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Applying the Component Display Theory to the Instructional Design and Development of an Educational Mobile Application

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Applying the Component Display Theory to the Instructional Design and Development of an Educational Mobile Application

by

Trelisa R. Glazatov

A dissertation report submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy
In Computing Technology in Education

Graduate School of Computer and Information Sciences
Nova Southeastern University

2015
We hereby certify that this dissertation, submitted by Trelisa Glazatov, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the dissertation requirements for the degree of Doctor of Philosophy.

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Mobile technologies present an opportunity for scholars and practitioners to extend the application of instructional design theories and models to a mobile learning environment. The goal was to examine mobile learning design and development issues, validate and extend the instructional design theory, Component Display Theory (CDT), to the development of mobile learning activities, and recommend guiding principles for mobile learning system development.

Using a formative research approach, which focuses on improving design theory for instructional practices and processes, CDT was used to design a tutorial mobile application targeting faculty professional development. This design instance was formatively evaluated to determine how CDT can be used to guide the design and development of a mobile learning environment; the key processes that are pertinent to translating instructional design plans into mobile learning lessons; and the challenges and issues in designing instruction for a mobile learning environment.

The findings resulted in the identification of variables and factors related to the instructional strategies, design variables, and the learning system that affected the application of the CDT. Recommendations and further research opportunities are presented to increase practitioner use of the theory and to address learner and organizational readiness. This research contributes to the field of instructional design and development by examining how underlying theories, principles, and frameworks can be applied to the design and development of mobile learning systems.
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Chapter 1

Introduction

Richey, Klein, and Tracey (2011) state that instructional design (ID) “is a science and art of creating detailed specifications for the development, evaluation, and maintenance of a situation which facilitate learning and performance” (p.3). Science and art represent the balance of research and theory thru dynamic, practical, and adaptive ID processes. Instructional systems design (ISD) links learning theories and instructional theories, creating an approach to address instructional situations and variable components of the learning system such as people, processes, learning objects, and the environment. As cultural, political, and technological changes affect how and where students are learning, it is important to re-examine philosophical perspectives and practices that guide the development of instructional strategies and design of learning environments.

This study examined the opportunities and challenges of applying an established ID model as the guiding framework for the design of a tutorial delivered to mobile devices. The mobile – friendly tutorial was offered as part of a community college faculty development program. This report gives an overview of the current state of learning, a literature review of mobile learning and instructional strategies, and the results of the study.

Background

Levin and Kojukhov (2009) refer to the post-industrial society as a virtualized society. This is a society where there is mass privatization and personalization; it is a society where people deal with simulated images instead of physical objects. The authors
also note that technologically, two trends have led to a virtualized society, computerization and innovations. Computerization has become the replacement for real events and real human actions thus, traditional forms of society, including politics, economics, culture, and education, are becoming acceptable in a virtualized state. Also, technological innovations have enabled a trend of global personalization. For example, mobile tools coupled with computerization have enabled access to content across networks and a community-to-individual trend where people can consume, create, and share information and content with specific communities.

Regarding education, Levin and Kojukhov (2009) suggest that a Personalized Learning Environment (PLE) would take advantage of a virtualized society’s features. For example, the presentation of content and the environment is personalized according to the learner’s preferences and academic progress. Moreover, teachers’ roles will change in a PLE as more content is handled through computerization; learner assessment is less formal; and more creative methods and processes are used for instruction, learning and assessment activities.

Similarly, Collins and Halverson (2010) refer to a second educational revolution in which technologies and social practices now influence the current model of schooling. This education revolution stresses real, active learning that is taken out of the school and into other environments where learners decide what, when, and how to learn. Yet, the benefits of a virtualized society are noted as incompatibilities with the current educational system (Levin & Kojukhov, 2009). These incompatibilities present challenges to education institutions as they choose to adapt and incorporate technology-driven learning and as a result, have created opportunities for different and adaptive learning
environments, including distance education, computer-based instruction, web communities, and mobile learning.

The prospect of learning through portable, personal devices is becoming a viable educational model as mobile tools and technologies continue to evolve. The tools and functions available on mobile devices, including communication, multimedia, and social tools, create an opportunity to examine how instruction can be developed for a mobile learning system. The questions for designers and educators are which ID theories are appropriate for the design and development of mobile learning and what limitations do current theories pose.

Emerging technologies and theoretical questions are common sources for design and development research problems (Richey & Klein, 2007). This research focused on addressing the applicability of an established ID theory as the design framework for a mobile-friendly tutorial, specifically examining the conditions and challenges that may affect the instructional design, development, and effectiveness of the learning objects. This report is organized to present a review of literature that supports the need for research; the approach used to examining the problem, and the results and implications from the research.

**Problem Statement**

The research is varied on the different aspects of mobile learning and as a result, there has been no consensus for the definition of mobile learning or even a mobile learning environment framework (Gedik, Hanci-Karademirci, Kursun, & Cagitay, 2012). In examining the definition of mobile learning, Traxler (2009) reviewed several research perspectives, in which definitions varied, including a techno-centric definition, a
definition defined by learning theories, or based on characteristics and attributes of mobile learning. Without a clear definition and framework, specific ID and development recommendations for a mobile learning system are lacking. In addition, there is an absence of research that validates current ID theories for mobile learning systems. Research is needed to examine how underlying theories, principles, and frameworks can be applied to the design and development of mobile learning systems.

**Dissertation Goal**

ISD is a scientific approach of planning and structuring of an instructional product (Richey, et al., 2011). The parts of the instructional system consist of various components, including people, process, resources and constraints. A system view details the inherent complexity in changing or introducing new variables, such as mobile technology. Identifying what those effects are and how they will influence the design and planning of an instructional product, such as a mobile application, was the goal of the research.

Matias and Wolf (2013) chose an activity-based approach to incorporate mobile technology into an online environment. The authors present mobile technology as two options for educators: learning tools that can be accessed by mobile devices, such as web 2.0 communications and collaboration sites, and tools developed specifically for mobile devices, such as e-books and mobile apps. The activity-based approach is used to identify the appropriate tool for each task or concept to be learned. In the study, four of the five courses did not require learners to engage with the mobile-based activities; thus, students determined when and how they would engage with mobile-based course material and assignments. The authors’ pilot program resulted in several conclusions, including:
students responding positively to the incorporation of mobile tools; mobile learning strategies should accommodate multiple delivery platforms; and the effectiveness of mobile learning depends on the ID.

This research differed in several ways from the pilot program presented by Matias and Wolf (2013). Instead of using mobile tools to supplement an online environment, a stand-alone mobile learning environment was designed. This enabled learners to access all tools, content, and communications from one system. A stand-alone system delivered as to mobile devices enabled the learner and learning system to take advantage of mobile devices’ built in functions, allowing for an easier integration of personal and informal environments and creating an authentic experience for learners. Also, an ID model, the Component Display Theory (CDT), served as a framework to design a faculty development tutorial delivered to mobile devices.

The research goal was to examine design and development issues, validate and extend the CDT to the development of mobile learning activities, and recommend guiding principles for mobile learning system development as it pertains to the design and development of content, presentation, sequencing of information, and feedback. The research objectives were to:

- Use formative research methodology to identify benefits and challenges with implementing an ID model for a mobile-friendly tutorial.
- Propose an adaption to an ID model for mobile learning environments based on the outcomes of the formative research.
Research Questions

The research questions were:

1. How can Merrill’s (1994a) CDT be used to guide the design and development of a mobile-friendly tutorial?

2. What key issues were pertinent to translating ID plans into mobile learning lessons?

3. What were the challenges and issues in designing instruction for a mobile learning environment?

Relevance and Significance

In a virtualized society, it is inevitable that technological resources and tools used in a personal environment will become integrated into other parts of life, including the professional environment. For professional training and development, mobile learning enables faculty to access just-in-time training that is current, appropriate, and flexible to their needs while minimizing the time and physical space barrier to faculty training and development (Palloff, Pratt, & Engel, 2010). Additionally, faculty use of mobile technology in both personal and professional contexts can lead to faculty engaging with students differently by integrating emerging technology and applying it in different pedagogical contexts (Lefoe, Olney, Wright, & Herrington, 2009). Furthermore, modeling the application of mobile learning, through faculty development opportunities, encourages knowledge-building related to faculty training, the advantages of integrating technology in the learning environment, and pedagogical consideration for using emerging technology. As such, this research centered on creating a mobile-friendly tutorial for faculty training and development.
According to The World in 2010 report (as cited by Gedik, Hanci-Karademiric, Kursun, & Cagiltay, 2012), 90% of the world’s population has access to mobile networks, and more individuals own at least one mobile device. With mobile technology creating a more usable and purposeful device beyond a device’s primary function, mobile devices can emerge as the next iteration of the personal computing machine. Similar to previous technologies, such as the computer, the mobile learning system is positioned to complement or serve as an alternate to the traditional, face-to-face learning environment. The potential uses of mobile technologies and the changing ways we learn in the 21st century provide a chance to examine the ID and development process.

Although mobile learning environments may be comparable to current computer-based or e-learning environments, the differences in how the system components: people, processes, resources and constraints, interact and affect each other call for an independent approach to understanding the potential pedagogical effectiveness and limitation of the learning system. As compared to e-learning, which can be considered a formal, interactive, collaborative, computer-based environment, mobile learning can be considered more informal, spontaneous, networked, and portable (Laouris & Eteokleous, 2006). Instructional strategies, presentation of information, communication, media, and interaction with content will differ in the mobile learning environment. In particular, mobile applications offers a new perspective in presenting instruction to learners as oppose to a Web browser that is often used in distance and e-learning. Mobile applications, through a personal device, will offer individual and authentic learning experiences and group learning as well. For this research, the learning environment
designed for higher education faculty was confined to a mobile web environment that can be accessed through personal mobile devices such as phones or tablets.

Many established ID models can be applied to the design and development of a mobile learning app. To further the design and development knowledge base, the aim of this research considered an appropriate model, the CDT, and examined the applicability of CDT to the instructional development and design process of a mobile-friendly tutorial. Based on the CDT, it is presumed that cognitive learning objectives and test items are represented by two factors: what the learner is expected to do and the type of content that is presented, referred to as the performance-content matrix (Merrill, 1994a). CDT, also, is prescriptive in the presentation, sequence, and display of instructional content and the assessment of knowledge. The detailed framework of the CDT prescriptions is what makes the theory suitable for computer-based applications (Merrill, 1994b) and allowed the researcher to identify specific variables that need to be considered to extend the theory to the computer’s successor, mobile devices. This research contributes to the field of ID and development by validating the effectiveness of the CDT’s use for a mobile learning environment and identifying the variables that affects its effectiveness.

**Barriers and Issues**

Previously, it was stated that ID is a “science and an art.” Both the science and the art presented barriers for this research. There are opportunities for mobile technologies to be integrated into learning environments but since mobile learning is an emerging technology, finding recent comparable research to this research was be difficult, especially as it pertains to the CDT. Finding research that deals with ID
theories applied to computer-based systems and empirical research that address specific elements of the proposed research mitigated this issue.

The “art” of ID pertains to addressing the practicability of the CDT model. A holistic view would concede that there are too many variables to consider an ID model in real-world applications. So, identifying general principles and prescriptions that encompasses most mobile learning components and sub-systems, and still allows flexibility for the designer, was be difficult. The feedback cycles from ID peers and colleagues provided the balance of including practicality of the resulting key processes and guidelines. The research addressed both the science and art of ID, thus contributing to the scholarship of the ID field and practical application.

Additionally, the researcher was also a participant in the design and development of the tutorial. The various role of the researcher may present bias and affect the validity of the research results. To reduce the bias and increase validity additional methodological strategies will be employed during the research phase. These additional strategies will be addressed in Chapter 3.

**Assumptions, Limitations, and Delimitations**

As stated previously, 90% of the world’s population has access to mobile networks, and more individuals own at least one mobile device (as cited by Gedik, Hanci-Karademiric, Kursun, & Cagiltay, 2012). It is assumed mobile technology has potential uses in delivering professional development learning activities to higher educational faculty. The research was limited to adjunct and full-time faculty at a community college district. It is assumed that the faculty represents a population who would most benefit from the professional development tutorial delivered via mobile technologies.
Additionally, it is assumed that instructional strategies are comprised of multiple components, micro and macro strategies (Merrill, 1994a). The CDT is only concerned with micro-level strategies, such as the characteristics, interrelationships and sequence of individual displays presented to the learner. Macro-level instructional strategies, such as the selection, sequence, and organizational structure of subject-matter topics, as well as delivery and management strategies will be examined from a system perspective to place the application of the CDT into context and to identify system-level variables that may affect components of the CDT.

The following aspects of the proposed research, including the setting, participants, and developed mobile application, may affect the generalizability of the results. Thus, the results of the research may not be generalizable to other settings or populations.

- The research was conducted at a two-campus community college district. The tutorial was also developed collaboratively through the district’s Technology and Educational Support Services (TESS) office. As a result, the developed tutorial was tailored for the targeted settings and learners and may not be applicable to other higher educational settings and learners.
- Participants in this research are members of a distinctive group and may not represent other populations of adult learners.
- Resources, technology availability, and time constraints influenced the instructional methods and tools used for the development of the mobile-friendly tutorial.
The research was the study of a single application of an instructional design theory. Additional applications are necessary for further development and extension of the theory.

The following variables were intentionally altered for the research to constrain the scope of the study.

- Participants were adjunct and full-time faculty members at a single community college district.
- The expert panel review of the application of the CDT was limited to one iteration.
- Two design instances, one reviewed by the expert panel and the other reviewed by the faculty, of the mobile-friendly tutorial based on the CDT were completed.
- The developed mobile-friendly tutorial was offered to the targeted learners during the fall 2014 semester. Learners had until the end of the semester to complete the tutorial.

Definition of Terms

The following is an alphabetized list of terms that are included in this report.

- Component Display Theory (CDT): A micro-level theory, focused on providing instructional strategies for a single idea, concept, or principle (Merrill, 1983).
- Design and development research: The systematic study of design, development, and evaluation processes with the goal of creating 1) research-based instructional and non-instructional products and tools and 2) new or
enhanced instructional design and development models (Richey & Klein, 2007).

- **Elaboration Theory:** A macro-level theory that provides guidance for the scope and sequencing of large units of instruction based on the assumptions that there are different types of learning tasks and, as a result, instruction will vary according to the task type (Reigeluth, 1999b).

- **Formative research:** Developmental research or action research that is intended to improve design theory for designing instructional practices or processes (Reigeluth & Frick, 1999).

- **Instructional design theory:** A theory that offers explicit guidance on how to design instruction so that learning goals are more likely to be attained. Specifically, instructional design theories identify methods of instruction and the situations in which the methods should be used (Reigeluth, 1999a).

- **Instructional strategies:** Specification for selecting and sequencing events and activities within a lesson (Richey & Seels, 1994).

- **Mobile learning:** An instructional situation in which the learner has physical limited access to the instructor and other learners and the primary way to access the learning environment, content, instructors, other learners, is through mobile devices and technologies (Author).

- **Mobile device:** A hand-held device, that has a screen, input option and can perform computing functions (Author).

- **Mobile application:** An application software designed to run on a mobile device (Author).
• **Social constructivism:** A learning philosophy that emphasizes group learning and collaborative, self-governed activities in which learners have opportunities to learn by themselves in addition to obtaining knowledge from technological and social resources (Kundi & Nawaz, 2010).

• **Transactional distance:** Separation of learners and teachers, physically, psychologically, and/or through communications that affects teaching and learning behaviors and potentially causes misunderstanding between the instructor and the learners (Moore, 1997)

• **Tutorial:** Programs designed to present information and guide learners in their initial acquisition of knowledge or skills. In addition to an introduction and closing, tutorials generally include a cycle of information presentation, practice, and feedback (Alessi & Trollip, 2001)

**Summary**

As mobile technologies continue to be a part of the learning environment, it is important that instructional designers understand the issues surrounding the *science and the art* of ID. This understanding includes how ID theory can guide the ID process for a virtualized learning environment, system considerations that may alter the applicability of ID theories in varying situations, and the effective integration of emerging technologies to promote learning. This research examined the CDT as an ID framework for the design of a mobile-friendly tutorial to better understand the advantages and limitations of the theory.
Chapter 2

Review of the Literature

This research centers on three propositions:

- Learning in the 21st century creates the need to examine ID and development challenges and issues.
- Mobile technologies will affect how ID theories and models are implemented and adapted.
- The CDT may provide a descriptive and prescriptive framework to guide the design and development processes for a mobile learning system.

The review of literature provides a general overview of each proposition as it pertains to the research goals.

21st Century Learning

In the 21st century, learning opportunities are abundant in a digital, information-rich world. The context of learning has become more learner-focused, learner-controlled, and learner-structured through increased access to the Web, mobile technologies, and the nature of the tools available on the Web, such as social networking, media sharing, and knowledge development tools (Greenhow, Robelia, & Hughes, 2009). In discussing the various philosophies that differentiate learning theories, Kundi and Nawaz (2010) suggest a paradigm shift within e-learning environments characterized as a spectrum incorporating objectivism, constructivism, and social constructivism viewpoints. Similarly, Naismith, Lonsdale, Vavoula, and Sharples (2004) reviewed literature related
to mobile technologies and learning and identified six broad perspectives of learning: behaviorist; constructivist; situated; informal/lifelong; collaborative; and teaching and learning support. Both views offer insight on how learning is occurring in the 21st century.

From the objectivism or behaviorist perspective, learning is facilitated through reinforcement based on a stimulus and response. Within the mobile learning environment, this would be represented as a presentation of content, followed by responses from the learners, and then feedback. So, from an objectivism/behaviorism view, information is transmitted from the system or tutor to the learner. The \textit{transmission of knowledge} is considered to be traditional or objectivist, where the learner has the least amount of control of the learning dynamics as it relates to content and sequencing of information (Kundi & Nawaz, 2010). Systems such as presentation software, static websites, and computer-based application are typical examples of technologies that allow learners to interact through one-way, standardized, linear, transmission of information through clicks, links, and responses from either the instructor or the application itself.

In the middle of learning spectrum, cognitive constructivism is viewed as negotiated learning with learners constructing ideas and concepts based on their current and prior experiences and knowledge (Kundi & Nawaz, 2010). Negotiated learning is created through students’ collaboration with the context and content whereby individual students can construct their own knowledge. Comparatively, the constructivist and situated learning perspectives by Naismith et al. (2004) fall along this part of the spectrum with constructivism assuming learners construct new knowledge based on prior knowledge and where situated learning assumes that not only the acquisition of
knowledge but the social participation process enables learning, with the situational context playing an important role. Within a mobile learning environment, activities such as participatory simulation, including role playing games, or context-based learning at museums would represent opportunity for learners to negotiate their knowledge. Learning through customized training modules, individualized tutorials, chat rooms and discussion boards are examples of the types of e-learning tools the learner will interact with in the self-service model.

