathering (January 2012) TCN was comprised of 29 different ministries and projects in over 140 countries around the world.

TCN and Technology. New methods of transportation and communication are regularly leveraged by Christian organizations to this date. Adhering to the established pattern of Christianity's employment of modern technology, TCN has engaged in the dissemination of multiple innovations since the late 1970's. TCN sponsored a film project to provide people with the opportunity to learn about Jesus Christ in their own language through film. According to the TCN website, this two-hour docudrama was the result of the research from 500 scholars. Billions

of people have seen the film, which is reported as the most translated and viewed film in history (data source: TCN Newsroom – Historical Fact Sheet accessed 4.9.13). The website further explains that the film has had a “life changing impact” on over 200 million men, women, and children all over the world (data source: TCN Newsroom – Historical Fact Sheet accessed 4.9.13). For the past two millennia Christian’s have chosen to adopt the latest emergent technology to support evangelistic efforts.

Nick Tred, a Technology Office staff member, shared an example of the showing of this film in one culture (data source: Nick Tred - Interview 4.11.12). He explained that in the early 1980’s TCN began to distribute the film, it had been translated into multiple languages to help bridge language and literacy barriers. It was brought to villages and towns throughout the world and set up for viewing even in the most remote locations. Large outdoor screens and generators were used when necessary to bring the content to new audiences (Figure 4.4).



Figure 4.4 TCN Film Project Outdoor Screenings (data source: TCN Film Museum website timeline – ‘1980’).

On one occasion, local people reacted to the film in an unpredicted manner. They began to throw spears at the giant-sized people that appeared on the projection screen.

Authors note: Nick said that, though the film was an effective medium for delivering TCN’s content, the medium itself might have caused misinterpretation

of the intended message because of the local people had no past experience with film (data source: Nick Tred - Interview 4.11.12). I was reminded of McLuhan's (1964) quote, "The medium is the message"; the way content is delivered affects the way it is received. Accounts of undesirable, indirect, and unanticipated consequences of introducing new technology suggested the need for change agents who are careful to understand the form, function, and meaning of an innovation. Rogers (2003) defines each of these as critical to understanding consequences. *Form* is the directly observable physical appearance and substance of an innovation. *Function* is the contribution made by an innovation to the way of life of members of a social system. *Meaning* is the subjective and frequently unconscious perception of an innovation by members of a social system. Rogers (2003, p. 451) states: "Change agents more easily anticipate the form and function of an innovation for their clients than its meaning."

While no specific data was reported regarding the impact, or number of converts, as a result of using the film, the film website archives many personal stories documenting the reported impact of the film on local, indigenous populations. The adoption of film as a medium to support TCN's organizational goal continues today. The use of this film has grown into several projects that include now additional versions of films that specifically target women and children. This growth, and more widespread use, demonstrated the high level of film adoption, in the routinizing stage, at TCN.

Another indication of the success of the film at TCN is that they have developed both a website and a museum (at TCN international headquarters) archiving the story of the film and its impact on millions of people. The website reports that by early 2000 the film was reportedly watched by 5 billion people worldwide and had been translated into its 800th language (data source: TCN Newsroom – Historical Fact Sheet accessed 4.9.13). In 2007, the film's translation count reached 1,000 languages (data source: TCN Newsroom – Historical Fact Sheet accessed 4.9.13).

The TCN film was not the end of TCN's efforts to leverage technology to meet their organizational goals. By 2009 TCN reported that 66 million people had visited one of their over

100 websites (data source: TCN Newsroom – Historical Fact Sheet accessed 4.9.13); another indication of technology innovation adoption – in this case the Internet. Additionally, TCN began engaging in an mLearning project through a partnership between the Technology Office and the East African Seminary (EAS) (data sources: The Technology Office Website: ‘The mLearning Project’ Blog Post accessed 1.30.12 & Andy Schmid – Blog Post 7.10 ‘The mLearning Project’). The EAS’ choice to pursue adopting mLearning led them to seek out TCN resources that might support their efforts (data sources: The Technology Office Website: ‘The mLearning Project’ Blog Post accessed 1.30.12; Andy Schmid – Blog Post 7.10 ‘The mLearning Project’; Andy Schmid – Interview 2.10.12).

History of mLearning at TCN (prior to this study). The focus of this research study is on TCN’s adoption of mLearning. In 2010, two years before my participant-observation experience with the Technology Office, the staff at TCN’s Technology Office had created and implemented the Missionary Training Project (MTP), an mLearning course with missionaries and lecturers at the EAS school. The seminary school stated “We noticed that students who attended lectures rarely made it to every class because of busy schedules and traffic” (data source: an East African Newspaper interview of the seminary school’s IT department staff member; May 26, 2011). Therefore, it was noted that these factors were hindering the educational process (GOAL). The AT framework below illustrates the activity system associated with the development and deployment of the MTP (Figure 4.5).

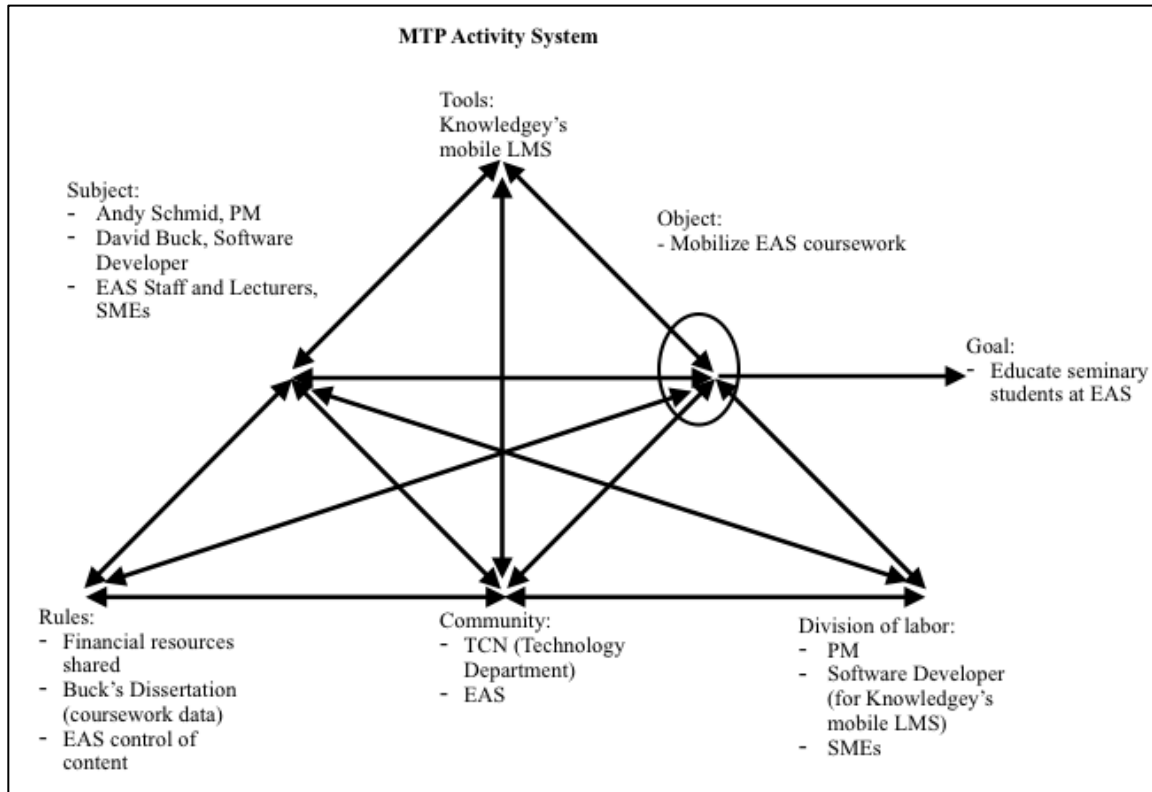


Figure 4.5 MTP Activity System

Andy Schmid served as the project manager (PM) with David Buck (Dr. Buck) serving as the software designer. The EAS staff and lectures worked as subject matter experts (SMEs) during the process of mobilizing their course content (DIVISION OF LABOR). Andy wrote the following MTP description on the Technology Office website (Organizational Document 4.2).

How would this work?

A missionary attends a short orientation session where he receives a mobile phone (like an iPhone or Motorola Droid) pre-loaded with videos, audio lectures, class notes, and all of the electronic books he needs to complete a course on church leadership. These courses will be administered by seminaries and churches.

He returns home, continues his ministry and job, and studies through the course while he goes about his usual life. When he takes quizzes, the program on his phone sends those results over the inexpensive mobile phone network in a text message, and he gets an immediate response indicating his quiz score. He continues working on the course at his own pace until he completes the curriculum. During his study he interacts with other students and with the course instructor using his phone to send text messages and make voice calls.

The course, including mobile phone, costs less than if he took the in-class lecture series, and once he has the phone he can download and take other classes as well. If the course requires tuition, that can also be paid using his phone.

This model of Biblical training is sustainable in cost because each missionary can afford it. It also can expand at a rate that can keep pace with the growth of the church across Africa, East Asia, South Asia, and anywhere else where the growth of spiritual movements outpaces the availability of Biblical training.

Organizational Document 4.2 data source: Andy Schmid's MTP Process 1.30.12

The MTP team (SUBJECTS) consisted of a) Andy; b) Dr. Buck, a software designer; and c) the SMEs from the EAS. The Technology Office supported MTP, which was launched in 2010 at an East African seminary school. To promote the MTP project, Andy created the following example (Organizational Document 4.3)

In a Tanzanian village of several thousand people lives a missionary named Matthew. Africa's electrical grid has not found its way down the unpaved roads to Matthew's home. To access 21st-century, modern conveniences, Matthew has found creatively approached his environment with ideas of solutions. rather than thoughts of barriers. Matthew's refrigerator runs on a kerosene engine,; he collects rainwater for drinking, and he uses solar panels for some electricity. Despite these setbacks and limitations, Matthew has mobile coverage at his home. He believes missionary training has the potential to positively impact his work in Tanzania, but time, travel, and cost will have detrimental consequences for Matthew's work if he were to leave. The Christian Network's Missionary Training Project (MTP) has transformed course content, for Christian's like Matthew, into a mobile platform allowing access to meaningful content, virtually anytime, anywhere.

Organizational Document 4.3 Matthew, the missionary

Andy explained that he created the 'Matthew' story based on a real example of missionaries in the field who were taking the MTP courses (data source: Andy Schmid – Interview 2.10.12).

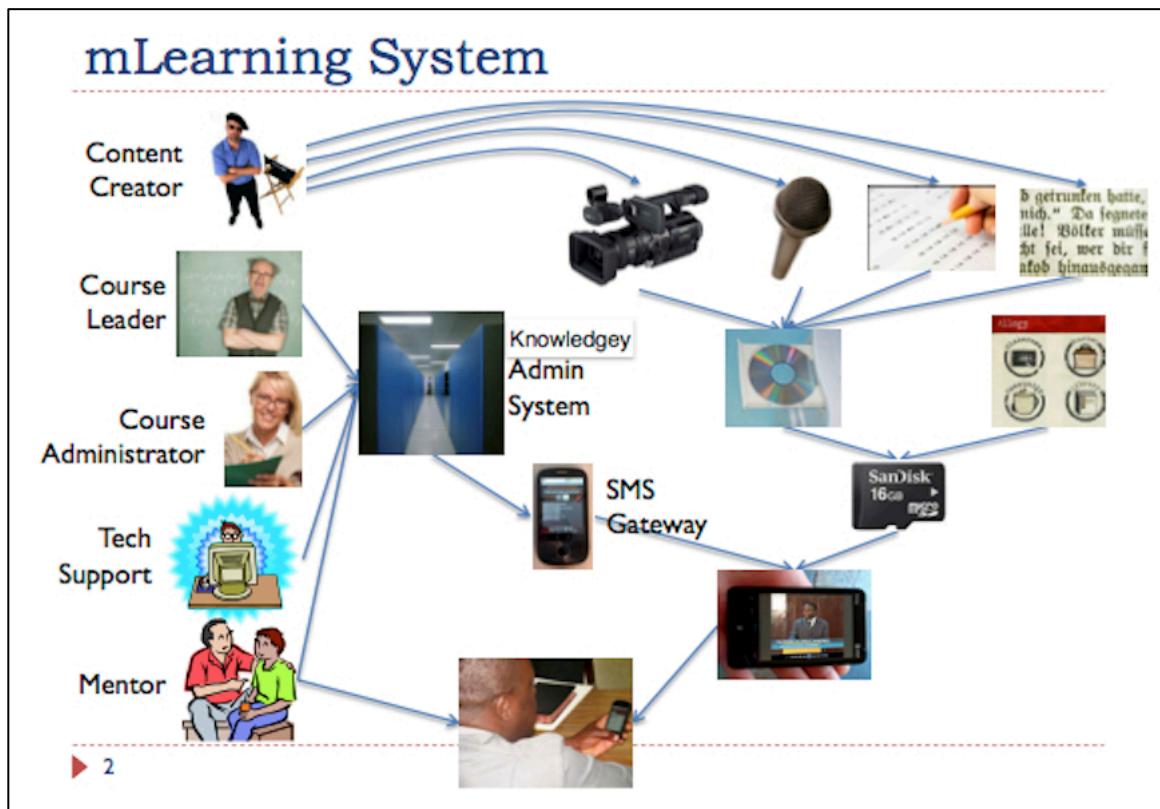
Matthew's story was posted on the Technology Office website. The mobilization of the EAS coursework into the MTP courses (OBJECT) was carried out in conjunction with SMEs from an East African Seminary (COMMUNITY).

Author's Note: In our 2.10.12 phone interview Andy referenced an interesting relationship between the Technology office and the East African Seminary (EAS). The seminary wanted limited interference from the Technology Office in the courses to be transformed for mobile, specifically the EAS wanted help with technical, mobile delivery only but also wanted complete control over content (data source: Andy Schmid – Interview 2.10.12). Andy's description of this relationship made me understand that TCN had formed a culture that operated like a confederacy of independent organizations that came together when common purposes intersected. Yet each maintained individual, sovereign authority (data source: RR 6.24.13).

In an interview, the EAS vice chancellor reiterated the belief that as the requestors of the mLearning project, they should be involved in the course creation "We were involved in every step." stating it was because they "...felt that it is important that we advise him on what we

expected the software to offer.” (RULES & DIVISION OF LABOR) (data source: East African Newspaper 5.26.11)¹³.

At the request of the project support, Andy prepared an explanation of the design and development process for the Seminary’s team. The process was developed as a slideshow presentation (data source: Appendix 7. MTP mLearning System). As an overview of the process Andy began with slide 2 “mLearning System” (Organizational Document 4.4):



Organizational Document 4.4 mLearning System Introduction Slide 2 (data source: Appendix 6. MTP mLearning system)

¹³ No further citation is given since it would lead directly to TCN’s actual, confidential identity.

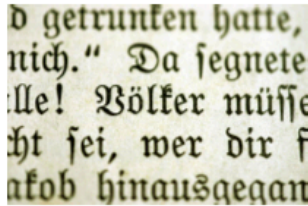
Andy indicated that students would register for courses, pay for courses, receive a phone (with course preloaded), complete the course, and take tests. The mentor (or instructor) would follow the progress of the individual students, mentor students (via voice calls, conference calls, and text messages), and grade student short answer quizzes. Test formats were multiple choice and short answer (up to 130 characters). All activity would be leveraged by the Knowledge Admin System (TOOL). Knowledge's founder, Dr. Buck, was a PhD student when he developed the MTP courses to work with his mobile learning management system (LMS). Dr. Buck was at that time developing a mobile LMS as his dissertation project (data source: Andy Schmid - Interview 2.10.12).

Author's Note: Andy described Dr. Buck's desire to complete his dissertation was a driving force in the programs development (data source: Andy Schmid - Interview 2.10.12). In diffusion of innovation terms, I believe this made Dr. Buck the "champion" of this first mobile learning initiative.

The mobile courses were set up into three levels that progressed through the seminary schools curriculum for missionary training. The courses were composed of video lectures that the participants would watch. The videos required a 16-gigabyte micro-SD card. Andy and Dr. Buck both traveled to Africa to launch the mobile coursework. More detailed descriptions are explained in Appendix 7. MTP Learning System specifically slides 21-24 the "mLearning Components MTP Content."(Organizational Document 4.5).

mLearning Components

Text Content



- ▶ Text background material for the courses:
- ▶ Course curriculum
- ▶ Books
- ▶ Transcripts
- ▶ Bible

▶ 21

mLearning Components MTP Content

- ▶ LEVEL I
- ▶ Great Commission Movement Training - Better choices
 - ▶ Identifying Dreams
 - ▶ AIDS Transmission
 - ▶ Living With AIDS
 - ▶ Making Life Choices
 - ▶ Amazing Love
 - ▶ Making An Impact
- ▶ Module One - Introduction to Evangelism and Discipleship
 - ▶ Orientation: A Call To Reach Your World
 - ▶ Be Sure You Are A Christian
 - ▶ Experiencing God's Love and Forgiveness
 - ▶ Empowerment of the Holy Spirit
 - ▶ Empowerment For Living
 - ▶ Introduction To Discipleship
- ▶ A Call To Help Fulfill The Great Commission
- ▶ Presenting The Four Spiritual Laws I
- ▶ Presenting The Four Spiritual Laws II
- ▶ Closing the Presentation of The Four Spiritual Laws
- ▶ Conducting Introduction to Discipleship #1
- ▶ Module Two
 - ▶ The Priority of Our Relationship with God
 - ▶ The Attributes of God
 - ▶ Our Identity in Christ
 - ▶ The Word of God
 - ▶ Beginning a Ministry of Discipleship I
 - ▶ Preparing and Communicating Personal Testimony
 - ▶ Motivation for Discipleship
 - ▶ Communicating the Spirit Filled Life
 - ▶ Studying the Word of God
 - ▶ Beginning a Ministry of Discipleship II
 - ▶ Planning a Personal Ministry Strategy

▶ 22

mLearning Components MTP Content

- ▶ Module Three
 - ▶ The Grace of God
 - ▶ A Biblical Call to Make Disciples
 - ▶ The Dynamics of Spiritual Multiplication
 - ▶ Biblical Stewardship
 - ▶ Characteristics of Disciples of Jesus Christ
 - ▶ Overview of the Discipleship Process
 - ▶ Dynamics of Group Discussion
 - ▶ Methods for Teaching the Discipleship Series
- ▶ Module Four
 - ▶ Living with an Eternal Perspective
 - ▶ Discerning God's Will For Our Life
 - ▶ Loving Others
 - ▶ Importance of a Spiritual Movement
 - ▶ Movement Building I
 - ▶ Movement Building II
- ▶ Family Life Seminar
 - ▶ Biblical basis of family
 - ▶ Design and purpose of marriage
 - ▶ The role of family members
 - ▶ Preparations for marriage
 - ▶ Family finances management
 - ▶ Communication
 - ▶ Separation, divorce & re-marriage
 - ▶ Sex in marriage
- ▶ Balancing Personal, Relational, and Public Life Seminar
- ▶ Church Growth and Church Planting
- ▶ Pastors Leading God's Way
- ▶ Spiritual Gifts
 - ▶ Part I
 - ▶ Part 2

▶ 23

mLearning Components MTP Content

- ▶ LEVEL II
- ▶ Biblical Interpretation
- ▶ OT Survey
 - ▶ Part 1
 - ▶ Part 2
 - ▶ Part 3
- ▶ NT Survey
 - ▶ Part 1
 - ▶ Part 2
 - ▶ Part 3
- ▶ Church History in Africa
- ▶ Africa in the Bible
- ▶ Reaching People of Other Faiths (Muslim)
- ▶ Counseling Principles
- ▶ Principles of Preaching and Teaching
 - ▶ Part 1
 - ▶ Part 2
- ▶ Women in the Ministry
- ▶ LEVEL III
- ▶ Resource Development
- ▶ Leadership and management
- ▶ Transformational leadership
 - ▶ Part 1
 - ▶ Part 2
 - ▶ Part 3
- ▶ Christian doctrine
- ▶ Focus on children
- ▶ Focus on youth
- ▶ Theology of work
 - ▶ Calling, Spirituality and work,
 - ▶ Biblical world view of work
 - ▶ Jesus and work
- ▶ Conflict Management
- ▶ Project Management

▶ 24

Organizational Document 4.5 mLearning Components MTP Content slides 21-24 (data source: Appendix 6. MTP mLearning system)

The MTP team distributed the courses through micro-SD cards for use on Android-only devices (DIVISION OF LABOR).

The Technology Office purchased a micro-SD card replicator machine to make multiple copies of the courses. In November of 2010, Andy's department ran a trial of the program. According to Andy, the mobile version of the course had 33 students, meanwhile, 15 other students attended the classroom-based version of the same course and the mobile students

outperformed the classroom students. Mobile students completed the course at 97% compared with 50% of the classroom students¹⁴ (data sources: The Technology Office Website: ‘The mLearning Project’ Blog Post accessed 1.30.12).

Author’s Note: Andy had access to the online assessment data from his work with Knowledgegy, as we sat in his cubicle during my onsite work, Andy opened a file of data and scrolled through it while he explained his perception of the programs success both during the first run in 2010 and a second trial in the spring of 2011 (data source: Andy Schmid - conversation 4.9.12). I did not have a copy of the data for myself to review and as he discussed the data Andy fondly remembered the experiences with Dr. Buck and even shared pictures with me of the two of them on the trip. He chuckled as he shared a picture of a monkey holding Dr. Buck’s peanut butter and informed me that the monkey had stolen it perturbing Dr. Buck (data source: Andy Schmid - conversation 4.9.12).

Andy and staff at the East African Seminary also interviewed several of the mobile course students to ask about their experience. The students were simply asked to describe their experience with their MTP coursework. Student responses to completing the course included:

“I love Christ more and have a deep desire to share the love of Christ to others.

“I have been helped personally to grow in the Word. I am really equipped to bring about changes in church.”

“I have grown in reflecting on the word of God, specifically in knowing how to prepare and preach and study the Word.”

(data sources: Andy Schmid – Blog Post 11.23.10 & Appendix 6. MTP mLearning system).

The video-testimonials were posted on the TCN Technology Office website.

¹⁴ These details are slightly different than the ones reported by the East African Newspaper (5.26.11) that interviewed a member of the seminary’s IT department who stated “60% of the students who attended lessons completed the course compared to 100% of those under the mLearning pilot.”

Author's Note: I reviewed one of the interviews and found at the beginning of the taped interview, the participant is asked 'Is it ok is if we use your video for both helping us to learn how to improve the program and also for sharing it with people that are involved in the program?' The participant confirms 'Yes' (data source: RJ 2.9.12). As a researcher, I believed it was important to know if these informants were knowledgeable about how their video-testimonials might be used.

Specific accounts from some of these testimonials were selected, by Andy, to be used in our mLearning demo course for the purpose of explaining how these students perceived the advantages of mLearning.

Andy kept a web-blog of his experiences with the MTP deployment. He wrote on May 28, 2011 the following entry about his interviews (Organizational Document 4.6):

They took the final exams for the MTP course and told us about how their ministries changed as a result of the class and how they had grown spiritually through it. John said that he was so grateful for the class because he could not afford to pay for training at a seminary and couldn't leave his ministry and family. He is a perfect example of why we developed this type of training.

Organizational Document 4.6 Andy's Blog Post (data source: Andy Schmid – Blog Post 5.28.11)

The MTP, while prior to my participant-observation, was used to inform many of our initial decisions over TOOLS, SUBJECTS, RULES, and the overall OBJECT we were to produce (mLearning Demo app). These decisions are described in later sections of this chapter.

TCN's historical context shows an organization that has continued to grow over the past 60 years and with their growth they have adopted emergent technology to support their organizational and departmental goals. TCN's technology adoption included film, satellite communications, and the Internet, each became routinized, the final stage of the organizational innovation process (Rogers, 2003), within TCN's organizational activities as ongoing elements employed to achieve TCN's goal: Christian evangelism. Each technology appears to have

contributed to the growth of global communication and learning networks that have supported TCN's growth and mission and now mLearning adoption will be richly described through stage of the organizational innovation process (Rogers, 2003), and AT frameworks (Engeström, 2001).

TCN Context Summary.

Prior to my participant-observation activities, data were gathered through socio-cultural, economic, and historical lenses to explore TCN's organizational activities. Anecdotal stories on branding, media use, and initial attempts at mLearning, suggested adoption of innovation examples that helped achieve TCN's goal to support Christian evangelism (GOAL). The story of re-branding TCN through a new name that appropriately reflected the organization's goal demonstrated the organization's ability to adopt a critical change across an international organization while maintaining, and perhaps bolstering, its connectedness as a social-cultural group. The anecdotal stories of TCN's historical use of media to support their work suggested that TCN regularly adopted new TOOLS to support their organizational GOAL. Through adoption of emerging technologies, TCN had demonstrated their flexibility, and competencies, to learn and adjust to their target audience's needs, perceptions, and goals.

The story about the first mLearning effort spoke to the engagement of individuals at TCN in exploring the adoption of new tools to accomplish the organization's goals. In this example informants shared additional stories about the processes to accomplish smaller objectives in pursuit of mLearning including seeking financial and infrastructure support to reach a target audience. The account of adoption of film as a medium to evangelize (a form of training) as well as accounts of the initial mLearning effort demonstrated TCN's desire to use technology, like mLearning, to "change training" (data source: Andy Schmid – Interview 2.10.12).

The initial context data presented in this section and the following sections were examined through the Activity Theory critical lens, which supported a deeper understanding of TCN's history of adoption. From this context section I will transition to an analysis of mLearning adoption at TCN that I experienced as a participant-observer, through the stages of adoption that I experienced at TCN.

My entrance into TCN as a participant-observation research experience.

I learned more of TCN's mLearning MTP efforts as they were gaining outside attention in some social networking areas that I am connected to. On one instructional design site I follow, I found an online article of interest that highlighted the growing success of the *YouVersion Bible App*. According to the article, the app's success defined by its large number of downloads (1 out of 17 smartphones) and minutes of usage (11 billion), (data source: instructional design site article written on December 1, 2011)¹⁵. Additionally, the article reported that the *YouVersion Bible App*'s design, flow, and content for a specified target audience (Christian smartphone users) was paramount to the app's success.

Author's Note: I have not given more citational reference to the above mentioned article since it would lead the reader directly to the organization I have confidentially identified as TCN (data source: RJ 2.28.12). As a member of the target audience (Christian smartphone users) who had also previously downloaded the app discussed, I was intrigued by it's success. I had been exploring mobile learning as a possible research area to focus on for my dissertation.

As I continued to read the article I found an additional post in the comments by one of the business's employees named Adam B. dated December 19, 2011 (Figure 4.6).

¹⁵ No further citation is given since it would lead directly to TCN's actual, confidential identity.

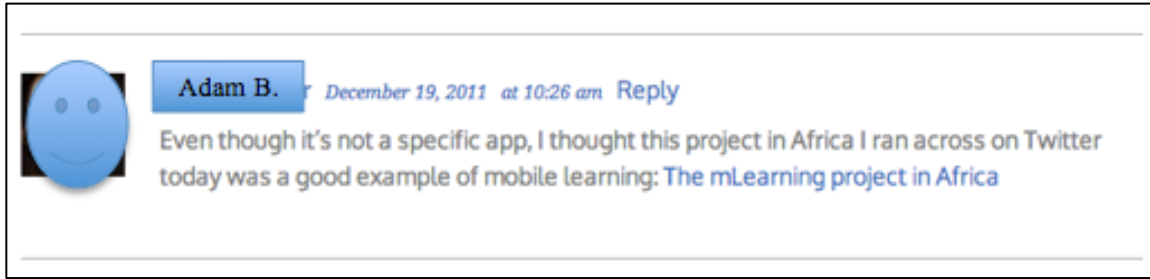


Figure 4.6 Adam B. 's Tweet 12.19.11

Adam B. mentioned a “good example of mobile learning” that he saw on twitter and he provided a link to TCN’s MTP. On January 14, 2012 I followed Adam B. ’s link, which led to a webpage about the MTP run by TCN’s Technology Office. I believed that at TCN there was the possibility for research on mLearning and organizational adoption. On January 30, 2012 I emailed the TCN Technology Office’s generic email address (data source: Micah Shippee - Email 1.30.12) In the email I introduced myself as a fellow Christian (insider), an instructional designer, and an interested researcher (Figure 4.7).

Dear mLearning-Project Coordinators,

I stumbled on your project while reviewing mLearning research. As a born again Christian and PhD student (dissertation focus: mLearning) I'm fascinated in your project. What a powerful way to stand in the gap, I pray the Lord adds the increase.

Presently, I'm studying Instructional Design, Development, and Evaluation at Syracuse University (upstate NY). My research focuses on using mobile technology to improve instructional practice. I'd love to know more about your project and how I might potentially be involved as a participant and/or researcher.

thank you for your time, I look forward to speaking with you more on this,

Micah Shippee

Figure 4.7 Micah 's Introduction (data source: Micah Shippee - Email 1.30.12)

Author's Note: Due to my status as an insider, in anthropological terms an 'emic,' I was able to engage in this study as a participant-observer. My shared belief system allowed access to TCN.

Within four days I received an email response from Andy Schmid, a project manager at the Technology Office, (data source: Andy Schmid - Email 2.3.12) with Laurin Graves (another project manager) Cc'd on the email (Figure 4.8).

Micah,

Thanks for contacting us. I'm sorry it took me a few days to reply.

There are several opportunities where you might be able to participate in what we are doing. I just talked to one of our staff members today who may want to develop a community leadership training program for some parts of French-speaking Africa. She understands the need for instructional design but does not have any personal skills to accomplish this. The group I work with focuses on the technology rather than instructional design. So people like you are still missing from our mix.

Would you have some time toward the end of next week to talk more? If so, would 11:00 am EST work for a call next week (2/9)?

In the mean time you can see some of what we have been doing here:
<http://xxxxxxxxx.TCN.org/projects/the-mlearning-project/>
<http://xxxxxxxxx.TCN.org/category/project-activity/project-mlearning/>

Let me know your thoughts.

Andy

Figure 4.8 Andy Schmid Email 2.3.12.

Andy's email led to our follow up phone call on 2.10.12. During our phone call Andy described his excitement over mLearning as a way to "change training at TCN" and a method to "quickly produce mobile learning courses and content." He described how Dr. Buck had completed his PhD dissertation through work with the Technology Office and the MTP. Andy felt that there would be opportunities for an instructional designer, like myself, to engage in multiple projects

at TCN. He offered to connect me with various departments that could use my skill set. I accepted and agreed to serve as a volunteer instructional designer in TCN's Technology Office.

My role at TCN as an instructional designer and researcher.

In my role as instructional designer, I created wireframes of app layouts complete with sample content, I designed mLearning strategies/activities for existing content, and I was engaged in the team communications through email and conference calls. Additionally my on-site experiences allowed for face-to-face strategy meetings with the project team, the Technology Office staff, and various TCN department staff and decision makers. These opportunities allowed for a rich participant-observation experience with the Technology Office.

The Technology Office was the primary point of contact for my work. In their role as project managers the staff connected me with subject matter experts related to my work as a volunteer instructional designer. Participants worked with me, both on- and off-site, for one year, January 30, 2012, to January 30, 2013.

Our work generated data in the form of shared cloud documents, email communications, group and individual phone calls (with memos and notes), and video lesson segments. During the year I collected data both off-site and while the entire project team was together on-site for one week during April 9-13, 2012.

As previously suggested (Chapter 2), adoption of innovation is likely to occur in five stages of adoption: agenda setting, matching, redefining/restructuring, clarifying, and routinizing (Rogers, 2003). TCN's Technology Office presented me with an example of an organization involved in the adoption of a new technology, mLearning. What follows is a description of the results of this study focused on the mLearning demo course project at TCN.

I describe my observations as I both participated as a stakeholder in the development of an mLearning product and as an observer of the adoption process at TCN. This included observations about how the Technology Office was situated and operated within TCN, how the stakeholders interacted to reach their/our objective, and other observations related to accomplishing TCN’s goals. Within the study context there were three major informants (Technology Office Informants Table 4.1)

Table 4.1 Technology Office Informants Table

SUBJECT	Team Role	Motivation	Relevant Prior Experience	Perception of Project
Andy Schmidt	Initial Project Manager & Subject Matter Expert	Wanted to replicated positive experience with MTP	Member of the Technology Office who had past successful experiences with mLearning (MTP).	Explored in Stage One
Laurin Graves	2nd Project Manager	Explored in Stage One	Experienced in eLearning and multiple web applications.	Explored in Stage One
Nick Tred	3rd Project Manager	Explored in Stage 3	Experienced in traditional video production.	Explored in Stage 3

The next section in this study will discuss stage one of organizational adoption called agenda setting, which involves the initial activity of adoption at TCN.

Initiation - Stage One: Agenda Setting for the mLearning project

From the initial context data gathered to provide a preliminary contextual understanding of TCN (as presented in the previous chapter) I found TCN’s ability to rebrand itself to be an indicator of their ability to adopt change in order to more effectively achieve their GOAL. Specifically as the

US departments adopted the new organization title after the international organizations had embraced it. Additionally, TCN's adoption of various emergent technologies (TOOLS) like film and Internet, exemplified a culture (COMMUNITY, DIVISION OF LABOR, flexible RULES) willing to explore and deploy, or adopt, new methods they perceived as better able to meet the needs of their target audiences and fulfill the organizations' overall mission of educating and evangelizing.

Now as a participant-observer, I worked as a volunteer instructional designer with TCN's Technology Office with the task of supporting the design and development of an mLearning demo course that could be used to help other departments and ministries in the process of adopting mLearning. As a researcher I examined the adoption of innovation process stages and my specific experiences and environmental settings using the Activity Theory (AT) framework. Through the AT lens I sought to describe activities and interactions throughout the project initiatives while revealing changes, or contradictions, during each of the stages of innovation. These observations were focused on exploring my research questions through our work at TCN, including:

- How does an organization progress through the mLearning adoption process? (Q1)
- How does an organization engage in mLearning initiatives at different adoption stages? (Q2).