At the other end of the spectrum, social constructivism emphasizes group learning and collaborative, self-governed activities offer the opportunity for learners to learn by themselves or harvest knowledge from the abundance of technological and social resources (Kundi & Nawaz, 2010). The collaborative and informal/lifelong learning perspectives fall within this social constructivism category (Naismith et al., 2004). Collaborative learning proposes that learners must be able to communicate with others and the learning system in order to construct knowledge. In addition, within informal and lifelong learning environments, learning happens all the time and is influenced by the environment and context. Mobile computer-supported collaborative learning activities can encourage learning through the promotion and facilitation of interactions and collaborations, and sometimes impromptu learning episodes. Many of the social networking and communication tools, such as blogs, wikis, gaming technology, and virtual worlds, lend themselves to be used by learners in creating, analyzing and synthesizing information.

The learning and teaching support perspective presented by Naismith et al. (2004) is not on the learning spectrum but instead goes across all the learning paradigms. Since
support is part of the learning experience, it should be taken into consideration and include system tools and resources that will support the learner both technically and pedagogically.

Fallery and Rodhain (2011), who consider learning to be a communication process, examined the e-learning models based on the epistemological foundations of the learning process. The e-learning model, based on a behaviorist perspective, is a just-in-time framework, where the feedback is instant and the structure is standardized. The self-service e-learning model, grounded in the constructivist perspective, is based on the premise that the activities, roles, and environment are important since the message is structured in the interaction between the three components. Thus, the experience of the relationship is the source of learning. The authors refer to this type of learning as a negotiation of meaning. For this perspective, the learner has increased responsibility to master the content through participation and co-production of content and knowledge. The e-learning model moves to an open, collaborative environment, where information can be delivered in a personalized manner and the learner has full control to access the content as needed, can adapt and customize the technology, and engage in communication with peers.

Twenty-first century learning encapsulates the full spectrum of learning philosophies that support the notion that a mobile learning environment can promote individualized instruction as well as authentic learning opportunities and learning within communities and groups. In the following section, the affordances and pedagogical challenges of mobile learning are discussed.
Mobile Learning

Mobile technologies are present in every aspect of society, redefining spaces, discourse, relationships, and communities (Traxler, 2009; Kundi & Nawaz, 2010). Mobile devices provide users with a variety of functions that make them comparable to the personal computing machine and one key feature of mobile devices, portability, enables other technological advances related to learning, such as individuality and collectively learning, ubiquitous learning across formal and informal contexts, and interactivity (Park, 2011). These features afford connectedness, accessibility, and portability advantages that can complement or serve as an alternative to the traditional, face-to-face learning environment. To understand how mobile technologies will influence ID, some key advantages, including seamless learning and collaboration, and challenges, such as learner autonomy, presence, critical literacies, and transactional distance are discussed.

Seamless Learning. Mobile assisted seamless learning promotes one-to-one learning opportunities, where learners are empowered to learn whenever and wherever they feel the need to learn as opposed to the feeling of being required to learn with the help of a mobile device (Looi et al., 2010). Seow et al. (2008) proposed a framework to explore seamless learning based on mobile technologies and identified five components that may contribute to learning: space, time, context, community, cognitive tools, and cognitive artifacts. Within this framework, mobile technologies demonstrate the vastness in which technological affordances can facilitate learning. These affordances include accessibility to information, resources, peers, and content experts as well as the ability to use mobile technologies to offload, recall, create, and modify information. Since the
technologies are available when needed, learners are able to construct and share knowledge while moving between spaces and context.

Likewise, Hamid, Waycott, Kurnia, and Chang (2010) reviewed literature that summarized activities supported by online social technologies. These activities include content generation, sharing, interacting, and collaboratively socializing facilitated via mobile functions and tools. Seamless learning gives students the opportunity to engage in higher-level thinking through activities that foster critical thinking, collaboration, and analysis while the mobile learning environment provides a system where the learners are not confined to a particular context in order to engage with or construct knowledge.

Collaboration. Collaborative learning enables the learner to share and discuss in the practice environment, thus, allowing the learner to construct knowledge and reflect on what happened in the environment (Laurillard, 2009). In addition, collaborative learning also centers on learner control and engaging socially to construct knowledge (Cheong, Bruno & Cheong, 2012). Related to the seamless learning components of space, time, context, and community, the learner control and social engagement expected in collaborative spaces can be facilitated through mobile technologies by controlling information and interactions through push/pull mechanisms.

The push mechanism uses technologies to allow the service provider or system to send device users relevant information based on location or current device tasks. Whereas, the pull mechanism can be considered “on-demand” as the user will use technology to request information or use of services when needed. Thus, the different information delivery mechanism that can be provided within a mobile learning environment can offer different levels of learner control. Through the use of mobile
devices, which usually are personal devices, increased learner control allows the use and adaption of tools with this one-to-one relationship. In a one-to-one mobile assisted environment, learners can search and pull information when needed as well as control the time and space they choose to interact with learning objects and others. Additionally, successful collaborative learning activities require constant generation, transference, and understanding of knowledge (Su, Yang, Hwang & Zhang, 2010). Mobile devices and technologies provide a portable and additional means of communication and collaboration for learners, though forums, messaging tools, and other online social technologies. These key activities of engagement, sharing, and participation can be facilitated via mobile learning systems.

For educators and instructional designers, developing a mobile learning environment is not without challenges. To gain a complete picture of how mobile technologies influence the design of instructional systems it is important to reflect on the pedagogical challenges and how those challenges will affect the implementation of mobile technologies into the system.

**Learner Autonomy.** Issues that could affect learner autonomy include motivation, learner initiative, confidence as well as learner control over learning activities and communications used in the learning environment (Kop, 2011). Within mobile learning systems, decreased autonomy could not only negatively affect collaboration but also how the learner chooses to use the technology and tools within the environment. For example, when examining usage and abandonment of instant messaging technology among self-identified former users of instant messaging, Birnholtz (2010) discussed a couple of relevant implications from the findings. The study’s aim was to explore how
adaptation of a technology changes as priorities change and to better understand why users abandon technology they once found useful. The first implication was theoretical. Although there is research on why people chose to adopt certain technologies, there is little research that examines how technologies, such as instant messaging, allow the learner to adapt to changing context and dynamics in social relationships. The researcher notes that technologies are used over time under conditions that may not be foreseen in adoption. Thus, context is important in understanding social and temporal adoption and adaption of technologies.

The second implication was related to design. Designers will need to incorporate an easier way for learners to adapt the technologies. In a mobile learning environment the technology must not only make it easier for students to move between context but also needs to be able to allow changes to how the technology is used by the learner. For example, the use of mobile communication systems and push/pull mechanisms allow for the dissemination and sharing of information. Mobile features also enable users to manage their connections and communities, including who they will communicate with and when they will communicate. The ID and underlying theory for mobile learning needs to be flexible enough to allow for autonomy across contexts while still allowing the educator or facilitator to actively engage, manage, and support the leaners and environment.

**Presence.** In order to increase the student engagement and satisfaction with the learning experience, level of presence should be high (Kop, 2011). Previous discussions highlighted the multitude of communication resources and tools available through mobile technologies. Although the means to communicate is important for presence, just as
important in a learning environment is a method to provide feedback to learners. The mobile environment must be designed to allow feedback, thus creating relationships and an iterative form of communication between the learner and the system, facilitator, and peers.

Also, related to presence is the sense of community. Several conditions must be met to create a learning community: collaborative workspace that provides interaction; shared social context for learners to socialize, learn, and construct knowledge; and social, action, and activity awareness (Cheong, Bruno & Cheong, 2012; Sugumaran, Raghunathan, & Vivekanandan, 2009). The social technology intersection in the Framework for the Rational Analysis of Mobile Education (FRAME) model describes the relationship between one learner and one device and describes the collaboration via the device among multiple learners (Koole, 2009). The FRAME model (Figure 1) emphasizes social constructivism and considers technical, social, and personal aspects of learning with the convergence of all three aspects representing an ideal mobile learning situation. The model was developed to guide the development of mobile devices and the design of instruction for mobile learning environments. Accordingly, the FRAME model implies the most important issue related to presence is how information is exchanged and how collaboration happens among learners.

The conditions for a mobile community present a unique issue of balance between the need for learner autonomy and the needs of the learning community. Although one aspect of the environment does not need to be decreased at the expense of the other, there is a need to better understand how to develop a mobile community that will effectively engage the learner in both personalized and group learning activities.
Critical Literacies. Although we are living in the 21st century, digital literacy skills are necessary for a learner to effectively engage in a mobile learning environment. The current generation of students may embrace new technology, but there must be perceived benefits for the technology to be accepted, adopted, and supported. One concern related to literacy is the amount of information available through the Web and other online resources. In a one-to-one mobile learning environment, the learners need to be able to aggregate and critically analyze what information is needed to meet their learning objectives (Kop, 2011). One way to mediate the concern is to ensure the technology is used in same or comparable matter in which the learner is already accustomed to using them to lead to a smoother uptake and better acceptance (Cheong, Bruno & Cheong, 2012). If learners are comfortable using the technologies and
resources then aggregation and cataloguing of information is easier. Getting learners accustomed to the technology can be accomplished both, by the learner, through the adaption of chosen mobile tools and through the design of the mobile learning environment by embedding flexibility in how the learner can engage with learning objects. In addition, the availability of “experts” within the environment can be used to assist learners in analyzing the resources available to them. Experts can be placed formally in the environment as facilitators or can be identified “organically” through informal group activities.

**Transactional Distance.** Transactional distance (TD) refers to a continuous variable of miscommunication between the learners and instructors due to time and space separations within the learning environment (Moore, 1997). The theory posits that three variables, dialogue, structure, and learner autonomy, affect the degree of transactional distance in a learning environment. With the goal of striking the appropriate balance between the variables to minimize the perceived transactional distance, the struggle for instructional designers is identifying mobile technologies and instructional frameworks that may minimize the perceived transactional distance. Park (2011) posits, through the proposal of four types of mobile learning activities, that mobile technologies attributes will influence transactional distance by enabling diverse learning contexts via multiple instructional methods and supporting varied individualized and networked communications. With appropriate frameworks, mobile learning may offer opportunities for highly interactive, bi-lateral transactions between learners, facilitators, and the content through course design, structure, and various types of communication media.
Instructional Strategies

In discussing the pedagogical perspective of mobile learning, Kearney, Schuck, Burden and Aubusson (2012) identified three distinct features of mobile learning: personalization, collaboration, and authenticity. Programmed instruction, cognitive apprenticeship and anchored/situated instruction are examined to gain insight on how these instructional strategies can guide the development of mobile instruction and capitalize on the distinct features of mobile learning.

Programmed Instruction. Programmed instruction is the foundation for computer-mediated instruction (Lockee, Larson, Burton, & Moore, 2008). The basis of the theory is formed by Skinner’s operant condition assumption that conditioning reinforces desired behavior and the principles of shaping, priming, prompting, and transfer of stimulus control. Programmed instruction enhances learning based on the strategies to break up content into smaller, sequenced tasks, and encourage learner participation through composed response while giving immediate feedback to learners (Richey, et al., 2011a). In addition, through individualized instruction, learners are allowed to control the pace and sequence of tasks. At the base level, programmed instruction offers a strategy of how learners can interact, via a mobile device, with content and the system. In addition, mobile technologies such as Short Message Service (SMS) text or instant messaging provide feedback strategies.

Higgins and Hannan (2013) used gaming technology to improve hand hygiene compliance in a hospital. Surewash software, a mobile computer-based system, guided hospital staff through the steps of effective hand hygiene and allowed learners to demonstrate techniques with feedback in the form of video audits and instant scoring.
The mobile system allowed the hospital to place the training in various parts of the hospital and allowed staff to use the system at any time. Using the gaming learning system, the hospital compliance significantly increased over the 12 month testing period, from 42% to 84% compliance. Over time, the mobile learning system enabled the users to learn at their own pace, receive immediate feedback on techniques, and increase the learners’ compliance.

**Cognitive Apprenticeship.** Cognitive apprenticeship is defined as a guided experience by an expert on cognitive and metacognitive learning as opposed to physical skills and processes (Dennen & Burner, 2008). There are several phases of learning that increase in complexity over time as the learner becomes more experienced. Instructional strategies consist of modeling, coaching, reflection, and exploration while the learners are engaged in acts of observation, practice, and reflection. Several concepts are relevant to cognitive apprenticeship: situatedness, where active learning takes place in authentic contexts; legitimate peripheral participation, where observation is a valid, primary activity for the learner; guided participation, that incorporates Vygotsky’s zone of proximal development (ZPD) describing the ability just beyond the learners current level of ability; and membership in a community of practice, where members identify with a common task or practice.

The University Teaching Professional Development (UTPD) developed at the Universities of the Canary Islands, focused on giving faculty access to resources to develop teaching capacity; create an interactive, self-paced learning experience; and give faculty an opportunity to participate in computer-mediated mentoring (Villar Angulo & Alegre De La Rosa, 2006). The mentoring component included the pairing of faculty
across academic disciplines, having protégés and mentors complete online modules related to expectations and best practices of mentoring, mentoring activities including online communication and completion of the UTPD training, and assessments for both the mentor and protégés through the development of digital portfolios, self-reflection narratives, and questionnaires.

The cognitive apprenticeship theory highlights the opportunities to implement instructional strategies aimed at learning and collaborating through communities and groups. Within the mobile learning environment, various tools and resources, such as forums, chat rooms, social networks, and virtual worlds will allow learners to share whenever and wherever they want.

**Anchored (Situated) Instruction.** Situated learning theory, which influences anchored instruction, relies more on social and cultural factors than individual psychology (Driscoll, 2007). From a situated learning perspective, learning occurs from engaging in communities of practice. In defining constructivist design theory, Richey, et al. (2011b) discuss the principle of authentic and contextualized learning activities, in which instructing in real-life contexts results in situated, authentic learning.

The purpose of the Online Human Touch (OHT) framework, developed by Drexel University, is to support and retain online faculty through personalized mentoring, faculty engagement, community development, faculty development, personalized communication, and data driven decision-making (Betts, 2009). The OHT framework includes as the use of Second Life and web-conferencing tools to conduct orientation, meetings, and training and an online portal where faculty can find administrative information as well as engage with each other through discussion boards. In addition,
new faculty members were paired with experienced faculty before they began teaching online. The mentoring process included opportunities to shadow the mentors in an online class and virtual meetings to discuss teaching styles and strategies.

The advantage of using social web-based tools to communicate in real-time and offline situations allows mentors and protégés to put themselves in an authentic situation in order to understand how to support others in an online environment and the complexity of activities offer the opportunity for the participants to find relevant information, collaborative activities, and occasions to collaborate with others.

**Instructional Design Theories**

The link between learning and instructional theory indicates that the perspective in which one views how a person learns brings with it different pedagogical challenges. Mobile technology affordances offer ways in which learning systems can engage the learner while maintaining learner autonomy and control. Yet, there are still questions on the best approach to implement and support the technology within a learning system. Several ID theories are discussed in regards to their application to mobile learning including the component display theory (CDT) (Merrill, 1994a), elaboration theory (Reigeluth, 1999b), and Jonassen’s (1999) theory for designing constructivist learning environments.

**Component Display Theory (CDT).** The CDT is a micro-level cognitive, conditions-based ID model (Merrill, 1994a). The theory classifies learning tasks according to the performance-content matrix, according to levels of performance and types of content. Based on the 13 types of learning tasks, general instructional strategies are prescribed. Merrill (1994b) has four parameters for the instructional strategies:
• Primary presentation form and content: the assumption that instructional presentations are discrete and described based on two dimensions, content mode (general or instance) and presentation mode (expository or inquisitory).

• Secondary presentation form: information used in addition to the primary presentation to enhance learning by helping the learner process information or by providing additional context.

• Inter-display relationships: represent the interrelationships between different forms that will affect how learning will occur. The relationships include:
  o divergent or the characteristic differences between presentation instances;
  o range of difficulty, matching of non-examples that allows learners to discriminate among relevant/non-relevant characteristics;
  o fading of help and information to allow the learner to increase their mental processing;
  o random order of presentation and information to eliminate irrelevant learning cues;
  o chunking discrete items into small groups;
  o response delay to encourage problem-solving or instant recall in the application of knowledge;
  o Primary Presentation Form (PPF) isolation where the primary presentation is explicitly identified for the student;
  o learner control that will determine whether the learner or the instructor/system makes decisions about the learning.
While the CDT does not explicitly address social and cultural variables that will influence learning, the ID model does offer some opportunities for the design of mobile learning environments. Originally developed for computer-based instruction, the CDT could provide a framework for designing mobile learning by providing discrete instructional prescriptions for cognitive learning outcomes. If the CDT is used, the design of mobile learning may be limited to self-paced tutorials and instructions. Conversely, a more eclectic approach may be needed to incorporate the social and authentic environment that mobile devices afford.

**Elaboration Theory.** The elaboration theory is a macro-level version of the CDT. The theory provides guidance for the scope and sequencing of large units of instruction based on the assumptions that there are different types of learning tasks and, as a result, instruction will vary according to the task type (Reigeluth, 1999b). The elaboration theory prescribes a general-to-detailed sequence with the initial epitome, or content overview, followed by various levels of content elaboration, then an internal summarizer that reviews the original epitome, and finally an internal synthesizer which identifies the relationships between the different content presented (Richey, et al., 2011b).

Reigeluth (1999b) explains that decisions about sequencing cannot be made with grouping the content; hence, scope and sequence and dependent. The elaboration theory offers three sequencing strategies based on the type of expertise that is to be developed. Conceptual elaboration sequence is used for learning related concepts; theoretical elaboration sequence is used to learn related principles; and simplifying conditions sequence is used for learning a moderately complex task. All of the sequence methods
involve teaching general information before providing more detailed information; using either a topical or spiral sequence approach; grouping content into learning episodes; teaching supporting content with tasks that are closely related; and giving students choice over with learning episode to elaborate on first/next.

The elaboration theory offers the same advantages and limitation as the CDT. Although the theory offers strategies that will help with the design of complex or large units of instruction, the model views learning from a cognitivist perspective. The portability, interaction, ubiquitous learning contexts, and collective learning experiences that can be designed into mobile learning environments are features that can provide a richer, more authentic learning process for students. Thus, similar to the CDT, the elaboration theory may need to be extended to included social and collaborative strategies.