To understand the organizational adoption process (Q1), I describe how TCN engages in the adoption of mLearning through the design and development (Q2) of their own mLearning demo-product within their technology solutions department. I report on the contextual factors within the organization and department that inform the demo-product's adoption.

Each of the following stage sections will describe TCN's organizational adoption process. Each is analyzed first by how the events fit within the organizational innovation process and second by how the AT system functioned at each stage. The analysis of the AT system at each stage will follow the six-steps previously presented in the literature review as developed by Jonassen and Rohrer-Murphy (1999): (1) clarify the purpose of the activity system, and understand the subject and the relevant context in which activities occur, (2) analyze the activity system, defining in depth the components (subjects, objects, community, rules, and divisions of labor), (3) analyze the activity structure, defining the activity by decomposing it into types of components and operations, (4) analyze the tools, focusing on those that provide direct and indirect communication among subject, community and object, (5) analyze the internal subject-driven context bounds that are essential to the dynamics that exist among the components of the Activity Theory framework and (6) analyze the activity theory dynamics, which requires stepping back from the system described and assessing how components affect each other (analysis of the interrelationships that exist within the components of the system)

The agenda setting stage (Figure 4.9) occurs when an innovation is initially identified to fit a perceived need. This stage consisted of (a) identifying and prioritizing needs that existed at the Technology Office; and (b) searching TCN's environment to locate innovations of potential usefulness to meet these needs.

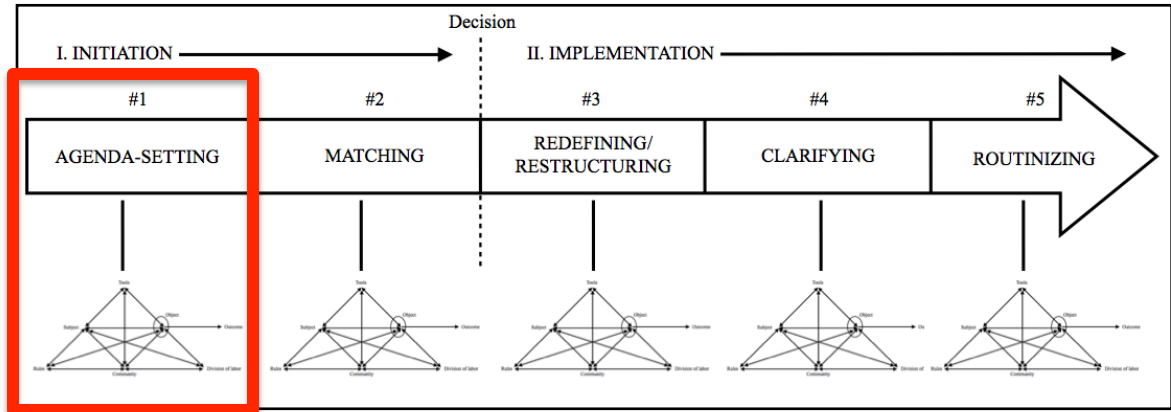


Figure 4.9 Activity in the organizational innovation process

The focus of the Technology Office was to support TCN departments with relevant technological solutions. In an article written by Laurin Tome, Laurin maintained that the Technology Office was tasked, by their VP, to support TCN staff now, and in the future, specifically the VP said:

“Building capacity is like building the road so that the fast cars can run. . . In one sense, we continue to pay attention to what our staff and our department needs, but on another side, we want to be proactive for coming needs. Where should we build the road so the departments can run fast?” (data source: Organizational Document 5.1 Laurin Graves article 3.27.13).

The Technology Office was in stage one of mLearning adoption since they had perceived success with the MTP (data source: The Technology Office Website: ‘The mLearning Project’ Blog Post accessed 1.30.12) and now, as developed in this chapter, they were trying to identify mLearning’s usefulness for other TCN departments. This goal articulated itself in the initiative to develop an mLearning demo-product that would explain how other departments might leverage this emergent mobile technology.

Step 1: Clarification of the purpose of the activity system.

In step 1, the activity system is analyzed to understand relevant contexts within which the activities occur and to understand the informants' motivations and interpretations of what they perceive they need to accomplish.

Based on the success of the MTP, an mLearning course with missionaries in Africa, the Technology office staff were beginning to perceive a new part of their role was to support mLearning activities. Evidence of this was from a conversation with Andy (data source: Andy Schmid - Interview 2.10.12) who referenced several opportunities at TCN (Organizational Document 5.1 mLearning Project Dashboard) to participate in mLearning initiatives. These initiative and specifics of the work involved by the Technology Office would become clearer over the next month. According to Andy, these opportunities were a result of news that the MTP mLearning coursework for missionaries was drawing interest from the TCN community. He noted that various staff and departments from within TCN were already coming to the Technology Office with requests for help on mobile solutions to combat educational issues arising from problems with time and space. The proposed projects were outlined by Andy in the projects document titled "mLearning Projects Dashboard" (Organizational Document 4.7).

1. MTP trial phase (2400 students) coming to conclusion in March/April 2012.
2. MTP French Translation and transfer content to Knowledgey's new learning management system (LMS) by May 2012.
3. MTP course addition operated by East African Seminary totally independent of the Technology Office.
4. Moodle as a mobile delivery system for courses in the Philippines since Knowledgey's new LMS development schedule was now delayed.
5. "Churches All Over the World" (CAOW) would like to prototype some content for mobile delivery to help support their church planting and pastor training efforts.
6. "TCN High" had an android app developed in 2011 by Knowledgey to promote their high school content. The Technology Office needed to investigate the ongoing use of this app and if it is still wanted. Possible future iterations might look the app called "This is me," an inspirational testimonial app used to share how people became Christians.
7. "Daily Devotionals" would like a mobile application that would combine their video content with questions, reflections, discussions, and life-applications.
8. "Conversation Starter Films" (CSF) would like a mobile app to help support conversations which follow their films.
9. "Christian Workforce Initiative" (CWI) had spoken to Andy on 2.3.12 and would like to explore mLearning possibilities in more detail. (Andy highlighted this project with bold lettering that read "Most likely to use Instructional Design help first!")
10. "Leader Growth USA" wanted to develop a mobile staff training app.
11. Andy believed that the Technology Office needed to develop an "mLearning Demo App" in order to help other TCN departments understand how mobile technology might be used to help them deliver content.

Organizational Document 4.7 mLearning Projects Dashboard

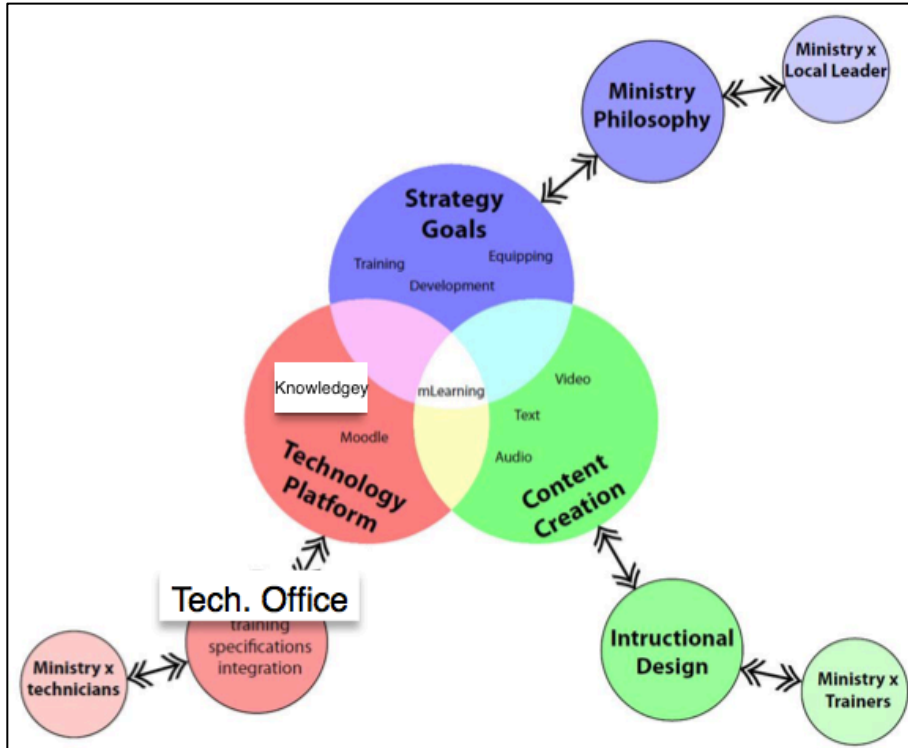
The MTP projects listed were further iterations of the mobile learning initiative explored in the previous section. The CWI, and mLearning Demo App will be explored more in the sections that follow. Through Andy, TCN's Technology Office offered me an opportunity to observe and take part in their ongoing experience with mobile technology.

The final item on Andy's list identifies the motivation for our work. According to the data presented in this step, the initial need (Agenda Setting) is clarified (Step 1) as: an mLearning Demo App was necessary to help other departments understand how mobile technology might help them deliver content.

Step 2: Analysis of the Activity System.

In step 2, the activity system is more fully described through the defining of the SUBJECTS, RULES in which the group operates, the DIVISION OF LABOR that informs how they understand their roles, how the COMMUNITY(s) is involved view the tasks, the GOAL that motivate the subjects, the expected outcome of the activity (OBJECT) and how the members of the activity system communicate, interact, and resolve contradictions and conflicts.





Rules. Andy Schmid reiterated with me, that the philosophy of the Technology Office was to operate within a system that “consolidated the complexity and distributed the control” (data source: Andy Schmid - Skype Audio Only 3.13.12). Through Andy’s “three circles” illustration (Organizational Document 4.8) he explained that the Technology Office believed in local, department-level, ownership of content, with support for development and deployment. Like the Technology Office’s experience with the EAS and the MTP (data sources: The Technology Office Website: ‘The mLearning Project’ Blog Post accessed 1.30.12 & Andy Schmid – Blog Post 7.10 ‘The mLearning Project’). Andy viewed the Technology Office’s role as that of a department which delivered clear technological solutions (like mLearning) to other departments that would then use their own SME’s and content management strategies to ‘control’ what content was delivered to their target audiences (data source: Andy Schmid - Skype Audio Only 3.13.12).



Organizational Document 4.8 Three Circles (data source: Appendix 7. MTP Introduction)

Andy further explained, mLearning is the intersection of the three circles that make up the triple-venn diagram (also found on slides 17-19 in Appendix 7. MTP Introduction), and the other departments will also contribute to a project’s success. The triple-venn diagram illustrates the Technology Office’s actions and activities used to mediate their process (RULES) of technological solutions. Specifically, training specifications integration in a technology platform.

Division of Labor. The Ministry Department provides guidance as the ‘Strategy Leader’ while its staff provides content as subject matter experts (SMEs). In his MTP Introduction slides (data source: Appendix 7. MTP Introduction) Andy referred to SMEs as ‘Content and Curriculum Creators.’ The ‘Technology Manager’ provides a platform for deployment of the content. Andy illustrated these points with a product showcase slideshow (data source: Appendix 7. MTP Introduction) specifically slides 20-23 shown below (Organizational Document 4.9).

<h3>Strategy Leader's Role</h3> <ul style="list-style-type: none"> • Prioritize the project • Call together a team to form a plan • Participate on team to form a plan <ul style="list-style-type: none"> – Get Content and Technology approval to confirm Leadership sub-plan. E.g. Can we build a course with our current funding? Can we build this course with our timeframe constraints? • Follow up to make sure the plan is being carried out • Learn from project participants how to improve program  <p>20</p>	<h3>Content & Curr. Creator's Role</h3> <ul style="list-style-type: none"> • Participate on team to form a plan <ul style="list-style-type: none"> – Get Strategy Leader and Technology approval for new material production sub-plan. E.g. We need remote testing centers. Can we develop these? • Bring together subject experts and course design experts to produce new material or gather existing. • Test material on students • Learn from students how to improve the content and curriculum  <p>21</p>
<h3>Technology Manager's Role</h3> <ul style="list-style-type: none"> • Participate on team to form a plan <ul style="list-style-type: none"> • Get Strategy Leader and Content approval for new technology production sub-plan. E.g. Will this quiz feature meet the need for proper assessment? • Manage the technology development plan • Bring together technical experts to configure the technical services and software • Test the technology to ensure it works. • Learn from students how to improve the system  <p>22</p>	<h3>Overall Process</h3> <ul style="list-style-type: none"> • Form a plan, work the plan, improve the program • Each partner has limitations : <ul style="list-style-type: none"> – Strategy Leader : resources – Content Creator : time, [talent], money – Technology Mgr: time, [talent], money, worldwide state of technology development  <p>23</p>

Organizational Document 4.9 MTP Slides 20-23 (data source: Appendix 7. MTP Introduction)

Andy further explained that time and money are shared by departments through strategy leaders, SMEs, and the Technology Office. Other sources of funding are found in private donations to the individual departments or the Technology Office. Private donations came in multiple forms, for example, one SME, Sharon Richards was working to get outside funding from Christian business leaders for mobile phones to be used in her project (CWI referenced later in this study).

The TCN website explained that the annual budget is allocated to the Technology Office for project development and explained their specialization in several ‘products.’ These include a) Google search support, b) free website building support, c) identity management for TCN online resources, and d) a social management program to track communication with ministry

supporters, e) mobile learning (data source: Global Operation home website accessed 4.8.14).

The specializations of the Technology Office demonstrated how they were invested in the adoption of technology throughout TCN's departments.

Community. In the Technology Office the dozen or so staff members I met, or heard about, during my time with TCN were world travelers with international experiences and stories memorialized by various knick-knacks around their cubicles. Multiple participants would eventually contribute directly and indirectly to my understanding of TCN as an organization engaged in technology adoption. At the agenda-setting stage, Andy Schmid was the primary contributor to my understanding of TCN's adoption process and the COMMUNITY that we would operate in. For example, Andy's MTP experience from January 2012 on was modified when he reported on January 4, 2012 "Today we confirmed our training dates for the coordinators who will be facilitating the mobile phone missionary training. Looks like two people from our team will conduct two days of training in East Africa. It looks like I probably won't be going on this trip" ...due to a family matter. (data source: Andy Schmid - Blog Post 1.4.12). One day later he reported the advantage of sending other team members to work on this project "This will increase the number of people on our team who can lead other mobile phone training projects in the future." (data source: Andy Schmid - Blog Post 1.5.12). The hands on experience of supporting mobile learning deployment was particularly meaningful to Andy, he reflected on this in his blog looking back at one year (November 2011- November 2012) "God blesses us so much... and the team I work directly with filled in on things I couldn't do because I couldn't travel." additionally he wrote "I didn't miss traveling like I expected." (data source: Andy Schmid - Blog Post 11.6.12). Additional participants will be introduced as the case study unfolds.

Subjects. Andy Schmid is a white male in his mid-40s. He lives in the southern U.S. with his wife and two young adult children. Andy has been a project manager on multiple Technology Office initiatives including the MTP, a mobile learning project. In this study Andy served as both an initial PM and SME (on mobile learning). Andy was my initial contact and quickly brought me into the Technology Office project scene. His enthusiastic and energetic mannerisms are manifest in his big picture, rather than a detail oriented, leadership approach as evidenced in Stage 2 where he mentors Lauren Graves.

Author's Note: I believed that Andy was the *champion* of the mobile learning efforts at TCN. His past experience with MTP and the level of enthusiasm with which he discussed the work we were engaged in appeared to identify Andy as the primary proponent of the coming project's success. Roger (2003) explained that a champion's role is to initiate the innovation process and to guide the new idea through to approval and implementation. Andy maintained a public blog that provided more context to his personal life at the time of mobile adoption at TCN. The blog identifies multiple events in Andy's life that may have affected his ability to serve as the primary champion of the mLearning effort. In July 2011 his wife was diagnosed with cancer, her treatments and surgeries continued through August 2012. My participant-observation experience began January 30, 2012 just two days earlier Andy posted on his wife (Sherry) and her second chemotherapy treatment. (data sources: Andy Schmid – 7.2011-8.2012 and 1.30.12 Blog Posts).

The significance of personal experience outside of the mLearning project may have informed some of Andy's decisions throughout this research study timeline (Sherry would undergo eight total rounds of chemo-therapy and two surgeries).

Goal. Andy Schmid wanted to replicate what he perceived as the successes of the MTP (data source: The Technology Office Website: 'The mLearning Project' Blog Post accessed 1.30.12). In an effort to evaluate the instructional design aspects of the MTP (GOAL) I asked Andy if I could get a copy of the course (data source: Micah Shippee - Email 2.20.12), and in just one day he sent me (via Fed-Ex Express) an SD-card copy of the course to preview. It came complete with instructions for setup on an Android device. Apple mobile devices did not include

an SD reader, which was required to use this 16-gigabyte course. I mentioned to Andy that it would be beneficial to transform the content to audio only to decrease the file size making it easier to access the files through Apple podcasts, Andy disagreed with the recommendation, believing that the video added to the participants' reception of the mLearning product (data source: Team Conference Call – Skype Audio Only 2.28.12).

Author's Note: Andy's use of videotaped lectures was the same initial long-distance educational solution employed by a colleague of mine at my university. As an instructional designer I often would interject my thoughts about how courses were designed and perhaps how, in my opinion, they might be more efficient. I believed that Andy's own data, reported later on in the form of 4 testimonials, supported my argument for audio-only recordings. (data source: RJ 2.14.12).

In an effort to focus on the areas of mLearning that motivated Andy (GOAL), he selected the four MTP participant interviews for us to review in the development of our mLearning demo app and in an evaluative manner to understand how Andy perceived why and how mLearning is successful (GOAL). Andy shared their transcriptions via email (data source: Andy Schmid - Email 4.10.12) and from the transcriptions he highlighted the following excerpts:

Participant 1. I could learn at my own time. For example, I could go for a meeting at the church and if people were late I could pick up my phone and listen to a lesson. It is according to my time frame, and according to my work, and I was able to organize myself.

Participant 2. Top of the list would be the phone! It's a really cool gadget. I have desired to have one like this one for a long time. Also the flexibility. I could listen to my lessons while riding on the matatu (bus). A few times when driving home I would put up the headphones and learn that way. I have really enjoyed learning that way. Basically this has multiplied my time.

Participant 3. One key thing is the flexibility. I can listen as I travel and work around the home. That flexibility is so good. Because of work you may not have time to sit and do studies.

Participant 4. I liked doing the learning at my own time. Being in full-time ministry meant for me to do. . . that doing classes I would have to slot in that hour, 7 to 8,

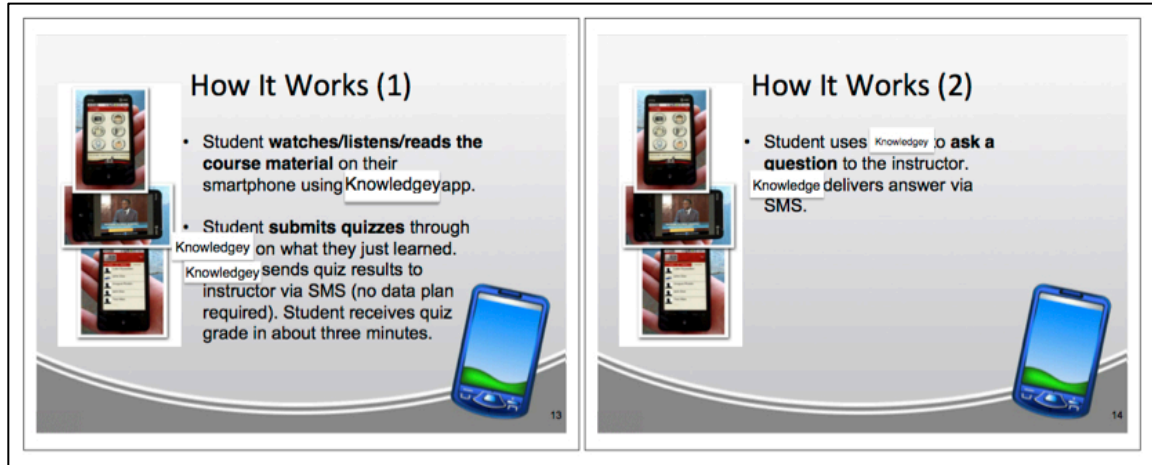
otherwise would mean I would have to take it during times when I do my ministry work. and . . .that is when I am doing my ministry. mLearning is a plus because I get to plan when it is that I do my lessons. I can plan for anytime, even on the weekends. That worked well so much for me. Because I did it at my own pace I found it worked very well for me... All I had to do was make sure I completed each level in the stipulated time.

Author's Note: The accounts provided by Andy highlighted themes of access, regardless of time and place. As a team we would reference a major mLearning affordance being the access to content "anytime, anywhere" (data source: RJ 4.10.12).

Object. The four accounts, selected by Andy, demonstrated his perceived value of mLearning as articulated by the selected participants. He revealed his expectations for future mLearning projects by volunteering these examples (data source: RR 3.6.13). I did not review all of the other interviews nor did I ask if all interviews (including negative reactions) were reviewed by Andy. From these excerpts Andy demonstrated his belief that convenience and flexibility of time and place were the most valuable experience from mLearning users.

Each time Andy spoke to me about this project, and potential projects, I perceived he spoke with great enthusiasm, often smiling and speaking at a fast, excited rate. Skype video and face-to-face conversations revealed Andy's infectious smile and energetic discourse on the project's direction. Andy's enthusiasm and motivation to work with mLearning projects led me to believe that I was beginning to participate in another successful project.

In step 2, Andy focused the project on the concept of the Technology Office (SUBJECTS) preparing a way for TCN SMEs (SUBJECTS and COMMUNITY) to disseminate their content (OBJECT). Andy prepared a summary of the project to motivate (GOAL) other TCN departments which included "How It Works" (Organizational Document 4.10) slide 13-14 below (data source: Appendix 7. MTP Introduction).



Organizational Document 4.10 MTP Slides 13-14 “How It Works” (data source: Appendix 7. MTP Introduction)

The MTP Introduction slides combined with Andy’s account of ‘Matthew, the Missionary’ were posted on the Technology Office’s website and used to describe the impact mLearning was making, and could make, on participants throughout TCN. Additionally, in step 2, contradictions over effective and efficient use of media (video versus audio-only lectures) were highlighted but in the end the project manager (PM), Andy Schmid, made the final decision to retain the use of video in the mLearning demo course plan.

Step 3: Analysis of the Activity Structure.

In step 3, the activity system’s actual work is described. This is a shift from step 2 where the perceived work is discussed to an explanation of transforming project objectives (OBJECT), roles of the SUBJECTS and DIVISION OF LABOR to the actual activities of the mLearning initiative.

Division of Labor. By late February 2012, our project team had grown to include Andy Schmid, Laurin Graves, Myself, and Aaron Crescent (data sources: Andy Schmid – Email 2.13.12 & Andy Schmid – Interview 2.24.12). Aaron, the newest member was experienced in

video production in the private sector (data source: Team Conference Call – 2.28.12). As a team we set about focusing the project’s objectives through conference calls and emails. Andy wrote Aaron and I “For the last 11 months we have discussed the need for a ‘demo’ course and a ‘how to’ course for our mLearning Project” (data source: Andy Schmid – Email 2.13.12). In reply, I responded: “Perhaps both could be the same project? A demo course that covers mLearning?” (data source: Micah Shippee – Email 2.13.12). Aaron concluded:

“Mica does have a point – we need a ‘production statement’ for the demo course. But in the end, I would advocate making the focus of the demo something that is not about the technology but is instead presents a practical element usable for Christians who speak English worldwide. That way we can showcase the strengths of the media form to our audience. Then, they’ll be much more likely to see the relevance of the skills they will learn in the ‘how to’ course applied in their particular setting.” (data source: Aaron Crescent – Email 2.16.12).

Our team would continue these types of conversations throughout Stage 1 – Agenda Setting as we tried to identify how our mLearning course might be structured.

Subjects. Andy and I spoke on the phone about the status of the Technology Office’s mLearning efforts (data source: Andy Schmid – Interview 2.24.12). Using Knowledgey’s LMS, the plan was to create a system where TCN’s SMEs could enter their own content and it would be delivered through a mobile interface.

Object. Andy reported that since the success of the first trial run of the MTP, the Technology Office (COMMUNITY) had been discussing the need to create an mLearning introductory course (GOAL) (data source: Andy Schmid – Email 2.13.12). Andy stated that he and the Technology Office team found that “motivation shoots up” when their users (target audience) are handed a phone with an mLearning course (GOAL) on it (data source: Andy Schmid - Phone interview 2.10.12). Andy wanted this experience replicated in the mLearning Demo App. The target audience would consist of decision makers, strategy leaders, and

practitioners (COMMUNITY) from all over TCN who were coming to TCN headquarters in June 2012. The Technology Office decided that an mLearning Demo course app (Organizational Document 4.11) could convey a concise understanding of mLearning in their strategy meetings.

mLearning Demo App

1. High-level conceptual understand mobile learning
2. Tutorial on how to build a course in Knowledgegey's LMS
3. Market with high quality published content -
_____ And past examples of TCN -produced content. (Increases efficiency of
production)
4. PR through _____ TCN _____. Influence and PR. E.g. send a demo phone to every PM & Allstaff
email list. _____ TCN Magazine.

Organizational Document 4.11 mLearning Demo App project original plan

The course would explain mLearning as a concept to other departments through a “demo” and “how to” tutorial on building an mLearning course. Andy and Laurin decided that the app would take on the structure of two courses: One, the “demo” course would provide decision makers and strategy leaders with an understanding of the broader concepts in mLearning; and two, the “how to” course would target the actual future course producers. They did not expound on the process of coming to decide on this course structure but Andy explained that this design was based on his experiences with the East African Seminary (EAS) and the needs of the staff there.

In Step 3, the project team (SUBJECTS) began to transform the project’s objectives which would soon be turned into actionable activities.

Step 4: Analysis of the Mediators.

In step 4, the TOOLS used are described specifically. Their availability and change over time is explained. Also, this step explores any changes in roles and RULES in the activity system.

Tools. This course would use Knowledgey’s learning management system, called “iPub,” that MTP had used as the Technology Office had a contract with Knowledgey (data source: Team Conference Call 2.28.12). Dr. Buck emailed myself, Andy, and Nick, a future team member, to explain the features of iPub (Figure 4.10).

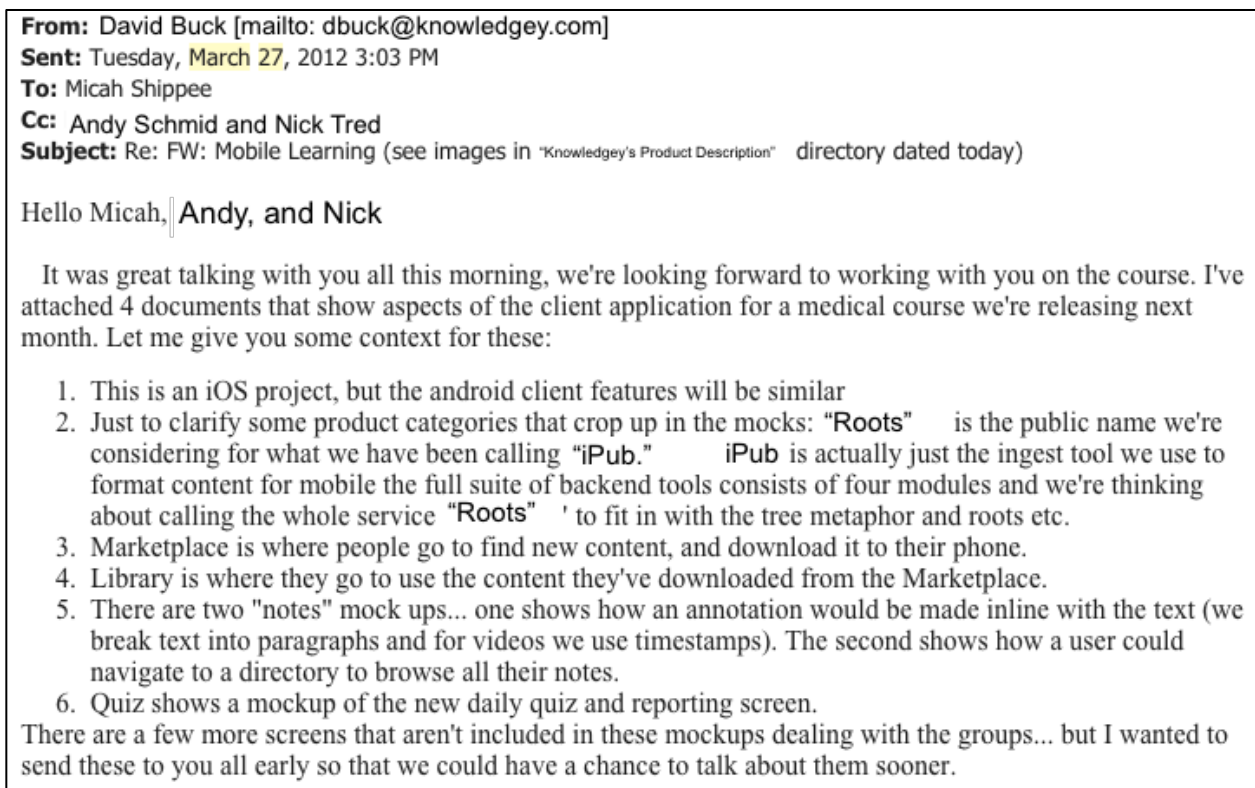


Figure 4.10 Features of Knowledge’s iPub LMS (data source: Dr. Buck – Email 3.27.12)

iPub was the original plan, but looked promising for our project.

Rules. iPub allowed subject matter experts (SMEs) to enter their own content into a database and select its uses for their learners but Knowledgey would have to push-out the content. A key feature promoted in the update app, Roots, was that SMEs could enter content that would be automatically formatted for mobile (data source: Dr. Buck – Email 3.27.12 & Team Conference Call – 3.21.12). Andy blogged “This new software will make it possible for non-technical people to publish their own mobile learning course for smartphones or tablets.”

(data source: Andy Schmid - Blog Post 2.10.12). Knowledgy's iPub system required manual installation on each phone as reported by Andy:

“We will ship another 1800 blank memory chips, along with two mass duplicators, to the program coordinators in East Africa. It is these memory chips which hold the content that each missionary-in-training will go through during their training. Without an Android smartphone, though, these memory chips are useless. Each one must be installed into a phone and activated before the training course will be available on the student-missionaries phone.” (data source: Andy Schmid - Blog Post 1.10.12).

Since the launch of the MTP, Knowledgy had been working to update their learning management system (LMS) and would deploy the new release (Roots) with the demo app.

Author's Note: It was unclear to me how this would be released. Early on I explained to the team (in later stages) that iOS and Android platforms should both be considered. Further, I explained that an “app” installed via an “app store” online would be significantly more efficient than the SD-replicator method employed in the MTP (data source: RJ 3.13.12).

In step 4, Knowledgy's iPub (TOOL) was identified as presently within the organization (Agenda Setting), under contract, that would meet the need of delivering mLearning. The potential for the Roots app (TOOL) was to change the way SMEs could update content (RULES) giving them more control.

Step 5: Analysis of the context.

In step 5, the activity system's SUBJECTS are analyzed to develop their beliefs about the project as well as the methods and TOOLS they find useful in the project's development. This step continues to describe the DIVISION OF LABOR as it may shift over time.

Subjects. Andy had described Dr. Buck as “purpose driven more than profit driven” (data source: Andy Schmid – Interview 2.24.12). In Dr. Buck’s email to the team he used language like: *will be, we’re trying to, intended, and we’re considering,* (data source: Dr. Buck – Email 3.27.12) early on in the mLearning design and development process these were connected to exciting promises, but a few months later these types of words were still being used.

Andy’s belief about the project were exemplified in the mLearning app vision he wrote “cast a vision for mLearning... primarily for stimulation within TCN” (data source: Team Conference Call 2.28.12).

Tools. Unlike the MTP, the mLearning demo course app was to be developed for native installation, meaning not web based, all data would be stored locally on Apple and Android devices (data source: Team Conference Call 2.28.12). The intent was to maximize the applicability of the affordances to many audiences using their own device with or without cellular service. Much of the work at this point was in trying to focus our direction on the project, however we did identify the need for video production (data source: Team Conference Call 2.28.12). Additionally, we all agreed to watch several ‘Common Craft’ videos, that depicted a simple narration over stills and stop motion animation, as possible model for our video production (data source: Team Conference Call 2.28.12).

Division of Labor. The project was due to be completed by June 2012, six months after I began discussing it with Andy. Andy’s direction and insights led me to believe that he would serve as project manager (PM) based on his MTP experience and I would serve as instructional designer (ID) based on my studies. We would share responsibility as subject matter experts (SMEs) to develop relevant content. Knowledgey’s software developers would transform our content for a mobile platform.

In step 5, the project team (SUBJECTS) interacted in an to attempt to visualize what our end product might look like through Knowledgy's iPub (TOOLS and DIVISION OF LABOR). Each of these steps would take on greater detail in future stages of this study.

Step 6: Analysis of Activity System Dynamics.

In step 6, the final step, the interaction of the components of the system are examined to reveal any contradictions or inconsistencies, specifically, contradictions within the needs of the target audience and the objectives of the project. Additionally, in this step historical factors examining past practice are described.

Andy Schmid explained the objectives of the project in an email focusing on the need for an mLearning demo course app as it related to the target audience:

“So far, when we have needed to speak to each of these two audiences (decision makers and strategy leaders), we made a presentation that helped the audience visualize the possibilities. But whenever we have handed someone an actual mLearning phone and given them the opportunity to work with it themselves, their understanding and motivation shoots up far more quickly. We'd like to have two demo courses so we can have more experiences like the latter and less like the former.” (data source: Andy Schmid – Email 2.20.12).