**Constructivist Learning Environments.** Jonassen (1999) provides a constructivist theory to support problem solving a constructivist learning environment (CLE). The focus in a CLE is to have learners analyze, interpret, and solve an ill-defined question, problem, issue or case with the support of additional tools and resources. In order to engage and motivate the learners to participate and attempt a solution, the problem presented should include the contextual factors that affect the problem; be authentic and relevant; and provide ways for learners to create and their solutions and receive feedback. Jonassen notes that when these problem components are included it will create learning goals that can be “owned” by the learners and more likely to be solved.
The instructional strategies in the CLE are in line with the strategies previously discussed and include modeling, scaffolding, and coaching and the support resources and tools include (Jonassen, 1999):

- Related cases and information resources to support understanding of the problem and possible solutions by allowing learners to frame their previous experiences, formulate hypotheses, and interpret multiple perspectives.

- Cognitive tools, such as visualization tools, knowledge modeling tools, and performance support, to help learners interpret and manipulate the problem through interactions with the CLE.

- Conversation and collaboration tools that will support the building of learner communities to enable social construction of knowledge;

- Social and contextual support system to help users implement the CLE, including the organizational, cultural, and technical training and support of the learning environment.

The CLE includes the missing social and collaborative strategies that limit both the CDT and Elaboration Theory. In addition, CLE may provide a complementary design framework to CDT and the Elaboration Theory in terms of defining the learning goals as ill-defined problems instead of classified tasks and designing appropriate activities for the learning goals.
Summary

Established ID theories and models provide various perspectives on how to approach instruction and can provide a general framework on how to approach the design of mobile learning. The review of theories and models reveal the biases inherent in each, whether it is the philosophical foundation on which it is based, the level of detail provided for the instructional prescription, or diminished attention paid to social and group learning. From a social constructivism perspective, mobile learning can offer environments where learners can construct knowledge individually and collectively. Mobile technologies and resources will have an influence on the adoption of various ID strategies, including the design of mediated communications and media selection.
Chapter 3

Methodology

A field evaluation, through the use of a case study, was used to validate an application of the CDT to the development of a professional development tutorial. A field evaluation study allows for validating the applicability of an ID theory as well as examining the implications of adapting the theory by systematically studying the effects of products that have been created with the theory (Richey & Klein, 2007). In addition to understanding the applicability of the CDT, examining the practicality of theory in everyday use may hold more relevance to ID practitioners. Therefore, offering guidelines for the use of the CDT theory to develop mobile learning systems will allow for replicability, validation opportunities, and real-world applicability for practitioners.

The ADDIE framework was used as a general, systematic approach for developing the tutorial. The major stages of the framework are Analysis, Design, Development, Implementation, and Evaluation (Figure 2).

Figure 2. Overview of the ADDIE framework depicting the major phases of the instructional design process.
The overview of the process has a main, iterative design cycle denoted by the dashed arrows. Throughout the workflow process, formative and summative evaluation is used to inform and provide feedback to the designer. The use of this framework guided the researcher in considering a general systems framework for a mobile learning environment before designing the mobile learning objects and to reflect on systems issues that may affect the effectiveness, efficiency, and appeal of the mobile-friendly tutorial.

**Formative Research**

The research emphasized the design and development phases of instructional design and employed a formative research approach, which focuses on improving design theory for instructional practices and processes (Reigeluth & Frick, 1999). Design theory is improved by identifying any theory weaknesses found in the application and testing of an instance, identifying improvements, and hypothesizing a revised theory improvement. This study was a designed case study for an existing theory. In a designed case study, the researcher decides on the theory and formatively evaluates the instance (Reigeluth & Frick, 1999). The methodological process for a designed case study is:

1. Select a design theory or model.
2. Design an instance of the theory.
3. Collect and analyze formative data on the instance.
4. Revise the instance.
5. Repeat the data collection and revision cycle.
6. Offer tentative revisions for the theory.

The formative approach was implemented as follows:

1. *Select a design theory or model.* The CDT model was used to design and
develop a faculty tutorial that was delivered via mobile devices.

2. *Design an instance of the theory.* The CDT was applied to the design of a tutorial aimed at increasing faculty’s awareness and knowledge about the legal, social, and ethical issues related to using copyrighted digital works. The tutorial is titled, “Copyright and Fair Use in a Digital Learning Environment” (Glazatov, 2014).

3. *Collect and analyze formative data on the instance.* The data were collected in multiple phases. A working prototype of the instance was created and included as part of the expert review. An expert review was used to validate the application of the CDT to the instructional design of the tutorial. In addition, three instructional design experts reviewed the working prototype and gave feedback on the design and instructional strategies used. During the design of the instance, the instructional designer also created notes and project management documents that were used to document the ID process and identify challenges. The work documents provided additional formative information.

4. *Revise the instance.* The revision was based on the collected data and documents from the expert review and the ID notes. A revised version of the tutorial was developed and implemented as part of the district’s tutorial offerings during the last two months of the fall 2014 semester. The DE website was used to deliver the tutorial to the participants.

5. *Repeat the data collection and revision cycle.* Eight faculty members completed the tutorial as part of their professional development. At the
conclusion of the tutorial, the participants completed a survey to gather their perceptions of the tutorial’s relevance, effectiveness, and satisfaction. The situational variance for the implementation of the tutorial included different faculty completing the tutorial, varied levels of technical knowledge, and the participants’ teaching experience. In addition, the participants had the opportunity to contribute in an optional one-on-one interview. The semi-structured interviews explored strengths and weaknesses of the design instance and the participants’ learning experience. Three of the tutorial participants participated in the interviews. Interviews were recorded, transcribed, and analyzed.

6. **Offer tentative revisions for the theory.** Based on the collected data and revisions, suggested adaptations to the CDT are presented to answer the research questions. Assumptions and limitations for the revision are noted as well as future research opportunities.

**Reliability and Validity**

Reigeluth and Frick (1999) discussed methodological concerns within the formative research process that need to be considered, construct validity; sound data collection and analysis procedures; and attention to generalizability of the theory. The three concerns are discussed in relation to the study conducted.

Construct validity is concerned with appropriate use and application of the theory being studied to a situation. Construct validity can by weakened by omission or commission of theory elements. The primary elements of the CDT including primary presentation forms, secondary presentation forms, and inter-display relationships, were
fully included in the tutorial. Additionally, three external instructional designers reviewed the tutorial to identify any issues related to the application of the theory.

The researcher is also the instructional designer. As such, the researcher’s biases and assumptions should be disclosed to address any credibility concerns (Reigeluth & Frick, 1999). The researcher has over ten years’ experience as an instructional designer and trainer within higher education. She has a graduate degree in instructional technology and has taught online for over five years. The researcher has been employed in the study site for over five years as the organization’s distance education coordinator. In the role, one of her primary responsibilities is to develop and facilitate training for district faculty on instructional technology and distance learning. She is engaged with faculty at both colleges, who are also the study population, on a daily basis.

The researcher’s learning beliefs are most closely aligned to social constructivism, where learning is personalized, social, and collaborative. Based on her experience working with faculty, designing instruction that develops communities of knowledge and encourages shared experiences helps in the acknowledgement of the learner’s unique experiences to the creation of knowledge and the transference of knowledge across the organization. The researcher’s bias was managed by using multiple sources for the data collection so that different contextual conditions could be identified and triangulated so any conclusions or tentative recommendations could be cross–validated.

To increase the generalizability of the theory, the context under which the theory was applied is described. This description enables others to determine conclusion about
how it may be applied under different situations. In addition, recommendations from this study include additional contextual limitations that may need to be considered.

**Data Collection**

The researcher collected data using multiple methods including: expert reviews, instructional design notes, tutorial surveys, and participant interviews. The data were collected during the summer and fall 2014 semesters.

During the design and development of the tutorial, the designer created various instructional design artifacts. These artifacts were used to provide contextual information related to workflow processes and decision-making as well as examples of content related to the design instance. The artifacts included design documents, project management documents, including project logs, and appropriate communications, storyboards, prototypes, the developed tutorial, and the instructional designer’s notes (Appendices A, B, and C).

Targeted emails (Appendix D) were sent to potential reviewers who were identified as having of over five years of instructional design experience (Table 1). The three external instructional designers reviewed the prototype and provided formative feedback regarding the application of the theory as well as design and development concerns (Appendix E).
Table 1

*Instructional Designer Reviewers*

<table>
<thead>
<tr>
<th>Title</th>
<th>Affiliation</th>
<th>Qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional Designer</td>
<td>Private/Corporate Industry</td>
<td>MA - Organizational Development and Learning; over 14 years’ experience as trainer and instructional designer</td>
</tr>
<tr>
<td>Instructional Technology Analyst</td>
<td>Loyola Marymount University</td>
<td>MA - Technology-Based Education; over 13 years’ experience as technologist and instructional designer</td>
</tr>
<tr>
<td>Instructional Designer</td>
<td>The American College</td>
<td>MS - Computer Education and Cognitive Systems; over six years’ experience as an instructional designer</td>
</tr>
</tbody>
</table>

The tutorial was offered during November and December 2014, with participants starting the tutorial at various times of the month. Regardless of when the participants initially started the tutorial, the tutorial had to be completed, as indicated by completion of the tutorial survey, by the end of the fall 2014 semester. After completing the tutorial, participants submitted an anonymous online survey, administered through the DE department’s website (Appendix F). The survey questions were designed to gather information about the participants’ background and demographics; the tutorial design appeal and ease of use; interactions in the tutorial; and satisfaction. A Likert scale was used to measure the participants’ attitudes. There were also open-ended questions to gather participants’ comments on their perceived learning and satisfaction with the tutorial.

Participants also had the option to be interviewed as part of the tutorial evaluation, by indicating their interest and contact information as part of the tutorial survey. The
purpose of the interview was to discover learner perceptions on mobile technology and mobile learning for professional development purposes (Appendix G). Each interview was approximately 30 - 45 minutes. All interviews were recorded in audio format. Interviews were fully transcribed by the researcher.

**Data Coding**

The researcher coded the qualitative data using Dedoose™ software. The software was used to aggregate the qualitative data in a central location, add additional notes and thoughts through memos, create themes, and code the data according to themes and subthemes. Preliminary codes were aligned to reflect the research questions. These were:

1. *Application of a micro-level instructional strategy (Instructional Strategies):* The application of the Component Display Theory to guide the design and development of a tutorial delivered to mobile devices, including the elements of the theory that were challenging to implement.

2. *Instructional design variables that affect the relationship between theory and application (Learner and Contextual Characteristics):* Instructional design variables that may affect how the instructional strategies and methods are implemented. The practical workflow limitations of translating theory to practice in work situations. Adaption of the Component Display Theory that may extend the usability of the theory in practice.

3. *Learning system variables that affect the relationship between theory and application (Technology Conditions):* The challenges and issues in designing
instruction for a mobile learning environment. The relationship of transactional distance to a tutorial designed for a mobile learning context.

Through the coding process additional categories emerged and were noted. Subsequently, the codes were interpreted and organized to themes and subthemes. These categories and themes are presented in chapter 4.

Participants and Setting

The organizational setting for the study was San Bernardino Community College District (SBCCD), which is comprised of two colleges, Crafton Hills College and Valley College. The SBCCD distance education (DE) department provides access to technologies that will enhance and support alternative learning modalities for learners and, administratively, the department manages and provides support for educational technologies, including technical support, training, access to technologies, and video-streaming. The DE department’s three-to-five year goals include developing and expanding programs and services to empower and improve employee competence and performance (SBCCD, 2014). The department goal aligns to the district’s strategic plan and includes offering structured training for faculty that is available in different modalities, including face-to-face, online, web-based, and mobile instruction.

The 2013 annual DE survey (SBCCD, 2013) results indicated that faculty, both full-time and adjunct, wanted more training opportunities available beyond the campus-based offerings. Thus, during the fall 2014 semester, one of the DE department’s projects was to develop a faculty tutorial that could be delivered to mobile devices. The departmental goal was to gather faculty perceptions about learning in a mobile environment. The department also wanted to gain insight on how training can be
provided through alternative delivery methods, in particular what were the required resources necessary to develop mobile learning opportunities.

Purposive sampling was used to select participants from the population of faculty, both full-time and adjunct, currently teaching at SBCCD. Targeted emails (Appendix H and I) were sent to potential participants based on their teaching status. Institutional Review Board (IRB) approval was obtained from both SBCCD colleges and Nova Southeastern University prior to faculty participation in the study (Appendix J). All participants signed an informed consent document before participating and each participant had the opportunity to participate in an optional in-person interview after completing the tutorial.

Eight faculty members chose to participate in the research, five from Valley College and three from Crafton Hills College. Three faculty members chose to participate in the optional in-person interview. Five of participants are full-time and three are adjunct. The participants come from varied academic backgrounds, including health, math, science, social sciences, library sciences, and administration of justice.

**Resources**

Various resources were needed to conduct the research. Table 2 describes the type of resources and how each was used in the research.
Table 2

*Research Resources*

<table>
<thead>
<tr>
<th>Resource Need</th>
<th>Use of resource</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td>Development of mobile application</td>
<td>Windows 7 PC</td>
</tr>
<tr>
<td></td>
<td>Basic productivity software</td>
<td></td>
</tr>
<tr>
<td>Mobile development</td>
<td>Development of mobile application</td>
<td>Adobe Creative Suite, Adobe Captivate 8, Articulate Storyline 2</td>
</tr>
<tr>
<td>software</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile devices</td>
<td>Testing of application</td>
<td>Apple iPod and iPad; Android Phone and tablet; Windows 8.1 tablet</td>
</tr>
<tr>
<td>Website</td>
<td>Deployment of web based mobile learning tutorial</td>
<td></td>
</tr>
<tr>
<td>Internet Connectivity</td>
<td>Testing and Development of mobile application</td>
<td></td>
</tr>
<tr>
<td>Web-based survey</td>
<td>Collection of tutorial survey data</td>
<td>Adobe Forms</td>
</tr>
<tr>
<td>Qualitative Software</td>
<td>To aggregate and analyze qualitative data</td>
<td>Dedoose</td>
</tr>
</tbody>
</table>

**Summary**

The Component Display Theory was examined using a formative research approach. Following the approach described by Reigeluth and Frick (1999), a designed case study is created and examined to identify potential revisions to the theory. For this study, the designed instance was a tutorial developed for the professional development of community college faculty. The ADDIE framework served as a systematic, iterative approach for designing and developing the instance.

Multiple methods of data collection were employed to gather instructional design feedback, including data from instructional design experts, design documents, as well as
feedback from faculty. The instructional design feedback was used to revise and improve the instance. Additionally, the collected data were coded and analyzed to provide insight on how the CDT can be applied in practical instances of mobile learning. The codes were aligned to the research questions and organized to themes and subthemes. The themes identified additional variables and challenges of designing for mobile learning environments.
Chapter 4

Results

The results are presented as a narrative of the instructional design process, including how the Component Display Theory (CDT) was applied and how the formative feedback process was carried out. The data analysis included system variables, such as variances in mobile technologies that affected how the CDT was applied for a mobile learning environment. To discuss the relationship between the CDT components and the system variables, the findings also consider instructional transactions, such as learner interactions with the presentations, self-assessment, and peers.

Key Design Considerations

The instructional design decisions for this tutorial were made with a goal to balance organizational needs with learners’ desired outcomes. This balancing act led to an iterative design process as conditions and variables were identified and changed. It also led to insight regarding the practical applicability of the theory and system design frameworks used in the design and development of the instruction.

The coding and interpretation of the data resulted in the creation of themes and subthemes (Figure 3). The themes and subthemes are used to organize and explain the initial findings of the study.
Figure 3. Coding Hierarchy resulting from qualitative analysis and identification of major themes and sub-themes.

Based on the resulting themes and sub-themes from the data coding and analysis process, three broad areas were identified as key design considerations made by the instructional designer (Table 3). The considerations were learner and contextual characteristics, instructional strategies, and technology conditions. Each is briefly described for contextual understanding regarding the complexity of the issues identified in the study.

Table 3

*Key Design Considerations*

<table>
<thead>
<tr>
<th>Key Design Considerations</th>
<th>ID Decisions</th>
<th>Adult Learners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner and Contextual Characteristics</td>
<td>Self-directed Professional Development</td>
<td>Relevancy Flexible</td>
</tr>
<tr>
<td>Instructional Strategies</td>
<td>Component Display Theory Elaboration Theory</td>
<td>Effectiveness Autonomous</td>
</tr>
<tr>
<td>Technology Conditions</td>
<td>Mobile Transactional Distance</td>
<td>Efficiency Appeal</td>
</tr>
</tbody>
</table>
Learner and Contextual Characteristics. At SBCCD, the faculty population is very diverse in technology skills, teaching experience, and knowledge of district policies. With a large adjunct faculty population at the district, completing professional development requirements oftentimes compete with other personal and professional commitments. Faculty have to complete a certain amount of professional development during the academic year but they have the flexibility to choose the types of activities to participate in and are required to self-report their activity to receive credit from the respective colleges. No formal assessment activity is required to receive professional development credit, only attendance.

During the analysis process, the instructional designer noted several concerns related to the organizational context, particularly, designing the tutorial so to align closely to the current organization’s professional development culture. Some of these concerns were confirmed through email and verbal communications with the instructional designer and faculty during the implementation phase when some faculty members asked questions such as “How long will the tutorial take?” and “Can I receive flex credit for this tutorial?”

As a result, the mobile-friendly tutorial was planned to be comparable to other district tutorial offerings. For example, the mobile-friendly tutorial was designed to take no more than one hour to complete. Similar to other tutorials, this one was offered during the semester and interested faculty were able to sign up and complete the tutorial on their own time. Assessment items were optional and presented as practice and self-knowledge activities. Completion of the tutorial was confirmed by submission of a tutorial survey.
The instructional designer also noted concerns related to project management. The district’s distance education department provides instructional technology training for both college’s faculty populations. Subsequently, limited time and personnel affected the type of tutorial that could be designed and developed as well as the type of development technologies used. The designer decided on software that allowed for rapid prototyping and testing across various mobile platforms, which reduced the time necessary to design and develop the tutorial.

**Instructional Strategies.** The Component Display Theory (CDT) was used as the guiding framework in designing the instructional presentation for the tutorial. The instructional designer, although familiar with the CDT, was using the theory in a practical application for the first time. The instructional designer developed a task aid to assist in recalling prescription elements and conformed as close as possible to the theory prescriptions to increase the validity of the outcomes and recommendations. Additionally, external instructional designers reviewed the prototype and provided formative feedback regarding the application of the theory as well as design and development concerns.

Although the CDT was identified as the guiding framework for the instructional presentation elements, the tutorial consisted of multiple topics. Therefore, a framework to guide the summarization, synthesis, and organization of the topics in the tutorial was also needed. The Elaboration Theory was used as a macro-level framework. The use of the Elaboration Theory (Reigeluth, 1999) helped to frame the scope of the tutorial, including what the learner needs and wants to learn, and the sequence of the content, including how the content should be grouped and ordered.
**Technology Conditions.** The chosen learning modality for the tutorial was a mobile learning environment. The design and development process involved the use of numerous technology tools, including Adobe Captivate 8, Articulate Storyline 2, and mobile devices. Key considerations for the instructional designer included the organizational policies regarding mobile computing use. The district is currently a “Bring Your Own Device” (BYOD) campus and not standardized for a specific mobile platform. The tutorial needed to be compatible for a variety of mobile devices. As a result, in order to increase the likelihood of device compatibility and decrease development time, the ID decided to make a mobile web application instead of a native mobile app.

The theory of transactional distance was considered in its relationship to mobile learning environments. Park (2011) adapted the transactional distance theory for mobile learning and classified the types of mobile learning environments into four types. Based on the summarized types, the study’s tutorial was designed as a Type 2 – High Transactional Distance and Individualize mobile learning activity. According to Park (2011), this type of mobile learning is influenced mostly by the context of when and where to learn and classified with several characteristics. For a Type-2 mobile learning activity, the individual learners have more psychological and communication space with the instructor or instructional support. Also, it is expected that the individual learners receive tightly structured and well organized content and resources through mobile devices. In addition, the individual learners receive content and control their learning process in order to master it. Finally, the interactions mainly occur between the individual learner and the content.
Designing and Implementing the Tutorial

The topic for the tutorial was determined based on the department’s goals to increase faculty’s awareness and competencies about digital literacy. The tutorial, “Copyright and Fair Use in a Digital Learning Environment,” addressed the legal, social, and ethical issues related to using copyrighted digital works. The macro and micro level instructional strategies that were used are discussed to provide further details of the instructional designer’s decisions and workflow process.

**Macro-level instructional strategies.** The tutorial allowed the learners to explore effective practices as well as legal and ethical considerations for using copyrighted digital works through the presentation of typical instructional scenarios. The defined instructional problem was: “How to determine permission and appropriate use of copyrighted digital works for educational purposes?” A topic analysis was conducted to determine the scope of the instruction, and identify the facts, concepts, procedures, and principles that would comprise the instruction (Figures 4 and 5). The result was six topics (Table 4) with each topic aligned to a CDT prescription based on the learning objective developed by the instructional designer. In addition, the topic analysis identified the ordered structure of the topics that would become the navigation for the learners within the learning environment (Figure 6).
Figure 4. Topic analysis of instructional problem that determined the scope of the instruction, and identify the facts, concepts, procedures, and principles that would comprise the instruction.

Figure 5. Topic analysis of instructional problem including sub-topics of the facts, concepts, procedures, and principles that would comprise the instruction.
Figure 6. Example of tutorial navigation used to structure and order the topics.
Table 4

Resulting Topics for Instruction and CDT Alignment

<table>
<thead>
<tr>
<th>Topic</th>
<th>Objective</th>
<th>CDT Strategy (Prescriptions) – Analysis Phase</th>
<th>CDT Strategy (Prescriptions) – Final Redesign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application of Copyright Law (*Overall Tutorial Objective)</td>
<td>Learner will reflect and describe their experience with the general process of using copyrighted work.</td>
<td>CDT Rule 9 Use-Procedure</td>
<td>CDT Rule 7 Remember Generality - Principle</td>
</tr>
<tr>
<td>Intellectual Property Law</td>
<td>Learners will identify copyrighted works from other intellectual property such as trademarks and patents.</td>
<td>CDT Rule 5 Remember-Generality Concept</td>
<td>CDT Rule 8 Use - Concept</td>
</tr>
<tr>
<td>Copyright Limitations</td>
<td>Learners will identify works that would be included as part of Public Domain and Creative Commons.</td>
<td>CDT Rule 8 Use - Concept</td>
<td>CDT Rule 8 Use - Concept</td>
</tr>
<tr>
<td>Academic Exceptions</td>
<td>Learners will interpret general applications of fair use based on critical attributes.</td>
<td>CDT Rule 8 Use - Concept</td>
<td>CDT Rule 10 Use - Principle</td>
</tr>
<tr>
<td>Obtaining Permission</td>
<td>Learners will recall the process for obtaining copyright permissions.</td>
<td>N/A</td>
<td>CDT Rule 6 Remember-Generality Procedure</td>
</tr>
<tr>
<td>Attribution</td>
<td>Learners will recall components to appropriately attribute and document use of material.</td>
<td>CDT Rule 2 Remember-Instance Concept</td>
<td>CDT Rule 1 Remember-Instance Fact</td>
</tr>
</tbody>
</table>

Formative feedback related to the macro-level strategies highlighted two concerns, navigational user interface and the scope and relevance of content. Regarding the interface, there was confusion on how to access different topics and information throughout the tutorial using the designed interface. One expert reviewer commented:
“In the General Process slide where you list all the items but only the first is displayed (the others are grayed out), I got confused for a minute because the numbers were clickable (changed color when I tapped them) and I thought I was going to click each one and see a description. Might be less confusing if the numbers were not clickable. (Of course, later, I realized the slide was just announcing what section of the lesson we were in.)”

To limit confusion, the instructional designer redesigned the navigation to visually indicate which step in the process the learner was reviewing, whether the button was active, and if additional content was available for the student.

Although, the navigation presented the preferred sequencing of the content, the learner had the ability to review content in a non-linear order through various user interface controls, such as embedded buttons on the presentational display and through player controls for the application. Even with increase control and flexibility, a couple of learners noted that they had navigational challenges that affected the tutorial’s effectiveness.

“I had extreme difficulty moving through the app - I tried first on my iPhone 5S and I could not read or get the iPhone to respond to my clicking. I moved to my iPad (which I rarely have used) and the display was beautiful. I could see that a great deal of work went into the content - however, I still could not get the app to respond.”

“Honestly, the problems I experienced had a negative impact on how I connected with the material.”
The second area of formative feedback was related to the scope and relevance of the content. During the iterative design process, the instructional designer reviewed and revised the initial design document by increasing the number of topics by one and realigning the topics to a more appropriate CDT prescriptions (Table 4). The realignment was done after the initial prototype was built and the content reviewed against the prescription parameters. The final aligned CDT prescriptions reflected the type of behavior expected for the learner as designed by the practiced question and the level of performance expected in the workplace by district.

The expert reviewers had questions about the use of time within the context of completing the module and if the tutorial would include real-world, project-based learning assignments for practice and review. In order to limit the scope of content covered in the tutorial, the instructional designer used a real-world scenario to frame the context of the instructional scope (Figure 7). The scenario helped the instructional designer to synthesize and summarize content across topics (Figure 8).

Related to the scope, the instructional strategy was to design the modules without completion timeframes or prerequisites in order to enhance learner control of the learning experience. A potential downside was the learning experience may become disjointed if learners completed the modules at different times. To mitigate the potential downside, past modules were accessible to allow for review and summary at any time.
Figure 7. Real-world instructional scenario used to contextualize the instruction.

Figure 8. Example of summarizing epitomes used to synthesize and summarize content across topics.
**Micro-level instructional strategies.** The instructional presentations for the tutorial were developed using the CDT prescriptions, consisting of primary presentation forms, secondary presentation forms, and inter-display relationships. Each topic explained concepts, facts, or processes, with examples. Learners were then given an option to assess their knowledge, at the end topic’s module, through practice questions, most often consisting of multiple choice and short answer questions (Figure 9). Standardized feedback was given for all practice questions.

![Figure 9. Example of open-ended assessment item used in the instruction.](image)

The primary presentation forms (PPF) were primarily composed of text and graphics instead of using multimedia and interactive learning objects. The instructional designer decided to decrease the production time for developing the tutorial and limit resource needs for multimedia elements. To promote interaction, strategies such as
using attention-focusing elements, including buttons and prompts, and designing the interface to allow for learner control over sequencing of information were used. Thus, each topic was built to be a discrete learning object and enabled the learner to personalize the learning by deciding which topics were important to learn. The discrete learning objects were then synthesized through the problem-based scenario woven into the beginning and ends of each module.

Some learners suggested that future revision include presentational variations beyond text and graphics to account for learner preferences and to improve the navigability of the tutorial. Following are two comments that represent this sentiment:

“Would be good to have an audio component and a few more slides to reduce viewers from missing links in prior slides.”

“It seemed kind of cumbersome to get around to things. It didn’t seem like it flowed really easily. And I know when you go to one screen and it had multiple tabs. So you could click on any tab and go in any order but it kind of takes you to the next place.....With the reading on a small device, it’s kind of awkward to have that much... even though it’s not a lot of words. It’s still kind of overwhelming not exciting.”

Thus, message design guidelines within a mobile learning environment may be another key variable to consider when using the CDT.

The secondary presentation form (SPF) includes information to enhance the PPFs. Throughout the tutorials, different types of mnemonics were used, such as colored backgrounds to indicate topics, alternative visual representation for textual information, and short lists to help in remembering processes (Figure 10). The use of a problem
scenario to connect the topics is also considered an enhancement presentation form within CDT framework. The SPF element of the CDT, proved to be challenging for the instructional designer. While reviewing the tutorial’s content, the instructional designer noted that oftentimes the SPFs in the designing of the modules, based on the prescription suggestions, were missing. The designer redesigned the presentational displays to incorporate elements of SPF to enhancing the instructional message.

Figure 10. Example of visual and short lists mnemonics used to offer alternative visual representation and to aid learners’ remembering processes.

The SPF parameter also includes incorporating practice and assessment items. From the design notes, the instructional designer indicated a particular concern regarding assessment items: “CDT prescriptions suggest certain types of feedback for the
assessment items. I'm struggling with how to provide the feedback when it is only system feedback (as oppose to facilitator feedback for more open ended assessment items).” The use of open-ended assessments allowed for an increase in cognitive levels of thinking, an increase in interaction with the learning environment, and integration of personal experience, which may increase motivation and relevancy for the learner. To mitigate the concern of providing system feedback for the open-ended assessment items, an "ideal solution" was presented to the learner. This method allowed for learners to reflect on their own experience while providing facilitated system responses on effective practices. In addition, the instructional designer developed a discussion board for learners to submit specific questions that could be answered by peers and the facilitator.

Although several learners answered and submitted their open-ended responses within the learning system none participated in the discussion board. One learner remarked that she was uncertain about using the discussion board feature:

“You have people getting on there and you don’t know who they are.... People have gotten into trouble for what they put on Facebook because people read it. So yeah...a little suspicious. So if we could set up just a group that is San Bernardino Valley College and I knew it would be isolated from my personal. Oh yeah, I’d be on there all the time because there are a lot of people that know a whole heck of a lot more than I do.”

The discussion board was an externally linked, closed website, but the designer did not consider that there may be hesitance in using a social media tool for professional purposes. The inclusion of the discussion board was to enable additional help resources for the learners within the learning system. Yet, this primary purpose for the discussion
board may have been misunderstood by the learners. Further examination on how social and system support tools can be integrated into mobile learning environments may have mitigated the hesitance of learners using the tool.

The CDT element of inter-display relationship conveys how different presentational displays affect one another. Examples of inter-display relationship elements implemented in the tutorial included divergent instances of examples, isolation of primary and secondary presentations, chunking of information, and allowance of extensive learner controls. Determining the optimum level of learner control was a concern for the instructional designer. “How much is too much? It seems like I'm giving the learner too much control. How do I balance their control with and ensure that a base level of information is given and received?” The designer decided to follow the CDT’s prescription suggestions for learner control. From a learner perspective, it seems that there were conflicts on how much control was needed as well. One learner commented:

“Instead of like a web page setup... more like a guided tutorial where there's one way to go along....No I like being able to skip things and back and forth. But more flow to it. When I opened it the one screen and it gave me the options and buttons to click and then you click and read separate things. I felt like I am going to skip all the buttons...But please don’t do that thing where it won’t let you take the test without watching it for the full amount of time. I hate those things in trainings.”

As will be discussed in the implementation section, learner control also affected the assessment data collected from the tutorial and contributed to learners’ perceived technical issues with the tutorial. Guidelines on how to design and implement learner
control for mobile learning environments may need to be further examined or clarified for the CDT to help designers balance the instructional goals with learner wants.

**Implementation.** Before offering the tutorial to faculty, the expert reviewers had questions regarding confirmative evaluations and the collection of data.

“My experience with the self-paced modules is that student responses generally aren’t captured anywhere, so I was wondering if you were capturing that data and using it somehow. I was looking for a statement describing how you were going to show that the learning took place. Is that missing – or is that just not really the point of this? In other words, you’re presenting a theory and a method for implementing the principles, but how do we know it works? That’s the practical side of me coming out.”

“I am curious about how this course can offer an organization an opportunity for double looped learning (attainment of both individual and organizational learning goals). In that context, how would success be defined for the individuals and the organization?”

For revising the prototype, a different development tool had to be used, Adobe Captivate. The previous tool used, Articulate Storyline, had several technical limitations on how the tutorial could be deployed to users and the type of data that could be captured. Switching the development tool resulted in an extension of the planned development time.

Switching the development tool also allowed for collection of data and the tutorial offered to faculty captured submitted interactions and data by the learner. The collection of data allowed for the DE department to identify learners who were eligible for professional development credit, enabled the department to aggregate the responses and
identify gaps in knowledge that may need to be addressed through additional tutorials, and show progress in meeting the district’s strategic goals related to development and expansion of professional development programs and services.

As previously stated, assessment items in the tutorial were only used as a self-check of knowledge. However, the system only recorded responses if the learner submitted the questions at the end of the tutorial. The recorded responses were to be used for confirmative evaluation of the tutorial’s objectives. Unfortunately, only three of the participants submitted their assessment responses successfully. Two participants communicated, through email, that they were unsuccessful in submitting due to perceived technical issues with the learning system. The instructional designer noted some potential reasons why learners may have been unsuccessfully in their submission of assessment items.

“Assessment items were optional. Some tried but through interview and/or email stated they weren't able to submit. I also suspect that some did not get to the slide where the submission happens. This could have been because the module was not linear in progress or they had difficulty with some of technology so they may have abandoned the module before the submission slide.”

So, the amount of learner control, the design of the navigational interface, and the learning system’s technology may have all played a role in the collection of confirmative data.

Through interviews, learner perceptions about learning in a mobile environment indicate that faculty may have preferences for other computing systems out of comfort, convenience, and usability.
“As much as I love my phone, I always have my laptop available to me. So I’m always going to switch up to a bigger screen and I haven’t done the tablet route because again the typing part of it. I hate the touching pad it drives me nuts. I hate the feeling.”

“I actually really like it. Because initially I thought she won’t know the difference if I use my laptop for my choice of a mobile device. I said no. You got this little mini iPad, turn it on, and let it go. And I did. And I was really surprised. It wasn’t as big a screen and because I’m an older person and obviously half blind, it sucked a little bit. But I actually kind of liked it. It was okay. I’m spoiled by the big screens. I think it wasn’t that it took away from it. It’s just a comfort level.”

“I’m excited about it. I think it’s the best thing going. I think it’s moving very quickly and if I don’t get on the boat the boat’s going to leave without me. I’m very excited because you can do just about everything on a device that you can do on a regular computer and carry it with you.”

The comments affirmed the decision the instructional designer made to make a mobile web app instead of a native mobile app. The mobile web app allowed for learners to choose the type of computing device to use and yet have similar learning experiences to their peers. Based on the tutorial comments and the interviews, at least three of the eight faculty participants used Apple iPhones or iPads to complete the tutorial.

The comments also indicate that learners have varied ideas on what mobile learning is. The variance included the type of devices and whether using mobile tools in whole or in part constitutes mobile learning.
“Now when you say mobile device, I have a laptop. So, that doesn’t count, does it?”

“This was a first time I used an app. That’s because I have an iPad and a galaxy tablet and I have six laptop computers and I have macs and windows. But I haven’t had a chance to really sit down and use mobile.”

“I use my phone for everything. I use apps for hiking and running and apps for calculating metabolism. In my classroom, we use apps all the time. But I can’t say I’ve done a training.”

The tutorial was considered completed after the faculty submitted the tutorial survey. The results of the survey questions are presented in Table 5 and provide a starting point for discussing areas of the tutorial that may not have been as effective, particularly in the areas of peer and facilitator interactions, learner motivation, and integration of technology into the learning environment. The survey questions were categorized based on whether the questions reflected the definition of or were influenced by the transactional distance variables of dialogue, structure, and learner control.

Dialogue influences include the type of communications media used; for the CDT that includes the primary and secondary presentational forms. The dialogue variable is also influenced by environmental factors, such as the number of learner communication opportunity and the frequency, the physical environment, and the learner and facilitator’s characteristics and beliefs. For this tutorial, the program structure influences included the use of the Elaboration Theory and CDT instructional strategies as well as the organizational constraints related to resource use, policies, and culture. Learner autonomy is influenced by the both the learner’s and facilitator’s characteristics, the
constraints of the organization, and by the types of communication that are being employed in the instruction. The results of the survey will be further discussed in the findings section as they relate to the design of a high transactional distance mobile activity.

Table 5

*Survey Results from Tutorial Survey*

<table>
<thead>
<tr>
<th>Transactional Distance Variables</th>
<th>Survey Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dialogue</td>
<td>Relevant topic</td>
<td>3</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dialogue</td>
<td>Useful resources</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dialogue</td>
<td>Appropriate presentation style</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dialogue</td>
<td>Constructive Feedback</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dialogue</td>
<td>Collaboration</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Learner Autonomy</td>
<td>Purposeful workshop</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Learner Autonomy</td>
<td>Valuable workshop</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Learner Autonomy</td>
<td>Increased Understanding</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Learner Autonomy</td>
<td>Valuable to teaching</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Learner Autonomy</td>
<td>Positive change</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Structure</td>
<td>Well organized</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Structure</td>
<td>Enhanced with technology</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Structure</td>
<td>App easy to use</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Structure</td>
<td>App easy to access</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Structure</td>
<td>Technical issues resolved</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Structure</td>
<td>Effective integration of technology</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Findings

The data analysis resulted in the identification of key themes related to the design, development, and implementation of a mobile-friendly tutorial. Based on the data results, the findings related to the instructional strategies, learner and contextual characteristics, and technology conditions that affected the relationship between theory and practice are presented. The discussion is presented to align the findings with the primary research questions concerning the applicability of the Component Display Theory and the
identification of challenges and issues using a theory-based framework to design for mobile learning environments.