Author's Note: I found these expectations directly in alignment with Rogers (2003) research on the innovation-decision process for individuals which included five main steps: (1) Knowledge, (2) Persuasion, (3) Decision, (4) Implementation, and (5) Confirmation. Knowledge refers to exposure to the existence of the innovation and an understanding of how it works. Persuasion is the forming of a favorable attitude toward the innovation. Decision defines the commitment to the adoption. Implementation puts the innovation to use. Confirmation provides reinforcement based on positive outcomes.

The interrelationships involved in delivering the proposed mLearning demo app (OBJECT) are depicted in Figure 4.11.

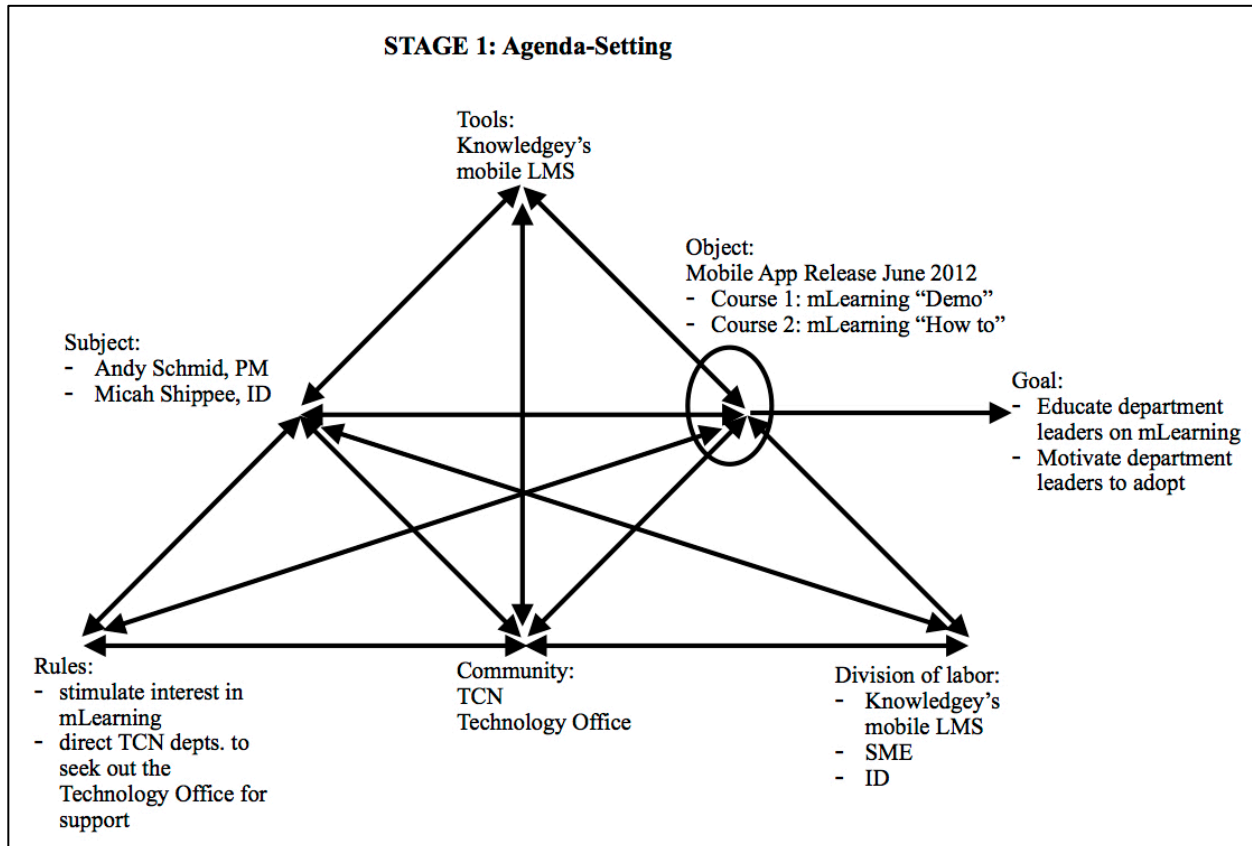


Figure 4.11 Stage 1 Activities

In this agenda-setting stage, mLearning was identified by the Technology Office (COMMUNITY) as a fit for their ongoing directive at TCN (COMMUNITY) as a part of TCN's Global Operations: "to help TCN teams build capacity so that people the world over can know someone who truly is a Christian" (GOAL) (data source: TCN Global Operations website accessed 4.8.14). In building 'capacity' the Technology Office's goal was to "consolidate the complexity; distribute the control" (GOAL) (data source: TCN Global Operations website accessed 4.8.14). With this focus the Technology Office wanted to create a mobile framework (OBJECT), or learning management system, (consolidate the complexity) that would allow

SMEs (DIVISION OF LABOR) to easily enter their own content (distribute the control) for mobile distribution (GOAL). The Technology Office planned to use Knowledgey's for their mLearning efforts (TOOLS). The cultural, economic, and historical factors that made up TCN promoted efforts like that of the Technology Office to further their organizational vision. The Technology Office's perceived success from the deployment of the MTP coursework combined with the growing mLearning Project Dashboard that Andy referenced on 2.10.12 had moved the Technology Office from the agenda-setting stage into the matching stage of initiation in organizational adoption.

In an AT System contradictions occur when SUBJECTS begin to question the established norms (Engeström, 2001). In the Agenda-Setting stage the primary contradiction was over Andy's belief that video production was necessary when I felt that audio-only would suffice (data source: RJ 2.14.12). Andy's own data, the 4 testimonials (participants 1-4), supported my argument for audio-only recordings in that 3 of the 4 testimonial spoke of listening (only) to the lessons and none said anything about the videos (data source: RJ 4.10.12). In retrospect, I should have asked Andy to explain exactly how many (if any) MTP course participants even spoke about the use of video as important. Conversation on this would continue, Andy and future project PMs would continue to support the focus on video production.

Author's Note: I recalled one such conversation with Laurin Graves. She asked what I thought of a feature length film as a mLearning tool on a phone sized screen. She handed me an example on her phone. After a few seconds I told her in my opinion the only users who would watch a lengthy video on such a device were children who were more interested in control and choice over the media than the quality of the viewing experience (data source: RR 4.10.13).

With the transition into the matching stage, my interactions with the Technology Office began to include more informants. These individuals would support my understanding of TCN’s mLearning adoption process.

Initiation - Stage Two: Matching for the mLearning project

In Stage One: Agenda Setting, TCN had initially identified mLearning as an innovation that could fit a need for delivering content to TCN’s various target audiences. TCN’s Technology Office had experienced mLearning through the MTP and in Stage One they began to develop an mLearning demo course plan. The purpose of the demo course was to provide an experiential example of how mLearning would meet the content delivery needs for many of TCN’s departments (data source: Andy Schmid – Email 2.20.12).

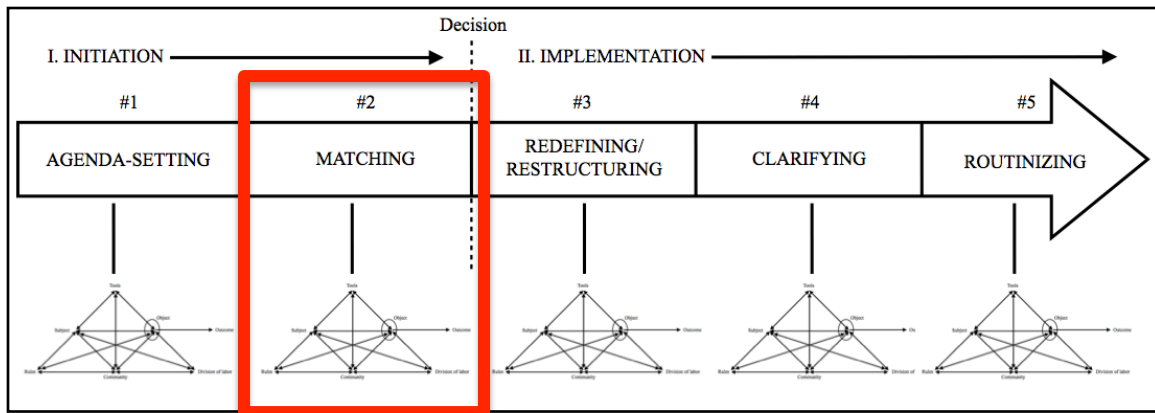


Figure 4.12 Activity in the organizational innovation process

The matching stage (Figure 4.12) occurs when an organization matches an innovation with the problem it wishes to solve—at first on a conceptual level and then on a practical level. Staff members anticipate the benefits and the difficulties that may occur when the innovation is implemented. The organization’s decision makers may conclude that the innovation is a mismatch for the problem; they may then terminate the innovation process (Rogers, 2003).

Step 1: Clarification of the purpose of the activity system.

In step 1, the activity system is analyzed to understand relevant contexts within which the activities occur and to understand the informants motivations and interpretations of what they perceive they need to accomplish.

Stage 2 (Matching) in this study began with the Technology Office's efforts to employ an mLearning LMS that would serve their philosophy, which was to "consolidate the complexity; distribute the control" (GOAL) (data source: TCN Global Operations website accessed 4.8.14). Accordingly, they wished to foster an environment of local ownership of content, with the Technology Office offering support in development and deployment (data source: Andy Schmid - Skype Audio Only 3.13.12). During Stage 2 the mLearning demo-project team evolved to include members with different skill sets that would impact development, and adoption, of mLearning at TCN.

According to the data presented in this step, the mLearning demo course would support the Technology Office's efforts (Matching) specifically (step 1) to support local ownership with Technology Office support.

Step 2: Analysis of the Activity System.

In step 2, the activity system is more described through the defining of the SUBJECTS, RULES in which they operate, the DIVISION OF LABOR that informs how they understand their roles, how the COMMUNITY(s) involved view the task, the GOAL that motivate the subjects, the expected outcome of the activity (OBJECT) and how the members of the activity system communicate and interact.

Subjects. Andy's initial e-mails (data source: Andy Schmid – Emails 2.20.12, 2.28.12, and 3.1.12) included other TCN staff that would become important to the project as time went

on. Andy announced that Laurin Graves would be “coordinating this ‘demo course’ project” (data source: Andy Schmid Email: 2.20.12) and serve as the project lead (data source: Andy Schmid – Email 3.1.12). Laurin was a staff member at the Technology Office with experience in writing and teaching (data source: Team Conference Call – 3.13.12). Additionally, she was leading Technology Office projects around the world (data source: Andy Schmid – Email 2.20.12 and Laurin Graves – Blog Post 1.19.12). On February 28, 2012, the day of our team conference call, Andy sent out an e-mail at 7:58 a.m. that read, “I will contact you by Skype or phone. Laurin will lead the meeting. Talk to you soon. Andy” (data source: Andy Schmid – Email 2.28.12). However, Andy led that particular conference call, at 12:15 p.m., explaining that Laurin had “flu like symptoms” having just returned from working in Africa (data source: RJ 3.13.12). Laurin’s role in the project will be further developed in the study.

Andy introduced me to another team member Aaron Crescent, a video production editor (data source: Team Conference Call – 2.28.12). Aaron owned a computer consulting business and had worked in broadcasting and production in primetime news (data source: Team Conference Call – 2.28.12).. He had also worked on the MTP in the Technology Office (data source: Team Conference Call – 2.28.12). Aaron was already more of a TCN insider than myself, his wife was employed by TCN and the two of them had been involved with TCN activities for several years (data source: Andy Schmid – Interview 2.24.12). For example, Aaron was a director and producer for a nationally broadcasted “Day of Prayer” event in Minnesota (data source: Aaron Crescent – Email 3.8.12). It was at this venue that he worked with AJ Fortune, another volunteer team member introduced later (data sources: Aaron Crescent – Email 3.8.12 and Team Conference Call – 3.13.12).

Tools. Shortly after our conference call Andy emailed the team that the software developer would be the same as the MTP (data source: mLearning Demo Course Project Plan – 2.28.12).

Object. In the conference call and the document Andy described the two courses that we would be creating:

Course 1: “Why Mobile?” the demo course would provide decision makers and strategy leaders with an understanding of the broader concepts in mLearning.

Course 2: “The Making of Why Mobile?” would target the actual future course producers.

Course 1 was to be completed by March 20, 2012, and Course 2, on April 25, 2012. The final testing of the app was set for May 25, 2012. (data sources: Team Conference Call – 2.28.12 and mLearning Demo Course Project Plan – 2.28.12).

The team conference call (2.28.12) was followed by a summative email by Andy (data sources: Andy Schmid – Email 2.28.12) and then by an email (11 minutes later) from John Penny, the VP of Global Operations (where the Technology office department resides) and TCN’s Chief Technology Officer. John said, “Andy, I’m particularly pleased how this Demo Course project is shaping up. It will be very useful to many of us in the mLearning field” (data source: John Penny – Email 2.28.12). This email confirmed that the Global Operations department decision makers accepted mLearning as an innovation worth adopting at TCN and our efforts through the Technology Office continued with more planning.

Community. The May due date would allow the app to be finished for the June 15, 2012, TCN Global Leadership Meeting (data source: mLearning Demo Course Project Plan – 2.28.12). The Global Leadership Meeting would bring together international TCN VPs, department heads,

and decision makers in one centrally located place (data source: mLearning Demo Course Project Plan – 2.28.12).

Goal. The annual TCN Global Leadership Meeting was described by Andy as the best opportunity to get a mobile course into the hands of key decision makers allowing them to better conceptualize this new learning medium and perhaps see how it might be employed in their various departments (data source: Team Conference Call – 2.28.12).

Author's Note: In the call Andy explained that, I was added to the team as a volunteer instructional designer who was looking to do research on mLearning (data source: Team Conference Call – 2.28.12). As a qualitative researcher I was very concerned about transparently conducting myself as a participant-observer. I wanted the participants to see me as a valuable participant (emic) but I felt it was necessary that they understood that I was a researcher (etic) studying mLearning at TCN (data source: RJ 3.6.12). My position as a researcher working on his dissertation was repeatedly explained both by Andy and myself. From our very first phone call, Andy said that my participation as an instructional designer who had been studying instructional design principles was valuable to TCN and the Technology Office (data source: Andy Schmid – Interview 2.10.12). Despite my lack of mobile-learning practitioner experience, I was viewed as the subject matter expert (SME) because of my research on the topic, Andy and Laurin would introduce me as a “mLearning guru” when I was onsite at TCN. Andy told me that he valued my “fresh/outside view” (data source: Andy Schmid - Skype Audio Only Call 3.13.12).

Division of Labor. Andy reported that we (the volunteers) would be responsible for telling him when “too much is too much,” (data sources: Andy Schmid Interview – 2.24.12 and RJ 3.13.12) meaning as we began to assign jobs and tasks to be completed in this project, it was our responsibility as volunteers to let Andy know if we were able to take on the work associated with those jobs and tasks. Andy repeatedly expressed gratitude for our volunteer efforts and tried to maximize our usefulness without driving us away because we could not handle the amount of work he had given (data sources: Team Conference Call – 2.28.12, Andy Schmid – Emails 3.4.12, 3.12.12, and 3.13.12).

Andy sent the team (now Laurin, Aaron and I) an email 10 minutes after our team conference call. In his email he said “Thanks for taking the time today on Skype to talk about building two mLearning Demo Courses. We made great progress!” (data sources: Andy Schmid – Email 2.28.12).

In step 2, more SUBJECTS were added to the team and there was a shift in project manager from Andy Schmid to Laurin Graves (DIVISION OF LABOR). However Andy appeared to be taking a mentorship-type role with Laurin by directing her to lead projects and conversations but filling in for her when she was not feeling well (data source: RJ 3.13.12). The TCN Global Leadership Meeting (COMMUNITY and GOAL) provided an opportunity (and target date) for the team to rollout the mLearning demo course. Finally, John Penny’s email to the team highlighted the importance of the project (OBJECT).

Step 3: Analysis of the Activity Structure.

In step 3, the activity system’s actual work is described this is a shift from step 2 where the perceived work is discussed. This step will explain the transformation of the project’s objectives (OBJECT), roles of the SUBJECTS and how the DIVISION OF LABOR actually functioned.

Object. On February 29, 2012, Laurin sent an email message, titled “Phase 1 – Course Design,” (data source: Laurin Grave – Email 2.29.12) to follow up the conference call (2.28.12) with notes on what we had discussed (Organizational Document 4.12 Laurin 2.29.12 Course Design Document).

Demo Course Design Document

#1 Why Mobile Learning

- **Overall purpose:** to stimulate interest and cast a vision for mobile learning. Give people an opportunity to experience a mobile course
 - a) Should use mission/Great Commission language
 - b) Should have an “opportunity is now” feel
 - c) Should demonstrate effective mobile learning principles through the demo course instead of simply telling principles

- **Intended Audience:** Ministry Strategy Leader
 - a) TCN staff primarily but not exclusively
 - b) International English speaker
 - c) 45+ age
 - d) Predominately male
 - e) Literate
 - f) Not tech savvy (but could download an app)

- **Possible content to include in the library:**
 - a) Could include high quality published content - xxxxxxxx And past examples of TCN-produced content.

- **Other questions that need answered?** a. Would love to get an mLearning elevator speech out of this that we can use as we communicate with leaders, donors, etc.... b.

#2 The Making of Why Mobile

- **Overall purpose:** to describe at a high level the major steps you need to get started implementing mobile learning for your area or ministry
 - 1) Modeled after a Common Craft whiteboard video that takes unknown concepts and helps bring a more concrete understanding; another example is Dropbox
 - “Common Craft - Why Video?”
<http://www.youtube.com/watch?v=BFsryhVMryM&feature=related>
 - “How to Make a Common Craft Video”
<http://www.youtube.com/watch?v=oCl1zoxs3Zo>
 - “Dropbox explanation” <http://www.dropbox.com/>

- **Intended Audience:** mLearning Project Manager (person responsible to implement the project)
 - a) TCN staff primarily but not exclusively
 - b) International English speaker
 - c) Age (varies)
 - d) Gender (probably male)
 - e) Probably has some technical savvy

- **Other questions that need answered?**

Organizational Document 4.12 Laurin 2.29.12 Course Design Document

I read the document and volunteered (DIVISION OF LABOR) to draft the first storyboard of “Why Mobile Learning?” and I intended to include a video style that I felt reflected the ‘Common Craft’ medium previously discussed (data source: Team Conference Call Meeting Notes 2.28.12) and referenced again under ‘#2 The Making of Why Mobile’ (data source: Micah Shippee – Email 3.1.12). In the draft storyboard (data source: Appendix 8. Why Mobile

Learning), slides 5-18 were presented as slides that would be narrated over in a simplistic manner meant to reflect the ‘Common Craft’ style.

Subjects. This email was Laurin’s first clear leadership directive to the, geographically dispersed, team involved in the mLearning project, even though it was based on a team conference call lead by Andy Schmid the day before (data source: Team Conference Call – 3.13.12). Andy replied to this e-mail, “Good work, Laurin! I think it would be great if we could put together a storyboard before our next call and use the call to refine the storyboard.” (data source: Andy Schmid – Email 2.29.12). Andy often offered positive encouragement to the team; however, with Laurin he seemed to assume an unofficial mentor role.

Author’s Note: I found it interesting that Andy concluded a March 1, 2012 email, to Aaron and I, by stating simply “the Demo Course project which Laurin is leading.” (data source: Andy Schmid – Email 3.1.12). This was the second time Andy stated that Laurin would serve as the project manager on our mLearning Demo App project (data source: Andy Schmid – Email 2.20.12). I did not discover any evidence, but it was as if Andy was mentoring Laurin in this role and encouraging her leadership (data source: RJ 3.13.12).

Andy (rather than Laurin) continued to bolster the decision to adopt mLearning through investigation of outside, learning industry perspectives (data source: Andy Schmid – Email 3.1.12). The primary content in Andy’s March, 1, 2012 e-mail to Aaron and I was quoted text:

For me, the critical difference between mobile learning and not mobile learning is this: that the classroom and eLearning are both taking you out of the context that you’re in [in] order to teach you, put you in front of a screen or put you in front of an instructor. You’re not in the context that you’re learning about. Mobile may do that as well. You can certainly use it as a screen. But, the possibility with mobile is you can learn in context. That means you can be on your job, or you can be in a situation where you’re experiencing something, and now you want to know more

information about it, you want to clarify some details or whatever, and it's relevant to you. You can also see what you're looking at and experience the situation you're in, and get the extra information that's available by mobile. To me, this changes things in that it's more motivating, it's more engaging, it's more relevant, and people can actually act out or do things in the context they're in, from the information they're getting from mobile. (Bockler, 2012)

Andy's purpose of sending this quote was to validate our efforts and perhaps to inspire our continued work with the "Why Mobile Learning?" course (data source: Andy Schmid – Email 3.1.12).

Division of Labor. By March 4, 2012, I had drafted a 40-slide wireframe (storyboard) of our proposed mLearning Course 1, now titled "Why Mobile Learning?" (data source: Appendix 8). Slide 3, shown below (Figure 4.13), depicts the aspects of mLearning that I chose to add to the first draft of our course 1. Each of the buttons are expounded on in the full document (data source: Appendix 8).



Figure 4.13 Why Mobile Learning?

I sent a link to the file to the team at 6:01 p.m., at 7:01 p.m. (data source: Micah Shippee – Email 3.4.12). Andy responded with brief positive feedback:

Wow! That is amazing, Micah! I [am] very impressed. I really like the content of the first section. I would want to add some more content about why the mobile opportunity also applies in today’s highly connected world. The FB/Twitter point does this well but I think we can add more. (data source: Andy Schmid – Email 3.4.12).

His prompt feedback was followed by a message from Aaron a day later stating: “I’ll spend some time over the next couple days thinking about it and send a follow-up email with my thoughts.

Thanks for your work!” (data source: Nathan Crescent – Email 3.4.12). Laurin was the only team member at that time to not respond at all.

Five days later, on March 9, Laurin e-mailed and introduced AJ Fortune to our team (data source: Laurin Graves – Email 3.9.12). AJ was a young college graduate and video editor with some television and radio broadcasting experience in the Midwestern U.S., not far from Aaron (data sources: Aaron Crescent – Email 3.8.12 and Team Conference Call – 3.13.12). AJ had participated in TCN activities in college and was recommended by Aaron (data source: Aaron Crescent – Email 3.8.12). AJ, Aaron, and I made up the volunteer portion of our project team. In her introduction of AJ, Laurin stated, “Thanks for your interest. We would love to have you part of the team! It’s exciting to watch how the Lord is bringing people with a variety of skills sets at just the right time. The potential of using mobile learning to reach the nations is so exciting. Having a demo tool that can cast that vision in a tangible and compelling way is incredibly key. We need you!” (data source: Laurin Graves – Email 3.9.12). Several days later, Laurin sent an email (data source: Laurin Graves – Email 3.12.12) to set an agenda for an upcoming conference call (March 13, 2012) where the team would do the following:

Meeting Agenda
March 13, 2012
Skype @ 12:15
Jerry Hertzler, Karin Tome, Micah Shippee, Nathan Vincent, CJ Luck

I. Introduce CJ

II. Look at storyboard of “Why mLearning?” (see “why mlearning course.pdf” in shared dropbox folder)

- **ADP (Allogly Digital Press) features to include:**
 - Flashcards
 - Checklist
 - “Read more”
 - Video
 - Quiz

III. Status of storyboard for “Making of ‘why mLearning’”

IV. (time permitting) Orlando trip details

Organizational Document 4.13 Laurin’s Meeting Agenda sent 3.12.12 at 5pm.

The “trip details” concerned arrangements for the entire team to be on site at TCN in Orlando, Florida, this would involve booking flights and accommodations for the out-of-town volunteers. A one-week time period, April 8–13, 2012, was selected (data source: Team Conference Call – 3.12.12).

On March 12, 2012, I completed the Course 2 draft (data source: Appendix 10, “mLearning How to”) and shared it with the group (data source: Micah Shippee – Email 3.12.12) for review prior to our meeting the next day. Slide 3, shown below (Figure 4.14), illustrates the main points to be addressed in our course 2. Each of the buttons were developed on in the full document (data source: Appendix 9).



Figure 4.14 mLearning How to

Upon reviewing the new course document only Andy commented “Nice work, Micah. Looking forward to tomorrow’s conversation.” (data source: Andy Schmid – Email 3.12.12).

Author’s Note: In designing the “mLearning How to” course I based my content decisions on human performance technology (Harless, 1973) findings on causes of performance gaps, specifically: Motivation, Environment, Skills, and Knowledge. I felt that these provided an informed approach to my course draft. (data source: RJ 3.4.12).

In step 3, actual work was begun on the project (DIVISION OF LABOR) through the course drafts (OBJECT) I forwarded to the teams. AJ was added to the mLearning project team (SUBJECTS).

Step 4: Analysis of the Mediators.

In step 4, the TOOLS used are described specifically their availability and change over time is explained. Also, this step explores any changes in roles and RULES in the activity system.

On March 13, 2012, we held a team conference call from 12:15-1:15pm. The call included the following team members: Andy, Laurin, Micah, Aaron, AJ, and Chuck. Chuck Cloud was introduced as having been a part of TCN for over 20 years. He had technical experience and did “code work” on the MTP. Andy reiterated that Laurin Graves would be taking over as the mLearning app project manager but that he and Laurin had decided that he would lead the call. (data source: Team Conference Call – 3.13.12)

Author’s Note: Chuck interrupted and corrected Andy several times regarding anecdotal technical details; however, this did not seem to be a problem for either team member. As it was an audio-only Skype call, I could not see their facial expressions and therefore was unable to interpret further the social dynamics. Also, in the call Andy referenced that he valued my “fresh” and “outside view” of the mLearning project (data source: RJ 3.13.12).

Rules. The team discussed how to best deliver content to other departments in a manner that would encourage them to seek out the Technology Office to do more work with mLearning

(data source: Team Conference Call – 3.13.12). Andy referenced simplistic video delivery styles that he felt would be attractive to our target audience. These videos were narratives with hands that shifted around simple scrapbook-type images (data source: Team Conference Call – 3.13.12). This was the third time this style of video was mentioned by Andy (data sources: Andy Schmid – Interview 2.24.12 and Team Conference Call 2.28.12).

Tools. Knowledgey's was reportedly rolling out a new LMS interface (Roots) that the team would explore in the near future (data source: Team Conference Call – 3.13.12).

In step 4, Andy proposed the team use video styles that would be attractive to the target audience (RULES). This was another step toward developing our content, yet no exact date was provided for the launch of Roots (TOOLS).

Step 5: Analysis of the context.

In step 5, the activity system's SUBJECTS are analyzed to develop their beliefs about the project as well as the methods and TOOLS they find useful in the projects development. This step continues to describe the DIVISION OF LABOR as it may shift over time.

Division of Labor. The Google Docs file used before, during, and after the conference call started with Laurin's original doc (Organizational Document 4.14) and evolved as an iterative, dynamic document with several group members participating to help shape the project. The team interacted with the document (Organizational Document 4.14) from March 12, 2012 at 4:46pm through March 16, 2012 at 4:31pm.

Meeting Agenda for Demo Course Project Added by Andy 3.16.12 at 4:31pm
 March 13, 2012
 Skype @ 12:15
 Andy Schmid, Laurin Graves, Micah Shippee, Aaron Crescent, AJ Fortune, Chuck Cloud

Reference the [Demo Course Project Plan](#):

I. Introduce AJ
 • Recent graduate; worked with TCN in upper Midwest region making Live video for winter conference
 Added by Laurin at 12:18pm 3.13.12

II. Orlando trip details
 • Aaron - flight booked for April 8-23. TCN housing booked.
 • AJ - waiting to hear back from work on time off dates; looking at April 9-13; if he can get the time off, he will stay in the TCN apartment.
 • Micah - open from April 6-14
 • TCN will pay for plane ticket, lodging, food
 • **Objectives for trip:**
 o Meet with people from Knowledge (the software development company) to learn about successes they have had
 o Produce content for both courses
 ■ Things we need to acquire/borrow for Florida trip: (this list is not exhaustive)
 • editing suite/software
 • machine for editing
 • video camera
 Added by Laurin at 12:41pm 3.13.12
 1. Added by Laurin at 12:41pm 3.13.12
 2. AJ removed "professional video switcher" at 12:55pm (3.13.12)
 3. Laurin Added "(this list is not exhaustive)" on 3.14.12 at 10:50pm

III. Knowledge Discussion
 Q: What is Knowledge?
 A: Knowledge is the software development company that created iPub
<http://xxxxx.com>
 Q: What file format?
 A: Any standard file format for media will work (.mp3, .mp4, .m4v, etc.). We are early enough in the stage that we should be able to specify what file format to include and Knowledge will include it
 Q: What kind of hardware will this run on?
 A: we anticipate creating a body of content which we will bundle into an iOS and Android package
 Added by Chuck at 2:44pm 3.13.12

Questions for Knowledge:
 a. Image mapping capability?
 b. What file size is supported?
 c. Time and lead time for their graphic designer?
 d. Capability to display my quiz score plus mine compared to everyone else in a group (like slide 28 of "why mLearning course.pdf")

IV. Steps to Follow in Design
 1. Refinement of content
 2. Instructional design elements
 a. video
 b. graphics
 c. text
 d. scores - storing and comparison
 3. Make a decision about media for production - i.e. Which style/genre to use?
 a. See about using existing TCN video available.
 4. Identify graphic design
 5. Identify requirements for the quizzing module and make sure we can accomplish this with the Knowledge software.
 a. Example: Does the quiz tell you immediately if you got the question correct, or do you finish the quiz and just see a final score
 Added by Aaron at 12:41pm 3.13.12

V. Deadlines
 • March 20: Course design content deadline
 • March 21: Next meeting @ 12:15 via Skype
 o Storyboard
 o build interactive modules
 o decide if low-bandwidth environments.

VI. Action Items
 • Micah will put PPT file of both wireframes to the Dropbox folder.
 • All will contribute to content, especially Andy and Laurin
 • All study Micah's PPT of wireframes and write down comments.
 • Andy will setup meeting with Knowledge staff to meet the "campers" and explain ADP
 • Andy will monitor housing options for Micah
 • Andy will ask graphic designer for time in the April 8-23 range
 • Laurin will reserve suitable room for recording (can Nick T. help on this?)
 • Aaron, Chuck, and AJ will make list of tools required to build content (see list above)
 • Chuck will email everyone their action items.
 Added by Andy at 1:19pm 3.13.12
 2. Reformatted by Chuck at 2:44pm on 3.13.12 to read "____ will." Additionally Chuck added the last item to the list giving himself the responsibility to email the team their action items.
 AJ added his name to this list on 12:18pm 3.14.12

VII. Agenda for next meeting
 • confirm content meets everyone's approval
 • confirm educational modes meet everyone's approval (e.g. quizzes, flashcards, vocab, etc.)
 • Update on travel details so TCN can purchase tickets for AJ, Micah
 • Refine arrangements for Florida time.

Organizational Document 4.14 Skype Agenda 3.13.12 with team comments and edits.

Subjects. While Laurin handled the trip details (data source: Organizational Document 4.14: II. Orlando Trip Details) on the above document, Andy worked on the DIVISION OF LABOR (data source: Organizational Document 4.14: VI. Action Items). Additionally, Chuck was identified on the action items as the team member that would email everyone their tasks. He did not send an email out but did update the action item list at 2:44pm (following the call).

Author's Note: Chuck was not a part of the future team conference calls, or the on-site meetings in April. However, Nick T. (Tred) was mentioned in the "Action Items" as being able to help out by securing a room for video recording (data source: Skype Agenda 3.13.12). Chuck's exiting of the team and the addition of Nick would cause a shift not only in the DIVISION OF LABOR but Nick would quickly become an integral part of the mLearning team in the next stage and beyond. This change or contradiction would alter the progress of adoption.

Tools. As seen in the 3.13.12 Skype Agenda (Organizational Document 6.8) the team was directed to identify quiz features that we could employ through Knowledgey's software. Further, Andy was to setup a meeting with the team and Knowledgey's staff.

In step 5, the team (SUBJECTS) interacted on the Skype Agenda, each contributing to how the team would define the project tasks (DIVISION OF LABOR) within the context of Knowledgey's software (TOOL).

Step 6: Analysis of Activity System Dynamics.

In step 6, the final step, the interaction of the components of the system are examined to reveal any contradictions, in inconsistencies, specifically, contradictions within the needs of the target audience and the objectives of the project. Additionally, in this step historical factors examining past practice are described.

The mLearning demo-project team evolved during stage 2 and as more team members were added, tasks (DIVISION OF LABOR) were also beginning to be assigned. Stage 2 is typically identified as the stage at which the role of an innovation is set to match the

organizations agenda (Rogers, 2003). Much of the discussion thus far during stage 2 illustrated how the Technology Office, more specifically the mLearning demo-project team, were working to identify what other departments needed to know in order to see mLearning as a potential tool (RULES) to meet their goals at TCN (COMMUNITY). The team itself was going through it's own adoption process, the adoption of a virtual team to complete the project. Rogers (2003, p. 405) identifies a virtual organization (like our virtual team) as a network of geographically distant employees who are linked by electronic communication. Difficulties in pursuing this type of team include greater conflict and misunderstanding (as opposed to face-to-face) (Rogers, 2003 p. 407). I found myself concerned with a lack of prompt feedback over the two course wireframes that I emailed out to the team. Andy would at least respond with a short positive note but Laurin, as the PM, did not offer feedback as prompt or as often.