**Application of the Component Display Theory.** The Component Display Theory (CDT) can be used as a framework to guide the instructional strategies for a mobile learning system. Although the instructional designer was able to use the theory in practice, there were a couple of challenges. First, the instructional designer had limited use of applying the theory in practice and perceived the theory to be complex with the amount of variables for the prescriptions. Initially, this limited experience resulted in difficulty to applying the prescriptions to a mobile learning activities. As a result, task aids and design documents were developed by the instructional designer to clarify and support the design activities. With the tasks aids, the instructional designer was able to use the CDT to review instructional design decisions and identify alternate presentational strategies to consider.

Moreover, mobile learning system characteristics, functionality, and limitations needed to be considered to identify effective ways to apply prescription elements related to learner control and presentational forms. In particular, the instructional designer reflected and decided on message design and navigational elements that would allow for appropriate levels of learner control and enhance the positive interdependency relationships between the CDT primary and secondary presentational elements. The development tools enabled the instructional designer to efficiently design, implement, and test a delivery solution for multiple devices.

These challenges are less indicative of the CDT’s adaptable to mobile learning systems and more to the practitioner’s limited experience with designing for an emerging
learning system and using a different toolkit which included different ID frameworks and
development technologies. Nonetheless, the instructional designer was able to transfer
knowledge and existing skillsets and use the theory in practice.

**Instructional design variables.** The instructional design process for the tutorial
was undertaken in a community college with limited resources and numerous needs. This
environment condition affected the type of design that took place. Mobile learning
presented an opportunity to increase access to professional development tutorials for
district faculty. The implementation of this tutorial allowed for testing of this innovative
change and helped to identify other variable that will ultimately affect the long term
adoption of the mobile learning and the resources necessary to internally design, develop,
and support mobile instruction. Several organizational characteristics affected the how
the theoretical frameworks was translated to practice.

Although faculty have access to personal mobile devices and are willing to use
their device for faculty development, organizational readiness for mobile learning
affected the types of strategies that could be implemented. The organization’s technical
infrastructure, faculty’s perception of social media in the work environment, and an
informal professional development culture affected how the CDT elements were applied
to the design of the tutorial and the implementation of the tutorial across the organization.
For example, learning objects and the learning system were designed to use a minimum
amount of bandwidth, easily accessible over Wi-Fi, and compliant with accessibility
requirements. Although a discussion board was available for learners, concerns over
privacy and security resulted in non-use of the social engagement tool. As the
organization looks to increase access and acceptance to mobile learning, a review of infrastructure, guidelines, and cultural readiness will be necessary.

With limited personnel and financial resources, the instructional designer assumed numerous roles in the design of the tutorial, including the developer, facilitator, and the project manager. The organizational structure and expectations affected the level of facilitation and support embedded into the learning system. In order to create and offer new learning opportunities for the district, the design and development cycle were reduced by using development tools that allowed for rapid design and testing. The amount of multimedia and interactive objects that needed to be created were limited and device compatibility was increased by creating a mobile web application instead of native mobile applications. These decisions decreased the project completion time and met the organization’s expectations to add offerings for different delivery modalities. However, the trade-off was the perceived effectiveness and appeal of the offerings to the learners were negatively impacted as additional design and system elements that would increase personalization and adaptive learning were not implemented.

**Learning system variables.** Allowance of personal mobile devices presented challenges of designing for highly variable devices as it pertains to technical capabilities, device personalization, and the physical attributes of the devices. At the micro-level of instruction, the message design plan served to be a repeating challenge. Message design for mobile learning environments is a very important instructional design element. The perception and how learners interact with the presentational forms are critical parts of the CDT’s effectiveness. Design decision regarding typography, text schemas, layouts,
multimedia content, color, and graphics correlated to how the content was communicated and perceived by the learner.

The instructional designer attempted to balance the variability of mobile devices, device functionality, and learner preferences with the instructional appeal, technical resources, and accessibility requirements. Ultimately, the decision was to design the message to accommodate the most learners and systems. The result was a tutorial using primarily texts and graphics coordinated with color; thus, creating a consistent message and linking information through navigational and focus attention elements. Reducing the design to the most common denominators resulted in no accommodations for learner preferences in regards to how they interact with the content, the facilitator and their peers. Thus, the affordances of having an adaptive and collaborative mobile learning system were not realized.

The tutorial was designed as a Type-2 High Transactional Distance Mobile Learning Activity, which allowed for a self-paced learning and engagement primarily between the individual learning and content. Using the CDT as a framework was very suitable for this professional development context where there is a large, geographically dispersed, full-time and adjunct faculty population. Although the Type-2 mobile learning activity assumes high transactional distance, the tutorial survey provides some insight about some environmental factors that may have had more impact on the perceived high transactional distance of this tutorial.

Based on the tutorial survey, how assessment feedback was given and the lack of collaboration decreased the dialogue variable. This could be directly tied to how learners interacted with the presentational forms. It could also reflect the limited
adaptability of the content based on learner preferences, especially as it relates the learner’s preference to personalize the mobile learning environment and the opportunity and frequency to communicate to the facilitator and peers.

Unresolved technical issues, perceived ineffective integration of technology, and perceived limited usability of the tutorial on a mobile device decreased the structure variable. Issues surround the usability of the mobile-friendly tutorial might be a reflection of learner’s inexperience in using their mobile functions, in particular as a learning tool instead of for personal uses. However, support mechanisms may have alleviated the difficulty that learners had navigating and using their devices.

Learner attitudes that the tutorial will not affect positive changes in their professional practices also decreased the learner autonomy variable. This may reflect the culture of professional development within the organization, where learners select and self-report the opportunities to complete for credit. The relevancy of the tutorial, although important for the organization, may not be of immediate concern or importance for the learner. Examining the tutorial through the lens of transactional distance, hint at some learner and mobile learning characteristics that need more in depth analysis, to better understand how the learning system variable affected how the instructional designer could apply the CDT.

**Summary**

The results of the study was presented in this chapter. Notes from the instructional designer/researcher and feedback from external ID reviewers were analyzed for key themes. Key design considerations and the design and implementation of the tutorial using the Component Theory Display as the guiding framework was described
with the associated challenges and outcomes. Participant interviews, communications, and tutorial survey responses were also analyzed to identify issues related to the learning system and outcomes. Based on the analyzed results, summative findings from the instructional design process are offered.
Chapter 5

Conclusions, Implications, Recommendations, and Summary

This chapter includes a summary of the study that examined the opportunities and challenges of applying an established instructional design model, the Component Display Theory, as the framework for the design of a tutorial delivered to mobile devices. Implications and recommendations for further research are also offered. A summary of the entire study concludes this chapter.

Conclusions

Through formative research, the Component Display Theory (CDT) was examined to identify mobile learning characteristics, affordances, and challenges that need to be considered when applying the theory in practice. A case study was used to validate an application of the CDT to the development of a professional development tutorial implemented for community college faculty and understand the instructional design workflow of designing, developing, and implementing a mobile learning tutorial. The findings resulted in key variables related to the instructional strategies, design variables, and the learning system that affect how the CDT was applied and the effectiveness of the instructional design strategies. The findings provide insight into answering the three research questions.

Research Question #1: How can Merrill’s (1994a) CDT be used to guide the design and development of a mobile-friendly tutorial?
The CDT served as a supporting resource to review instructional design decisions and to identify other presentational strategies for instruction. The instructional designer’s experience level of designing for mobile learning systems affected how effective the CDT can be used as a guiding framework especially for emerging learning systems, such as mobile learning. Creating task aids that integrate system and environment considerations within the instructional design framework offered support to the instructional designer and effective translations from theory to practice. An example of a task aid that takes into consideration the theory and the learning system is offered (Table 6).

The CDT is agnostic to different types of learning modalities but the prescriptions do indicate that student, environmental, and task attributes may be conditions that modify the CDT parameters. For the current CDT prescriptions, there is limited conditional use for the parameters, thus allowing for adaptable prescriptions. However, a task aid that lists student, environmental, and task attributes to consider may help the instructional designer to identify variables for their learning context. The attributes presented in the task aid (Table 6) are attributes that affected the tutorial. Further research is needed to understand how the attributes may influence the conditional application and adaption of the CDT parameters for mobile learning environments.
Table 6

Example of Task Aid for Apply the CDT to Mobile Learning Systems

<table>
<thead>
<tr>
<th>Component Display Theory Parameters</th>
<th>Propositions</th>
<th>Mobile Learning Considerations for S.E.T attributes (Student, Environmental, Tasks)</th>
</tr>
</thead>
</table>
| **Primary Presentation Forms (PPF)** | Segment of instruction consists of three primary presentation forms: presentation, example, and practice. | **Student Attributes**  
  • Andragogy vs Pedagogy  
  • Learner experience with mobile learning environments  
  • Learner preferences for mobile devices |
| **Secondary Presentation Forms (SPF)** | Secondary presentation form: information used in addition to the primary presentation to enhance learning by helping the learner process information or by providing additional context. | **Environmental Attributes**  
  • Formal vs Informal learning  
  • Mobile technologies  
  • Mobile device type |
| **Inter-display Relationships** | Inter-display relationships: represent the interrelationships between different presentation forms that will affect how learning will occur. | **Tasks**  
  • Complexity of Task*  
  • Divergence of task characteristics*  
  • Performance Support |

*Note: *Attributes are currently used for some of the prescriptions in the original CDT.*
Research Question #2: What key issues were pertinent to translating ID plans into mobile learning lessons?

The organization had limited resources and increasing training and development needs for faculty. Planning for organizational change in response to the needs included trying mobile learning as a pilot program to determine how the innovation of using mobile learning for professional development might be adopted on a larger scale. The pilot program identified challenges and issues that affected the type of mobile learning that could be designed and implemented for the organization. Challenges and issues included the organization and learner readiness for mobile learning.

The organizational readiness is the ability for the organization to leverage the affordance of the innovation and change to meet its goals. Organizational readiness requires a certain amount of personnel, financial, infrastructure, and development resources are available. At the instructional design and development level, the availability of those resources affected many decisions including the project management process, the role of the facilitator, and the support systems for the learning environment.

Learner readiness was influenced by the learners’ prior learning experiences, perceived usability of the application, and barriers to access. Low learner readiness resulted in learners not understanding navigational elements of the tutorial, unintentionally abandoning the tutorial, and frustration with technical issues related to the tutorial and their personal devices. From the instructional design perspective, building in support mechanisms, and increasing the flexibility in how learners can engage with the content through learner control elements may help in increasing learner readiness for mobile learning.
Ultimately, both organizational and learner readiness affected the efficacy of the tutorial and, in the long term, will affect the acceptance and adoption of mobile learning for professional development purposes within the organization. Additional organizational and instructional strategies that may increase critical digital literacy and technical skills for learners should be identified and examined.

*Research Question #3: What were the challenges and issues in designing instruction for a mobile learning environment?*

This tutorial was implemented with the expectation of learners using their own, personal mobile devices. There are learner and organizational benefits to having a Bring Your Own Device (BYOD) policy for mobile learning, including personalization of the learning environment and the shifting of administrative costs for devices to users. There are challenges as well, such as variances in mobile devices and learners traversing between their personal and organization’s learning environments that affect the design of instruction.

Mobile computing devices vary by device type and operating systems. Learners have laptops, tablets, and smartphones. These devices could have any of the major operating systems include Windows, Android, and iOS. A BYOD learning environment matrix of mobile computing devices to design and develop for without universal mobile system standards. The instructional designer has to weigh the pros and cons of developing native mobile apps, mobile web apps, or a hybrid. The organizational constraints of time and resources weighed heavily in the decision of the development tools and the type of mobile activity designed. The mobile web app was compatible for most mobile devices and operating systems. However, it limited the ability to incorporate
device functionality based on personal preferences or instructional design because the resulting tutorial was not a native mobile application.

Learners in a BYOD environment can traverse seamlessly between their personal and the organization’s learning environments. In this study’s context, the affordances of seamless environments allowed faculty to complete their professional development obligations on their own time, schedule, and preferred places. The study highlighted some organizational needs and learner concerns related to seamless learning environments. There were concerns related to learner privacy and security of community learning spaces, such as discussion boards and blogs, which caused some learners to hesitate in participating. Park (2011) notes, that for Type-2 mobile learning activities, attention is needed to the creation and management of the knowledge database, accessibility, and technical connection problems. These concerns are aligned to previously discussed issues related to the cultural and administrative readiness of the organization to support mobile learning. Further consideration is needed on how to support the mobile, self-directed learner as they move between their personalized learning environment and the organizational learning environment that may be less socialized and more structured.

Limitations

There are several limitations for this study. This research consisted of a single case for using the CDT as a framework for designing a tutorial delivered to mobile devices. As a result, additional studies using the theory are necessary. Additionally, the context of the instruction was faculty training and development within a community college setting. Community colleges are a subset of higher education with unique
characteristics. Increasing the studies across context and settings are necessary to validate the application of the theory and the identified findings.

The tutorial was implemented during one academic semester. Increasing the data collection to multiple academic semesters will allow for a longitudinal examination of the effective changes for the design iterations and an in-depth look at organizational and learner characteristics that affected the ID process. Implementing during one academic semester also limited the number of participants for the study. The number of participants was small and although the study focused on the instructional design process, user testing and feedback are important parts of the process. Increasing the participant size will improve the qualitative and quantitative feedback for the instructional designers and further strengthen the finding related to the study.

Last, the study focused on the design and development of the tutorial. Data was collected from both the learning system and learners as part of the design improvement process. A more holistic approach would be to collect and analyze data as it pertains to the instructional and program outcomes for the tutorial and organization.

**Implications**

The study contributes to the instructional design and development body of research in several ways. The research validates and extends the application of the Component Display Theory to mobile learning environments. Additionally, it contributes to the body of research that examines training and organizational development issues within higher education settings. The research also identifies mobile learning variables, affordances, and constraints that instructional designers need to consider during the design and development phases of instruction, further supporting the identification and
development of framework and models that can be used by instructional design practitioners. Overall, this research addressed both the science and art of instructional design, thus contributing to the scholarship of the instructional design field and practical applications.

**Recommendations**

There are several future research opportunities based on the study’s findings. Using the Component Display Theory (CDT) for faculty training and development purposes identified variables that affected the design of mobile learning activities. As a result, a proposal to include mobile learning considerations as part of the prescriptions’ student, environmental, and task attributes were offered. Further research is recommended to understand how mobile learning variables will conditionally affect the prescriptions.

Faculty at community colleges is a diverse group in terms of its demographic and member’s professional experiences. Although there were assumptions made in regards to learner’s experience with mobile technologies, the study’s finding indicated that other demographic and learner characteristics may have affected perceptions and experiences which, in turn, will affect the design and development of instruction. Conducting a learner analysis will identify characteristics and demographics that may significantly affect the design of the instruction and improve the effectiveness of the instruction. The learner analysis will also provide insight into how the organization can increase its readiness to implement emerging instructional systems as well as support learners.

Given the various organizational and instructional design and development roles undertaken by practitioners, a toolkit will help practitioners to support their work process
and increase their efficiency and skillset in designing for emerging learning systems.

Frameworks and guidelines need to be explored, developed, refined, and used in practice to lead to a better understanding of effective practices.

Summary

This research contributes to the field of instructional design and development by examining how underlying theories, principles, and frameworks can be applied to the design and development of mobile learning systems. The goal was to examine a specific theory, the Component Display Theory (CDT), and validate the effectiveness of using the CDT as the guiding design framework for a mobile learning environment as well as identify the variables that affect the theory’s use.

A review of current research and literature indicate an opportunity to examine theories and frameworks for mobile learning environments based on three propositions. First, mobile learning can support a full spectrum of learning, from individualized instruction to learning within communities and groups. Second, there are many affordances and challenges that will affect the implementation and adaption of instructional design theories and models. The affordances include seamless learning, collaborative learning opportunities, and the challenges include learner autonomy, presence, critical literacies for learners to engage in a mobile learning environments, and transactional distance. Finally, a micro-level instructional design theory, such as the Component Display Theory (CDT), may provide a framework to guide the design and development processes for a mobile learning system through discrete instructional prescriptions for cognitive learning outcomes.
Using a formative research approach, a designed instance of a case study consisting of a professional development tutorial for community college faculty was developed. The guiding research questions were:

1. How can Merrill’s (1994a) CDT be used to guide the design and development of a mobile-friendly tutorial?
2. What key processes were pertinent to translating ID plans into mobile learning lessons?
3. What were the challenges and issues in designing instruction for a mobile learning environment?

The CDT served as the framework in designing and developing the tutorial that was delivered to mobile devices. A working prototype of the instance was created and feedback from an expert instructional designer review panel validated the application of the CDT. A revised tutorial was developed and implemented during the fall 2014 semester. Data were collected from instructional design notes and documents, the tutorial survey, participant interviews provided additional information and feedback on the instructional design process, perceptions of participants’ satisfaction and the tutorial’s effectiveness. The data were coded and qualitatively analyzed by identifying themes that aligned to the research questions. Data analysis resulted in several factors that affected the applicability of CDT for mobile learning activities.

The factors were related to the instructional strategies, design variables, and the learning system. The instructional designer/researcher was able to use the CDT as a guiding framework but additional task aids were needed to support the practitioner’s work process and development of the mobile learning activity. Organizational
characteristics and conditions affected the application of the theory. The tutorial was implemented in an institution that uses a bring your own device (BYOD) policy, which resulted in challenges designing for unstandardized and personalized devices and increasing transactional distance. The community college’s professional development culture and technical readiness for mobile learning affected how elements of the tutorial were designed, implemented, and managed. Over time, the organization’s level of readiness will affect the access and acceptance of mobile learning for professional development purposes.

As a result of the findings, several recommendations are presented. An example of a task aid that includes mobile consideration to consider for the CDT student, environment, and task attributes is offered as a way to help practitioners identify instructional design variables. Strategies to increase critical digital literacy and technical skills for faculty are also recommended. Organizationally, the examination of policies, infrastructure, and learning support systems are recommended to prepare the organization for implementing innovative changes in delivering professional development to mobile devices.

Further research is needed to understand how the student, environment, and tasks attributes will conditionally affect the CDT prescriptions. Another research opportunity is to refine and examine other frameworks and guidelines related to mobile learning design and development to identify effective practices.