As a mix of TCN staff, veteran volunteers (Aaron and AJ), and a new volunteer (Micah) the team would offer what tasks they felt that they could complete and what skills they had to offer to the project (DIVISION OF LABOR). Stage 2 interactions and activities in the final stage of initiation of the proposed mLearning app are depicted in Figure 4.15.

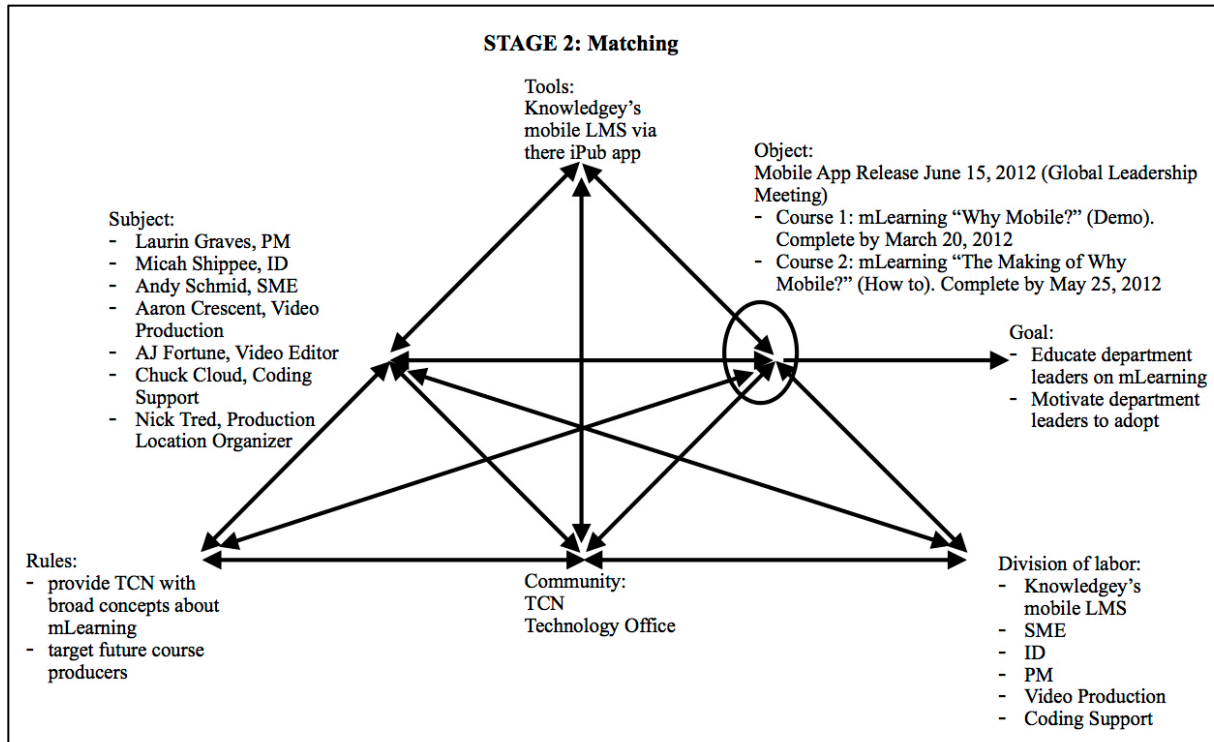


Figure 4.15 Stage 2 Activities

In stage 2, the COMMUNITY and TOOLS remained consistent with stage 1. The SUBJECTS, OBJECT, RULES, and DIVISION OF LABOR gained more clarification and detail. The Technology Office began to prepare to implement the mLearning Demo App project (OBJECT). The only inconsistency, or contradiction, at this point between the two stages was found in the announcement of Laurin's role as project PM with Andy serving as a subject matter expert (DIVISION OF LABOR). As described, Andy's role appeared to be more of a mentor role with Laurin.

The project planning at stage 2 did little to explore potential problems that may arise. The team relied on the successes of MTP and Knowledgegey's past products to guide the new demo project to successful implementation (TOOLS). However, the team moved forward with the mLearning project (OBJECT) developing how it could be positively perceived by other departments at TCN. With the initiation phase the team would move the project forward toward

implementation where the project would be modified and restructured to better achieve the goal of motivating other departments to adopt mLearning.

Implementation - Stage Three: Redefining/Restructuring

In Stage Two: Matching TCN’s Technology Office continued with their plans to develop a mLearning demo course. A team of Technology Office staff members and volunteers were forming to develop the course. A target completion date of June 15, 2012 was set for a rollout of the course for TCN’s Global Leadership Meeting, where TCN leadership could experience the course for themselves (data source: Team Conference Call – 2.28.12).

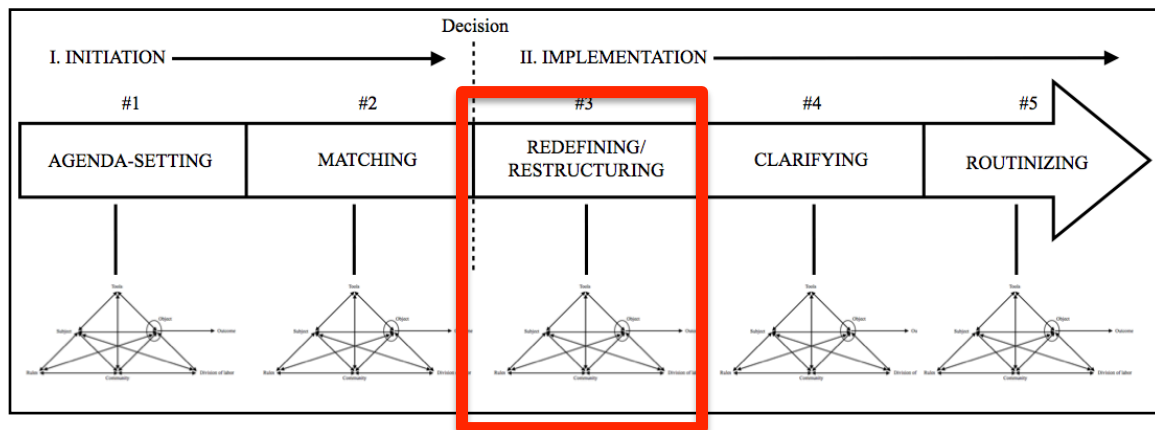


Figure 4.16. Activity in the organizational innovation process

Rogers (2003) defined the implementation subprocess as consisting of all events, actions, and decisions involved in putting the innovation into use. The redefining/restructuring stage occurs when the innovation is implemented and re-invented to accommodate the organization’s needs and structure more closely, and when the organization’s structure is modified to fit with the organization. Both mLearning (the innovation) and TCN (the organization) were expected to change during this stage.

Step 1: Clarification of the purpose of the activity system.

In step 1, the activity system is analyzed to understand relevant contexts within which the activities occur and to understand the informants motivations and interpretations of what they perceive they need to accomplish.

Stage Three started when the Technology Office began to modify the mLearning Demo Course Project plan to better meet their needs as interpreted by the new project manager. Two days after Laurin's "action item" list was sent out (data source: Laurin Grave – Email 3.13.12), Andy sent an e-mail to the team titled "A change in leadership of the TCN mLearning demo course project" (data source: Andy Schmid - Team Email 3.15.12 at 4:48pm). In the email, Andy introduced Nick Tred as a 23-year TCN veteran, and as the new project lead. Nick's name and e-mail first appeared on March 13, 2012, as the one potentially supporting Laurin on arranging a room for video recording (Organizational Document 4.12 Skype Agenda 3.13.12). Andy announced that Laurin would be relieved of this role (as PM), as she "needed to focus her attention on other priorities for now." (data source: Andy Schmid - Team Email 3.15.12 at 4:48pm). Andy stated that he would still participate in the conference calls but that Nick would lead them. Apparently, Nick had a good reputation at TCN due to projects he had been working on, Aaron (more of a TCN insider than I) responded to this news: "I'm looking forward to the privilege of working with Nick. . . . Laurin will, of course, be missed" (data source: Aaron Crescent - Team Email 3.15.12 at 4:55pm).

Author's Note: Andy's e-mail also introduced John Regis as an instructional designer who was interested in joining our team (data source: Andy Schmid – Email 3.15.12). John Regis did not join our team. During our work, Nick would regularly re-direct our team to use of film as the primary medium in supporting our mLearning Demo Project. His reliance on film was, I believed, due to his personal experience with the successes of film technology at TCN. Additionally, it was notable that Andy responded to Aaron's email about "missing Lauren" in the following way: "Laurin won't be missed, happily, because she isn't going

anywhere. She'll be around during mLearning Camp, albeit distracted because she'll be leaving for Brazil at the end of that week. And she will still be coordinating two other mLearning projects that we expect to involve an instructional design phase" (data source: Andy Schmid - Team Email 3.15.2013 at 5:02pm). According to Andy, the Technology Office was making plans for mLearning through "two other" projects... without the completion of the mLearning course demo project.

In step 1, a shift in the DIVISION OF LABOR (Laurin to Nick) would inform the direction the rest of the project would take. Andy had directed much of the previous Stages himself and through Laurin, now Nick was the primary PM.

Step 2: Analysis of the Activity System.

In step 2, the activity system is more described through the defining of the SUBJECTS, RULES in which they operate, the DIVISION OF LABOR that informs how they understand their roles, how the COMMUNITY(s) involved view the task, the GOAL that motivate the subjects, the expected outcome of the activity (OBJECT) and how the members of the activity system communicate and interact.

Rules. Nick sent an e-mail (data source: Nick Tred - Team Email 3.16.12) explaining his plan for our current project direction. He stated that we'd discuss it further during our first team conference call meeting, scheduled for March 21, 2012. Nick's e-mail was meant to provide material that the group was to 'digest' prior to the call (data source: Nick Tred - Team Email 3.16.12).

Subjects. Nick explained that after speaking with Andy and Laurin about where the project was at this point, they decided that the project would be "modified" "to reflect our current thinking." (data source: Nick Tred - Team Email 3.16.12).

Author's Note: Nick Tred's background at TCN was as a member of a large film ministry in TCN dedicated to making accessible a theatrical production of the *Life of Jesus Christ*. The film is described earlier in this work. The success of this

particular ministry may have led to Aaron's comment (data source: Aaron Crescent - Team Email 3.15.2013 at 4:55pm) about the "privilege of working with Nick," someone who had so much experience with a successful product. In 2003, Nick stated that making this video "available on the Internet has no geographic boundaries," noting his desire to increase accessibility of the movie to intended audiences and that "nine years later we were all part of a team to bring a product that would transcend even the electrical grid" (data source: a Christian publication 3.11.03) (data source: RR 4.9.13).¹⁶

Goal. Nick saw that more explanation was needed about how mLearning would impact the stakeholders from varying departments (data source: Nick Tred – Team Email 3.16.12).

Object. The mLearning Demo Course Project would now be a single mLearning course with three lessons. The team would now create the lessons in the following format:

Lesson 1: Explain the core concepts of mLearning using newly crafted content.

Lesson 2: Demonstrate mLearning using re-created content.

Lesson 3: Give an overview of the process of accomplishing lessons 1 and 2.

Each lesson would teach users about mLearning at a more in-depth level as they progressed through the lessons with the hope of creating a more tangible product. The first two lessons would be our team's initial priority.

Division of Labor. Nick made no changes to the team put together by Andy and Laurin. Nick did identify the type of learning content that we needed to develop without assigning anyone the tasks yet. The learning content he included were: 1) Video and/or Audio (w/ annotation), 2) Text, 3) Images, 4) Quizzes (multiple choice only), 5) Flash Cards, 6)

¹⁶ Nick's quote in 2003 was in a Christian publication whose name has remained confidential to prevent the work from pointing to my confidential informants.

Vocabulary, 7) Checklist, 8) Concepts, 9) Metadata (for associating content or custom searches), and 10) Group Interaction (w/ Social Media) (data source: Nick Tred – Team Email 3.16.12).

Community. Nick wanted to now use content that was familiar to TCN leaders in his Lesson 2 plan. Nick explained that this topic: ‘What Acts 2 Teaches Us’ already had a lot of accessible content that we could use (data source: Nick Tred – Team Email 3.16.12).

In step 2, Nick took on the PM role quickly with a plan (OBJECT) that he reported came from himself, Laurin, and Andy (SUBJECTS). The team remained intact through the leadership change (DIVISION OF LABOR) but he described ‘learning content’ that we were to add to our project (OBJECT and RULES). Nick’s directive was to make the product meaningful to the TCN leaders (COMMUNITY) who would adopt mLearning.

Step 3: Analysis of the Activity Structure.

In step 3, the activity system’s actual work is described as a shift from step 2 where the perceived work is discussed. This step will explain the transformation of the project’s objectives (OBJECT), roles of the SUBJECTS and how the DIVISION OF LABOR actually functioned.

Object. According to Nick’s email (data source: Nick Tred - Team Email 3.16.12) in Lesson 1 our first task was to define and explain the core concepts that we wanted to convey about mLearning. Nick referenced my initial work (data source: Appendix 7. Why Mobile Learning?) and the five key concepts (wireframes 33–37) I had highlighted in it (Figure 4.17) (data source: Nick Tred - Team Email 3.16.12).

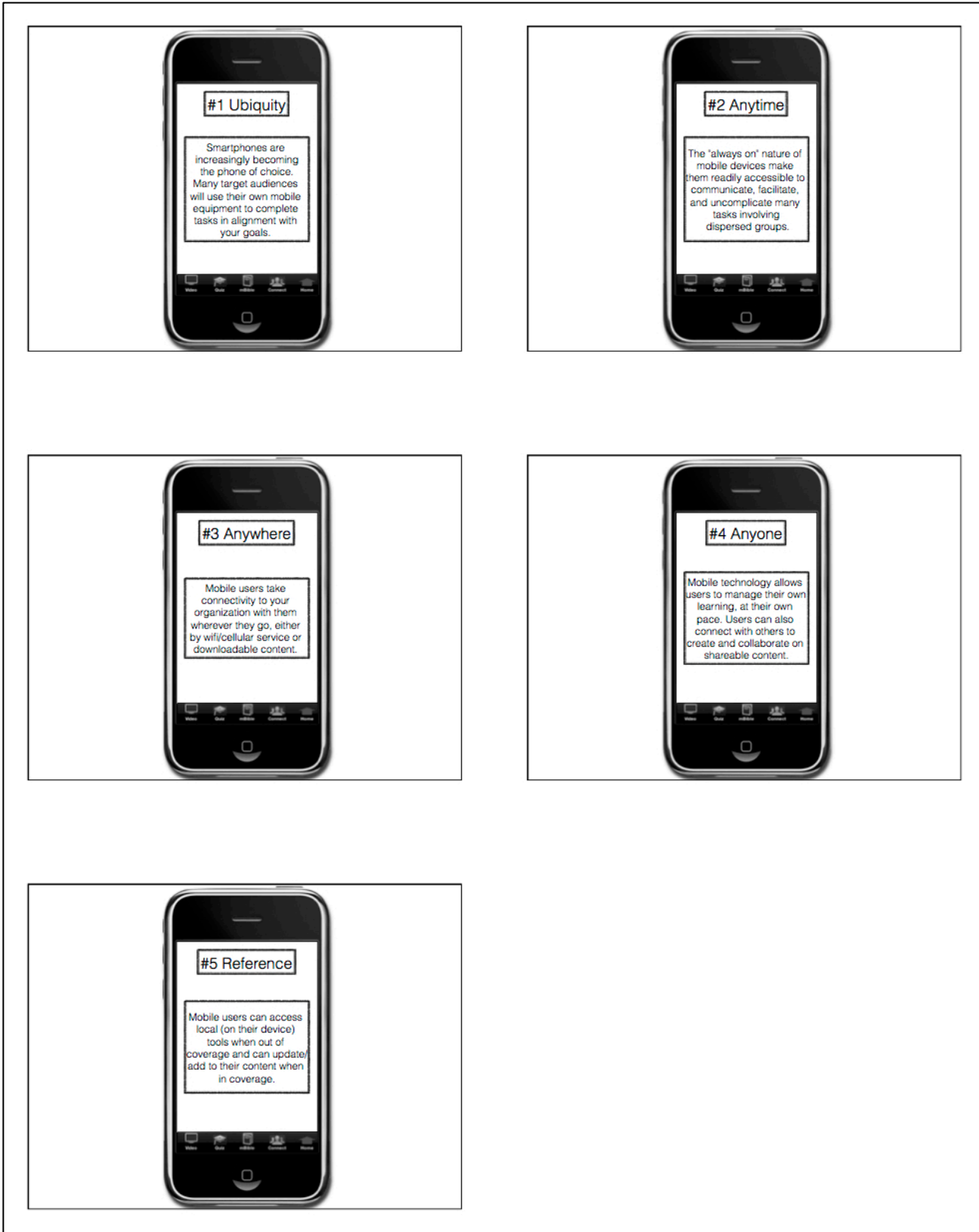


Figure 4.17 Five key concepts from *Why mLearning?*

Author's Note: I had been researching the affordances of mLearning and used my findings to inform the development of these 5 concepts (Ubiquity, Anytime, Anywhere, Anyone, and Reference). From my research I found: Mobile Learning (mLearning) is the exploitation of ubiquitous handheld technologies (UBIQUITY), together with wireless and mobile phone networks, to facilitate, support, enhance and extend the reach of teaching and learning (MoLeNET 2011). mLearning uses mobile technology to aid in the learning of, reference of or exploration of information (REFERENCE) useful to the user at that moment or in a specific use context (Feser, 2010)... Mobile Devices are defined by several criteria; form, connectivity, and state. The form factor clarifies a mobile device as comfortably fitting into the palm of one's hand. Mobile devices must be connected to a network via a cellular network or a wireless network. A mobile device is "always on" allowing for instant on-demand learning, ANYTIME, ANYWHERE. (Agarwal, 2009)... There are three types of mLearning: formal, informal, and self-directed. Formal is much like eLearning coursework viewed on a mobile device. Informal incorporates more web 2.0 themes: two-way communication and social media. Self-Directed is learner/user directed use (ANYONE) of REFERENCE and performance support materials, content and courseware, and media-based content (Brink, 2011). Like the successful gaming industry, mLearning's greatest potential is found in its ability to foster collaboration and engage students (users) deeply (ANYONE) in the process of learning (Johnson et al. 2010). (RJ 3.6.12)

Division of Labor. Nick included a link to a collaborative cloud-based document (Google Doc) that the team would use to brainstorm the "core concepts." (data source: Nick Tred – Email 3.16.12). Nick stated: "We do not need to explain the elements used to teach within a mobile environment. Instead we will use those methods to teach them the core concepts." The types of learning content that we "need to develop to convey the chosen concept" would be a) video and/or audio (w/annotation); b) text; c) images; d) quizzes (multiple choice only); e) flash cards; f) vocabulary; g) checklist; h) concepts; i) metadata (for associating content or custom searches); and j) group interaction (using social media) (data source: Nick Tred – Email 3.16.12).

The focus of lesson 2 would be to demonstrate mLearning using re-created content. Nick explained that "we" (Nick, Andy, and Laurin) suggest using material that is very familiar to TCN leaders (data source: Nick Tred – Email 3.16.12). This material would be TCN's *Foundational Principles*. Specifically, content on "What Acts 2 Teaches Us," would be used. This content

came with a great deal of existing material for us to use: a) original written lesson; b) Bible study; c) video part 1 and part 2; d) web app. Nick explained to the team that we were able to create a login for this content and work with the web app to get our initial feedback. In Nick's view the transformation of TCN content for Lesson 2 would be done in a virtual team off-site. During April 9–13, the on-site dates, our time together would accelerate the process. (data source: Nick Tred – Email 3.16.12).

Lesson 3 would give an overview of the process of accomplishing lessons 1 and 2. As a team we would outline this lesson as we progressed through the first two lessons. Nick said that, for this lesson, “We may initially produce a traditional presentation format for this and then adapt it for a mobile lesson.” (data source: Nick Tred – Email 3.16.12).

Subjects. Nick concluded this introductory e-mail (data source: Nick Tred - Team Email 3.16.12) with an interesting summary and invited feedback:

“I wish we had some time to sit around a meal and get to know each other before giving direction. I want you to feel the freedom to suggest where we are headed in the wrong direction or how we could improve things. I will attempt to give more defined action steps for each of us during the call (March 21) or right afterward. I know email does not enable you to get a feel for my style and personality, just know that I hold most of this very lightly but also desire to accomplish our goal. I look forward to working with each of you.”

In step 3, more direction was given to the team (SUBJECTS) to begin to explore (DIVISION OF LABOR) the core concepts and the TCN content that we were to transform for mobile delivery (OBJECT). Nick defined specific tasks as on-site and off-site (as a virtual team). Rogers (2003) defined virtual organizations (like our team) as a network of geographically-distant employees who are linked by electronic communication.

Step 4: Analysis of the Mediators.

In step 4, the TOOLS used are described specifically their availability and change over time is explained. Also, this step explores any changes in roles and RULES in the activity system.

Rules. I emailed Nick for clarification on the vision for the lessons he proposed, specifically, regarding the outcomes for the intended user groups (data source: Micah Shippee - Email 3.17.12 1:21pm). I suggested:

“the users will 1. be inspired to contact the Technology Office and request the Technology Office take their content to make it a mobile app. 2. learn more about mLearning and begin to design their own app. 3. Both 1 & 2.” (data source: Micah Shippee - Email 3.17.12 1:21pm):

Within a few hours, Nick responded to this e-mail (data source: Nick Tred - Email 3.17.12 4:57pm) and provided insight into how the Technology Office perceived their function at TCN, which he described as a “3-fold” role:

1. *Tools.* to help Dr. Buck’s Knowledgery develop their product and thereby influence the features of their product development
2. *Rules.* Manage some initial projects to get TCN content into an mLearning environment and demonstrate to various department leaders the uses and scope of mLearning so that they will begin developing strategies for how to best leverage it within their own sphere of influence
3. *Rules.* Educate content developers, trainers and technology leaders within TCN on how they can craft and manage their own mLearning projects.

(data source: Nick Tred - Email 3.17.12 4:57pm)

Nick’s explanation of the three roles gave a fuller picture of how and why some of the decisions on this project were made. He explained that the Technology Office was fulfilling the first role

and growing into the second and third (data source: Nick Tred - Email 3.17.12 4:57pm). The intent was to be most involved with the third role. Further, it became clear that Nick and Andy both viewed their connection with Dr. Buck's Knowledgegy as mutually beneficial, meaning their symbiotic relationship would provide a stronger mobile product for both Dr. Buck and the Technology Office.

In step 4, Nick explained his perceived value in maintaining a working relationship with Knowledgegy and their mLearning LMS development (TOOL). And that this relationship was an acceptable way to grow both the Technology Office's offerings and Knowledgegy's product development (RULES). Nick shared that together the Technology Office and Knowledgegy would be able to share the 'uses and scope' of mLearning (OBJECT) with TCN department leaders (COMMUNITY) to leverage within their own context.

Step 5: Analysis of the context.

In step 5, the activity system's SUBJECTS are analyzed to develop their beliefs about the project as well as the methods and TOOLS they find useful in the projects development. This step continues to describe the DIVISION OF LABOR as it may shift over time.

Tools. I suggested to Nick that the "Group Interaction (w/ Social Media)" content type (offered by Knowledgegy) should include using a "nearby" feature (like Google+) (data source: Micah Shippee - Email 3.17.12 1:21pm). Nick replied that this was a "good catch" since he had left off "location-based triggers," but he concluded that this was something Knowledgegy was planning to incorporate in their mobile products, but they had not totally "fleshed out" the function for our use (data source: Nick Tred - Email 3.17.12 4:57pm). Knowledgegy's mobile products were reportedly in a state of constant development (data sources: Nick Tred - Email 3.17.12 and Dr. Buck – Email 3.27.12).

Subjects. One week prior to our first full team conference call on March 21, the team used the Google Doc (data source: Nick Tred – Email 3.16.12) to collaboratively develop, edit, and produce mLearning “core concepts.” The agreed upon concepts were the perceived affordances and instructional principles to be reinforced in the app project (Figure 4.18).

1. Create new content to specifically teach and emphasize major mLearning concepts.
2. Everyone has a mobile device (ubiquitous) – Urgency/viability
3. Always with you, Accessible
4. Engaging (allows for maximum retention)
5. Connected (Internet) via built- in social networking or established sources (twitter, Facebook, etc....) – most common device for getting online.
6. Always On and convenient

Figure 4.18 mLearning core concepts

Nick told me “getting one of the Knowledgy guys on the project could really help us to maximize the features and build the content around them” (data source: Nick Tred – Email 3.17.12) yet, we never officially welcomed one of these SUBJECTS to our team.

Division of Labor. Nick requested that as a team we review the concepts to ensure that we agreed on the major concepts to be developed in our finished product (data source: Nick Tred - Team Email 3.20.12). Also, he asked that we explore either the iOS or Android version of Knowledgy’s free apps. This would help us to identify “features they enable the user and teacher to utilize.” (data source: Nick Tred - Team Email 3.20.12).

Author’s note: I downloaded and reviewed all the above apps as requested by Nick (data source: RJ 3.20.12). These apps ranged in product type, each demonstrating different features that Knowledgy was able to employ for us, as follows:

1. *Spearhead*: a conference event guide
2. *MedNow*: a medical alert app using location-based services to find emergency services
3. *iCommunity*: a social media-based community events app
4. *Big Ben*: a learning app with quizzes, goals, and progress tracking
5. *This is me*: an inspirational testimonial app used to share how people became Christians

Nick was particularly interested in how we might envision working with “This is me” as a template for our app creation (data source: Team Conference Call 3.21.12). Just after our first interview, Andy had also referenced the same as a template for three potential projects (data source: Andy Schmid – Email 2.10.12). This specific app was heavily reliant upon video to relay content. Nick’s video production background, the make-up of our team, and Andy’s work on the MTP all pointed to a video heavy product. The “This is me” app would generate critical discussion at our on-site meeting with Dr. Buck a month later.

The team had generously accommodated my busy schedule and offered to conference call for 45 minutes during my lunchtime at work (data source: Team Conference Call 3.21.12). Prior to our face-to-face meeting in April, we held six conference calls,¹⁷ Nick led four of these six conference calls before our planned weeklong meeting in Orlando. Nick’s leadership style was much more directive than Andy and Laurin’s had been.

Object. During the call, the lessons were further refined (data source: Team Conference Call 3.21.12). Lesson 1 showed key concepts through video that would instruct users on the key concepts. Lesson 2 would still be used to transform content for mobile. However, lesson 2 now incorporated three sources of content that did not directly correlate in flow and sequence. Lesson 3 would seek to answer the following questions:

1. How did we create lessons 1 and 2?
2. How did we create new content?
3. How did we take existing content and move it to mobile learning?

¹⁷ Most of our team conference calls were over the free version of Skype, which would not allow video for more than two people. We used Google+ on several occasions, not gaining much more in the way of live video streams. Facetime and Skype both worked well for several individual calls. These provided adequate video—any video stream problems we had were during conference calls.

4. How did we take an 80-page PDF and turn it into a mobile course?

(data source: Team Conference Call 3.21.12)

Division of Labor. The three courses would heavily rely on the use of video. Nick would make arrangements for cameras, lighting, location, and casting for a half-day shoot. Aaron and AJ would serve as the production and editing team. (data source: Team Conference Call 3.21.12).

Tools. Also, Nick reported to the group that Knowledgegy was working on a way for subject matter experts (SMEs) to input updated content on the back end of their new app, “Roots.” This promising new app would replace their old app “iPub” and allow SMEs to have dynamic content without knowing code. During this call, Andy reported to the team that I would be working as an instructional design consultant for mobile learning interventions on multiple projects during my on-site visit to TCN headquarters. Andy and Laurin would be using me as a consultant on various projects. (data source: Team Conference Call 3.21.12).

Division of Labor. Nick followed up the conference call (3.21.12) with an action plan of what needed to be done within the next week (Figure 4.19).

I have updated the [mLearning Course Design](#) doc and the [Project Plan](#) doc. They now show our current plan. We have a lot of work to do in the next week. I want to highlight some of them for you things that need to get done ASAP.

1. **Micah** to create a teaching outline for each of the 3 courses. This will be the basis for crafting all the other content. Since the other steps depend on this being done it is **critical that it gets done early this week**.
 1. break course 1 into 5 teaching segments. This should be an outline of what you would want to teach your students about each point. Keep it to an outline with some notes on possible wording and image references.
 2. Develop a basic outline for teaching the Foundational Principles based on main points in Course Design doc.
2. **Aaron and AJ** to take the teaching outline and develop storyboards and a script for the video/audio content
 1. For Lesson 1 you will use a combination of live video and motion graphics. Graphics will need to be outsourced, so we will need working ideas of what is needed. I would like to have a **working script by April 30**.
 2. For Lesson 2, you will need to suggest how the original video can be broken down to match the teaching points. Download file link is in the Course Design doc.
3. **Nick** to set up shoot logistics for crew, location, actor, equipment
4. **Nick** to assign a motion graphic designer and static image designer to make additional pieces as described by **Micah** and **Aaron**. The final version can be incorporated into the video during the second week Aaron is in Orlando (April 16-

Figure 4.19 mLearning Demo App action plan

Each team member set to work completing the actionable items established by Nick. To my knowledge there were no complaints or concerns over a lack of equity in the work to be done.

Nick continued to work with Andy and Dr. Buck regarding the capabilities of Knowledgegy to support our plan. Dr. Buck suggested merging lessons 1 and 2 but Nick felt it would be best to stay with our three-lesson plan (data source: Nick Tred – Email 3.26.12).

Tools. Dr. Buck also reported on a few features of Knowledgegy's Roots app that "would be" available soon (to replace iPub) (data source: Andy, Nick, Micah, and Dr. Buck – Conference Call 3.27.12). When I asked Dr. Buck about the use of a badge for users to earn while completing their lessons, Dr. Buck reported that this was a great idea. However, he did not have time to have this ready for an April release of the new Knowledgegy Roots app that we

would employ for our content. He stated that it was a possibility to have this feature available for May/June. (data source: Andy, Nick, Micah, and Dr. Buck – Conference Call 3.27.12). So we continued on our actionable items with the plan that we had formulated.

From its beginning our team had heavily emphasized a video-graphic approach to the mobile learning app. Aaron and AJ with their video production experience, combined with Nick's video experience, found support from Andy's video-centric vision. Andy hoped to replicate the successes of the Missionary Training Project, and he felt that video was a key part of that success. I was given the task of writing the initial narrative (script) on mLearning that applied the collaborative affordances we developed for lesson 1. For lesson 2, I was to transform existing content (text and video) into segments that were more suited for mLearning. These segments would include a video introduction, textual content, and a quiz. The team was happy with the work I produced and made only a few changes to my 'academic-ese' statements, which became a source of shared humor for our team.

Subjects. One week before our on-site work was to begin, Nick organized another team conference call (April 4, 2012). The conference call included our team, with the exception of Laurin, and Rory Smith was added as the 'actor' selected to appear in our video production. Rory's appointment was largely one of convenience. He worked for TCN in the same video department that Nick Tred had just left. Final actions were decided on and formalized a few days later when Nick sent out the TCN mLearning Schedule (data source: Appendix 10). The schedule identified specifically what the volunteer members of the staff would be working on all week.

The work from January 30, 2012, through to April 4, 2012, was completed by our virtual, off-site team. The use of conference calls, individual Facetime/Skype calls, and e-mail all

contributed to the team's planning efforts. The Google Docs cloud-based collaboration features were also used in conjunction with a Dropbox file-sharing folder. These mediums allowed for effective off-site collaboration.

Author's Note: On-site at TCN headquarters. My April 8, 2012, arrival in Orlando, Florida fell on Easter Sunday. Nick picked me up at the airport and brought me to his home to share dinner with his wife, three daughters, and mother-in-law. Following dinner, Nick brought me to a TCN visitor apartment complex where I found like-new accommodations. The next morning we began our busy week at TCN headquarters (HQ). TCN HQ consisted of a beautiful campus of vast green spaces and two identical white, two-story office buildings, each with a circular-rotunda-type entrance. The very clean, very modern office spaces were walled with windows on every side. After obtaining a visitor pass from security, I began to look for the Technology Office. On my way there I was intrigued by the modern design of the buildings, with large open spaces. I stopped to investigate a large computer monitor that had a live feed posting alerts every time someone in the world made a "commitment to Christ." I'm not sure how this "commitment" was measured, but I found the display and concept interesting as another link between technology and Christianity. Eventually, I found the Technology Office, which was housed in a cluster of cubicles on the ground floor of one of the buildings. The entire Technology Office staff (15–20 people) started their Mondays off with a time of sharing and praying. They kindly prayed for my work that week and for my own research efforts. Each seemed genuinely interested in my research interests in mobile learning. Many identified anecdotally with the value of using mobile devices to deliver content. (data source: RJ 4.9.12)

In step 5, the team (SUBJECTS) collaborated (DIVISION OF LABOR) via Google Docs on how we would explain the mLearning core concepts. This collaboration allowed us, as a group to clarify our beliefs about the project (OBJECT). The Knowledge release of Roots was anticipated as a productive TOOL to help us leverage mobile devices. The team also reviewed Knowledge's free apps to better understand their existing product capabilities (DIVISION OF LABOR). Finally, in step 5, Nick provided the team with an action plan for areas that we could begin to work (DIVISION OF LABOR) on directly related to our mLearning demo project (OBJECT).

Step 6: Analysis of Activity System Dynamics.

In step 6, the final step, the interaction of the components of the system are examined to reveal any contradictions or inconsistencies, specifically, contradictions within the needs of the target audience and the objectives of the project. Additionally, in this step historical factors examining past practice are described.

As an organization, TCN (COMMUNITY) was transitioning out of the redefining/restructuring stage of implementation toward clarifying. In the clarifying stage more departments would explore mLearning. Many TCN staff members reportedly saw the advantages of mLearning, and the Technology Office hoped our work would help realize mLearning’s potential.

Figure 4.20 depicts stage 3 interactions and activities of the mLearning demo-project.

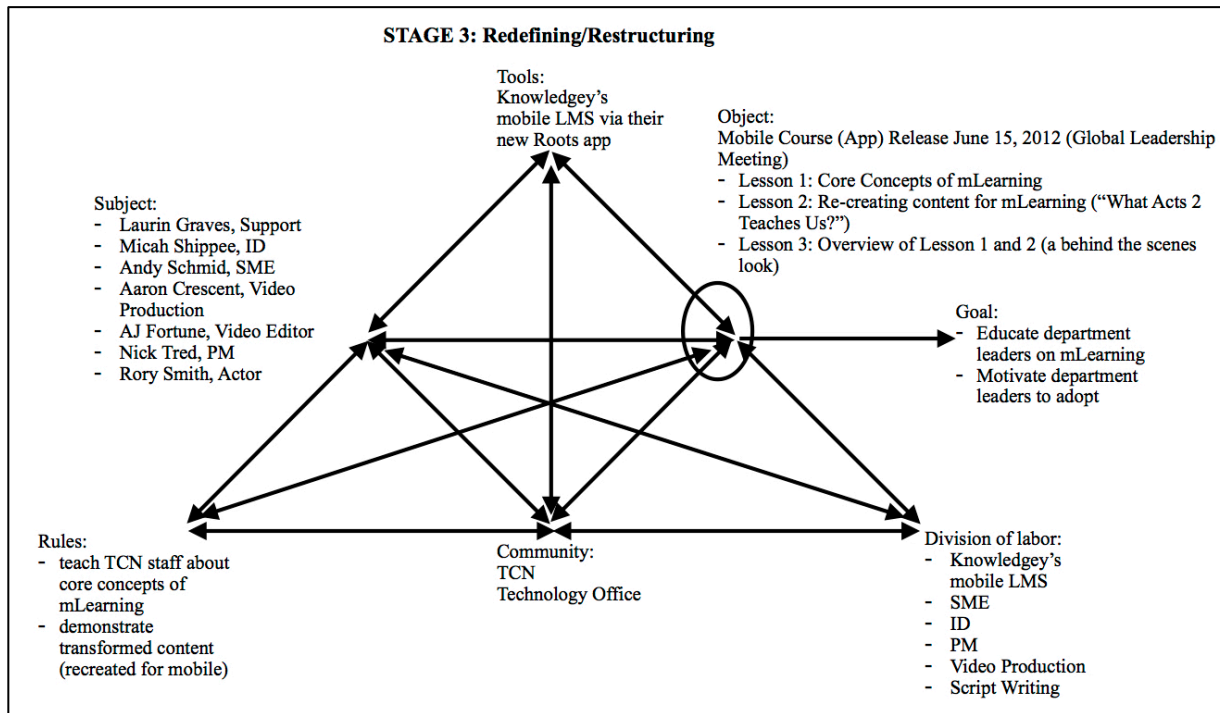


Figure 4.20 Stage 3 Activities

In stage 3, the TCN community remained consistent with stages 1 and 2. Contradictions became significant at stage 3. With the appointment of Nick Tred as the new PM, the team (SUBJECTS) experienced its third project PM in as many stages. Nick supported Andy's (and Laurin's) video-centric approach to the mLearning demo course (OBJECT). However, Andy's 'Common Craft' style of video (data source: Team Conference Call 2.28.12).was not part of Nick's directive. At one point, Nick emailed me: "I am imaging a series of short 30-second videos that go along with the Lesson 1 content. I think a technology/professor sitting in his lab/office explaining about mLearning... like a Bill Nye the science guy or Alton Brown's Good Eats." (data source: Nick Tred – Email 3.17.12).

John Regis was introduced as a new team member but never engaged in our team. This may have been due to the virtual, off-site nature of our initial work. Rogers (2003) explained virtual employees have less organizational identification, lower satisfaction, and higher turnover rates partly due to virtual communication that may lead to greater conflict and misunderstanding.

Knowledgey's new iPub app would allow SMEs to "have dynamic content without knowing code" (TOOLS). This new feature meant Chuck Cloud's coding support was no longer necessary on the team. With Nick Tred's video production background came the addition of "script writing" (DIVISION OF LABOR) and Rory Smith as the actor (SUBJECT). The modification and reinvention of the mobile course occurred in stage 3 (OBJECT). Nick felt that one course with three lessons was the most effective and efficient way to fully demonstrate mLearning as a new learning paradigm in TCN (RULES).

The course structure was revised, or as Rogers (2003) would call it "reinvented," to better match the needs of diverse stakeholders. The Technology Office's structure was modified with the addition of Nick Tred to handle this new and growing innovation.

Implementation - Stage Four: Clarifying

In Stage Three, TCN's Technology Office mLearning demo course project had moved into the implementation sub-process of organizational adoption. Stage three included events, actions, and decisions involved in putting the mLearning demo course plan into development for use. Stage Three also developed a shift in leadership from Andy Schmid to Lauren Graves to Nick Tred. This shift brought it's own redefining and restructuring of what the actual mLearning demo course would look like and how it would function.

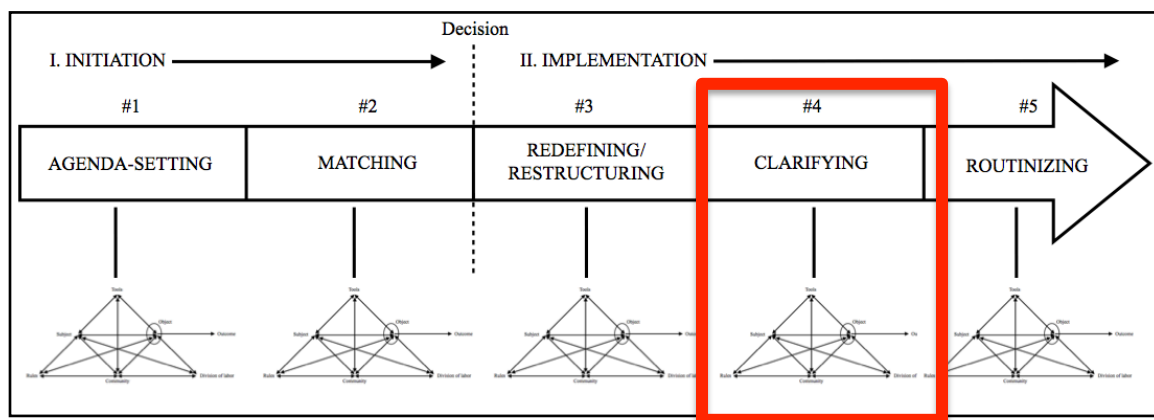


Figure 4.21 Activity in the organizational innovation process

The clarifying stage occurs as the implemented innovation is put into more widespread use in an organization, so that its meaning gradually becomes clearer to the organization's members. Rogers (2003) states that too-rapid implementation of an innovation at the clarifying stage can lead to disastrous results. The clarifying stage consists of social construction. As the people in an organization talk about the innovation, they gradually gain a common understanding of it.

Step 1: Clarification of the purpose of the activity system.

In step 1, the activity system is analyzed to understand relevant contexts within which the activities occur and to understand the informants motivations and interpretations of what they perceive they need to accomplish.

Stage 4 was the point at which the Technology Office was in contact with several TCN departments who were seeking to use mLearning to meet their instructional needs. This occurred at the same time as the Technology Office was still developing the mLearning Demo App project. Andy and other Technology Office members were inspired by the number of SMEs interested in employing mobile devices as a way to meet their content delivery needs (data sources: Andy Schmid – Interview 2.10.12 and Andy Schmid - Email 2.10.12).

Several different departments, including College Outreach and the iTCN Area Team Leader for Francophone Africa, scheduled SMEs to meet with me when I arrived on-site at TCN (data sources: Andy Schmid – Team Conference Call 3.21.12 and Andy Schmid – Email 4.5.12). Our meeting purpose was to explore ways in which their content might be appropriately transformed for mobile devices. Andy received e-mails from department heads and SMEs all over TCN encouraging him to continue the mLearning Demo App project (data source: John Penny – Email 2.28.12). Many of them saw it as a perfect tool to bridge their current content delivery gaps (data sources: John Penny – Email 4.5.12, Sharon Richards – Interview 4.9.12, College Outreach Meeting 4.11.12, and RJ 4.12.12).

In step 1 multiple TCN departments were seeking to leverage mLearning to achieve the departmental objectives. As the department leaders and SMEs sought out support from the Technology Office and myself, a clearer understanding of mLearning began to develop organizationally.

Step 2: Analysis of the Activity System.

In step 2, the activity system is more described through the defining of the SUBJECTS, RULES in which they operate, the DIVISION OF LABOR that informs how they understand their roles, how the COMMUNITY(s) involved view the task, the GOALS that motivate the subjects, the

expected outcome of the activity (OBJECT) and how the members of the activity system communicate and interact.

Community. On April 5, 2012, John Penny, TCN's Chief Technology Officer (head of the Technology Office) reported to Andy that at a recent Global Operations VP meeting, one VP expressed an interest in an app to replace a laminated cue card that they gave leadership trainers. Trainers used this laminated card while on a phone call or even face-to-face to guide them in how to fulfill their tasks (data source: John Penny – Email 4.5.12).

College Outreach wanted an app to help college students with organizing events and sharing the Bible with their classmates. I met with a project manager from that department and he described a flashcard-type app that would have content available quickly for students to review in the moment. He was unclear as to how mobile might solve his other concerns about organizing groups of students. I suggested that he use existing social media to resolve his event organizing concern (data sources: College Outreach Meeting 4.11.12, and RJ 4.12.12). Also, I shared with him a mobile-app-design keynote template that I had been using, which he could use to figure out what he wanted each app screen to show (data source: College Outreach Email – 4.11.12).

Author's Note: The request of the leadership trainers and the College Outreach PM to “transform” the laminated-cards and flashcards content into a mobile platform informed my understanding of how TCN (outside of the Technology Office) was perceiving practical applications of mobile devices to achieve their desired instructional goals. Were they defining “mLearning” similarly to then mLearning under adoption at the Technology Office? Or did they merely want to use mobile devices to deliver static images to their target audience? This was a clear part of Stage 4: Clarification - the meaning of the innovation for them is constructed over time through a social process of human interaction (Rogers, 2003). (data source: RJ 4.11.12).

Subjects. Sharon Richards, a project manager in the Leader Movements department, wanted to launch an app in Francophone Africa (data source: Sharon Richards – Interview 4.9.12). From February 10, 2012 up to my arrival on-site (4.9.12), Andy, Laurin, and I had many conversations off-site and on-site with Sharon regarding her desire to use mLearning (Figure 4.22) (data sources: Andy Schmid – Email 2.10.12, 2.24.12, 3.22.12, 4.5.12; Laurin Graves – Emails 3.23.12; Micah Shippee – Email 3.23.12; Sharon Richards – Email 2.25.12).

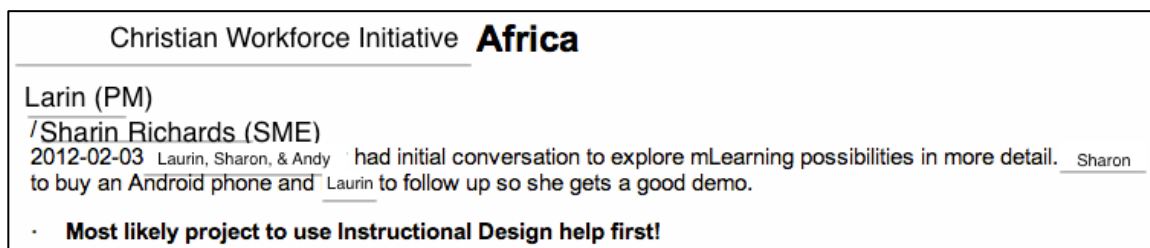


Figure 4.22 Christian Workforce Initiative original app plan (data source: Andy Schmid – Emails 2.10.12).

It was decided that Laurin would be the PM for the Christian Workforce project (data source: Andy Schmid – Email 3.22.12). Leader Movements was geared toward users in the workforce. These users were from all over the world and were not involved in any traditional ministry; rather they were professionals from every aspect of life. Leader Movements offered a two- to three-day conference, in over 50 cities around the world, for training on how to be more effective in their workplace and communities. Sharon highlighted one such location in Francophone Africa as her first choice of a place to release an app (data sources: Sharon Richards – Interview 4.9.12). Sharon believed Francophone Africa was the place of greatest need and had the most potential to attract financial support to fulfill that need. Sharon wanted to release the app eventually to all the trainers and trainees the world over. Sharon believed that a universal app for her department would help to standardize their content and vocabulary. She reported that in Francophone Africa users had great difficulty getting access to on-site training due to time,

distance, and cost constraints (data source: Sharon Richards – Interview 4.9.12). Sharon surveyed her trainers and users to find out whether they saw mobile as a potential solution. All participants thought it would be a perfect tool; however, some said that they would not have regular Internet access.

Rules. Sharon procured funding for this new project via a grant that she had written (data source: Sharon Richards – Email 2.25.12) this included funds for 60 to 65 android phones (data source: Sharon Richards – Interview 4.9.12). These phones would be preloaded with the new training app, to be called the Christian Workforce Initiative (CWI). Work began immediately on transforming Sharon’s training content for deployment through Knowledgegey’s Roots app. Like the Technology Office, Sharon planned for a launch date of June 15, 2012, to coincide with the TCN Global Leadership Meeting; it would be the perfect time to introduce her app and to network to secure more funding (data sources: Sharon Richards – Interview 4.9.12).

Division of Labor. Work to be complete during our one-week on-site visit was outlined by Nick Tred (data source: Nick Tred – Email 4.6.12) in his TCN mLearning Schedule (Figure 4.23).

TCN mLearning Schedule

Sunday, April 8

1:12p MCO Micah arrives via Jetblue 661 (Nick p/u at 1:30)
 2:00p-8:00p Tred's home Easter dinner
 10:00p MCO Aaron arrive via Delta 1223
 Aaron rents car and goes to Wycliffe
 (suggest you stop at grocery store for breakfast supplies)

Monday, April 9

9:00a-10:00a TCN Breakfast on your own
 Tech Off. conf. rm Moring prayer at TCN

10:30a-12:00p Tech Off. conf. rm Nick/Andy/Micah/Aaron/Rory work on
 Course 1 script

11:46a- MCO AJ arrives via Delta 2074 (Aaron or Mike to p/u)
 12:00p-1:00p TCN café Lunch

1:30p-5:00p Tech Off. conf. rm Nick/Andy/Micah/Aaron/AJ/Rory work on
 Course 1 script

2:00p-3:00p TCN Micah/ Laurin meet with Sharon about a mLearn
 project

6:00p-8:00p BBQ Dinner

Tuesday, April 10

Breakfast on your own

9:00a-10:30a mLMS HQ Nick/Mike/Micah/AJ Client App design

11:00a-12:00p TBD Lunch

1:30p-5:00p Tech Off. conf. rm Course 1 script, Course 2 structure, other
 mLearn elements

5:00p- on your own FREE

Wednesday, April 11

8:00a-9:00a TCN Film Studio Nick/Aaron/AJ/Rory Film setup

9:00a-12:00p TCN Film Studio Nick/Aaron/AJ/Rory Course 1 Shoot
 (others are welcome)

12:00p-1:00p TCN café Lunch

1:30p-2:30p TCN Nick/Micah/Aaron/AJ Life of Jesus Christ FILM Tour

3:00p-5:00p TCN Nick/AJ/Rory Edit Course 1 and 2

3:00p-5:00p Tech Off. conf. rm Andy /Micah Discuss other mLearn projects

6:00p-9:00p Downtown Dinner, shopping and dessert

Thursday, April 12

9:00a-12:00p Tech Off. conf. rm Editing, mLearn element design, etc.

12:00p-1:00p TCN café Lunch

1:30p-5:00p TCN Editing, mLearn element design, etc.

7:15p- Downtown Corporate 5k (arrive by 6:15p) - Box dinner
 afterward

Friday, April 13

9:00a-12:00p TCN Editing, mLearn element design, etc.

11:30p-12:30p TCN café Lunch

1:00p-2:30p Tech Off. conf. rm wrap-up

3:56p AJ departs via Delta 1979

5:20p Micah departs via Jetblue 658

April 16-20

Aaron works on Course 3 and final edits for Course 1 and 2

Figure 4.23 TCN mLearning Schedule

The detailed plan highlighted how we predicted the workweek to go including some idea of what the division of labor might actually look like. April 11 from 3-5pm was blocked off for Andy and I to speak with other departments about mLearning.

Object. The week's schedule (data source: Nick Tred – Email 4.6.12) arranged for us was designed to accelerate the production of content for our mLearning demo course (three-course structure).

Goal. Shortly after my arrival on April 9, Laurin received an e-mail message that Dr. Rob Garnet, VP of Leader Movements (and Sharon's boss), wanted to meet with me (data source: Laurin Graves – Email 4.9.12). Laurin and Andy seemed rather nervous about the meeting since the VP was an important figure at TCN (data sources: Andy Schmid – Email 4.9.12 and RJ 4.11.12). Laurin and I went to meet with him in a different office area on the campus. From my perspective Dr. Garnet was a pleasant older man who expressed appreciation that someone like me (non-TCN) was interested in working with them (data source: RJ 4.11.12). He stated the theme that I had been hearing from others—that mLearning had great potential—and he wanted to see the project we were working on be successful (data source: Rob Garnet - Interview 4.11.12). Following our 15-minute meeting, Laurin reported to Andy all that was said, and both were energized by the support of such a high-ranking VP. Later that day Laurin confided in me that she was very concerned about not meeting Dr. Garnet's expectations for delivering a successful product (data sources: Laurin Grave – Meeting 4.11.12 and RJ 4.12.12). Other departments were reportedly motivated even without our demo app (data sources: John Penny – Email 4.5.12, Sharon Richards – Interview 4.9.12, College Outreach Meeting 4.11.12, and RJ 4.12.12).

In step 2, interested department leaders and SMEs (SUBJECTS and COMMUNITY) were introduced to me to have a discussion about mLearning (GOAL). Time was set-aside for me to meet with them (DIVISION OF LABOR). Parallel with this, our mLearning team was making plans for completion of our mLearning demo course (OBJECT) through an on-site plan developed by Nick Tred (DIVISION OF LABOR).

Step 3: Analysis of the Activity Structure.

In step 3, the activity system's actual work is described as a shift from step 2 where the perceived work is discussed. This step will explain the transformation of the project's objectives (OBJECT), roles of the SUBJECTS and how the DIVISION OF LABOR actually functioned.

Division of Labor. During our on-site week at TCN headquarters, we continued with our actionable items for producing content through the plan created by Nick (Figure 4.19 TCN mLearning Schedule). We also completed video production for lesson 1, now titled: "Why mLearning?" We focused on any final edits to the script I had written, with AJ and Aaron offering suggestions as to how it might be visualized using our actor, props, and background. Nick had secured production space and equipment from his friends at the *Life of Jesus Christ* (TCN film production) department. A green screen, high definition (HD) cameras, teleprompter, and additional sound equipment were brought in to our production space (data source: RJ 4.11.12). I was very much impressed by Nick's ability to quickly secure all of this equipment from another TCN department. Once the video shoot was complete, AJ set to work editing and adding soundtracks that might work (data source: AJ Fortune – Email 4.12.12). Additionally, as we previously discussed, AJ edited video from TCN's *Foundational Principles*, particularly the content titled "What Acts 2 Teaches Us" (data source: Nick Tred – Email 3.26.12) This content was provided to us for lesson 2, which we now titled: "Transforming Your Content." The video

was segmented to fit several mini-lessons, with quizzes for each segment all prepared to be inserted into Roots. I would work on the mini-lessons when I returned home the following week (data source: Team Conference Call – 4.19.12). We would spend time reviewing his work over the next few days (data source: Micah Shippee – Email 4.13.12)

Subjects. The week concluded with the team feeling as though we had accomplished a great deal (data sources: Andy Schmid – Email 4.13.12; Micah Shippee – Email 4.13.12; AJ Fortune – Email 4.123.12; Nick Tred – Email 4.17.12) and that we were well on our way to producing a powerful app using Knowledgey’s Roots app (data source: Nick Tred – Email 4.17.12). Andy concluded the week with a quick e-mail:

“Thank you for your work this week! I was very impressed by what you all accomplished. This app is going to be a great thing toward moving mobile learning forward in The Christian Network. Thank you for your service to the Lord. Andy” (data sources: Andy Schmid – Email 4.13.12).

Object. By April 7, 2012, I had completed lesson 2’s textual content and quizzes and all content for lesson 3. I e-mailed them to the team. Nick replied, “Great job, Micah. I will add these to the Knowledgey system as we get closer” (data source: Nick Tred – Email 4.17.12). The project team was in full engagement mode working on our three-lesson plan. For a week the team went back and forth making comments about how best to edit and produce the video and quiz media. Finally, on April 23, 2012, Nick e-mailed the team:

Thanks for the input. It is helpful to catalog this feedback, even if it is beyond the edits of the current release. We may revisit some of this after the app gets published and we start to observe the response from our intended audience. (data source: Nick Tred – Team Email 4.23.12)

In step 3, development of video content (DIVISION OF LABOR) for the mLearning demo course (OBJECT) was central to the work done by AJ and Aaron (SUBJECTS). Much of my work had been done prior to the on-site work through script writing and lesson planning with the existing content. On-site I would consult on the project development and meet with other department leaders and SMEs about how they might use mLearning to achieve their objectives.

Step 4: Analysis of the Mediators.

In step 4, the TOOLS used are described specifically in their availability and change over time is explained. Also, this step explores any changes in roles and RULES in the activity system. This step in the final stage of this study explores the one constant tool throughout the study, Knowledgey's mobile LMS. As discussed in all of the stages, Knowledgey's product was being relied upon as the Technology Office's mobile delivery solution. The Roots app, a second iteration of their product (formerly iPub) would be used to deploy our mLearning demo course and would be used to produce other courses for TCN's various departments.

Rules. Much of our work on Monday April 9, 2012, was designing wireframes and content layout (Figure 4.24) in a manner that would best demonstrate the transformation of content into a mobile platform (data source: RJ 4.9.12). This was done in preparation for our meeting the next day at Dr. Buck's Knowledgey headquarters (also located in Orlando, Florida).

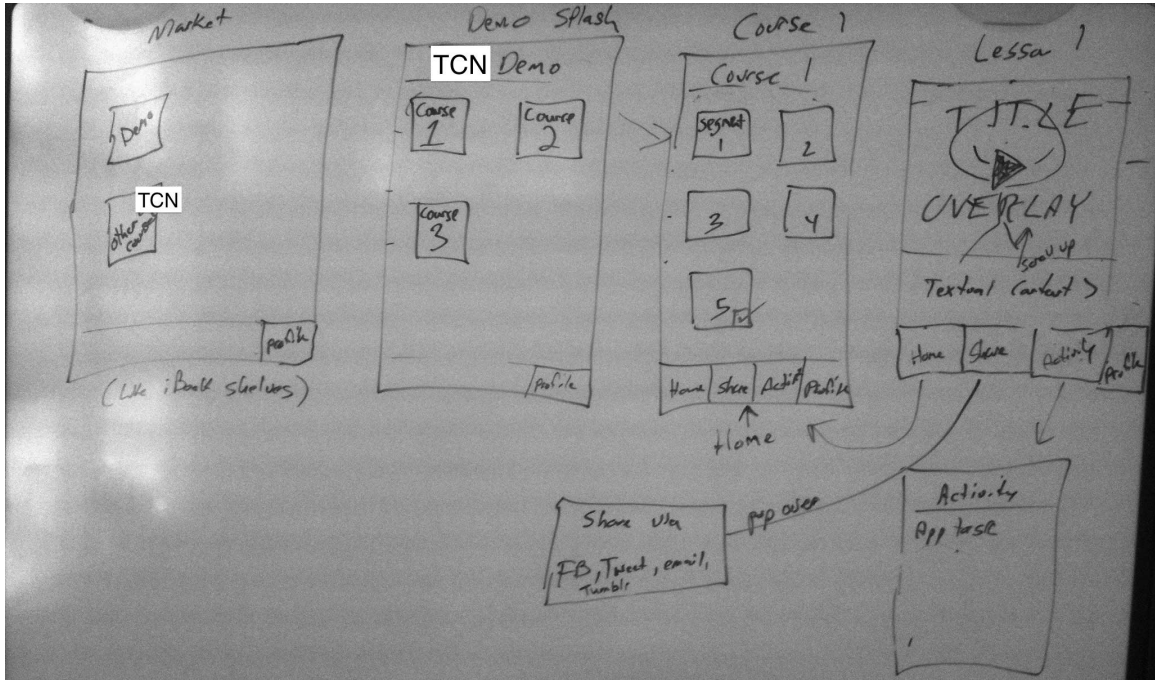


Figure 4.24 App wire frames

Tools. The following morning we went to the Knowledgey office to discuss the development of our mobile app (data source: Knowledgey Meeting 4.10.12). Dr. Buck and Andy, being well acquainted, were casual with each other. We discussed several design features that Knowledgey offered in their other apps as examples of what we did and did not want in ours (data source: RJ 4.11.12). Dr. Buck was not ready for our requests. I raised a point about “This is me,” an app that Andy and Dr. Buck often used as an example (data sources: Andy Schmid – Email 2.10.12 and Team Conference Call 3.21.12). I felt that it had a very cumbersome navigation system, which I described as “going down a navigational rabbit hole” and that I felt we should “avoid navigational overload” (data source: Knowledgey Meeting 4.10.12). A group conversation ensued regarding intuitive design, user interface (UI), and user experience (UX).

I expressed concern over the current Knowledgey and the proposed Roots interface, which I felt might hinder user adoption. Dr. Buck cordially pointed out that they hoped to resolve these issues soon. He stated that Knowledgey would finish the Roots app by April 20, 2012, and

we could input our content immediately (data source: Knowledgey Meeting 4.10.12). When we returned to TCN HQ we had a lengthy discussion about UX.

Author's Note: Andy and Nick reported to me after the meeting with Dr. Buck that they appreciated my frankness regarding my perceived UI design flaw. Andy had known Dr. Buck for several years and was willing to accept the difficult interface, realizing his users are not. As an outsider, I brought issues like this to the forefront since I felt it would lead to a better product. (data source: RJ 4.11.12).

The evening of April 10, following our Knowledgey meeting, Andy sent an email to Dr. Buck listing a series of 'action points' and a request for confirmation on the proposed deadlines:

Action Points

- * TCN to give Knowledgey some artwork starting points by Friday April 13.
- * Knowledgey to mock-up artwork for TCN approval by Friday April 20.

[Finalize artwork for demo app by Friday April 27.]

- * Increase height of rows in default client navigation. Use the "Settings" spacing rather than the "Read" spacing (from *Daily Devotionals* app) – by Friday April 27.
- * Further conversations about details of badges, progress, notes, transcripts, etc. are needed. Complete conversation by April 27 – David Buck, Nick Tred, Andy Schmid. Andy will schedule.
- * Navigation feature change request: Upon selecting Course 1 - jump to first segment content. Back button goes to Table of Contents after initial start. Goal: minimize navigation to get to content quickly. Client modification done by Friday May 4.

Figure 4.25 Andy Schmid - Knowledgey Meeting Follow-up Email (data source: Andy Schmid – Email 4.10.12)

Dr. Buck replied to Andy that these proposed deadlines were “All good, except the navigation change... I need to do a little research before I can firm up a release date for that feature...” (data source: Dr. Buck – Email 4.11.12). Nick followed up both emails with an e-mail that explained what we were thinking about the navigational changes (Figure 4.26):

Dr. Buck,

We had a lot of conversation about the client interface design. I would like to add dates for wireframes of the screen designs for the client. I attached our original icon drive sketches. We feel strongly that the UI is more part of the learning process in the mobile environment than what may be true in eLearning or textbooks. Therefore we want to work with your team to design the screen layouts, page transitions and navigational structure.

What date can we set for an initial wireframe showing layout, functions and navigations—while leaving the art and colors for a later round?

Nick Tred

Figure 4.26 Nick Tred - Knowledgey Meeting Follow-up Email (data source: Nick Tred - Email 4.11.12)

Nick sent Dr. Buck the wireframes we had generated as a team prior to going to the Knowledgey office (Figure 24. App wire frames) (data source: Nick Tred - Email 4.11.12). A meeting was scheduled for May 8, 2012, for Andy and Nick with Dr. Buck “to discuss the client design and functionality.” It became clear that Andy was torn; his personal experience and time with Dr. Buck during the MTP project had made them relatively close and comfortable with each other. Now we were questioning the proposed product that Dr. Buck was supplying us, and conversations and direction from Nick, were less casual with the Knowledgey team.

On May 8, 2012, Andy and Nick met with Dr. Buck to discuss design concerns as well as deliverable deadlines (data source: Nick Tred – Email 4.30.12). Andy e-mailed the mLearning

project team as well as other TCN staff (data source: Andy Schmid – Email 5.9.12). Included in the agreed upon details was Sharon’s CWI project (Figure 4.27).

App Name	Time Period	Number of Days	Phase
Demo Course	May 14 - May 25	12	build app
	May 25 - May 31	7	test app
	June 1 - June 15	15	beta release (non-Market)
	June 16 - June 30	15	fix and modify app
	July 1 - July 15	15	"private" Market release
			64
Daily Devotional	May 15 - May 29	15	build app
	May 30 - June 13	15	test app
	June 14 - June 30	17	beta release (non-Market)
	July 1 - July 15	15	fix and modify app
	July 16 - July 31	16	"private" Market release
			78
CWI	June 1 - June 15	15	build app
	June 16 - June 30	15	test app
	July 1 - July 15	15	beta release (non-Market)
	July 16 - July 31	16	fix and modify app
	Aug 1 - Aug 15	15	"private" Market release
			76
TCN College	June 16 - June 30	15	build app
	July 1 - July 15	15	test app
	July 16 - July 31	16	beta release (non-Market)
	Aug 1 - Aug 15	15	fix and modify app
	Aug 16 - Aug 31	16	"private" Market release
			77

Figure 4.27 Knowledgegy app publishing schedule (data source: Andy Schmid – Email 5.9.12)

A follow up e-mail from Andy and Mike’s boss, John Penny, the Chief Technology Officer, reiterated the relevance of the timeline (Figure 4.28):

Andy, thanks for putting this schedule together. If I am reading it correctly, we can expect to have beta versions of the Demo course and Daily Devotional in time for the Global Leadership Meeting June 18–22. This would be a very powerful deliverable. We would then have 3 apps that others and I can use to demonstrate a variety of types of mLearning.

Will these be Android only, or will iPhone versions be available now?
John

Figure 4.28 John Penny's Feedback on Knowledgy's Publishing Schedule (data source: John Penny - Email 5.10.12)

The mention of “three apps” caused Andy to revisit the April 5 e-mail from John requesting a leadership-training app (data sources: John Penny – Email 4.5.12 and Andy Schmid – Email 5.15.12). This proposed app would replace a laminated cue card that they gave leadership trainers. A relatively simple design was suggested: turning the card into high quality images that could work as flashcards (data source: John Penny – Email 4.5.12). Andy would add the training content into the Knowledgy system (data source: Andy Schmid – Email 5.15.12).

Sharon's CWI App would not be ready for the Global Leadership Meeting (data source: CWI Team Meeting: Laurin Graves, Sharon Richards, and Micah Shippee – 5.3.12). However we moved forward on her work and I created a presentation for her to potentially use to explain at Global Leadership Meeting what she wanted to do with the app (data source: Appendix 11. CWI Project Keynote Presentation). The file was e-mailed to Sharon, Andy, and Laurin on May 29, 2012 (data source: Micah Shippee – Email 5.29.12). Sharon and Andy replied within 24 hours and were very positive in their feedback (data sources: Andy Schmid – Email 5.30.12 and Sharon Richards – Email 5.30.12).

Laurin, the CWI project PM, did not reply, so I e-mailed her a follow-up on June 5 asking for feedback and more direction on the project (data source: Micah Shippee – Email 6.5.12).

Laurin’s reply follows (Figure 4.29):

Hi Micah,
The draft you sent was amazing. Thank you! Right now I am working on adding some content in to the Knowledgegy backend. When Sharon comes to Orlando the week of June 18, we will discuss in more detail your wireframe and hopefully see some of that content structure on an app. I’m glad you have the ideos phone! At this stage, the app is not ready to be viewed on Android, but we should be able to see a beta version of it on iPhone.

I have been doing a poor job of keeping you in the loop. I am sorry for that! Please know that your work is incredibly valuable and I need you!! My personality is such that I tend to have many things in my head and getting all of it down on paper and communicated with the appropriate parties is a continual challenge. I intend to get better at this.

Is school out? Sharon and I have not yet set up a time for the week of June 18 but including you in on video Skype would be ideal if you are available.

Laurin

Figure 4.29 Laurin Grave CWI Feedback (data source: Laurin Graves - Email 6.5.12)

Author’s Note: Throughout the course of my work, Laurin was frequently traveling on TCN Technology Office business. Often her e-mail would send an automated response to my e-mails that she was out of the office. This made it difficult to maintain timely productivity and Andy regularly provided direction that I was not getting from Laurin. (data source: RJ 9.28.12).

In step 4, our project team remained focus on the use of Knowledgegy’s mobile LMS (RULES).

We expressed some dissatisfaction with the existing product and requested details about when we would be able to see the new interface, Roots (TOOLS).

Step 5: Analysis of the context.

In step 5, the activity system's SUBJECTS are analyzed to develop their beliefs about the project as well as the methods and TOOLS they find useful in the projects development. This step continues to describe the DIVISION OF LABOR as it may shift over time.