Learning in the 21st century will include mobile educational models. Existing and new theory based models and frameworks need to be continuously used in practical scenarios so that designers and educators can understand advantages and limitations in
different learning and organizational contexts. This study presented a balance of the science and art of instructional design by extending the Component Display Theory and highlighting instructional situations and variable components of the learning system that affects the design and development of mobile learning activities.
Appendices
## Appendix A

### Design Documents

**Copyright and Fair Use in a Digital Learning Environment**

<table>
<thead>
<tr>
<th><strong>Tutorial Overview</strong></th>
<th>The tutorial offers faculty information and practical application of how to determine permission and appropriate use of copyrighted material for educational purposes.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target Audience</strong></td>
<td>Adjunct and full-time faculty as San Bernardino Community College District (Valley and Crafton Hills)</td>
</tr>
</tbody>
</table>
| **Tutorial Details**  | Size: 10-15 participants  
Time: 1 hour  
Instructional method: Mobile app delivery, self-paced instruction with social collaboration tools |
<p>| <strong>Instructional Goal</strong>| The goals of this tutorial are to explain copyright law and limitations including fair use and Public Domain as well as how to identify, discriminate, and appropriately implement copyright material into the curriculum. |
| <strong>Performance Objectives</strong> | Given scenarios of various educational situations, learners will identify and apply copyright law limitations, exceptions, and crediting of copyrighted works. |
| <strong>Domain(s)</strong>         | Cognitive                                                             |
| <strong>Learner Prerequisites</strong> | None                                                                  |
| <strong>Facilitator Prerequisites</strong> | Basic knowledge of copyright and fair use laws. Review of scenarios presented in application. |</p>
<table>
<thead>
<tr>
<th>Timing</th>
<th>Topic</th>
<th>Objective</th>
<th>Content</th>
<th>CDT Strategy (Prescriptions)</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Primary topic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Application of Copyright Law (Application)</td>
<td>Learner will be reflect and describe their experience with the general process of using copyrighted work.</td>
<td>Presentations of various scenarios that illustrate the applicability of copyright in educational settings.</td>
<td>CDT Rule 7 Remember Generality - Principle</td>
<td>Learners will correctly recall the ordered steps of the process and share an example of a copyrighted work used for academic purposes and explain how they used the general process to use copyrighted work.</td>
</tr>
<tr>
<td></td>
<td><strong>Subtopics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 15 min | Intellectual Property Law            | Learners will identify copyrighted works from other intellectual property such as trademarks and patents. | Presentation defining and comparing through examples different types of intellectual property law  
• Copyright  
• Trademarks  
• Patents | CDT Rule 8 Use - Concept                     | Learners will correctly identify different types of intellectual properties based on definitions and attributions. |
| 15 min | Copyright Limitations                | Learners will identify works that would be included as part of Public Domain and Creative Commons | Presentation defining and interpreting through examples key attributes of copyright limitations  
• Creative Commons  
• Public Domain | CDT Rule 8 Use - Concept                     | Learners will correctly identify different types of copyright limitations.                                           |
<table>
<thead>
<tr>
<th>Timing</th>
<th>Topic</th>
<th>Objective</th>
<th>Content</th>
<th>CDT Strategy (Prescriptions)</th>
<th>Evaluation</th>
</tr>
</thead>
</table>
| 15 min | Academic Exceptions        | Learners will interpret general applications of fair use based on critical attributes. | Presentation defining and interpreting through examples key attributes of copyright exemptions and limitations  
  • Fair Use  
  • TEACH Act | CDT Rule 10 Use - Principle | Presented with various scenarios, learners will determine best practice for applying copyright and fair use principles. Selection will be compared to the “ideal” answer with explanation. |
| 5 min  | Obtaining Permission       | Learners will recall the process for obtaining copyright permissions      | Presentation through examples elements needed to appropriately document resources | CDT Rule 6 Remember-Generality Procedure | Learners will recall the process for obtaining copyright permissions                                                                                                                                   |
| 5 min  | Attribution                | Learners will recall components to appropriately attribute and document use of material | Presentation through examples elements needed to appropriately document resources | CDT Rule 1 Remember-Instance Fact    | For examples of copyrighted work, learners will select attribution elements.                                                                                                                                  |
Appendix B
Example Storyboard

Module: What is Copyright?  Topic: Attributions  Screen ID: 2s

**Attributes**

Review each critical attribute of intellectual property law. Click each button and learn the values for copyright, trademark, and patents. Then study the examples that follow.

- **Applications**
- **Federal requirements for protection**
- **Length of protection**
- **Holder’s Rights**
- **Symbols**

**Interactivity:**

*Description of navigation, links and other user interactions with the system.*

Examples:
- BACK: links to screen 1
- NEXT: links to screen 3
- HELP icon: graphic to technical help and tasks aids
- HOME: links to screen 1
- SHARE: opens up browser to the workshop blog

**Media:**

*Information related to types of text, audio, and visual media on the screen*

Examples:
- All text and graphics appear at once
- Narration is synched with corresponding on-screen text
- Once attribution button is click, screen overlay appears with the definition and values. Close overlay button.

**Narration Script:**

Review each critical attribute of intellectual property law. Click each button and learn the values for copyright, trademark, and patents. Then study the examples that follow.

**ID Notes:**

*Notes related to the instructional strategy, including difficulty levels, learner control, and other interdisplay relationships*

Example:

This is part of the expository generality (EG) presentation which should consist of the definition and relevant attributes that will distinguish the concept with coordinated concepts. Sequence and review frequency of the attributions are controlled by the learner.
Appendix C

Complete Tutorial

Copyright and Fair Use in a Digital Learning Environment Captivate 8 Summary

- Start and End Options used:
  - Loading Screen : None
  - Password Protect : No
  - Project End Action : Close project

- Preferences Used:
  - Output options used:
    - Advanced movie compression : Yes
    - Compress compile SWF file : Yes
    - 508 compliance : Yes
    - Frames per second : 30
  - JPEG Image Quality : 80%
  - Include mouse when project is generated : Yes
  - Include audio when project is generated : No
  - Play tap audio for recorded typing : No

- Visual and Sound effects:
  - Background Audio : None

- Score setting:
  - Quiz Name : Quiz
  - Quiz Requirement : Optional: The user can skip this quiz
  - Quiz Settings :
    - Allow backward movement : Yes
    - Show score at the end of quiz : Yes
    - Allow user to review the quiz : Yes
    - Show Progress : No
    - Pass / Fail Options :
      - Total marks needed to pass : 80%
      - Passing grade-Action : Open Survey URL
      - Failing grade-Action : Open Survey URL
      - Number of attempts : 1
<table>
<thead>
<tr>
<th>Slide Number</th>
<th>Slide JPEG</th>
<th>Slide Properties</th>
</tr>
</thead>
</table>
| 1            | ![Slide JPEG](Slide JPEG) | **Properties:**
|              |            | Navigation : No Action |
|              |            | Audio : None |
|              |            | **Objects:**
|              |            | 1) Text Caption : Copyright and Fair Use in a Digital Learning Environment |
|              |            | 2) Text Caption: If you have questions or concerns about the copyright status of material, please contact your campus' library for further assistance. The information contained in the workshop should not be considered legal advice. Individuals should consult their own attorney. |
|              |            | 3) Text Caption : Developed by: Trelisa Glazatov, M.Ed, Ed.S, Instructional Technology Specialist |
|              |            | 4) Image : SBCCD Logo |

| 2            | ![Navigation Tips](Navigation Tips) | **Properties:**
|              |            | Navigation : No Action |
|              |            | Audio : None |
|              |            | **Objects:**
|              |            | 1) Text Caption : Instructions
Navigate the course by clicking on topics to explore issues related to using copyrighted material in an educational setting. The table of contents can be accessed by clicking the arrows in the upper left corner or the TOC button. On your mobile device you will notice a small hand icon in the upper right corner which will indicate the compatible gestures for interacting with the course.

You will work through scenarios by answering prompts and receiving feedback. A link to discussion forums is available to continue the conversation with your peers and the workshop facilitator. |
|              |            | 2) Image : Navigation.png |
The workshop offers information and best practices to determine appropriate use of copyrighted material.

Learning Objectives:

Learners will be able to

- Classify copyright, trademark, and patent works.
- Classify appropriate copyright limitations
- Explain or predict probably outcomes of different scenarios based on fair use standards
- Identify attribution elements for copyrighted material
- Employ a general process of determining how to use copyrighted work in an academic setting.

Professor Smith searches a library database and finds an excellent research article that was written in 2008 to share with her students.

Can the professor distribute a printed copy to students for classroom use? How do you share material for a class that is delivered online?

Is the distribution of the material considered fair use? What are the best practices for this scenario?

This is one of many scenarios faculty face in deciding how to use and share copyrighted material for educational purposes. The increased availability of digital content and information have presented copyright and fair use challenges for students and faculty. This workshop will increase your understanding of what and how to share copyrighted material.
5 Think about your own learning experience. Give an example of a copyrighted work you used for teaching, learning, or research and explain how you decided to use or share the work.

Properties:
Navigation : No Action
Audio : None

Short Answer
Think about your own learning experience. Give an example of a copyrighted work you used for teaching, learning, or research and explain how you decided to use or share the work.

Points : 10
Type : Graded
Passing grade-Action : Continue
Failing grade-Action : Continue
Number of attempts : 1
Reporting-Objective Id : Quiz_201482621920
Reporting-Interaction Id : 60115

6 A general process to determine how to use copyrighted work in an academic setting is to

Determine if the work falls under the category of copyright.
Identify any legal limitations to exclusive rights to the copyright work
Identify any academic exceptions to exclusive rights to the copyright work
Obtain any permission
Attribute the work

Properties:
Navigation : Execute Advanced Actions
Audio : None

Objects:
1) Text Caption : A general process to determine how to use copyrighted work in an academic setting is to

7

Properties:
Navigation : No Action
Audio : None

Objects:
1) Button: Trademarks
2) Button: Patents
3) Button: Copyright
4) Text Caption : Introduction:
Intellectual Property laws protect commercially valuable products that have been created or development. Intellectual Property laws can be divided into two categories: industrial property and copyright.

Industrial property includes trademarks and patents.

Copyright is literary and artistic work.

Before you can consider intellectual property for personal or professional uses, it is important to understand whether the property is industrial or copyright. Trademarks, patents, and copyright differ on several characteristics, including:

- The scope of the works the law protects.
- Requirements for legal ownership of the work
- And the length of legal protection

Click on the examples and review the types of intellectual property. Then practice classifying items.

<table>
<thead>
<tr>
<th>Properties:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Navigation : Execute Advanced Actions</td>
<td>Audio : None</td>
</tr>
</tbody>
</table>

Objects:
1) Text Caption : CHARACTERISTICS
Scope of Work: Signs for goods and services
Legal Ownership: Registration required and legal right is granted
Length of Protections: Renewable every 10 years

Learn about the different types of trademarks by reviewing the examples on the left
2) Text Caption: Trademark property rights deal with how businesses distinctively identify their products. The right protects words, phrases, logos, or other graphic symbols used by a manufacturer to sell or distinguish its products from others
3) Text Caption : Images courtesy of openclipart.org
**Characteristics**

**Scope of Work:** Inventions

**Legal Ownership:** Registration required and legal right is granted

**Length of Protection:** Utility & Plant - 20 years; Design - 14 years

Learn about the different types of patents by reviewing the examples on the left.

**Characteristics**

**Scope of Work:** Creative and artistic works

**Legal Ownership:** Work protected when created in tangible form; Registration is not a condition of your right.

**Length of Protection:** Life + 70 years

Learn about the different types of copyright by reviewing the examples on the left.

**Copyright Examples**

**Scope of Work:** Creative and artistic works

**Legal Ownership:** Work protected when created in tangible form; Registration is not a condition of your right.

**Length of Protection:** Life + 70 years

Learn about the different types of copyright by reviewing the examples on the left.
<table>
<thead>
<tr>
<th></th>
<th>Properties:</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Audio: None</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>IP Law Question Pool</strong></td>
<td></td>
</tr>
</tbody>
</table>
| 15 | Properties:  
|    | Audio : None  
|    | IP Law Question Pool |

| 16 | Properties:  
|    | Audio : None  
|    | IP Law Question Pool |

| 17 | Properties:  
|    | Display Time : 3.00sec  
|    | Transition : No Transition  
|    | Navigation : No  
|    | Action  
|    | Audio : None  

Objects:
1) Text Caption: Let's Review the Scenario: Professor Smith searches a library database and finds an excellent research article that was written in 2008 to share with her students.
2) Button: Determine if the work falls under copyright category
3) Button: Identify any legal limitations
4) Button: Identify any academic exceptions
5) Button: Obtain any permission
6) Button: Attribute the work
7) Text Caption: Since it is written work and in a tangible form then it would categorized as a copyrighted work. Now Professor needs to consider whether she needs prior permission from the owner to
use the share the work with her students. Let's first consider any limitations to exclusive copyright.

<table>
<thead>
<tr>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Copyright Limitations to Exclusive Rights</strong></td>
</tr>
<tr>
<td><strong>Legal Exception</strong></td>
</tr>
<tr>
<td><strong>Public Domain</strong></td>
</tr>
<tr>
<td><strong>Creative Commons</strong></td>
</tr>
</tbody>
</table>

Properties:
- Navigation: No Action
- Audio: None

**Objects:**
1) Button: Legal Exception
2) Button: Public Domain
3) Button: Creative Commons
4) Text Caption: Copyright limitations are instances when works may be used without prior permission from the owner. Three types of limitations exist: legal exceptions, works in the public domain and works with creative commons licenses. Learn about the different limitations and review the examples. Then practice classifying different types of copyright limitations.

<table>
<thead>
<tr>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Legal Exceptions</strong></td>
</tr>
<tr>
<td><strong>Commentary</strong></td>
</tr>
<tr>
<td><strong>Parody</strong></td>
</tr>
<tr>
<td><strong>First Sale Doctrine</strong></td>
</tr>
</tbody>
</table>

Properties:
- Navigation: Execute Advanced Actions
- Audio: None

**Objects:**
1) Image: 17477-Angela_temp.png
2) Text Caption: Legal exception use of copyright works is an exemption to copyright protection. Examples of legal exception are commentary
parody
first sale doctrine
Review the reasons below of some legal exceptions
3) Button: Back to Limitation List
4) Text Caption: Commentary
A sizable portion of a copyrighted work is necessary to provide effective critical analysis and commentary. The courts have reasoned that copyright holders may not necessarily provide permissions for work believe to be used in this manner.
5) Text Caption: Parodies
Similar to commentary use, parody requires a sizable portion of the work to be used in order to imitate, poke fun of, or ridicule the original work and/or creator.
6) Text Caption: First Sale Doctrine
The first sale doctrine allows a person who buys an
authorized copy of a copyrighted work to dispose of it how he/she pleases, including selling or loaning it to someone else. Thus you do not have to get prior permission to dispose the copyrighted work.

7) Text Caption: Images courtesy of openclipart.org

Properties:

Navigation : Execute Advanced Actions
Audio : None

Objects:

1) Image : 17477-Angela_temp.png
2) Text Caption: Government documents and works, works with an expired copyright or no existing protection, and all works published before 1923 are in the public domain and can be used without getting prior permission from the copyright holder. Review the examples below of work that may be in the public domain and why.
3) Button: Back to Limitation List
4) Text Caption : Works of the U.S. Government
Works produced by an officer or employee of the United States government, in the course of that person’s duties, are not eligible for copyright protection. Examples include: statutes and reports from Congress; judicial rulings from federal courts; studies prepared by the State Department; websites developed by the National Park Service.
5) Text Caption : Facts and Non-Creative Works
Copyright law does not protect facts, processes, and discoveries.
Short or common phrases are usually not copyright able, and collections of data that are not compiled or organized in an original manner are not protected.
6) Text Caption : Expired Copyright
Copyrights expire, and works enter the public domain. The term of protection is commonly referred to as the “duration” of copyright, and the exact length of protection for an individual work may depend on many factors.
7) Text Caption : Images courtesy of openclipart.org
Creative commons is an alternative license that allows creators to manage their own licenses on their own terms by granting different levels of permissions for use, sharing, and modification. Review the video to learn more about the different licenses and permissions.

1) Text Caption: Creative commons is an alternative license that allows creators to manage their own licenses on their own terms by granting different levels of permissions for use, sharing, and modification. Review the video to learn more about the different licenses and permissions.
2) Button: Back to Limitation List

Limitation Question Pool

Limitation Question Pool

Limitation Question Pool
<table>
<thead>
<tr>
<th>Page</th>
<th>Image</th>
<th>Properties:</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td><img src="image1.png" alt="Image" /></td>
<td>Audio: None</td>
</tr>
<tr>
<td>26</td>
<td><img src="image2.png" alt="Image" /></td>
<td>Audio: None</td>
</tr>
<tr>
<td>27</td>
<td><img src="image3.png" alt="Image" /></td>
<td>Navigation: Execute Advanced Actions</td>
</tr>
</tbody>
</table>

**Limitation Question Pool**

**Properties:**

- Audio: None

**Objects:**

1. Text Caption: Let's Review the Scenario:
   Professor Smith searches a library database and finds an excellent research article that was written in 2008 to share with her students.

2. Button: Determine if the work falls under copyright category
3. Button: Identify any legal limitations
4. Button: Identify any academic exceptions
5. Button: Obtain any permission
6. Button: Attribute the work
7. Text Caption: The work is not in the public domain nor does it state that it has a creative commons license. In addition, professor Smith is borrowing the article from the library so the first sale doctrine would not apply. So there seems to be no limitations to the original author's copyright. Depending on how the work is used in the classroom there may be limitation related to commentary and/or parody use. Let's consider some academic exceptions.
8) Text Caption: Before you can consider intellectual property for personal or professional uses, it is important to understand whether the property is industrial or copyright. Trademarks, patents, and copyright differ scope, ownership requirements, and protection length.

9) Text Caption: Copyright limitations are instances when works may be used without prior permission from the owner. Three types of limitations exist: legal exceptions, works in the public domain and works with creative commons licenses.

28

Properties:
Navigation : No Action
Audio : None

Objects:
1) Text Caption: The most common academic exception where a copyrighted work may be used for academic purposes without prior permission from the owner is fair use. Fair use allows a portion of a copyrighted work to be used for academic and research purposes according to certain restrictions.

Let's review different scenarios to understand how the courts have interpreted fair use standards. Then practice predicting possible fair use outcomes.

2) Image: 17503-Angela_temp.png

29

Properties:
Navigation : Execute Advanced Actions
Audio : None

Objects:
1) Text Caption : Purpose of Work

Copying and using selected parts of copyrighted works for specific educational purposes qualifies as fair use, especially if the copies are made spontaneously, are used temporarily, and are not part of an anthology.