On May 23, 2012, Nick sent an update out to the mLearning Demo App project team informing us of the status of our work (Figure 4.30):

It has been a while since I have updated you on the status of the Demo App. All the content has been completed and loaded into Knowledgegey's backend system, called iPub. Knowledgegey started reviewing the content yesterday and will have a basic wireframe or mockup for us by the end of the week.

We decided to use the generic navigation structure from Knowledgegey for this app. The reasoning is that we want to continue to add features to the Demo as they are made available by Knowledgegey. Thus the Demo App will be an organic demo that shows more possibilities over time. This will serve the purposes of TCN/Technology Office better than have a slick custom interface that must be revamped as new features come online.

I will let you know when we have something. We have found that Knowledgegey is able to release development iPhone apps much faster. I can set up any of you as a tester if you want.

Nick Tred

Figure 4.30 Nick's mLearning Project Update (data source: Nick Tred - Team Email 5.23.12)

Subjects. It appeared that Nick and Andy had capitulated to Knowledgegey's existing interface that we had all agreed was not intuitive for users. The iPub (standard) interface was Knowledgegey's original app, not the new Roots app that was promised. Nick reinforced this impression in a June 5, 2012 email:

We decided that the best approach for the future with Knowledgegey is to help them develop their standard client interface, rather than asking for custom designs. We have

seen several iterations of this client, but are now waiting for the release June 18 of the initial stable client . . . we should be able to see the fruits of our labors in a couple weeks.

(data source: Nick Tred – Team Email 6.5.12)

A few weeks went by and attempts were unsuccessfully made to add me as a ‘tester,’ for the Knowledgey product in Apple’s Test Flight app (used to test apps before they are released). (data sources: Nick Tred – Email 5.23.12, 6.5.12, Micah Shippee – Email 6.5.12, Andy Schmid – Email 6.5.12).

I emailed Laurin for a status up date on the CWI project (data source: Micah Shippee – Email 6.28.12), Laurin replied and filled me in on what was going on in multiple aspects of our work (Figure 4.31):

Hi Micah,

Thanks for checking in. We are finishing up the last day of a weeklong conference with the Global Leadership Team (this was the focus for the mLearning demo app you worked on). I met with Sharon on Tuesday afternoon here at the conference and things are moving along. She loved your wireframe and showed it to their leadership team yesterday. I haven't yet connected with her today to find out how it was received.

What you may not know is that our software company, Knowledgegey, is moving a little slower than what we need. This week, Andy and Nick Tred went to San Jose for the mLearnCon conference to see other options that are out there. I spoke with Andy last night and he seems to think there is a good solution for CWI using HTML5. Hopefully that means we can have more options for interactivity than what the current platform is delivering at this stage.

Hey, right now you are being talked about from the platform to all the Global Team! Rob Garnet (you met him, the Vice President for Leader Movements) is describing this mobile app that's coming by the end of the year. Exciting!!!

All this is to say, Sharon is smack dab in the middle of the content creation process. She has been filming leaders this week to make short intro clips. Your expertise in helping shape the content for this area of the world (with very little bandwidth) will be so helpful.

Sharon - how would you like to move forward with Micah?

Laurin

Figure 4.31 Laurin's CWI and mLearning update (data source: Laurin Graves - Email 6.22.12)

Author's Note: Laurin's CWI and mLearning update email (6.22.12) highlighted several important aspects of mLearning adoption at TCN. First, that Knowledgegey's work was no longer being solely relied upon. Nick and Andy were looking for a better mobile delivery solution at mLearnCon 2012 (ELearning Guild, 2012). mLearnCon 2012 included featured sessions led by David Metcalf, Clark Quinn, and Geoff Stead... as a researcher I regret not asking my informants about the event and what they might have learned. Second, Laurin's email identified Rob Garnet (VP at TCN) speaking to the Global Team about the mLearning app and mentioning me (I did not uncover if this was a generic mention of our work or my specific name). Rob's speech demonstrated TCN as a COMMUNITY continuing to see value in mLearning (TOOL). Finally, Laurin's update revealed Sharon's (SUBJECT and SME) persistence in moving forward in the development of an mLearning app for her work with CWI. Again, showing a perceived value in mLearning through a willingness to continue to try adoption even with all of the delays. (data source: Laurin Graves - Email 6.22.12).

Tools. On June 28, 2012, Nick e-mailed me (cc: Andy) regarding Knowledgegey’s current production of a generic course player, and that the Technology Office was “evaluating other authoring and delivery tools as well” (data source: Nick Tred - Team Email 6.28.12) AJ and Aaron were not included in these conversations. On July 16, 2012, Andy e-mailed the whole project team (Figure 4.32):

Aaron, Micah, and AJ,

I’m sorry we haven’t kept you better informed on things.

Here’s a short summary: Knowledgegey is six months late delivering software. They missed a key deadline mid-June of having software we could show our global leaders. We have decided to take 60 days and investigate other options for producing mobile learning applications and make a decision at the end of August about what our best path forward is.

The demo app content has been our best reference point. We have plugged it into a few different environments in our research. And we are still waiting to have an acceptable version of it in Knowledgegey.

Here is a link to the latest Android version of the course player, now called “Roots”. It is not ready for prime time, and you should use it under normal “non-disclosure” terms.

Link to Android Roots Client v1.08

I have to run, but I can explain more tomorrow if you have questions.

Andy

Figure 4.32 Andy’s Roots Update (data source: Andy Schmid - Team Email 7.16.12)

Andy had made it clear that their efforts with Knowledgegey had not yielded the necessary results to justify a continued relationship on this specific project. Several days later, Andy followed up (data source: Andy Schmid – Email 7.18.12), stating that they were exploring several options, he stated one of those options was “finding an app developer to build an app for the Demo Course independently.” However, he reiterated that the Technology Office was seeking to be able to facilitate deployment of mLearning throughout TCN. This needed to be done in the most

efficient manner possible, and custom app builds on every project was just not financially feasible. (data source: Andy Schmid – Email 7.18.12).

Meanwhile, as far as I knew Sharon’s CWI project was still under development, but I hadn’t heard from Laurin or Sharon in over a month. I had given Sharon some ideas about the types of content decisions an SME like her would need to make regarding textual content (data source: Micah Shippee – Email 5.29.12).

Division of Labor. The last time I heard about Sharon’s progress up to this point Laurin reported that Sharon was shooting video of authentic examples of community leaders involved with her department (data source: Laurin Grave – Email 6.22.12). I sent an e-mail to Laurin and Andy asking for an update on the project (data source: Micah Shippee – Email 8.21.12). Andy’s response revealed that the date of the mLearning Demo App project was tied to that of the CWI app (Figure 4.33):

Micah,

Thank you for your patience, and I apologize for our silence.

Since June we have switched gears with Knowledgegy and are still waiting on a viable mLearning system beyond what we have had since January, the old version being used in Africa.

Sharon is moving ahead, but she is behind schedule, too. She remains eager to work with you and take any guidance you can provide.

One of our challenges is that we do not yet know what the final, or near final, version of the software will be able to do. Therefore it is difficult to let you know what options you have as you design creative ways for how the content is learned.

We met with Sharon last week and agreed to stay in touch with each other as new developments occur. We have not been able to maintain a schedule estimate, though, as software development has been so long delayed and the CWI schedule has also been delayed.

Where might this affect you?

Can we (you, Laurin, me) have a conference call and talk about this one? What time works for you this school year?

Andy

Figure 4.33 Andy's Knowledgegy and CWI update (data source: Andy Schmid - Email 8.21.12)

The next day Andy asked Laurin to facilitate a conference call between herself, Sharon, and I (data source: Andy Schmid – Email 8.22.12). Not until nine days later, did she respond stating that I should directly connect with Sharon to work with her content (data source: Laurin Graves 8.31.12).

Tools. According to Laurin, at that time the Technology Office was “heavily investigating” Moodle Mobile as their solution (data source: Laurin Graves – Email 8.31.12).

Sharon and I did not immediately connect, so I waited for direction from the Technology Office.

On September 19, 2012 Andy e-mailed that they had been getting close to a solution: the products Moodle and GoMo would potentially both be used to deliver mobile content. Andy said a plan was in the works that would allow me to work with GoMo on the Demo App (data source: Andy Schmid – Email 9.19.12). This would help me to learn how the product worked so that I could then take my newfound skill set and apply it to Sharon’s CWI project. GoMo was described as:

GoMo Learning is Epic’s multi-device e-learning and mobile learning authoring tool. It delivers the same content to multiple platforms, optimizing it to each kind of device. Publish mobile learning apps to Apple, Android and BlackBerry devices, and create multi-device e-learning for desktops, smartphones and tablets. GoMo comes with a range of different assets, so you’ll have all you need to create your own engaging e-learning and mobile learning apps in-house. (Pappas, 2013).

Division of Labor. Nick confirmed Andy’s plan and proposed a new role that extended

Micah,

The idea of the “mentor” is that we see a need for more people with your skills and abilities to enable The Christian Network to successfully utilize mobile learning. We want to begin developing a team of volunteers and internal staff who have the skills needed to assist our various departments to utilize the mobile learning platform. This will take people with instructional design skills and technology acumen. This is a long-term vision and one that we have no specific action steps.

We are close to setting up an account with GoMo. While we want to use the Demo Course content for you to learn and evaluate the capabilities of GoMo, we have not decided on what the next project will be. Some of that is dependent on what you “learn” during the Demo Course build. There are 2 projects that are likely to be the first to use your skills and learning.

One is the CWI content that you have been interacting with over the past several months. While this one has strong leadership from the initiators, it does not have much actual content developed yet. This can be good in the sense that they are not trying to fit a square peg in a round mobile hole. But it also means that there is not much for you to know if GoMo will meet their needs. It would most likely be them developing content to fit the platform. Again this could be positive as far as moving the project along with minimal bumps.

The second project is one that involves making a mobile version of an online discipleship program used by our Middle Eastern Department. They are very motivated – in fact their slogan for the course is “Discipleship is anywhere anytime.” They have all the content – text, images and video – and it is very mobile ready (500 words max per lesson and <3 min videos). The challenge will be that all the content is in Arabic and some of the leadership people do not speak fluent English. You can see their website (Google translated) content at translate.google.com/xxxxxxxxxxxxx

my instructional design work to include mentorship (data source: Nick Tred – Email 9.20.12). Now, according to Nick, I would have “a role as technology evaluator for the GoMo solution, instructional design expert for building the app, and mentor for raising up more staff and volunteers like you to help our ministries build solutions in the GoMo platform” (data source: Nick Tred – Email 9.20.12). I responded that the idea sounded interesting and that I’d be interested in learning more about it. Nick explained that this role was needed at TCN (Figure 4.34):

Figure 4.34 Nick’s Mentor Offer (data source: Nick Tred - Email 9.27.12)

Author’s Note: It is important to note that I welcomed the request for me to take on more work with TCN and the Technology Office. I had been seeking opportunities like this because of my research interests and my eagerness to learn this skill set through participation in these projects (data source: Micah Shippee – Email 9.20.12). However, it was becoming clear that the Technology Office was seeking a new champion for the mLearning cause at TCN. I believe initially that champion was Dr. Buck, and perhaps Andy (data source: RR 3.2.13). Now things had changed and they were looking for not only instructional design support, app building support, which Dr. Buck had done on the MTP, but also serve as a “mentor for raising up more staff and volunteers like you to help our departments build solutions in the GoMo platform” (data source: Nick Tred – Email 9.20.12). I explained that I was uncertain of my abilities to work with GoMo but that I would do my best (data sources: Micah Shippee – Email 9.20.12, 10.1.12, and 10.14.12).

On October 1, 2012, Nick laid out a plan whereby I would use the content from *Daily Devotionals* to experiment with GoMo’s features (data source: Nick Tred – Email 10.1.12). Nick and I used our iPhones to Facetime on October 5, 2012. We hadn’t talked face to face in a while; in fact, over the past few months my contact with Nick had been at a minimum. During the call he updated me on Knowledgegy’s delays, and said that if the Technology Office were to continue with Knowledgegy they would need to see a “solid product.” Also, Nick added that CWI was under a leadership change in their Francophone Africa branch. Although this was a “positive” change, it would lead to a state of “flux” for about a month. (data source: Nick Tred – Interview

10.5.12). Nick talked to me about “exporting LMS to SCORM” in order to “track activity.” He continued to say that maybe we could “integrate activity tracking with things like SCORM Cloud,” an online “learning record store.” His use of up-to-date mobile jargon was evidence of his growth in his 10 months at the Technology Office. Nick had contacted GoMo and believed the UK based group was relatively new, not yet having “developed a full range of things to serve their customers.” Nick and Andy wanted GoMo to be a mobile solution that would allow TCN’s many SMEs (like Sharon) to upload their own content with some minor support from the Technology Office (GOAL). We ended the call with the agreement that I would set to work on GoMo and the Daily Devotional content, with a follow-up call in a week to include Andy, I downloaded the “GoMo Review App” and began my work (data source: RJ 10.5.12).

Author’s Note: At mLearnCon 2012 SCORM was one of the primary topics discussed (Brandon, 2012), this may have triggered Nick’s use of the word.

Nick, Andy, and I held a phone conference (data source: Team Conference Call 10.12.12) where I explained that I had spent about 2.5 hours uploading content into it and trying out its various features and that I frankly was not impressed. I felt that GoMo’s easy-build promises were not as achievable as they claimed: “You only need basic computer knowledge. If you use programmes like MS Word and PowerPoint, then you will be able to use GoMo with no problems. It has an easy intuitive interface” (What Skills Do I Need to Use GoMo? 2012). I explained that if the Technology Office wanted SMEs with average to low-average technological skill to use this product, then GoMo’s “most complicated piece must be as simple as building a PowerPoint slide” and it clearly was not. Nick replied that this was not the “outcome” he “wanted.” I explained that perhaps GoMo could produce a template that would work for TCN. Without these templates and/or additional training, I explained that I honestly could not help build apps in this

way. (data source: Team Conference Call 10.12.12) . Andy summarized our “next steps” (Figure 4.35):

- | |
|--|
| <p>Next Steps</p> <p>a. Nick ask GoMo about demos. Built using platform? Built by GoMo staff or third party client?</p> <p>2. What is GoMo’s plans for developing training material? There is a big gap in what is available.</p> <p>3. The Technology Office evaluates this current reality and decides how to move forward.</p> <p>4. Micah will continue working in GoMo to see what else might develop.</p> |
|--|

Figure 4.35. Andy’s Next steps (data source: Andy Schmid – Email 10.12.12)

The frustration was clear in the call manifested through seconds of silence over the phone. (data source: Team Conference Call 10.12.12). I truly felt bad for these men who had worked very hard to find a good solution only to be met a second time with a company that was not able to deliver what they wanted, when they wanted it. I told Andy and Nick that I would continue to work with GoMo to see if I could realize a way that it might be useful. With additional searching, I found the “GoMo Learning Channel” on youtube.com, which included six episodes that explained how to build an app in GoMo. I e-mailed Nick and we agreed that I would again try GoMo but try to only using basic features like an SME would (data sources: Micah Shippee – Email 10.14.12 and Nick Tred – Email 10.14.12). Nick submitted an official contract from TCN to use GoMo (data source: Nick Tred – Interview 11.2.12).

Author’s Note: During this process I related to Nick some of the research I had been reading regarding the importance of good design and interface as it related to individual user adoption of our mLearning deliverables: “I read in Everett Rogers’ ‘Diffusion of Innovation,’ that users are more likely to adopt an innovation (like mLearning) if they are able to try it first. For example, our GoMo trial allows us to see all their features and makes us more likely to appreciate what their product can do for us. If designed well, I believe users will WANT to "sign up" in order to have a greater experience with the product they've had some trial experience with. Additionally, with our users comes a form of "brand recognition" that should make

users more comfortable to give out personal information since they trust the "brand." The "YouVersion" Bible app (life church) asks for you to sign up with an account, they have a very high adoption rate asking for some personal information, they must be doing something right.” (data source: Micah Shippee – Email 10.26.12)

Community. On October 12, 2012 Andy asked if I had heard from Sharon, since he reported that Laurin had not heard from her. I also had not (data source: Team Conference Call 10.12.12).

Nick reported that the Middle Eastern Department had initiated more interest in an app and that I should stay tuned (data source: Nick Tred – Email 9.27.12). While I worked on GoMo, Nick sent me a tantalizing e-mail regarding TCN’s Middle East Department on October 16, 2012 (Figure 4.36):

Micah,
I am considering a trip to Egypt in mid-November to help them learn GoMo and better understand their content and goals. Would you be available/willing to go with me? I think we could do it over a weekend, but it would most likely require 3 days off of school for you. Maybe something like Nov 15-22. This is just an idea, but I wanted to get your thoughts on possibility of joining me.

Nick

Figure 4.36 Nick’s Egypt Project (data source: Nick Tred - Email 10.16.12)

I replied that I would love to be a part of that experience but I was concerned about whether I was “worth the money”—after all, this seemed like a very expensive trip (data source: Micah Shippee – Email 10.17.12). Nick reassured me that I was capable (in his opinion) to “assist in equipping them to build an App in GoMo” (data source: Nick Tred –Email 10.17.12). I recognized that Nick was satisfied with what I had accomplished thus far with GoMo and perhaps he felt that an incentive like Egypt would motivate me to do more. Nick believed the Egypt Project team would probably be interested in content that was textual, video, and quizzes (data source: Nick Tred – Interview 10.22.12). Several days later Nick updated me on the Egypt

Project, we spoke about their discipleship site which had 5 courses each with 5-6 lessons that they wanted to use in an mLearning platform (data source: Nick Tred – Interview 11.2.12).

Due to political/social unrest in Egypt, the trip was delayed until January 2013. There was no more news on the Egypt trip until December 24, 2012, when Nick wrote an email (Figure 4.37) to Aaron and me (and Cc'd Andy):

Micah and Aaron,

I have taken the demo content you developed and the videos we shot, and created a learning app in the GoMo system. I have a couple technical issues to iron out. But the plan is to publish it as a native app at the beginning of January.

I explained to the Technology Office team that GoMo is a great system for very simple applications. But that it is not extensible beyond its basic functions. Also, I thought that the content from the short film, What Acts 2 teaches us, was much more beneficial to me as part of the app where it was combined with textual/image explanation, plus chunked into 6 lessons.

I am going to Egypt in mid-January to meet with the people who run their online discipleship site. The meeting is to do strategic planning with them. They still want to do a mobile app but this meeting is to evaluate their goals and what steps need to happen before building an app.

At the end of January we will be evaluating the new Knowledgey release. We also have a part of the Technology Office team researching the option of building our own platform. The meeting in Egypt as well as interactions we have had with other online discipleship initiatives will provide better field driven requirements as the basis for our evaluation.

Nick Tred
The Technology Office

Figure 4.37. Nick's Egypt Project Update (data source: Nick Tred - Email 12.24.12)

Through this e-mail I surmised that plans had changed and I would not be going to Egypt with Nick.

Three weeks later Andy sent out an e-mail (data source: Andy Schmid - Email 1.17.13) and updated me on Sharon's CWI project, Knowledgey's new product, Nick's trip to Egypt, and the status of our mLearning Demo App (Figure 4.38):

Micah,

Here's a quick update on things for you.

Sharon Richards recently came "back online" last week with her mobile learning project. We are hoping to meet with her after Feb 5 and see where she is at in her process. This may result in her wanting to engage your skills again.

On Feb 5 we also plan to make some decisions about our direction forward (see Nick's description of things below from before). We have access to Knowledgey's new software platform, and we now have a better understanding of what it will really take for us to provide useful, compelling mobile learning tools for TCN. Doing so is a larger challenge than we originally understood, so we have some decisions to make.

Nick Tred is in Egypt now, and when he returns we will discuss what he learned from our staff members there and what we can do to move them forward. I'm not sure of any details of what that might look like.

The mLearning demo app is finally in production with GoMo. After they send us the finished app we will submit to Apple.

And we have decided to call our efforts, "Mobile Witness" going forward.

We'll stay in touch.

Andy

Figure 4.38 Andy's Final Update (data source: Andy Schmid - Email 1.17.13)

In step 5, the mLearning demo project and CWI project continued (OBJECTS). Project Managers Nick Tred and Laurin Graves (SUBJECTS) exhibited different leadership styles. Nick's feedback was quick and directive while Laurin's was infrequent and required prompting (DIVISION OF LABOR). Andy Schmid remained a constant contact throughout this stage (SUBJECT) his role was not clearly defined in the two projects (DIVISION OF LABOR). Knowledgey failed to deliver on the deadlines given to them (TOOLS). Nick and Andy sought

an alternative (DIVISION OF LABOR) and chose to use GoMo (TOOLS). Nick and Andy requested that I become a mentor (SUBJECT and DIVISION OF LABOR) in the mLearning efforts.

Step 6: Analysis of Activity System Dynamics.

In step 6, the final step, the interaction of the components of the system are examined to reveal any contradictions or inconsistencies, specifically, contradictions within the needs of the target audience and the objectives of the project. Additionally, in this step historical factors examining past practice are described.

Stage 4’s interactions and activity in the second stage of implementation (CLARIFYING) of the mLearning demo app project are depicted in Figure 4.39.

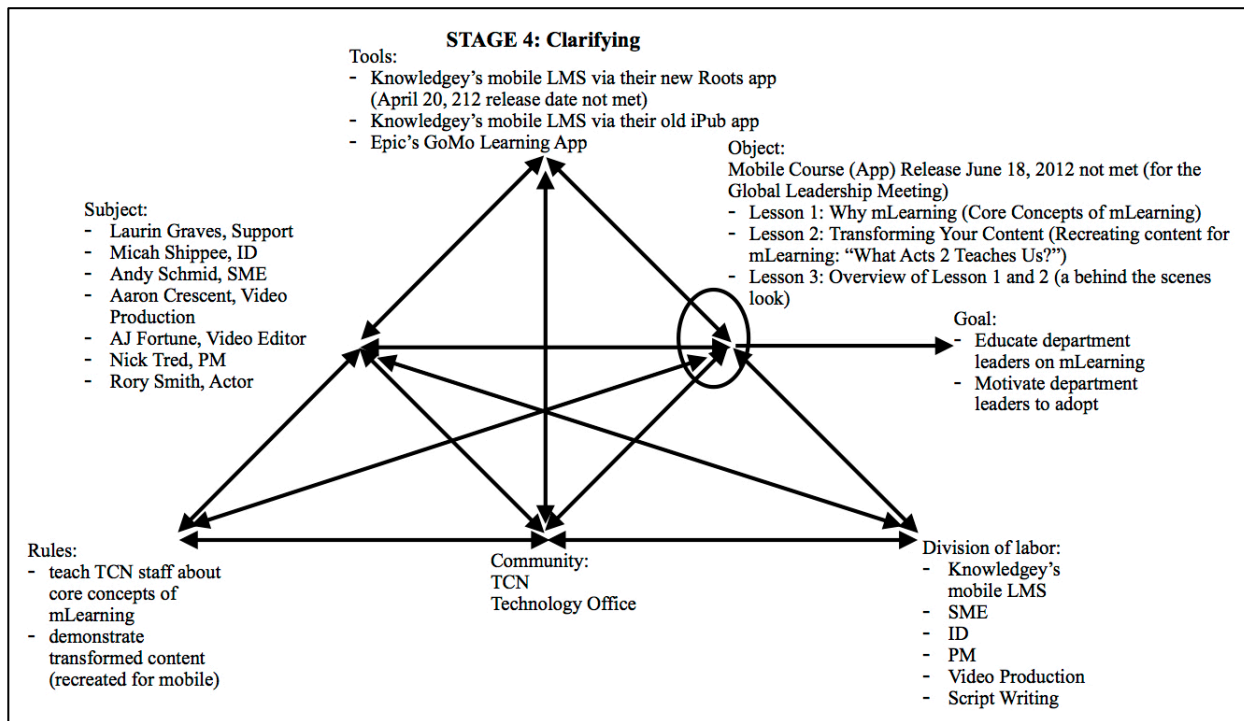


Figure 4.39 Stage 4 Activities

In stage 4, the only consistent component that remained was the TCN community.

Contradictions at stage 4 centered on Knowledgegey’s failed launch of a new mobile LMS called

Roots (TOOLS). In stage 3, a release date of June 15, 2012, was moved in stage 4 to June 18, 2012. Neither date was successfully met. This meant a major event, the Global Leadership Meeting, would be a missed opportunity for the Technology Office (COMMUNITY). The project team (SUBJECTS) had spent five on-site work days together shooting video, editing, and finally producing video for use in the mLearning demo courses (DIVISION OF LABOR). The Technology Office next sought to employ the old iPub mobile LMS but was unsatisfied and began to explore alternative tools for deployment. GoMo was selected and was under investigation at the conclusion of the study (TOOLS).

In the middle of all of these events Andy reiterated the goal of the Technology Office in all of this mLearning work: “It is not our goal to simply build an app.” He continued that they would only hire someone to build the mLearning demo app specifically if “we could learn more about deploying mobile learning in the process.” (data source: Andy Schmid – Email 7.18.12)

The clarifying stage revealed more widespread interest at TCN regarding mLearning. As an instructional paradigm, mLearning was gradually becoming clearer to TCN’s departments and SMEs (GOAL). My conversations with various department SMEs demonstrated that the stakeholders were realizing how mLearning would meet their varying needs (RULES). However, the Technology Office’s investment in multiple mLearning projects at the same time, without the software capacity to support their design and development (TOOLS), was responsible for their delayed success.

Conclusion.

During the course of my research, TCN never truly reached Stage 5: Routinizing. In Stage 5 mLearning would have been incorporated in TCN’s regular activities. The Technology Office would have been working to support sustainability of mLearning by allowing for design

and development insights from many of the other departments. mLearning was on the brink of becoming incorporated into the regular activities of TCN's various departments. Nick returned from Egypt and on January 22, 2012, he laid out a detailed description of what the Middle East Department in Egypt was looking to do with mobile (data source: Nick Tred – Email 1.22.12). mLearning was still a relevant and in-demand medium for TCN. TCN's Technology Office was very much trying to address a clearly trending innovation. Department after department would continue to seek out mLearning solutions from the Technology Office. The Technology Office's use of the name 'Mobile Witness' (data source: Andy Schmid - Email 1.17.13) was a testament to their desire to address this gap. Ironically, this name distinguished their efforts, which meant that mLearning was not being seamlessly integrated at TCN. Rogers (2003) explained that to have an innovation considered 'routinized' it loses its separate identity. At the conclusion of this research study, the Technology Office's ability to effectively and efficiently deliver an mLearning product was still a work in progress.

Chapter 5 - Conclusion and Implications

Introduction

The preceding chapters introduced this study with a review of relevant literature, an explanation of the methodological approach employed, and a presentation of the findings. Chapter two explored the evolution of instructional technology for distance education as an activity within the diffusion of innovation process. Chapter three described the case study approach as used in this study. Chapter four produced the results of the case study contextualized by the five stages of the organizational innovation process. In chapter five, the results of the analysis will be presented accompanied by additional thematic analysis.

Study Summary

The purpose of this study was to explore the process by which an organization adopts and engages in a mobile learning (mLearning) initiative. mLearning uses mobile technology to aid in the learning, reference, and/or exploration of information useful to the user at that moment or in a specific context. Current mLearning research studies focus on its support of effective and efficient content delivery to devices already adopted by individual users. To realize the potential of mobile technology in completing organizational objectives, mLearning was explored as an instructional design concept. I investigated the organizational issues and challenges in the adoption process for mLearning. This process was reported to change the organizational structure as the organization progresses through the initiation and implementation stages of adoption. Research was needed to examine how an organization changes as a result of systematic contradictions revealed during the active engagement in mLearning initiatives. Design and development of mLearning at the organizational level occurred in an activity-system where individual and group actions operate in the achievement of a common goal. The organizational

activity of design and development was contextually analyzed examining a) the kinds of activities that organizations engage in asking; b) who is engaging in that activity; c) what are their goals and intentions; d) what objects or products result from the activity; and e) what rules and norms restrict the activity within the larger organizational community.

Study Methodology

In this single-case research study, I employed interviews, participant-observations, documents, and artifacts to create a detailed description of the case in order to inform the research analysis of the specific organizational context. The purpose of this study was to explore the process by which organizations adopt and engage in mLearning initiatives. The combination of real-time and regularly scheduled observations provided understandings of how change occurred in the organizational innovation process.

Summary of Findings

The purpose of this research study was to explore the process by which an organization adopted and engaged in an mLearning initiative. In order to better the organizational adoption process, this study explored the following research questions:

- How does an organization progress through the mLearning adoption process? (Q1)
- How does an organization engage in mLearning initiatives at different adoption stages?

(Q2)

Rogers (2003) defines an organization as a stable system of individuals who work together to achieve common goals through a hierarchy of ranks and a division of labor. TCN was an organization engaged in an optional innovation-decision, which is, described by Rogers (2003) as the choice to adopt or reject an innovation that is made by an individual independent of the

decisions by other members of a system. The individual’s decision can be influenced by the norms of the system and by communication through interpersonal networks (Rogers, 2003).

The process by which TCN engaged in mLearning initiatives (their innovation decision) was examined through Rogers’ (2003) five stages in the innovation process in organizations. The initiation sub-process includes *Agenda-Setting* and *Matching* that focus on the perceived benefit organizations identify in an innovation. A decision to adopt moves an organization from the initiation sub-process to implementation. This next step includes *Redefining/Restructuring*, *Clarifying*, and *Routinizing* these stages show the application of the innovation and the standardization of the innovation in the organization’s activities. As discussed in chapter two, stage identification and criteria is based on Roger’s (2003) research and described in Table 5.1.

Table 5.1 Stage Identification and Criteria for completion

Stage Identification	Criteria
Agenda-Setting: the organization identifies a problem.	Identify and prioritize needs and problems. Search the organization’s environment to locate innovations of potential usefulness to meet an organizational problem.
Matching: a problem from the organization’s agenda is fit with an innovation, and this match is planned and designed.	Decision-makers determine the feasibility of the innovation in solving the organization’s problem. Decision-makers decide to accept or reject an innovation.
Redefining/Restructuring: an innovation has been adopted and now is re-invented to more closely fit within the organization’s needs and structure.	The innovation is re-defined to explain how it can fit organizational needs. The organization re-structures to fit the innovation to find it a home.
Clarifying: as the innovation is put into more widespread use, the idea gradually becomes clearer to the organization’s members.	Innovation is employed within the organization. More members of the organization seek to use the innovation.
Routinizing: the innovation becomes incorporated into the regular activities of the organization and losses its separate identity.	The innovation is a seamless part of daily operations. The innovation’s adoption is organization-wide.

A summary of TCN’s engagement in this activity is illustrated in Table 5.2.

Stage	#1 Agenda-Setting	#2 Matching	#3 Redefining/Restructuring	#4 Clarifying
Community	TCN Community	TCN Community	TCN Community	TCN Community
Object	<p>Mobile App Release June 2012</p> <ul style="list-style-type: none"> Course 1: mLearning “Demo” Course 2: mLearning “How to” 	<p>Mobile App Release June 15, 2012 (Global Leadership Meeting)</p> <ul style="list-style-type: none"> Course 1: mLearning “Why Mobile?” (Demo). Complete by March 20, 2012 Course 2: mLearning “The Making of Why Mobile?” (How to). Complete by May 25, 2012 	<p>Mobile Course (App) Release June 15, 2012 (Global Leadership Meeting)</p> <ul style="list-style-type: none"> Lesson 1: Core Concepts of mLearning Lesson 2: Recreating content for mLearning (“What Acts 2 Teaches Us?”) Lesson 3: Overview of Lesson 1 and 2 (a behind the scenes look) 	<p>Mobile Course (App) Release June 18, 2012 not met (for the Global Leadership Meeting)</p> <ul style="list-style-type: none"> Lesson 1: Why mLearning (Core Concepts of mLearning) Lesson 2: Transforming Your Content (Recreating content for mLearning: “What Acts 2 Teaches Us?”) Lesson 3: Overview of Lesson 1 and 2 (a behind the scenes look)
Rules	<ul style="list-style-type: none"> stimulate interest in mLearning direct TCN depts. to seek out the Technology Office for support 	<ul style="list-style-type: none"> provide TCN with broad concepts about mLearning target future course producers 	<ul style="list-style-type: none"> teach TCN staff about core concepts of mLearning demonstrate transformed content (recreated for mobile) 	<ul style="list-style-type: none"> teach TCN staff about core concepts of mLearning demonstrate transformed content (recreated for mobile)
Tools	<ul style="list-style-type: none"> Knowledgegey’s mobile LMS 	<ul style="list-style-type: none"> Knowledgegey’s mobile LMS via there iPub app 	<ul style="list-style-type: none"> Knowledgegey’s mobile LMS via their new Roots app 	<ul style="list-style-type: none"> Knowledgegey’s mobile LMS via their new Roots app (April 20, 212 release date not met) Knowledgegey’s mobile LMS via their old iPub app Epic’s GoMo Learning App
Division of Labor	<ul style="list-style-type: none"> Knowledgegey’s mobile LMS SME ID 	<ul style="list-style-type: none"> Knowledgegey’s mobile LMS SME ID PM Video Production Coding Support 	<ul style="list-style-type: none"> Knowledgegey’s mobile LMS SME ID PM Video Production Script Writing 	<ul style="list-style-type: none"> Knowledgegey’s mobile LMS SME ID PM Video Production Script Writing
Subject	<ul style="list-style-type: none"> Andy Schmid, PM Micah Shippee, ID 	<ul style="list-style-type: none"> Laurin Graves, PM Micah Shippee, ID Andy Schmid, SME Aaron Crescent, Video Production AJ Fortune, Video Editor Chuck Cloud, Coding Support Nick Tred, Production Location Organizer 	<ul style="list-style-type: none"> Laurin Graves, Support Micah Shippee, ID Andy Schmid, SME Aaron Crescent, Video Production AJ Fortune, Video Editor Nick Tred, PM Rory Smith, Actor 	<ul style="list-style-type: none"> Laurin Graves, Support Micah Shippee, ID Andy Schmid, SME Aaron Crescent, Video Production AJ Fortune, Video Editor Nick Tred, PM Rory Smith, Actor

Table 5.2 Comparison Chart for the Four Stages of Activity reached in the Organizational Innovation Process

At the conclusion of this one-year study, TCN had only reached *Stage four: Clarifying* of this process. Stage 4, the Clarifying Stage, was the end of my research at TCN. This stage found widespread interest in mLearning with out widespread deployment. Within this stage, like those before it, the Technology Office was trying to more clearly understand the needs of their target audience. These needs were both instructional and timely. Knowledgey's new LMS was promised to deliver in terms of the instructional needs, but it simply was taking too long. The Technology Offices decision to move on the a different LMS was part of their growth toward Stage 5, but this contradiction, in LMS, within Stage 4 was slowing progression in their organizational adoption. The Technology Office's reported success with the EAS mLearning project served as a pilot-like experience that informed the instructional and software decisions for much of our work with the mLearning Demo Course, but we were unable to attain our planned deployment. Each stage was identified by the criteria established by Rogers (2003). In order for TCN to reach *Stage five: Routinizing* they would have had to incorporate mLearning into their regular activities to the point where mLearning would have lost it's separate identity as a process of delivering instruction. This identity loss is in direct contrast to Andy's email (Figure 4.27. data source: Andy Schmid - Email 1.17.13) near the conclusion of the study where the Technology Office's mLearning efforts led them to create a distinct area of work titled: Mobile Witness.