2) Text Caption : Proportion/Extent of the Material Used

Duplicating excerpts that are short in relation to the entire copyrighted work or segments that do not reflect the "essence" of the work is usually considered fair use.
<table>
<thead>
<tr>
<th>3) Text Caption: Effect on Marketability</th>
<th>Click each sticky note to learn about the standards.</th>
</tr>
</thead>
<tbody>
<tr>
<td>If there will be no reduction in sales because of copying or distribution, the fair use exemption is likely to apply.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4) Text Caption: Nature of Work</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The more creative the work the more likely it is not considered fair use rather than a factual or published work.</td>
<td></td>
</tr>
</tbody>
</table>

| 5) Text Caption: There are four standards for determination of fair use. The more standards that are met the more likely that the use of the work fall under fair use. | |
| Click each sticky note to learn about the standards. | |

<table>
<thead>
<tr>
<th>6) Button: Purpose of Work</th>
<th>7) Button: Proportion/Extent of the Material Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>8) Button: Effect on Marketability</td>
<td>9) Button: Nature of Work</td>
</tr>
<tr>
<td>10) Button: Let's review some scenarios</td>
<td></td>
</tr>
</tbody>
</table>

| Properties: |
| Navigation | Execute Advanced Actions |
| Audio | None |

| Objects: |
| 1) Text Caption: Commercial producers of educational motion pictures and videos sued a consortium of public school districts, which systematically recorded programs as they were broadcast on public television stations and provided copies of the recordings to member schools. Was the district's activities fair use? |
| Think about the scenario and consider if the standards of fair use were met. |

<table>
<thead>
<tr>
<th>2) Text Caption: Purpose Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Although the court was largely sympathetic with the educational purpose, it also said that convenience</td>
</tr>
</tbody>
</table>
should not be a significant factor in the reasonableness of the purpose of the use, thus weighing against fair use.

3) Text Caption: Nature of Work Standard

Although the films had educational content, they were commercial products intended for sale to educational institutions, weighing against fair use.

4) Text Caption: Amount of Work Used

The defendant (school district) was copying the entire work and retaining copies for as long as ten years, weighing against fair use.

5) Text Caption: Effect on Marketability

The copying directly competed with the plaintiff’s market for selling or licensing copies to the schools, weighing against fair use.

6) Text Caption: Court's Final Decision

None of the fair use standards were met. The court had little trouble concluding that the activities were not fair use.

7) Button

8) Text Caption: Case summaries used under a Creative Commons BY license from the Copyright Advisory Office of Columbia University, Kenneth D. Crews, director

http://copyright.columbia.edu/copyright/fair-use/case-summaries/

9) Text Caption: Purpose of use: Copying and using selected parts of copyrighted works for specific educational purposes qualifies as fair use, especially if the copies are made spontaneously, are used temporarily, and are not part of an anthology.

Nature of the work: The more creative the work the more likely it is not considered fair use rather than a factual or published work.

Proportion/extent of the material used: Duplicating
excerpts that are short in relation to the entire copyrighted work or segments that do not reflect the "essence" of the work is usually considered fair use.

The effect on marketability: If there will be no reduction in sales because of copying or distribution, the fair use exemption is likely to apply. This is the most important of the four tests for fair use.

10) Button: Review Standards

Properties:
Navigation : Execute Advanced Actions
Audio : None

Objects:
1) Text Caption: NXIVM produced executive business training seminars that generated considerable controversy. NXIVM brought a copyright infringement action against website operators for posting excerpts from NXIVM’s training manuals. The training manuals were unpublished in the sense that they were not available to the general public.

Think about the scenario and consider if the standards of fair use were met.

2) Text Caption : Purpose Standard

The purpose of the use was deemed “transformative,” because it was to criticize NXIVM’s seminars and manual. Because the use was transformative, the first factor favored fair use, even in light of the bad faith in which the manuals were obtained.

3) Text Caption : Nature of Work Standard

Because both sides conceded that the work was unpublished, the second factor weighed against fair use.

4) Text Caption : Amount of Work Used

The amount used was only as necessary to further the transformative purpose. Also, Ross did not take the
“heart of the work,” because there was no specific portion that constituted the heart of NXIVM’s manual. Thus, the third factor weighed in favor of fair use.

5) Text Caption: Effect on Marketability

The court found that criticism of a seminar or organization did not substitute for the seminar itself or its market, and any harm to the market as a result of such criticism was merely a byproduct of free expression and public discussion. Thus, the fourth factor leaned in favor of fair use.

6) Text Caption: Court's Final Decision

Three of the fair use standards were met. This case demonstrates that even posting materials on publicly accessible websites can be within fair use, particularly if the use is in the context of critical discussion, and only portions are copied.

7) Button: Review Standards
8) Text Caption: Case summaries used under a Creative Commons BY license from the Copyright Advisory Office of Columbia University, Kenneth D. Crews, director
http://copyright.columbia.edu/copyright/fair-use/case-summaries/
| 33 | Properties:  
|     | Audio : None  
|     | Academic Exceptions Question Pool  

| 34 | Properties:  
|     | Audio : None  
|     | Academic Exceptions Question Pool  

| 35 | Properties:  
|     | Navigation : Execute Advanced Actions  
|     | Audio : None  
|      | Objects:  
| 1) Text Caption : Let's Review the Scenario:  
|      | Professor Smith searches a library database and finds an excellent research article that was written in 2008 to share with her students.  
| 2) Text Caption: Professor Smith needs to consider the fair use standards to determine if use is more than likely allowed under that condition. If sharing the work would fall under fair use and she is sharing the article through an online environment then best practice would be to link to the article so the students can access the article directly through the library. If permission is needed to share the work, then Professor Smith needs to understand the general steps to obtain the clearance. Let's take a look at those steps.  
| 3) Text Caption: Before you can consider intellectual property for personal or professional uses, it is important to understand whether the property is industrial or copyright. Trademarks, patents, and copyright differ scope, ownership requirements, and
protection length.

4) Text Caption: Copyright limitations are instances when works may be used without prior permission from the owner. Three types of limitations exists: legal exceptions, works in the public domain and works with creative commons licenses.

5) Text Caption: Fair use allows a portion of a copyrighted work to be used for academic and research purposes according to certain restrictions. There are 4 standards to determine fair use: purpose of work; nature of work; proportion used; and the effect on marketability.

You need permission from the copyright owner, if you determine that:

(1) the work you have selected to use is protected by copyright (i.e., not in the public domain)
(2) your use is not a fair use, and
(3) No other statutory exceptions apply.

The process of securing permission may take some time. Therefore, start the process for obtaining permission well before you will need to use the work.

Review the 3 steps to learn more about the procedure.

4) Text Caption: Once you have identified the copyright owner(s), contact the owner to request permission. Publishers often have websites that prescribe a method for contacting the copyright owner, so search the website for a permissions department or contact person.

Be sure to confirm the exact name and address of the
and call the person or publishing house to confirm the copyright ownership. Various collective rights organizations are sometimes able to facilitate granting permissions on behalf of owners.

If the copyright owner is an individual, you will need to do the usual Internet and telephone searches to find the person. Be ready to introduce yourself and to explain carefully what you are seeking.

5) Text Caption: A “nonexclusive” permission may be granted by telephone or handshake, but an “exclusive” permission or a transfer of the copyright must be in writing and signed by the copyright owner.

In all cases, a clearly written document with a signature is useful to confirm exactly what is permitted. Some copyright owners furnish their own permission form that may be downloaded from a website.

If the copyright owner does not provide a permission agreement form, find a general forms online and drafting your own permission letter.

6) Text Caption: Keep a copy of everything. If you successfully obtain permission, keep a copy of all correspondence and forms.

Why keep these records? In the unlikely event that your use of the work is ever challenged, you will need to demonstrate your good efforts. That challenge could arise far in the future, so keep a permanent file of the records.

Moreover, you might need to contact that same copyright owner again for a later use of the work, and your notes from the past will make the task easier.

7) Button: Keep a Record
Let's say you are a history professor who wants to use 30 pages from a book as part of a class assignment. You want to be able to post the contents of the 30 pages on a public website and make the pages downloadable to your students and the public. You decide to seek permission from the owner. What would be the best practice in seeking permission?

Select and Review the 3 steps.

5) Text Caption: Identify the copyright owner(s) and contact the owner to request permission. Since it is a book, you may want to contact the publishers to find the preferred method for contacting the copyright owner.

When contacting the copyright owner, use these tips to better ensure a timely response.

The copyright owner may prefer or require that permission requests be made using a certain medium (i.e. fax, mail, web form, etc.).

Telephone calls may be the quickest method for getting a response from the owner, but they should be followed up with a letter or e-mail in order to document the exact scope of the permission.

The request should be sent to the individual copyright holder (when applicable) or permissions department of the publisher in question.

State clearly who you are, your institutional affiliation (e.g., Columbia University), and the general nature of your project.

6) Text Caption: Use either the owner's permission form and/or write an effective letter that details the information concerning your request for information to use the work.
Be sure to include the following:

Who: Introduce yourself.
What: Be as specific as possible. If you plan to use the entire work, say so. If you need only part, give the details.
How: Tell how you plan to use the work. Specify whether your use is commercial or nonprofit, for classroom learning or distance education, for research and publication, etc.
When: State how long you plan to use the work, whether one semester or indefinitely.
Why: Tell why you are contacting that person or entity for permission. If you are using materials from a library or archives, do not assume that the institution holds the copyrights. You need to investigate and ask.

7) Text Caption: Sometimes you need to be patient and persistent, and sometimes the owner responds quickly.

In any event, keep records of all communications and note that the reply can take any number of possibilities:

Permission Granted. Great news. Keep a detailed record of the communications and permission form.

Permission Denied. Find out why. Maybe you can negotiate a better result. In any event, you may need to change your plans or look for alternative materials.

Permission Granted, but at a Cost. The copyright owner may charge a fee for the permission. Sometimes copyright owners require their own permission form that may impose limits or include legal constraints (“You agree to be bound by the law of Illinois”) that are not acceptable to you. The decision to accept will be up to you, your counsel or supervisors, and your budget.
Let's Review the Scenario:
Professor Smith searches a library database and finds an excellent research article that was written in 2008 to share with her students.

1) Button: Determine if the work falls under copyright category
2) Button: Identify any legal limitations
3) Button: Identify any academic exceptions
4) Button: Obtain any permission
5) Button: Attribute the work

If additional permission is required before sharing the work, Professor Smith should research the status, contact the copyright owner, and get the permission agreement in writing.

Regardless of whether prior permission is needed or not, Professor Smith should always attribute the work to the copyright holder. Several elements are needed to appropriately attribute copyright work.
8) Text Caption: Fair use allows a portion of a copyrighted work to be used for academic and research purposes according to certain restrictions. There are 4 standards to determine fair use: purpose of work; nature of work; proportion used; and the effect on marketability.

9) Text Caption: Copyright limitations are instances when works may be used without prior permission from the owner. Three types of limitations exist: legal exceptions, works in the public domain and works with creative commons licenses.

10) Text Caption: Before you can consider intellectual property for personal or professional uses, it is important to understand whether the property is industrial or copyright. Trademarks, patents, and copyright differ scope, ownership requirements, and protection length.

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Properties:

Navigation : No Action
Audio : None

Objects:

1) Text Caption: Once you have determined that you may fairly use or have permission to use a piece of work, you need to appropriately attribute the work to the creator. Attribution is about crediting a copyright holder according to the terms of a copyright license, usually crediting artistic works like music, fiction, video, and photography. Creative Commons has identified some best practices for attributing work. The acronym L.A.S.T., which stands for License, Author, Source, and Title can be used to remember the best practice.

Learn about copyright attribution and practice defining the attribution elements for different copyrighted works.

2) Text Caption: License - (How can I use it?) Look for a copyright notice on materials or the creative commons license to help determine what use is permissible and how to use the material.

Author - (Who owns the material?)
Name the author or authors of the material in question. The licensor may be a person, multiple people, a company, or pseudonym.

Source - (Where can I find it?)
Provide the source of the material so others can find and access it, too. Since the material is in a digital format, the source will be a URL or hyperlink where the material resides.

Title - (What is the name of the material?)
If a title is provided for the material, include it.

3) Text Caption : Source: Best practices for attribution: [http://wiki.creativecommons.org/Best_practices_for Attribution](http://wiki.creativecommons.org/Best_practices_forAttribution)

**Properties:**

<table>
<thead>
<tr>
<th>Navigation</th>
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<tbody>
<tr>
<td>Audio</td>
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</tr>
</tbody>
</table>

**Objects:**

1) Image : flickerAuthor2.PNG
2) Text Caption : SOURCE
This picture is found on a website. The source attribution is the full URL or hyperlink to the picture. For this example the URL is [http://www.flickr.com/photos/55663585@N00/8033460185](http://www.flickr.com/photos/55663585@N00/8033460185)
3) Text Caption : AUTHOR
Include the name of the author or authors of the copyrighted work.
4) Text Caption : LICENSE
Review the license to find out how the work can be used, shared, and modified. This picture is a CC-BY-SA 2.0 which means you can share and adapt the picture for any purpose but you must attribute the original work and use the same license for and distribution of the work. [https://creativecommons.org/licenses/by-sa/2.0/](https://creativecommons.org/licenses/by-sa/2.0/)
5) Text Caption : TITLE
The name of this picture is “Anhinga”
6) Text Caption : “Arhinga” by Alastair Rae is licensed under CC-BY-SA-2.0
7) Text Caption : The complete attribution is “Arhinga” by Alastair Rae is licensed under CC-BY-SA-2.0
8) Button: Author
9) Button: License
10) Button: Title
11) Button: Source
12) Button: Attribution

Properties:
Navigation : Execute Advanced Actions
Audio : None

Objects:
1) Image : book2.PNG
3) Text Caption : SOURCE
This book is not only available in paperback but also as an eBook. The source attribution is the full URL or hyperlink to the eBook download of the book. For this example the URL is http://www.aupress.ca/index.php/books/120146
4) Text Caption : AUTHOR
Include the name of the author or authors of the copyrighted work.
5) Text Caption : LICENSE
If you are using the digital version of the book, review the license to find out how the work can be used, shared, and modified. This book has a CC-BY-NC-ND 2.5 CA which means it may be reproduced for non-commercial purposes, provided that the original author is credited.
http://creativecommons.org/licenses/by-nc-nd/2.5/ca/
6) Text Caption : TITLE
The title of this book is “The Theory and Practice of Online Learning”
Let's Review the Scenario:
Professor Smith searches a library database and finds an excellent research article that was written in 2008 to share with her students.

When using other's works, Professor Smith should include the License, Author, Source, and Title of the work as part of the attribution.

Before you can consider intellectual property for personal or professional uses, it is important to understand whether the property is industrial or copyright. Trademarks, patents, and copyright differ scope, ownership requirements, and protection length.

Copyright limitations are instances when works may be used without prior permission from the owner. Three types of limitations exist: legal exceptions, works in the public domain, and works with creative commons licenses.

Fair use allows a portion of a copyrighted work to be used for academic and research purposes according to certain restrictions. There are 4 standards to determine fair use: purpose of work; nature of work; proportion used; and the effect on marketability.

Obtain any necessary permissions by contacting the copyright holder and documenting the permission given.
7) Text Caption: Attribution is about crediting a copyright holder according to the terms of a copyright license. The acronym L.A.S.T., which stands for License, Author, Source, and Title can be used to remember the best practice.

<table>
<thead>
<tr>
<th>50</th>
<th>Properties: Audio : None</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>End of Tutorial Question Pool</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>51</th>
<th>Properties: Audio : None</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>End of Tutorial Question Pool</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>52</th>
<th>Properties: Audio : None</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Text Caption: Submit your name and email then click the NEXT button to complete the survey</td>
</tr>
</tbody>
</table>
Thank You for Completing the Workshop!
Please complete the survey to help us improve the workshop!

1) Text Caption: Thank You for Completing the Workshop!
2) Button: Complete the Workshop Survey
3) Image : SBCCD Logo.png

Use the community discussion forum to ask further questions about the workshop information, and to share additional resources with others. You can also access the forum directly:

1) Text Caption :
- U.S. Copyright Office (http://www.copyright.gov/)
- U.S. Patent and Trademark Office (http://www.uspto.gov/)
- ASCAP (American Society of Composers, Authors and Publishers) (http://www.ascap.com/)
- CCC (Copyright Clearance Center) (http://www.copyright.com/)
- Creative Commons (http://creativecommons.org/)
- MPLC (Motion Picture Licensing Corporation) (http://www.mplc.org)
- SESAC (performing rights organization) (http://www.sesac.com/)
- VAGA (Visual Rights Organization) (http://vagarights.com/)

2) Button: Copyright
3) Button: Fair Use
4) Button: Open Educational Resources
5) Button: Distance Education
6) Text Caption :
   • Copyright and IP - ARL (Association of Research Libraries) (http://www.arl.org/)
   • Copyright & Fair Use Center - Stanford University (http://fairuse.stanford.edu/)
   • Copyright Advisory Office - Columbia University (http://copyright.columbia.edu/copyright/)
   • Copyright Crash Course - University of Texas (http://copyright.lib.utexas.edu/)
   • Fair Use Evaluator (http://librarycopyright.net/resources/fairuse/)
   • Fair Use - Advocacy, Legislation and Issues - ALA (American Library Association) (http://www.al.org/advocacy/copyright/fairuse)
   • Fair Use - Center for Media and Social Impact (http://www.cmsimpact.org/fair-use)
7) Text Caption :
   • Community College Consortium for Open Educational Resources (http://oerconsortium.org/)
   • OER Commons (https://www.oercommons.org/)
   • Open Education Consortium (http://www.oedsonsortium.org/)
   • MERLOT (http://www.merlot.org/merlot/index.htm)
   • National Academies Press (http://www.nap.edu/)
8) Text Caption :
   • DMCA (Digital Millennium Copyright Act) of 1998 (http://www.copyright.gov/legislation/dmca.pdf)
   • Distance Education and the TEACH ACT - ALA (American Library Association) (http://www.al.org/advocacy/copyright/teachact)
   • The Digital Millenium Copyright Act - ALA (American Library Association) (http://www.al.org/advocacy/copyright/dmca)
   • The Digital Millenium Copyright Act - Educause (http://www.educause.edu/library/digital-
Recall your favorite baseball team. Would you classify the logo on the team cap as a patent? Yes or No. Explain your answer.

**Feedback:**
No. The logo on the team cap is not a patent it is a TRADEMARK. The logo identifies and distinguishes one business from another.
You recorded a video of your original play performance that you wrote. Is the video recording work copyrighted? Yes or No. Explain your answer.

Feedback:
Yes. The recording is an original visual work created by you. Thus the video is copyrighted and allows you the right to reproduce, adapt, distribute and display the work.

You recorded a video of your original play performance that you wrote. Is the written play copyrighted? Yes or No. Explain your answer.

Feedback:
Yes. The written play is a creative, text-based work created by you. Thus the written play is copyrighted and allows you the right to reproduce, adapt, distribute, perform, and display the work.