The contradictions in the activity components at each stage do not necessarily inform TCN's failure to reach Stage five. Rather, these contradictions exemplify an organization fully engaged in the diffusion of innovation process. From stage to stage, the *community* and *rules* components remained relatively consistent. The Technology Office wanted the various TCN

departments to better conceptualize mLearning as a new instructional innovation and visualize how this innovation could meet their instructional needs. The *object*, *subject*, and *division of labor* components show less contradiction and more detail as they progressed through the stages. The one exception to this was the *subject* change of PMs which is a theme addressed later on.

Perhaps the greatest detriment to the Technology Office's efforts is found in the *tools* component. Their initial sole-reliance on Knowledgegy to produce an acceptable mLearning product led to a failure to meet release dates. As presented in chapter four, one of the emails from Nick Tred (data source: Nick Tred – Email 3.17.12), explained how the Technology Office initially viewed their relationship with Knowledgegy as symbiotic. Nick stated they wanted “to help Dr. Buck's mLMS develop their product and thereby influence the features of their product development” (data source: Nick Tred – Email 3.17.12). Knowledgegy's constant promise to develop new features for their next iteration was echoed in GoMo's product development. Nick had contacted GoMo and believed the UK based group was relatively new, not yet having “developed a full range of things to serve their customers” (data sources: Team Conference Call 10.12.12 and Andy Schmid – Email 10.12.12).

Throughout the course of this research there was a constant influx of emails encouraging the Technology Office to complete the demo product as well as requests for support to develop mLearning products like the CWI. The requests to design and develop multiple new mLearning projects during the Clarifying stage may have informed the Technology Office's failure to reach Stage five. Rogers (2003 p. 427) explained: “Too-rapid implementation of an innovation at the clarifying stage can lead to disastrous results.”

Discussion

Two central themes in this study were the adoption of mLearning and the sustainability of mLearning as a new innovation at TCN. TCN's Technology Office was the initial adopter that explored how to help other TCN departments perceive the value of mLearning and therefore adopt. The Technology Office's philosophy is to "centralize the complexity; decentralize the control" (data source: TCN website). With the belief in local ownership of content through their support for development and deployment, the Technology Office worked to create a paradigm for mLearning's sustained use at TCN.

Innovation Adoption in Organizations.

Rogers (2003) found that the rate adoption for an innovation can be determined by five innovation attributes (Table 5.3) a) relative advantage, b) compatibility, c) complexity, d) trialability, and e) observability (Lee et al., 2011; Rogers, 2003; Clarke, 1999).

Table 5.3 Five Innovation Characteristics

Attribute	Defined as the degree to which...
Relative advantage	an innovation is considered as being better than the idea it replaced. This construct is found to be one of the best predictors of the adoption of an innovation.
Compatibility	an innovation is regarded as being consistent with the potential end-users' existing values, prior experiences, and needs.
Complexity	the end-users' perceived level of difficulty in understanding innovations and their ease of use.
Trialability	innovations can be tested on a limited basis.
Observability	the results of innovations can be visible by other people.

Rogers (2003) stated that up to 49% of the variance in the rate of adoption is explained in these attributes.

Relative Advantage.

Rogers (2003) stated that the degree of relative advantage is often expressed as economic profitability, as conveying social prestige, or in other ways. The nature of the innovation determines what specific type of relative advantage is important to adopters, although characteristics of the potential adopter may also affect which specific sub-dimensions of relative advantage are most important. Diffusion researchers have found relative advantage to be one of the strongest predictors of an innovation's rate of adoption (Rogers, 2003). Rogers' (2003) Generalization 6-1 "The relative advantage of an innovation, as perceived by members of a social system, is positively related to its rate of adoption" (p. 265).

Prior to the start of this research, Andy Schmid and other staff at the Technology Office, had implemented a mLearning course development paradigm with the Missionary Training Project (MTP) used by participants in Africa (data source: Andy Schmid – Interview 2.10.12). The MTP, an mLearning training and discourse learning program supported by TCN's Technology Office was initially launched in 2010 to an East African seminary (EAS) school. The project created three courses distributed through micro-SD cards for use on Android only devices. The Technology Office ran a trial of the program with 33 students participating in the mobile version of the courses with 15 participants attending the classroom-based versions of the same course. Andy, then project manager, reported that the mobile students outperformed the classroom students, with 97% of the mobile students completing the course versus 50% of the classroom students. During the Spring of 2011, a second trial was run with similar successful results (data sources: The Technology Office Website: 'The mLearning Project' Blog Post

accessed 1.30.12). The convenience and flexibility of time and place were clearly central attributes in Andy's selections of sample testimonials from the MTP reflection on this specific initiative (data source: RJ 4.10.12).

Since the success of the first trial run of MTP the Technology Office had reportedly been in discussion about the need to create an mLearning introductory (demo) course (data source: Andy Schmid – Email 2.13.12). Multiple testimonials and examples from the MTP initiative were initially used in the creation of the mLearning demo course to demonstrate the compatibility of mLearning (data source: Andy Schmid - Email 4.10.12).

Compatibility.

Rogers (2003) explained that compatibility in the rate of adoption relates to how the innovation is consistent with the existing values, past experiences, and needs of potential adopters. Further, an idea that is more compatible is less uncertain to the potential adopter and fits more closely with the individual's situation. Rogers' (2003) "Generalization 6-2: The compatibility of an innovation, as perceived by members of a social system, is positively related to its rate of adoption" (p. 249).

The project team chose to use one specific MTP example to further illustrate the compatibility of mLearning with their potential TCN adopters (Figure 5.1).

I could learn at my own time. For example, I could go for a meeting at the church and if people were late I could pick up my phone and listen to a lesson. It is according to my time frame, and according to my work, and I was able to organize myself... Top of the list would be the phone! It's a really cool gadget. I have desired to have one like this one for a long time. Also the flexibility. I could listen to my lessons while riding on the matatu. A few times when driving home I would put up the headphones and learn that way. I have really enjoyed learning that way. Basically this has multiplied my time.

Figure 5.1 MTP Testimonial (data source: Andy Schmid - Email 4.10.12)

The Technology Office team felt that flexibility of access anytime and anywhere where simple attributes that their TCN target audience could identify with.

Complexity.

Any new idea may be classified on the complexity-simplicity continuum, for some new innovations complexity is a very important barrier to adoption (Rogers, 2003). Rogers' (2003) "Generalization 6-3: The complexity of an innovation, as perceived by members of a social system, is negatively related to its rate of adoption" (p.257).

The project team identified the target audience as those with limited technology skills, and therefore intuitive design was paramount (data source: Andy Schmid – Email 2.20.12). To simplify the course, mLearning principles were arranged to allow for demonstration using videos, short readings, and interactive content in the form of quizzes, flashcards, and checklists (data sources: Team Conference Call 3.13.12 and Laurin Graves – Email 3.13.12).

In our initial interviews, Andy articulated a demo course with two objectives (data source: Andy Schmid – Interview 2.24.12). First, a "Why mLearning?" a "high-level conceptual understanding of mobile learning" lesson demonstrating mLearning features like viewable "videos, interactivity, touch screen" and that mLearning made it "easy to learn." Second, a lesson on "How to build an application..." a lesson that would feature a "tutorial on how to build a course" through a mobile app development structure. Production of these courses would be handled by Knowledgegey, the software developer in the MTP initiative (data source: Andy Schmid – Interview 2.24.12).

Through an email by Andy, Laurin Graves, a Technology Office staff member was appointed as the project manager (data source: Andy Schmid – Email 2.20.12). The appointment was in name only for a few weeks and she would be replaced by our final PM, Nick Tred,

who joined the department from a video-centric department at TCN (data source: Andy Schmid – Email 3.15.12). Laurin never offered any significant direction and generally Andy guided the first stages of the project and team formation. A Skype conference call (data source: Team Conference Call 2.28.12) solidified the first objective “Why Mobile Learning?” and refined the second objective to “The Making of Why Mobile Learning?” which would document the course creation process as a demonstration tutorial. The conference call also was useful in identifying the target audience: strategy leaders from various international departments, a global audience of international English speakers, literate, and lacking advanced technological skills, but could download the app. Storyboarding the “Why Mobile Learning?” course was the first step. (data source: Team Conference Call 2.28.12).

As the instructional designer of the initiative, I was fully invested in the development of the mLearning course app, through a review of best practices and current literature, I produced a “Why Mobile Learning” (Appendix 8) a project storyboard with multiple wireframes. My intention was to create a simple mLearning Demo app plan. The wireframes included five buttons: Video, Quiz, mBible, Connect, and Home, each button hyperlinked to a content-filled wireframe illustrating the features requested by the SME. The home screen included a button for “How can mobile tech help you?” which brought the user to the five attributes of mobile technology. (data source: Appendix 8. Why Mobile Learning),

Following initial enthusiastic reception of my “Why Mobile Learning?” demo app plan, the team went through a leadership change the new PM, Nick Tred, was introduced by Andy and the project direction was “modified” to reflect their “current thinking” (data source: Nick Tred – Email 3.16.12). These modifications created a more complex approach to our initial two courses. The new plan was to have a three lesson format:

Lesson 1: explain the core concepts of mLearning using newly crafted content.

Lesson 2: demonstrate mLearning using re-created content.

Lesson 3: give an overview of the process of accomplishing Lessons 1 and 2.

The new plan was presented as a necessary way to address the needs of the target audience at TCN. Yet, adding complexity to the plan added time for its development. A significant amount of work was put into “Lesson 1” which might have been launched by itself as an app to introduce mLearning. (data source: Nick Tred – Email 3.16.12).

Trialability.

The personal “trying out” of an innovation is one way for an individual to give meaning to an innovation and to find out how it works under one’s own conditions, possibly dispelling uncertainty about a new idea. (Rogers, 2003). Rogers’ “Generalization 6-4: The trialability of an innovation, as perceived by the members of a social system, is positively related to its rate of adoption” (p.258).

In planning with decision makers, strategy leaders, and practitioners, the Technology Office staff claimed “motivation shoots up” when their audience was handed a phone with an mLearning course on it (data source: Andy Schmid – Email 2.20.12). Therefore, a well-developed mLearning course app would support a concise understanding of mLearning in the Technology Offices strategy meetings. The release date for the demo course was set for June 2012, six months after this research study began (data source: Team Conference Call 2.28.12). The goal of the demo course was “To stimulate interest and cast a vision for mobile learning. Give people an opportunity to experience a mobile course” (data source: Team Conference Call 2.28.12). The anticipated release date as an iOS and Android app was June 2012 when international TCN leaders (decision makers) would be together at the TCN international

headquarters at the Global Leadership Meeting (data source: Team Conference Call 2.28.12). The release date was not met, meaning the leadership did not have an mLearning app in-hand.

Observability.

Some innovations are easily observed and communicated to other people, whereas other innovations are difficult to observe or to describe to others (Rogers, 2003). Rogers' "Generalization 6-5: The observability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption" (p. 258).

The Technology Office's plan to produce an mLearning demo course with video that would explain mLearning and show people using mobile devices was meant to coincide with the Global Leadership Meeting (data source: Team Conference Call 2.28.12). They believed that this introduction and vicarious experience to mLearning would have positively related to adoption (data sources: Andy Schmid – Email 2.20.12 and Team Conference Call 2.28.12).

The demo project's initial plan was to use Knowledgey's, the existing software developer, and learning management platform, called iPub. iPub's limited design features were to be addressed by Knowledgey's planned upgrades in the new product called Roots (data source: Dr. Buck – Email 3.27.12). The team hoped to launch the finished mLearning demo app at the Global Leadership Meeting (June 2012) where it could be showcased (data source: Team Conference Call 2.28.12). The mLearning demo app failed to be released on time, and one year later, the technology office staff was exploring best options for releasing the app.

Adoption Summary.

Full adoption of mLearning at TCN by the target department leaders was not achieved by the Technology Office's plan. However, throughout this research study it was clear that department leaders at TCN perceived mLearning as an innovation that met their needs (data source: Rob

Garnet - Interview 4.11.12). Further, in my conversations and emails with various TCN department leaders, each leader could identify a way that they felt mobile devices could support their department vision and would allow them to better reach out to their own user-group in a more effective and efficient manner (data sources: Andy Schmid – Team Conference Call 3.21.12 and Andy Schmid – Email 4.5.12; John Penny – Email 2.28.12 and Email 4.5.12; Sharon Richards – Interview 4.9.12; College Outreach Meeting 4.11.12; and RJ 4.12.12). The Technology Office’s failure to launch an app at an opportune time (the June 2012 Global Leadership Meeting) may have hindered a more ubiquitous desire for mLearning projects, but their office did not demonstrate the ability to handle a higher mLearning work load at that time.

Sustainability of Innovation in Organizations.

Sustainability is defined as the degree to which a program of change is continued after the initial resources provided by a change-agency are ended (Rogers, 2003, p. 376). Rogers (2003) found that sustainability of the innovation was related (1) to its degree of re-invention, (2) the fit between the intervention and the organization, and (3) the involvement of a local champion (p. 429).

Re-invention.

Rogers’ (2003) “Generalization 5-10: A higher degree of re-invention leads to a higher degree of sustainability of an innovation” (p. 183). Diffusion of Innovation research showed that if potential adopters can adapt, refine, or otherwise modify the innovation to suit their needs, it will be adopted more easily (Greenhalgh et al., 2004).

The Technology Office worked to create a back-end system with Knowledgegy that would allow any TCN SMEs to enter their own content into a mobile app template. This template limited refinement of app appearance and functionality, yet produced a more cost efficient

method of delivering dynamic content to a broad audience. In my instructional designer-role I struggled to accept this template driven option. I explained to the team that the user experience (UX) would be hindered by a one-size-fits-all app. Further, I believed that this format would not be adopted by other leadership looking to have their own app.

Fit.

Norman (2002) describes the need for “good design” in technological innovation, as a necessary principle, he states “The same technology that simplifies life by providing more functions in each device also complicates life by making the device harder to learn, harder to use... principles of good design can make complexity manageable.”

Perceived fit (function) of an innovation for an organization predicts rate of adoption. Rogers (2003) explained function as the contribution made by an innovation to the way of life of members of a social system (Rogers, 2003). The Technology Office’s steady efforts and encouragement to diffuse mLearning throughout TCN can be credited to their homegrown efforts. Rogers (2003, p. 426) stated “If the innovation process comes from inside the organization, individuals regard it as familiar and compatible and hence find it easier to give meaning to the new idea.”

Role of the Champion.

Champion behaviors include those that are instrumental in successfully guiding projects through the approval hurdles: displaying persistence, expressing strong conviction in the innovation, and involving key individuals (Howell et al., 2005). The adoption of an innovation by individuals in an organization is more likely if key individuals in their social networks are willing to support the innovation (Greenhalgh et al., 2004).

The different champion roles for organizational innovations include: a) the organizational maverick, who gives the innovators autonomy from the organization's rules, procedures, and systems so they can establish creative solutions to existing problems; b) the transformational leader, who harnesses support from other members of the organization; c) the organizational buffer, who creates a loose monitoring system to ensure that innovators properly use the organization's resources while still allowing them to act creatively; and d) the network facilitator, who develops cross-functional coalitions within the organization (Greenhalgh et al., 2004).

Throughout the course of this research study I struggled to identify the actual champion. Initially, I felt that Andy Schmid was a clear champion for mLearning at TCN. His positive approach and enthusiasm for the topic led me to believe he would follow through on it's success, but very early in the research, he passed off leadership responsibilities for the project. As I began to learn more about the project context, I started to realize that Dr. Buck may have been the actual champion of MTP. His efforts directly supported his dissertation work. This insight led me to believe that perhaps Andy felt that I would be the next champion for the Technology Office's mLearning efforts with it benefitting my dissertation efforts.

There is very little direct empirical evidence on how to identify, and systematically harness the energy of, organizational champions (Greenhalgh et al., 2004). Yet, the impact of a champion on both the adoption and sustainability of an innovation is undeniable. Selecting individuals who display these particular champion behaviors may increase the probability that projects make it through the approval process (Howell et al., 2005).

Discussion Summary

The enthusiasm around mobile learning applications was clear at TCN. With a history of adopting technology innovations to support growth... TCN is likely to continue to grow through

new innovations that support their GOAL: Christian evangelism. A meeting with Rob Garnet, a TCN vice president, revealed an appreciation for the potential of mLearning and a desire to see it successfully deployed at TCN (data source: Rob Garnet – Interview 4.11.12). The meeting comments regarding mLearning were perceived by Laurin Graves, who attended me, as an important indicator of higher administrative expectations for the Technology Office’s efforts with mLearning (data sources: Laurin Grave – Meeting 4.11.12 and RJ 4.12.12). Lanzolla and Suarez (2012) found one of the main reasons underpinning the “technology-adoption” and “technology-use” divide is that different organizational actors are likely to be responsible for making the adoption decision for using and implementing the new technology.

While adoption was encouraged at the top of the organizational chart, full use was delayed as roll out details were developed. The Technology Office decided to do more than simply introduce mLearning; they wanted it to be able to allow SMEs to immediately begin to mobilize their content. According to Lanzolla and Suarez (2012) the technical layer, like the Technology Office, tends to have a more conservative approach when it comes to technology given the fact that, when a new technology is adopted, those in the technical layer have to go through a painful process of change in routines, processes, and cognitive maps.

Limitations of this research study

Yin (2003) addressed the limitations of doing a participant-observation in case study research. While one advantage was that I was able to gain access to TCN and the Technology Office due to our common faith-based beliefs, this advantage was the root cause of a research-bias, where it became difficult to work as an outside observer and I became a supporter of the work (Yin, 2003). Norum (2000) discusses the importance of making our biases clear within our research study, specifically stating, “rather than work against us, these biases direct our research”

(p. 315). I chose to explore my biases in Author's Notes and in presented data that revealed my own insider status that allowed me access to TCN.

I believe I addressed this bias-based limitation through my collecting data process and by producing data analysis while I was removed from the research site and distanced from the dates of the interactions (2012-2013). Meaning, after 2013 my relationship with TCN and the Technology Office was basically non-existent and continuing data analysis through to early 2016 afforded me a more removed, outside observer-researcher perspective of my data. However, while discussion of my bias and understanding of my insider status are relevant, they do not completely exonerate me from influencing my data and findings.

During the process of data analysis it became clear that I had been at fault for another one of Yin's (2003) limitations in doing a participant-observation, the participant role (instructional designer) took a great deal of time and focus that may have prohibited me from raising in-the-moment questions about what was going on in the mLearning adoption process at TCN. As the instructional designer on the mLearning Demo Course project it was very easy for me to get caught up in the product (participant) and neglect to reflect more on the process (observation).

Additionally, as a participant-observer my role undoubtedly informed how some events unfolded. Were I absent, removed, or only an observer researching TCN through a distant lens the results would not have been exactly the same.

Finally, the geographically dispersed nature of TCN and of the mLearning demo course project team made the participant-observation limited in that I was not able to participate and observe every aspect (Yin, 2003) of the adoption process at TCN.

Implications for future research

The main focus of this study was the diffusion of mLearning (innovation) at TCN (organization). Just as Everett Rogers (2003) *Diffusion of Innovation* work illustrates many examples of innovations that individuals and organizations adopt, mLearning served as the topic, or innovation, of the study and provided an example of how an organization makes a decision to adopt a new innovation and the process by which they develop and deploy the innovation. Future research should continue to investigate how innovations are being adopted by organizations in order to support effective and efficient deployment of new technology that might help to better achieve organizational goals.

The methodological approach for this study neatly hybridized two established frameworks, one a longitudinal view of an organizational process (Rogers, 2003) and the second a critical lens of activity in the moment (Engeström, 1987). What resulted was a method to investigate activity in the organizational innovation process as depicted in Figure 5.2.

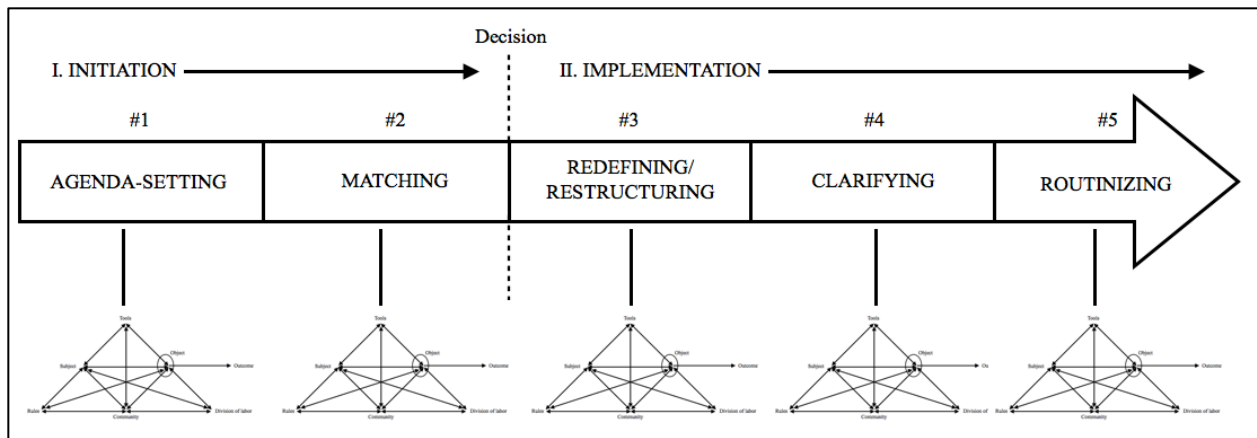


Figure 5.2 Activity in the organizational innovation process.

The work of Rogers (2003) and Engeström (1987) were combined to take advantage of a case study's greatest strength allowing a researcher to trace events over time (Yin, 2003). Yet, this approach attempts to clarify the starting and ending points of themes in the case study by

employing Rogers (2003) process. Future researchers interested in exploring the diffusion of innovation overtime should look to employ a similar approach that allows for a consistently detailed understanding at each stage of the process.

Conclusion

The main purpose of this study was to explore the process by which an organization adopted and engaged in mLearning. Several key questions were asked during this study.

First, this study asked: How do organizations progress through the mLearning adoption process? Rogers (2003) argued that innovations, like mLearning, change the organizational structure. The unsettling nature of the diffusion process is supported by other researchers who propose that mLearning initiatives must be understood as organizational change (Ally, 2009; Cross & Dublin, 2002; Quinn, 2011). Organizations can best approach these changes when they understand adoption of an innovation as a five stage process.

Second, this study then asked: How do organizations engage in mLearning initiatives at different adoption stages? Engeström's (1987) descriptive framework for analysis of the human activity system illustrated how the multiple variables in any activity are involved in the generation of a specified outcome. AT allowed for the description of TCN's engagement in mLearning at each stage of the adoption process. The AT framework can be useful for organizations to describe the variables that will have an impact on achieving their objectives.

The findings of this study suggest that the initial adoption of mLearning at TCN did not reach sustainable implementation because 1) no clear champion for the mLearning existed and; 2) Knowledgey's untested mLearning product was heavily relied upon even though it was being developed in parallel to the mLearning implementation efforts. Interest in mLearning at TCN continued, outside departments desired an mLearning learning management system (LMS) to

deliver content as soon as possible. Yet the organization simply was not prepared to accommodate due to delays in the mLearning product development.

Although, mLearning was the focus innovation in this case study, it is difficult to predict mLearning's impact on the future of learning. However, from the perspective of Moore's law future technological innovations will only become more powerful and conveniently part of our daily lives (Traub, 2004). It is important to understand how organizations can leverage new innovations to effectively and efficiently achieve instructional communication goals that transcend time and space. Without this understanding, trending technology will be limited to entertainment and anecdotal uses.

Finally, while this study focused on one organization working with one technological innovation, any organization seeking to employ any innovation (not limited to technology) can benefit from describing their context through AT and analyzing their adoption progress within the five-stage organizational innovation process. This study is by no means generalizable to other cases, but the framework used to explore TCN is transferable to many different settings.

Appendix

Appendix 1: IRB Memorandum



SYRACUSE UNIVERSITY
Institutional Review Board
MEMORANDUM

TO: Alan Foley
DATE: July 18, 2012
SUBJECT: Determination of Exemption from Regulations
IRB #: 12-185
TITLE: *Mobile Learning Design and Development*

The above referenced application, submitted for consideration as exempt from federal regulations as defined in 45 C.F.R. 46, has been evaluated by the Institutional Review Board (IRB) for the following:

1. determination that it falls within the one or more of the five exempt categories allowed by the organization;
2. determination that the research meets the organization's ethical standards.

It has been determined by the IRB this protocol qualifies for exemption and has been assigned to categories 1 & 2. This authorization will remain active for a period of five years from July 17, 2012 until July 16, 2017.

CHANGES TO PROTOCOL: Proposed changes to this protocol during the period for which IRB authorization has already been given, cannot be initiated without additional IRB review. If there is a change in your research, you should notify the IRB immediately to determine whether your research protocol continues to qualify for exemption or if submission of an expedited or full board IRB protocol is required. Information about the University's human participants protection program can be found at: <http://orip.syr.edu/human-research/human-research-irb.html> Protocol changes are requested on an amendment application available on the IRB web site; please reference your IRB number and attach any documents that are being amended.

STUDY COMPLETION: The completion of a study must be reported to the IRB within 14 days.

Thank you for your cooperation in our shared efforts to assure that the rights and welfare of people participating in research are protected.

A handwritten signature in black ink, appearing to read "Tracy J. Cromp".

Tracy Cromp, M.S.W.
Director

Note to Faculty Advisor: This notice is only mailed to faculty. If a student is conducting this study, please forward this information to the student researcher.

DEPT: Instructional Design, Development & Evaluation - Education, 332 Huntington Hall STUDENT: Micah Shippee

Office of Research Integrity and Protections
121 Bowne Hall Syracuse, New York 13244-1200
(Phone) 315.443.3013 ♦ (Fax) 315.443.9889
orip@syr.edu ♦ www.orip.syr.edu

Appendix 2: TCN Site Permission

The Christian Network (TCN)

7/20/2012

Micah Shippee
3684 Woodland Drive
Baldwinsville, NY 13027

Micah:

We appreciate your request for permission to obtain and use data from staff and volunteers associated with our organization. This letter contains the agreement between you ("You") and (The Christian Network, Inc., also known as "TCN" in the U.S. ("Licensor"), a California not-for-profit corporation having an address of Orlando, FL (collectively "the Parties") pertaining to the ownership, use and publication of data obtained by You for Your dissertation on mobile learning design and development processes ("Agreement").

1. Grant of License.

Licensor grants to You a limited, non-exclusive, non-transferable license to obtain and use data from Licensor's staff and volunteers for Your dissertation on mobile learning design and development process at Syracuse University by the Office of Research Integrity and Protections ("License"). subject to the duties and restrictions herein.

2. Duties and Restrictions.

The License is subject to You following the duties and restrictions below:

- a. The data You obtain through Your observations and interviews of Licensor's staff and volunteers ("Data") is to be used only for Your dissertation on mobile learning design and development processes. You shall not rent, sell, or otherwise transfer the Data to any third party for any purposes outside of Your dissertation.
- b. You shall not identify Licensor or Licensor's ministry locations in any published form of the dissertation, without prior written approval.
- c. You are responsible for obtaining consent from each individual staff or volunteer to use their Data and/or their name.
- d. If You name any location outside of the United States, you shall abide by the local ministry's procedures and policies on security issues.
- e. You shall provide to Licensor a copy of the dissertation before publication.

- f. You shall abide by the Confidentiality requirements herein.
3. **Fee, Payment and Additional Usage.** Licensor grants to You the rights herein at no charge. If You wish to make any additional uses of the data collected, You agree to seek additional permissions and licenses from the Licensor and make such payments as are agreed to between the parties at that time.
4. **Term.** The Term is from the Effective Date (defined below) through the time of active use, distribution, publication and printing of the Data.
5. **Confidentiality.**
- a. During the course of Your collection of the Data, You may observe and/or Licensor may disclose certain confidential information ("**Confidential Information**") that is either the property of Licensor or of a third party, under obligation of secrecy. This Confidential Information is defined as any and all information (whether in print, in electronic media, and whether internally generated or used by Licensor under contract with third party) that is marked or protected by Licensor as confidential or which would reasonably be understood to be intended to be confidential by Licensor, and/or any and all information which is orally disclosed as confidential. Such Confidential Information includes but is not limited to donor information, ministry locations in sensitive countries, ministry staff in sensitive countries, ministry strategies, internet methods, procedures, pricing and models, advertising strategies, products or marketing plans, computer programs including source code and object code, computer interfaces or interface mechanisms, processes, compositions, formulas, data, drawings, specifications, reports, techniques, methods, know-how, equipment, personal information possessed or maintained by Licensor about volunteers, ministry participants or third parties, or any other information that derives economic value, either directly or indirectly, from being confidential or proprietary to or trade secrets of Licensor or its actual or potential ministry partners or participants.
 - b. You shall hold all Confidential Information in strict confidence and shall use Confidential Information only in accordance with all policies and procedures of Licensor.
 - c. You shall not disclose, publish or otherwise reveal any of the Confidential Information to any third party without Licensor's prior written consent.
6. **WAIVERS.** No failure or delay by any party in exercising any right, power or privilege hereunder will operate as a waiver thereof nor will any single or partial exercise thereof preclude any other or further exercise thereof or the exercise of any other right, power or privilege. The rights and remedies herein provided will be cumulative and not exclusive of any rights or remedies provided by Law.
7. **DISCLAIMER OF WARRANTIES.** LICENSOR MAKES NO REPRESENTATION OR WARRANTY OR CONDITION OF ANY KIND, EXPRESS OR IMPLIED (EITHER IN FACT OR BY OPERATION OF LAW), WITH RESPECT TO THE DATA. LICENSOR EXPRESSLY DISCLAIMS ALL WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT. THIS SUBSECTION SHALL BE ENFORCEABLE TO THE EXTENT ALLOWED BY APPLICABLE LAW.
8. **LIMITATION OF LIABILITY.** TO THE EXTENT ALLOWED BY APPLICABLE LAW, IN NO EVENT SHALL LICENSOR BE LIABLE FOR ANY LOSS OF PROFITS, LOSS OF BUSINESS, LOSS OF USE OR DATA, INTERRUPTION OF BUSINESS, OR FOR INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND, EVEN IF LICENSOR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES AND NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

9. Indemnity. Licensor has no obligation or liability for, and You shall defend, indemnify and hold Licensor harmless from and against any claim arising from Your use of the Data. You agree to defend, indemnify, and hold harmless Licensor and its suppliers from and against any claims, liabilities, losses, damages expenses and costs (including attorneys' fees and costs) directly relating to or arising out of Your use, distribution or production of the Data including, without limitation, any claims, liabilities, losses, damages, expenses and costs arising out of defective production of or the use of defective media in the production of Data, unauthorized or illegal export of the Data, or infringement or misappropriation of intellectual property rights by Your products.
10. Termination for Material Breach. Either Party may terminate this Agreement upon thirty (30) days written notice if the other Party, its officers, directors, partners, employees, agents or contractors, materially breaches any of the terms of this Agreement PROVIDED, HOWEVER, except for Licensor's ability to seek injunctive relief, that this Agreement will not terminate if the non-terminating Party has cured the breach within the thirty (30)-day period.
11. Effect of Termination of Rights. Upon termination or expiration of this Agreement, all licenses for Data granted under this Agreement terminates.
12. Injunction without Bond. In the event of a breach or threatened breach of the License, damages to be suffered by Licensor may not be fully compensable in money damages alone, and accordingly, Licensor is, in addition to other available legal or equitable remedies, entitled to an injunction against such breach or threatened breach without any requirement to post bond as a condition of such relief.
13. Miscellaneous. This Agreement is binding upon the Parties hereto, their heirs, successors, assigns, and personal representatives. This Agreement constitutes the entire understanding among the Parties. Its terms can be modified only by a written instrument signed by all Parties. A waiver or a breach of any of the provisions of this Agreement shall not be construed as a continuing waiver of other breaches of the same or other provisions hereof. This Agreement is governed by the laws of the State of Florida. The Parties consent to exclusive jurisdiction and venue in the courts of the State of Florida and the federal courts in the US District Court for the Middle District of the State of Florida.
14. Effective Date. This Agreement is made effective as of the 30th day of January, 2012 ("Effective Date"), between the Parties.

To acknowledge Your agreement to comply with these terms, please sign and date two (2) copies of this letter in the space provided below. Keep one copy for Your files, and mail the other copy to: The Christian Network, General Counsel's Office, Attention: Department, Orlando, FL

Sincerely,

X

The Christian Network, Inc.

Micah Shippee ("You")

The Christian Network Inc. ("Licensor")

Signature: _____

Signature: X _____

Name: Micah Shippee

Name: X

Title: Graduate Student

Title: US Chief Financial Officer

Appendix 3: Consent Form



INSTRUCTIONAL DESIGN DEVELOPMENT AND EVALUATION
School of Education
Syracuse University

The Mobile Learning Design and Development Process

My name is Micah Shippee and I am a graduate student Syracuse University working on my PhD dissertation in Instructional Design Development and Evaluation. I am inviting you to participate in a research study. Involvement in the study is voluntary, so you may choose to participate or not. This sheet will explain the study to you and please feel free to ask questions about the research if you have any. I will be happy to explain anything in detail if you wish.

I am interested in learning more about the mobile learning design and development process. You will be asked to allow me to use our email communications, collaborative documents, and conference call conversations since January 30, 2012. These communications will allow me to examine the process that we went through in developing a mobile learning course. This process can identify key themes in helping other organizations to strategically complete the task of developing a mobile learning course. Also I would like to interview you over the phone regarding your experiences with mobile learning. This will take approximately one hour of your time. All information will be kept confidential since only you and I will know that your responses are in any way linked to you. My findings will be kept confidential. Any articles I write or any presentations that I make, I will use a made-up name for you, and I will not reveal details about where you work. Your study data will be kept as confidential as possible, with the exception of certain information we must report for legal or ethical reasons.

I would like to conduct an audio recording of an interview with you. The purpose for recording, is to help me capture a whole conversation regarding your experiences and opinions with mobile learning. This information will help me to understand the process of mobile learning development. I will destroy the recording by deleting the file immediately following transcription. The transcription will be stored in a password protected computer folder.

There are no direct benefits to you by taking part in this research study, however your experiential knowledge is a valuable source for my research to understand my research focus. The risks to you of participating in this study are minimized by the confidential nature of the study. However, you may feel uncomfortable talking about your experiences and relating your opinions to me as a researcher. If you do not want to take part, you have the right to refuse to take part, without penalty. If you decide to take part and later no

Consent Form 1

Appendix 4: Interview Guide 1

Environment	<ul style="list-style-type: none">• Describe TCN’s organizational structure.• Describe TCN’s mission.• How does your office function within this mission?• How does your office relate to (or work with) other offices at TCN?• What are some examples of the types of projects that the Technology office participates in?• What “mobile learning” projects are you currently involved in?• Is there a timeline for these projects? If so, what is the motivation behind these timelines?
Motivation	<ul style="list-style-type: none">• How do you perceive technology supporting TCN’s mission?• Why does your office engage in mobile learning opportunities?
Knowledge	<ul style="list-style-type: none">• What are your experiences with mobile learning? Successes? Failures?

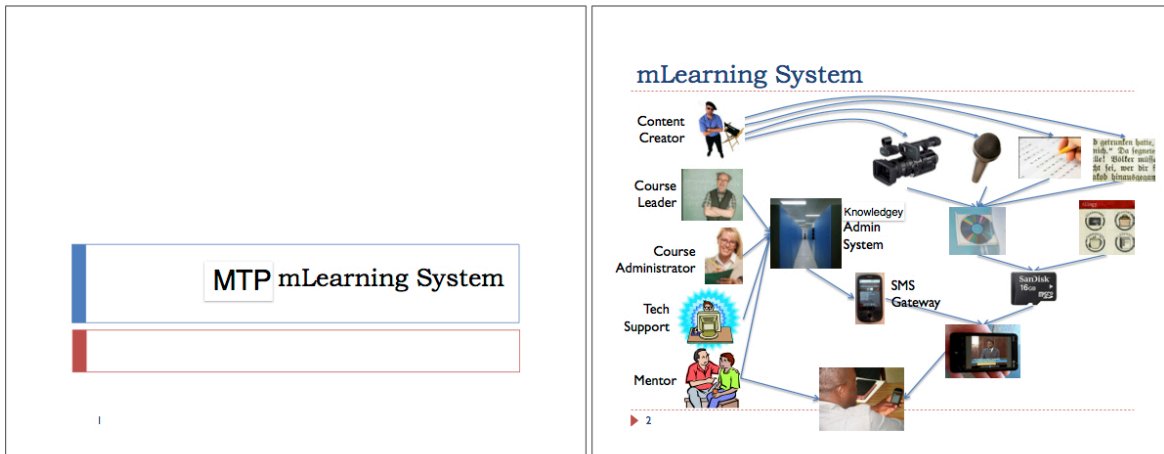
Skills	<ul style="list-style-type: none">• Based on your experiences, what skills sets are necessary to successfully develop an mLearning project? • Do you have a team in mind? or just an individual or two to complete an mLearning project? • How do you envision the task breakdown for an mLearning project?
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Appendix 5: Interview Guide 2

Object	<ul style="list-style-type: none">• What is the mLearning Demo course content?• What learning functions will the course have?
Tools	<ul style="list-style-type: none">• How is the project team communicating?• How is the project team collaborating?• What software is employed at this stage? For what purpose?
Subject	<ul style="list-style-type: none">• Who are the project team members?• How are their roles defined?
Rules	<ul style="list-style-type: none">• What means (financial and otherwise) are acceptably accessible for completion of the project?• What methods are used to mediate the process? Outside of the Technology Office, what departments are used to support the mLearning efforts?
Community	<ul style="list-style-type: none">• What is the nature of the team?

Division of Labor	<ul style="list-style-type: none"> • What are the tasks? • Who are the specialists for each of the tasks? • Who are the team members accountable to?
Outcome	<ul style="list-style-type: none"> • What form of the mLearning app is being produced? Native? Web-based? • How will the mLearning course be delivered? Does it employ a Learning Management System?

Appendix 6. MTP mLearning system



mLearning People

Content Creator

- ▶ Create course videos
- ▶ Record course audios
- ▶ Write course tests
 - ▶ Short answer
 - ▶ Multiple choice
- ▶ Compile course texts
 - ▶ Books
 - ▶ Course materials

mLearning People

Course Leader

- ▶ Oversee course implementation
- ▶ Oversee student progress
- ▶ Oversee results of courses

mLearning People

Course Administrator

- ▶ Register students
- ▶ Collect course fees
- ▶ Enable / disable student's courses
- ▶ Pull results reports
- ▶ Set up mentoring groups
- ▶ Set up / change passwords

mLearning People

Field Technical Support

- ▶ Test phone configurations
- ▶ Duplicate Micro SD cards
- ▶ Configure phones
- ▶ Diagnose technical problems for students
- ▶ Fix technical problems for students

mLearning People

Mentor



▶ 7

- ▶ Follow progress of individual students
- ▶ Mentor students using:
 - ▶ Voice calls
 - ▶ Conference calls
 - ▶ Text messages
- ▶ Grade student short-answer quizzes

mLearning People

Student



▶ 8

- ▶ Register for course
- ▶ Pay for courses
- ▶ Receive phone
- ▶ Complete courses
 - ▶ Watch videos
 - ▶ Listen to audio tracks
 - ▶ Take notes
 - ▶ Ask questions
- ▶ Take tests

mLearning Components

Knowledgegy Admin System

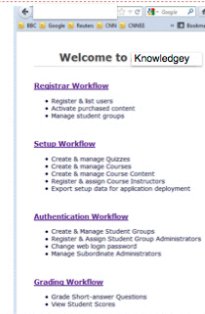


▶ 9

- ▶ Central computer
 - ▶ In Southeastern U.S.
 - ▶ Accessed from anywhere in the world via the internet
- ▶ Contains database of
 - ▶ Registered students
 - ▶ Fees received
 - ▶ Courses approved
 - ▶ Student Groups
 - ▶ Test results

mLearning Components

Knowledgegy Admin System



▶ 10

mLearning Components

Phone



▶ 11

- ▶ An Android phone.
- ▶ Must have following minimum specifications:
 - ▶ Android OS 2.2 or later.
 - ▶ Fast enough to play video
 - ▶ 16 Gb Micro SD slot
- ▶ Approved models should be tested and approved by local technical support team

mLearning Components

Phone



Huawei IDEOS U8150



HTC G2

▶ 12

mLearning Components

Micro SD Card



- ▶ Programmed ahead of distribution with the content by the technical support team.
- ▶ Holds videos, tests and books etc.
- ▶ Plugs into back of phone.
- ▶ Holds the Knowledgegy application.

▶ 13

mLearning Components

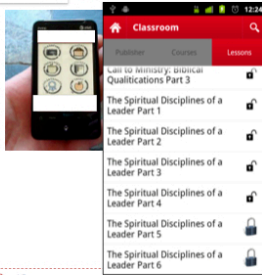
Micro SD Card



▶ 14

mLearning Components

Knowledgegy Application



- ▶ Is a standard Android "app" (application).
- ▶ Loaded onto the Micro SD card by the local technical support team.
- ▶ Configured with unique:
 - ▶ Student number
 - ▶ Gateway number
 - ▶ Unlock code

▶ 15

mLearning Components

SMS Gateway



- ▶ Allows the Knowledgegy admin system to "talk" to the student's phones.
- ▶ Converts e-mails to text messages and vice versa.

▶ 16

mLearning Components

Course Content



- ▶ The content for the application that the student sees.
- ▶ Consists of:
 - ▶ Video courses
 - ▶ Audio courses
 - ▶ Tests
 - ▶ Book content

▶ 17

mLearning Components

Video Content



- ▶ Multiple videos created for the course.
- ▶ Each lesson has a text introduction.
- ▶ Resolution designed for the phone screen.
 - ▶ Close-up shots of people.
 - ▶ Large text subtitles.

▶ 18

mLearning Components

Audio Content

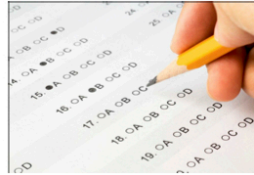


- ▶ Multiple audio tracks for the course.
- ▶ Each track has a text introduction.

▶ 19

mLearning Components

Tests / Quizzes

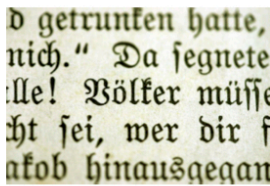


- ▶ One test per video or audio.
- ▶ Test formats:
 - ▶ Multiple choice
 - ▶ Short answer (up to 130 characters)

▶ 20

mLearning Components

Text Content



- ▶ Text background material for the courses:
 - ▶ Course curriculum
 - ▶ Books
 - ▶ Transcripts
 - ▶ Bible

▶ 21

mLearning Components MTP Content

- ▶ **LEVEL I**
 - ▶ **Great Commission Movement Training - Better choices**
 - ▶ Identifying Dreams
 - ▶ AIDS Transmission
 - ▶ Living With AIDS
 - ▶ Making Life Choices
 - ▶ Amazing Love
 - ▶ Making An Impact
 - ▶ **Module One - Introduction to Evangelism and Discipleship**
 - ▶ Orientation: A Call To Reach Your World
 - ▶ Be Sure You Are A Christian
 - ▶ Experiencing God's Love and Forgiveness
 - ▶ Empowerment of the Holy Spirit
 - ▶ Empowerment For Living
 - ▶ Introduction To Discipleship
- ▶ A Call To Help Fulfill The Great Commission
- ▶ Presenting The Four Spiritual Laws I
- ▶ Presenting The Four Spiritual Laws II
- ▶ Closing the Presentation of The Four Spiritual Laws
 - ▶ Conducting Introduction to Discipleship #1
- ▶ **Module Two**
 - ▶ The Priority of Our Relationship with God
 - ▶ The Attributes of God
 - ▶ Our Identity in Christ
 - ▶ The Word of God
 - ▶ Beginning a Ministry of Discipleship I
 - ▶ Preparing and Communicating Personal Testimony
 - ▶ Motivation for Discipleship
 - ▶ Communicating the Spirit Filled Life
 - ▶ Studying the Word of God
 - ▶ Beginning a Ministry of Discipleship II
 - ▶ Planning a Personal Ministry Strategy

▶ 22

mLearning Components MTP Content

- ▶ **Module Three**
 - ▶ The Grace of God
 - ▶ A Biblical Call to Make Disciples
 - ▶ The Dynamics of Spiritual Multiplication
 - ▶ Biblical Stewardship
 - ▶ Characteristics of Disciples of Jesus Christ
 - ▶ Overview of the Discipleship Process
 - ▶ Dynamics of Group Discussion
 - ▶ Methods for Teaching the Discipleship Series
- ▶ **Module Four**
 - ▶ Living with an Eternal Perspective
 - ▶ Discerning God's Will For Our Life
 - ▶ Loving Others
 - ▶ Importance of a Spiritual Movement
 - ▶ Movement Building I
 - ▶ Movement Building II
- ▶ **Family Life Seminar**
 - ▶ Biblical basis of family
 - ▶ Design and purpose of marriage
 - ▶ The role of family members
 - ▶ Preparations for marriage
 - ▶ Family finances management
 - ▶ Communication
 - ▶ Separation, divorce & re-marriage
 - ▶ Sex in marriage
- ▶ **Balancing Personal, Relational, and Public Life Seminar**
- ▶ **Church Growth and Church Planting**
- ▶ **Pastors Leading God's Way**
- ▶ **Spiritual Gifts**
 - ▶ Part I
 - ▶ Part 2

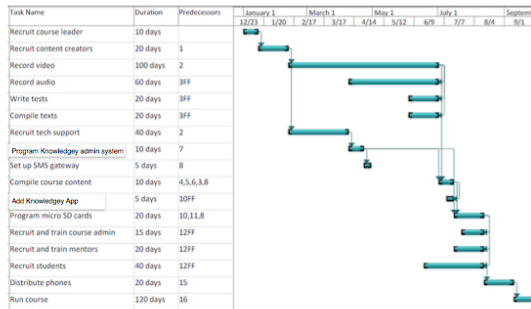
▶ 23

mLearning Components MTP Content

- ▶ **LEVEL II**
 - ▶ **Biblical Interpretation**
 - ▶ **OT Survey**
 - ▶ Part 1
 - ▶ Part 2
 - ▶ Part 3
 - ▶ **NT Survey**
 - ▶ Part 1
 - ▶ Part 2
 - ▶ Part 3
 - ▶ **Church History in Africa**
 - ▶ **Africa in the Bible**
 - ▶ **Reaching People of Other Faiths (Muslim)**
 - ▶ **Counseling Principles**
 - ▶ **Principles of Preaching and Teaching**
 - ▶ Part 1
 - ▶ Part 2
 - ▶ **Women in the Ministry**
- ▶ **LEVEL III**
 - ▶ **Resource Development**
 - ▶ **Leadership and management**
 - ▶ **Transformational leadership**
 - ▶ Part 1
 - ▶ Part 2
 - ▶ Part 3
 - ▶ **Christian doctrine**
 - ▶ **Focus on children**
 - ▶ **Focus on youth**
 - ▶ **Theology of work**
 - ▶ Calling, Spirituality and work,
 - ▶ Biblical world view of work
 - ▶ Jesus and work
 - ▶ **Conflict Management**
 - ▶ **Project Management**

▶ 24

mLearning System Timeline



▶ 25

mLearning System Costs

Key Item	No. Required	Approx. costs (each)
Phone	One per student	\$100 +/- 25%
16GB Micro SD card	One per student	\$10-\$20
SMSs for tests	40 per student for PTL	\$.02 per SMS
MTP license fee	One per student	TBD
SMS Gateway	One per 1,000 students	\$100 +/- 25%
SD duplicator	One per 10,000 students	\$1500
Tech support with PC	One per 1,000 students	40 hrs / week
Course admin with PC	One per 1,000 students	40 hrs / week
Training for techs and admin	2 trainers per course center	\$3,000
Mentors	One per 20 students	30 mins per day

▶ 26

Appendix 7. MTP Introduction

The **Missionary Training Project**

*Life-changing Biblical Training
Delivered on a Mobile Phone*

One of **TCN's** contributions to
Church Movements



1

New Opportunities

5X

Today if a telephone rings
anywhere on the planet, the
odds are 5 to 1 that it is a
mobile phone.




2

New Opportunities

Age 8

5.9 billion mobile phone
subscriptions active today.
Enough for everyone on the
planet, age 8 or older, to
have one.




3

New Opportunities

57%

4 billion unique mobile
phone users, 57% of the
planet's population.



4

New Opportunities

2X

People who use Facebook
on a mobile phone are
twice as engaged.

Students will be, too.



5

New Opportunities

\$87

Cost of an Android
smartphone



6

New Opportunities

The best

This is the best discipleship and training opportunity of our lifetimes.



7

mLearning in Africa

3 minutes

How long it takes to get an overview of mLearning by watching this video.

link to youtube video



8

MTP Classes Completed



9

What They Said

"I love Jesus more and have a deeper desire to share the love of Christ to others."

"I have been personally helped to grow in the Word. I am adequately equipped to bring about changes in church."

"I have grown in reflecting on the word of God, and knowing how to prepare and preach and study the Word."



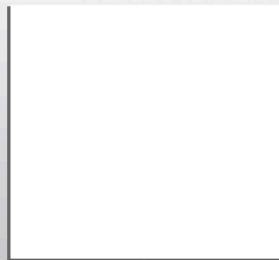
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MTP Coordinators Trained



11



10 Countries will train 2,400 pastors



12

How It Works (1)

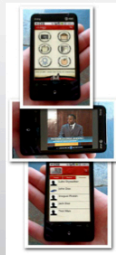

- Student **watches/listens/reads the course material** on their smartphone using Knowledgegey app.
- Student **submits quizzes** through Knowledgegey on what they just learned. Knowledgegey sends quiz results to instructor via SMS (no data plan required). Student receives quiz grade in about three minutes.

13


How It Works (2)

- Student uses Knowledgegey to **ask a question** to the instructor. Knowledgegey delivers answer via SMS.


14

“I have seen the future of training and it looks like a mobile phone.”





15

The mLearning Technology Path





16

mLearning Takes Teamwork

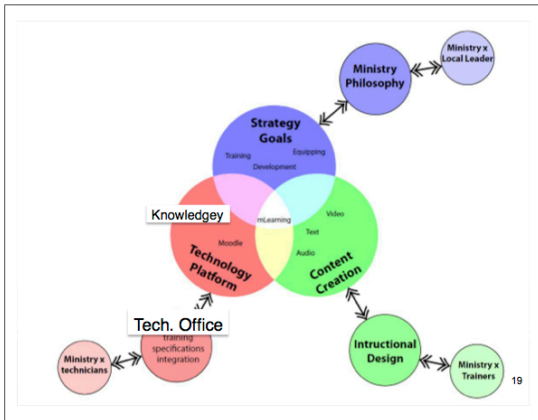



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Each Team Contributes





18



Strategy Leader's Role


- Prioritize the project
- Call together a team to form a plan
- Participate on team to form a plan
 - Get Content and Technology approval to confirm Leadership sub-plan. E.g. Can we build a course with our current funding? Can we build this course with our timeframe constraints?
- Follow up to make sure the plan is being carried out
- Learn from project participants how to improve program



20

Content & Curr. Creator's Role


- Participate on team to form a plan
 - Get Strategy Leader and Technology approval for new material production sub-plan. E.g. We need remote testing centers. Can we develop these?
- Bring together subject experts and course design experts to produce new material or gather existing.
- Test material on students
- Learn from students how to improve the content and curriculum



21

Technology Manager's Role

- Participate on team to form a plan
 - Get Strategy Leader and Content approval for new technology production sub-plan. E.g. Will this quiz feature meet the need for proper assessment?
- Manage the technology development plan
- Bring together technical experts to configure the technical services and software
- Test the technology to ensure it works.
- Learn from students how to improve the system



22

Overall Process

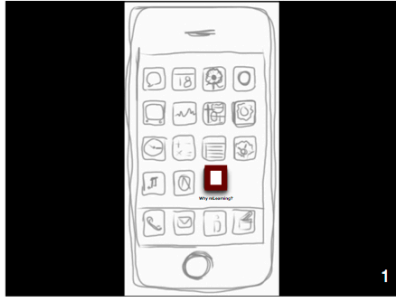
- Form a plan, work the plan, improve the program
- Each partner has limitations :
 - **Strategy Leader** : *resources*
 - **Content Creator** : *time, [talent], money*
 - **Technology Mgr**: *time, [talent], money, worldwide state of technology development*



23

Appendix 8. Why Mobile Learning?

9/21/14



1



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8



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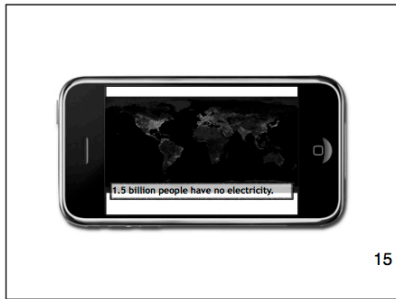
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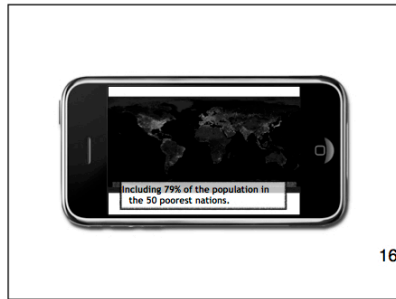
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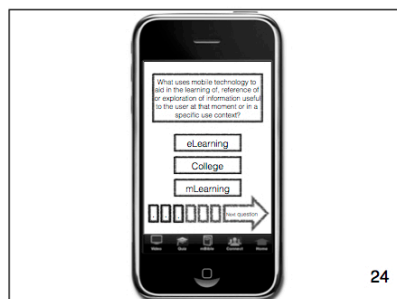
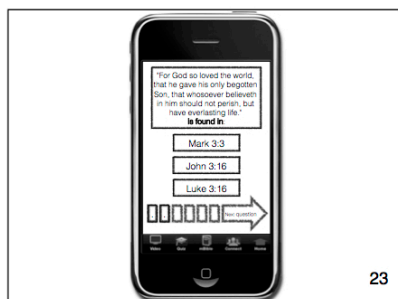
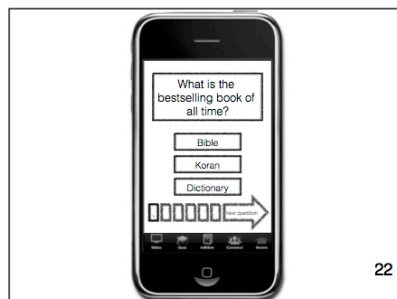
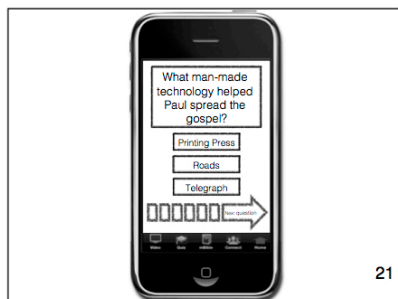
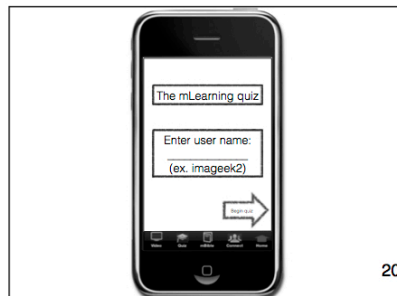
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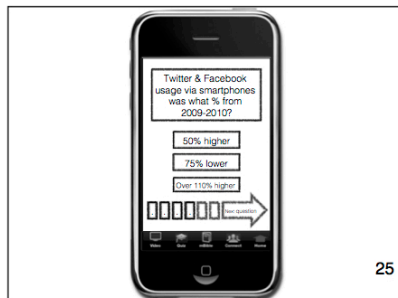


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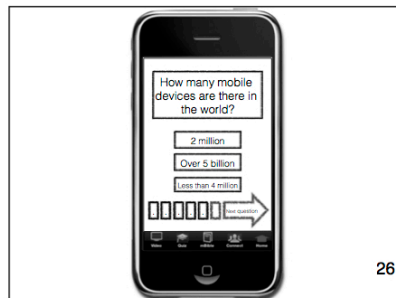


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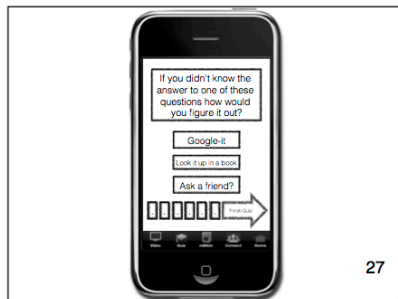




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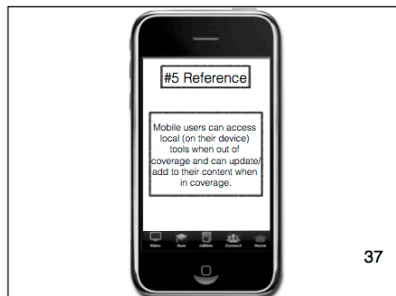


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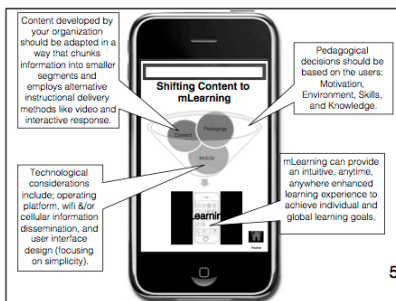
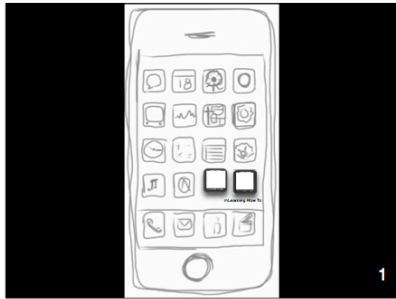


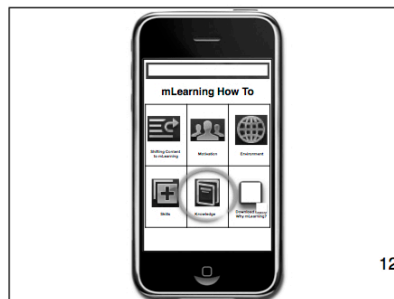
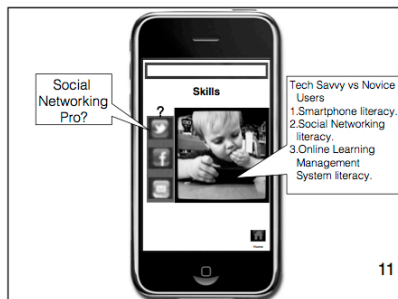
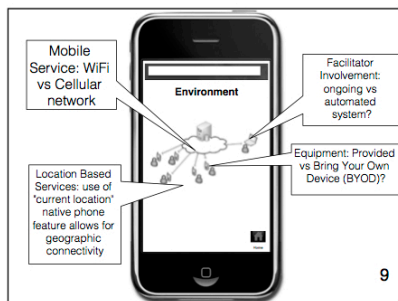
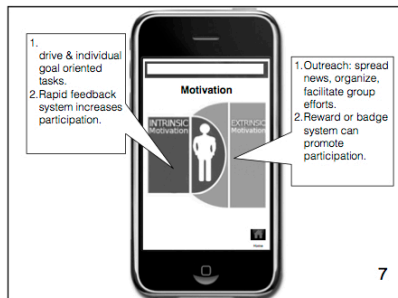
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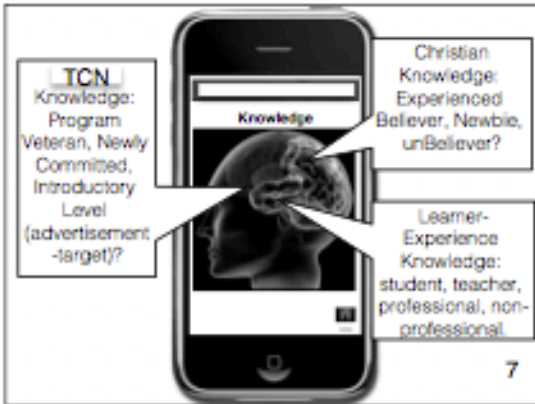




Appendix 9. mLearning How To







Appendix 10. TCN mLearning Schedule

TCN mLearning Schedule

Sunday, April 8

1:12p MCO Micah arrives via Jetblue 661 (Nick p/u at 1:30)
 2:00p-8:00p Tred's home Easter dinner
 10:00p MCO Aaron arrive via Delta 1223
 Aaron rents car and goes to Wycliffe
 (suggest you stop at grocery store for breakfast supplies)

Monday, April 9

9:00a-10:00a TCN Breakfast on your own
 Tech Off. conf. rm Moring prayer at TCN
 10:30a-12:00p Course 1 script Tech Off. conf. rm Nick/Andy/Micah/Aaron/Rory work on
 11:46a-12:00p MCO AJ arrives via Delta 2074 (Aaron or Mike to p/u)
 12:00p-1:00p TCN café Lunch
 1:30p-5:00p Course 1 script Tech Off. conf. rm Nick/Andy/Micah/Aaron/AJ/Rory work on
 2:00p-3:00p project TCN Micah/ Laurin meet with Sharon about a mLearn
 6:00p-8:00p BBQ Dinner

Tuesday, April 10

Breakfast on your own
 9:00a-10:30a mLMS HQ Nick/Mike/Micah/AJ Client App design
 11:00a-12:00p TBD Lunch
 1:30p-5:00p mLearn elements Tech Off. conf. rm Course 1 script, Course 2 structure, other
 5:00p- on your own FREE

Wednesday, April 11

8:00a-9:00a TCN Film Studio Nick/Aaron/AJ/Rory Film setup
 9:00a-12:00p (others are welcome) TCN Film Studio Nick/Aaron/AJ/Rory Course 1 Shoot
 12:00p-1:00p TCN café Lunch
 1:30p-2:30p TCN Nick/Micah/Aaron/AJ Life of Jesus Christ FILM Tour
 3:00p-5:00p TCN Nick/AJ/Rory Edit Course 1 and 2
 3:00p-5:00p Tech Off. conf. rm Andy/Micah Discuss other mLearn projects
 6:00p-9:00p Downtown Dinner, shopping and dessert

Thursday, April 12

9:00a-12:00p Tech Off. conf. rm Editing, mLearn element design, etc.
 12:00p-1:00p TCN café Lunch
 1:30p-5:00p TCN Editing, mLearn element design, etc.
 afterward 7:15p- Downtown Corporate 5k (arrive by 6:15p) – Box dinner

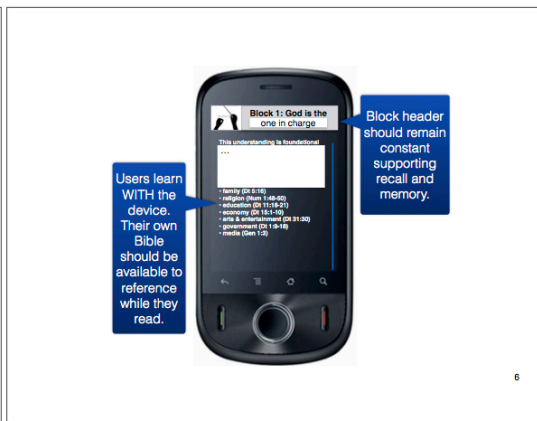
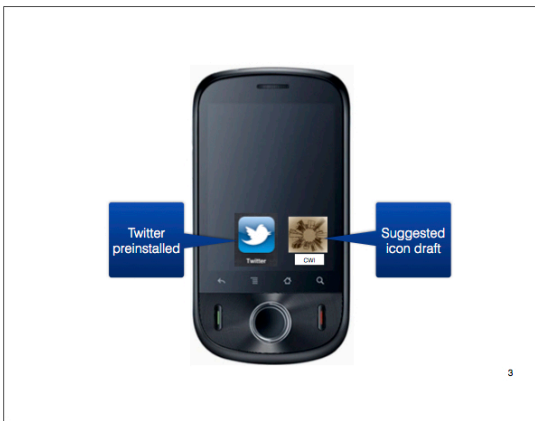
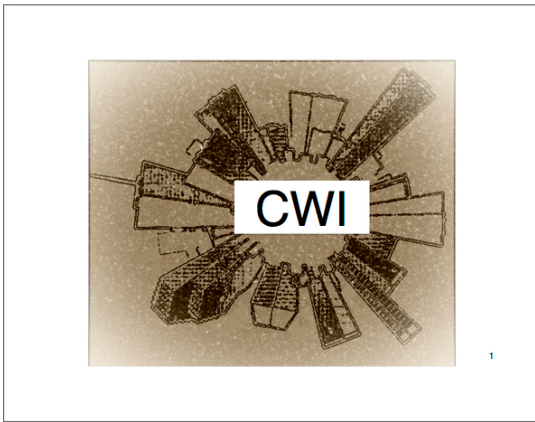
Friday, April 13

9:00a-12:00p TCN Editing, mLearn element design, etc.
11:30p-12:30p TCN café Lunch
1:00p-2:30p Tech Off. conf. rm wrap-up
3:56p AJ departs via Delta 1979
5:20p Micah departs via Jetblue 658

April 16-20

Aaron works on Course 3 and final edits for Course 1 and 2

Appendix 11. CWI Project Keynote Presentation



Use existing applications and discussions applied to Twitter with specific hash tags (#).

Hash tags allow users to select themes/categories on Twitter from anyone in the world using the same #_____

7

Ex. 99 character post.

140 characters keep responses abbreviated and more accessible on a mobile device.

Exact geographic location can also be shared.

Existing local activities that involve creation of items for discussion can take place via a photo of the created work.

Users can network with others & create groups (local, national, international)

Users can tweet there location to allow others to see their local responses; ex. #CWimylocle where I work

8

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