Review the following items. Check each that would be a copyrighted work.

- A) A company’s logo
- B) A slogan used to advertise a company’s brand
- C) A product’s unusual shape
- D) A software developed to match on personality traits
- E) The lyrics to a song
- F) A written post on a website about aliens on earth

Multiple Choice
Review the following items. Check each that would be a copyrighted work.

- A) A company’s logo
- B) A slogan used to advertise a company’s brand
- C) A product’s unusual shape
- D) A software developed to match on personality traits
- E) The lyrics to a song
- F) A written post on a website about aliens on earth
**Multiple Choice**

Review the following items. Check each that would be a trademark.

- A) A company’s logo
- B) A slogan used to advertise a company’s brand
- C) A product’s unusual shape
- D) A software developed to match mentee’s based on personality traits
- E) The lyrics to a song
- F) A written post on a website about aliens on earth

**Multiple Choice**

Review the following items. Check each that would be a patent.

- A) A company’s logo
- B) A slogan used to advertise a company’s brand
- C) A product’s unusual shape
- D) A software developed to match mentee’s based on personality traits
- E) The lyrics to a song
- F) A written post on a website about aliens on earth

Limitations Question Pool

1) Slide Count : 5
Short Answer
You buy a textbook for class then resale the book at the end of the semester. Has copyright been violated? Yes or No. Explain your answer.

Feedback:
The first sale doctrine allows the purchaser of a particular copy of work, such as a book, to do what he/she wants after purchasing it, including selling the work to another person.

Multiple Choice
Review the following items. Check each work that is more likely to be in the public domain

- A) A company’s logo
- B) A slogan used to advertise a company’s brand
- C) A book that has an expired copyright
- D) A book published in 1958 with no copyright notice
- E) A phone book published by a local city
- F) A published work written by Ann Williams in 2001

Feedback: It is the attribution CC-BY
Scenario: In this case, a researcher at a nonprofit foundation selected quotations from an unpublished literary manuscript of historical and cultural interest, and included the quotations in an analytical presentation that she delivered to a scholarly society. Think about the scenario and consider if the standards of fair use were met.

- A) Purpose Standard has been met
- B) Nature Standard has been met
- C) Amount Standard has been met
- D) Marketability Standard has been met
- E) Fair Use Exemption has been met
A number of university libraries entered into agreements with Google under which Google would digitize works in the libraries’ collections and provide them with digital copies. Many of those libraries deposited the digital copies with the HathiTrust Digital Library. HathiTrust displayed in full only those books that were in the public domain or for which the copyright owner had authorized use. For protected works, HathiTrust provided a full-text search that only showed the page numbers on which a term was found and the number of times the term appeared on each page. Think about the scenario and consider if the standards of fair use were met.

- A) Purpose Standard has been met
- B) Nature Standard has been met
- C) Amount Standard has been met
- D) Marketability Standard has been met
- E) Fair Use Exemption has been met
<table>
<thead>
<tr>
<th>Permission Question Pool</th>
<th>1) Slide Count : 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Multiple Choice</strong></td>
<td>Select all the instance when you may need to secure permission from the copyright owner.</td>
</tr>
<tr>
<td>- A) The work you selected is not in the public domain</td>
<td></td>
</tr>
<tr>
<td>- B) You cannot use the work under the fair use exception</td>
<td></td>
</tr>
<tr>
<td>- C) No other legal exceptions, such as first sale, parody, commentary, apply to your intended use</td>
<td></td>
</tr>
<tr>
<td>- D) The work carries a CC-BY license</td>
<td></td>
</tr>
<tr>
<td>- E) The work you selected is in the public domain</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Put the process for securing permission in the correct order</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Keep a Record</td>
<td>The general process is contact the owner, secure permission, and keep a record.</td>
</tr>
<tr>
<td>2. Contact the Copyright Owner</td>
<td></td>
</tr>
<tr>
<td>3. Secure Permission</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>End Assessment Question Pool</th>
<th>1) Slide Count : 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properties:</td>
<td>No Transition</td>
</tr>
<tr>
<td>Transition</td>
<td>None</td>
</tr>
<tr>
<td>Audio</td>
<td>No Transition</td>
</tr>
<tr>
<td>Audio</td>
<td>None</td>
</tr>
</tbody>
</table>

Feedback: The general process is contact the owner, secure permission, and keep a record.
Short Answer
At the beginning of the workshop, you were asked about your experience in using and sharing copyrighted works. Now, that you’ve learned more about appropriately using copyrighted works, how would you handle your previous experiences differently?

Feedback:
Remember:

Step 1: Before you can consider intellectual property for personal or professional uses, it is important to understand whether the property is industrial or copyright. Trademarks, patents, and copyright differ scope, ownership requirements, and protection length.

Step 2: Copyright limitations are instances when works may be used without prior permission from the owner. Three types of limitations exists: legal exceptions, works in the public domain and works with creative commons licenses.

Step 3: Fair use allows a portion of a copyrighted work to be used for academic and research purposes according to certain restrictions. There are 4 standards to determine fair use: purpose of work; nature of work; proportion used; and the effect on marketability.

Step 4: Obtain any necessary permissions by contacting the copyright holder and documenting the permission given.

Step 5: Attribution is about crediting a copyright holder according to the terms of a copyright license. The acronym L.A.S.T., which stands for License, Author, Source, and Title can be used to remember the best practice.
Sequence
Click and Drag each step of the general process to use copyrighted work into the correct order.

A) Attribute the work
B) Determine if the work falls under the category of copyright.
C) Obtain any permissions
D) Identify any legal limitations to exclusive rights to the copyright work
E) Identify any academic exceptions to exclusive rights to the copyright work

Feedback: The best practice process for using copyrighted work is to:
1. Determine if the work falls under the category of copyright Attribute the work
2. Identify any legal limitations to exclusive rights to the copyright work
3. Identify any academic exceptions to exclusive rights to the copyright work
4. Obtain any permissions
5. Attribute the work
## Properties:
- **Transition**: No Transition
- **Audio**: None

### Hot Spot
Select the Source Attribution

Feedback: That's right! You selected the correct response. You did not select the correct response.

### Hot Spot
Select the Title Attribution

Feedback: That's right! You selected the correct response. You did not select the correct response.

### Hot Spot
Select the License Attribution

Feedback: That's right! You selected the correct response. You did not select the correct response.

### Matching
Match the attribution element with its definition.

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitions</td>
<td>Attributions</td>
</tr>
<tr>
<td>How can I use it?</td>
<td>A) License</td>
</tr>
<tr>
<td>Who owns the material?</td>
<td>B) Author</td>
</tr>
<tr>
<td>Where can I find it?</td>
<td>C) Source</td>
</tr>
<tr>
<td>What is the name?</td>
<td>D) Title</td>
</tr>
<tr>
<td>Feedback:</td>
<td></td>
</tr>
<tr>
<td>------------------------------------</td>
<td></td>
</tr>
<tr>
<td>License - How can I use it?</td>
<td></td>
</tr>
<tr>
<td>Author - Who owns the material?</td>
<td></td>
</tr>
<tr>
<td>Source - Where can I find it?</td>
<td></td>
</tr>
<tr>
<td>Title - What is the name of the material?</td>
<td></td>
</tr>
</tbody>
</table>
Appendix D

Expert Review of CDT – Request for Review

Dear Potential Reviewer,

My name is Trelisa Glazatov and I am a doctoral student working on my PhD in Computing Technology in Education at Nova Southeastern University, FL. I also work at San Bernardino Community College as an Instructional Technology Specialist for the Distance Education department, and have a background in both instructional technology and online education. My work experience and interest in educational technology has led me to write a dissertation on designing instruction for mobile learning environments. I am especially interested in the Component Display Theory (CDT) and how it can be applied from a social constructivism perspective.

I am requesting your help to review the instructional design materials and provide any feedback and comments about the application of the CDT to the design of a tutorial as part of the expert panel. To be a participant, you should have at least 5 years’ experience as an instructional designer and be able to provide a total of 4 hours of review.

You will review instructional design documents related to a tutorial that will be delivered via a mobile app. After review you will note any questions or comments you have regarding the instructional design strategies. There will be two rounds of documentation review, each round should take approximately 2 hours to complete.

If you would like to participate, please reply to this request and I will email you the informed consent, and further information about the study. If you would like a copy of the results of this study, please submit a request in writing to the address listed below.

Any questions pertaining to the rights of the research participant should be directed to the Human Research Oversight Board (IRB) Nova Southeastern University. Phone: (954) 262-5369

Thank you in advance for your help with participating in this research study! Your timely response is truly appreciated!

Again, thank you so much for your consideration,

Trelisa R. Glazatov, M.Ed., EdS.
Instructional Technology Specialist
San Bernardino Community College District
Technology and Educational Support Services
1289 Bryn Mawr Avenue, Suite B; Redlands, CA 92374
Office: (909) 384-4318; Email: tglazato@sbccd.cc.ca.us
Appendix E

Expert Review Instructions

*The Component Display Theory Background:*

The Component Display Theory (CDT) is a micro-level instructional design theory, focused on providing instructional strategies for a single idea, concept, or principle (Merrill, 1983). The theory assumes that each instructional outcome can be classified along two dimensions: student performance and subject matter content (Table C1).

The CDT is based on the assumption that each performance-content combination makes it possible to indicate particular conditions, behaviors, and criterions that would promote acceptable learning outcomes. In particular, Merrill reasons that since the performance-content matrix represent a complete taxonomy to categorize learning, it is also presumed that there is a limited set of possible learning objectives types, with differences only occurring with varying topics.

The descriptive theory component of the CDT classifies the instructional outcomes and specifies the learning objectives and assessment items. Based on classification and learning objective specifications, the CDT proposes 13 instructional design prescriptions on the display pattern for each performance-content outcome. The standard display pattern includes four categories of parameters (Primary Presentation Form, Primary Presentation Form Content, Secondary Presentation Forms, and Inter-display Relationships) and the ability to modify prescriptions based on characteristics of the student, environment and/or task variables.

The CDT was used to guide the design and development of an instructional module to be delivered via mobile devices and web browsers.

**All documents and links are also available on the following website:**
http://digitallearninginnovations.com/

**Expert Review Process:**

1. Review the background of the CDT and objective table from the Expert Review Instructions.

2. Review the CDT prescription for the learning objectives (http://digitallearninginnovations.com/mobileapp/documents/Prescriptions_UsedInInstruction.pdf). The objective and instructional strategy summary are included as part of the expert review instructions and are coded to respond to the prescription parameters.
3. In addition, a working prototype is available for review to better illustrate the application of the prescriptions. The prototype can be access through either a web browser or mobile app by using the following link: http://digitallearninginnovations.com/mobileapp/story.html. The instructional strategy summary and prescriptions are included as part of the NOTES TAB in the module. **Note any questions or comments you have about how the prescription parameters were applied.**

4. Email your notes back to the researcher at tglazato@sbccd.cc.ca.us. Once the notes are received, the researcher will review and respond to any questions or outstanding issues identified by the expert reviewer.

5. A revised learning objective summary and prescriptions for the tutorial, along with the responses to questions and outstanding issues, will be given to the expert reviewers for final review. **Note any additional comments or questions you have and email your notes back to the researcher.**

Contact Information

Trelisa Glazatov, M.Ed., Ed.S  
Instructional Technology Specialist  
------------------------------------------------------  
Technology and Educational Support Services  
San Bernardino Community College District  
1289 Bryn Mawr Avenue, Suite B  
Redlands, CA 92374  
PH: 909.384.4318  
Email: tglazato@sbccd.cc.ca.us
How many years of instructional design experience?


Have you used the Component Display Theory in your professional experience?

| Yes | No |

Please check industry that you currently work in:

| K-12 | Higher Education | Military | Private Industry | Other (Please specify) |

Table C1

_Performance – Content Matrix_ (Merrill, 1994a)

<table>
<thead>
<tr>
<th>Student Performance</th>
<th>Find</th>
<th>Use</th>
<th>Remember – Generality</th>
<th>Remember - Instance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fact</td>
<td>Concept</td>
<td>Procedure</td>
<td>Principle</td>
<td></td>
</tr>
<tr>
<td>Subject Matter Content</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Expert Panel Notes

<table>
<thead>
<tr>
<th>Topic</th>
<th>Objective</th>
<th>CDT Strategy (Prescriptions)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application of Copyright Law</td>
<td>Learner will be reflect and describe their experience with the general process of using copyrighted work.</td>
<td>CDT Rule 7 Remember Generality - Principle</td>
<td></td>
</tr>
<tr>
<td>Intellectual Property Law</td>
<td>Learners will identify copyrighted works from other intellectual property such as trademarks and patents.</td>
<td>CDT Rule 8 Use - Concept</td>
<td></td>
</tr>
<tr>
<td>Copyright Limitations</td>
<td>Learners will identify works that would be included as part of Public Domain and Creative Commons</td>
<td>CDT Rule 8 Use - Concept</td>
<td></td>
</tr>
<tr>
<td>Academic Exceptions</td>
<td>Learners will interpret general applications of fair use based on critical attributes.</td>
<td>CDT Rule 10 Use - Principle</td>
<td></td>
</tr>
<tr>
<td>Obtaining Permission</td>
<td>Learners will recall the process for obtaining copyright permissions</td>
<td>CDT Rule 6 Remember Generality Procedure</td>
<td></td>
</tr>
<tr>
<td>Attribution</td>
<td>Learners will recall components to appropriately attribute and document use of material</td>
<td>CDT Rule 1 Remember-Instance Fact</td>
<td></td>
</tr>
</tbody>
</table>

**General Comments:**
SCENES 1 and 7: WELCOME AND RESOURCES

Rule 7: Performance Level: Remember Generality  Content Type: Principle

Objective:
Learner will be reflect and describe their experience with the general process of using copyrighted work.

Instructional method:
The information is presented with the definitions and general steps of how to use copyrighted work (a, b). Each steps is further explored throughout the whole tutorial (j). The steps are color coded and presented in outline form through navigational elements to help in the organization of the instruction and to assist in memorization (e, j). A scenario is presented at the beginning of the lesson and revisited throughout the tutorial to recap the step and introduce the next step (b, c, f, h). For practice, the learner is asked to reflect on their own experience and how they may have applied the steps of using copyrighted work (d). For additional feedback and interaction, an online forum is available for learners to share additional experiences, ask questions, and access additional resources. Learners have control over pace, help elements, and learning parameters through navigational features (i).

Evaluation:
Learners will correctly recall the ordered steps of the process and share an example of a copyrighted work used for academic purposes and explain how they used the general process to use copyrighted work (d, g, l).

Primary Presentation Form

(a) EG + Eeg + IG.P + IG.P
* An expository presentation consisting of a generality followed by an example, and a series of instances where the student responds by stating the definition.

PPF Content

(b) EG = Proposition - The presentation to the student consists of the name of the process along with the concepts and events associated with the process. May also be a formal law or principle.

(c) Eeg (reference example) = Explanation - The example presentation to the student consists of the name, a specific situation where the principle applies, and an execution of the events involved in the process

(d) IG.P = State Relationship - For the student practice, give the principle name and have the student recall or recognize a statement of the principle in paraphrase form.

Secondary Presentation Forms (SPFs)
With EG:

(e) Mnemonics = yes - The use of memory aids can be given to assist the learner in remembering.

With Eeg:

(f) Help = yes - Information added to the content to help the learner relate the instance to the generality

With IG

(g) Feedback = ca + h - The correct answer is given as feedback. An expository presentation of the problem is presented after the student attempt.

*Interdisplay Relationships*

For all:

(h) PPF isolation = yes - The primary presentation form is clearly separated and identified for the student by auditory or graphic conventions

(i) Learner control = yes - Learners have control over the pace, presentation forms, speed or any other learning parameters that can be controlled in the environment.

For EG + Eeg presentation:

(j) Chunking = yes - The learner is required to remember less than 7 new items at one time.

For IG.P practice/performance

(k) Response delay = short - Learner may have a short delay in responding to questions.

(l) Criterion = high - It is expected that learners’ accuracy in responding is high.

(m) Number of items = at least two - At least two instances are necessary for adequate instruction.
SCENE 2: INTELLECTUAL PROPERTY

Rule 8: Performance Level: Use Content Type: Concept

Objective:
Learners will identify copyrighted works from other intellectual property such as trademarks and patents.

Instructional method:
The information is presented with the definitions and characteristics that differentiate different types of intellectual property (a,b,g). The definitions for each type of intellectual property are elaborated on and include several matched examples using visuals and text (c,j,l,m). The example section is followed by practices which asks the learner to classify different items to the appropriate type of intellectual property type then feedback is given (k). Learners have control over pace and learning parameters through navigational features (n).

Evaluation:
Learners will correctly identify different types of intellectual properties based on definitions and attributions. (r,u).

Primary Presentation Form (PPF)

(a) EG + Eegs + Iegs.N + Iegs.N
* An expository presentation consisting of a generality followed by an example, and a series of practice inquiries.

PPF Content

(b) EG = Definition - The presentation to the student consists of the name of the concept, superordinate class to which the concept belongs, a list of the attributes and values which distinguishes he class from coordinate classes.

(c) Eeg (set of instances) = Examples - The example presented to the student consist of specific objects, symbols, or events or representation which illustrates the attribute value of the definition.

(d) IG.N (new set of instances) = Classify - For the learner practice, give a new specific object, event, or symbol not previously used in the Eeg set and student is asked to identify or recall its name. If given the name the student is asked to select the new specific object, event, or symbol the name refers to.

Secondary Presentation Forms (SPFs)

With EG:

(e) Mnemonics = yes - The use of memory aids can be given to assist the learner in remembering the generality.
(f) **Prerequisite information = yes** - Definitions of concept components comprising the generality are given.

(g) **Alternative representation = yes** - Generality is also presented in a different way (i.e. diagram, chart, formula, other words)

**With Eeg:**

(h) **Help = yes** - Information added to the content to help the learner relate the instance to the generality

(i) **Alternative representation = yes** - Instance is also presented in a different way (i.e. diagram, chart, formula, other words)

**With legs**

(j) **Alternative representation = yes** - Instance is also presented in a different way (i.e. diagram, chart, formula, other words)

(k) **Feedback = ca+ h** - The correct answer is given as feedback. An expository presentation of the problem is presented after the student attempt.

*Inter-display Relationships*

**For all presentation:**

(l) **Divergence = divergent** - Critical characteristics of examples should be as different from each other as possible.

(m) **PPF isolation = yes** - The primary presentation form is clearly separated and identified for the student by auditory or graphic conventions.

(n) **Learner control = yes** - Learners have control over the pace, presentation forms, speed or any other learning parameters that can be controlled in the environment.

**For EG + Eegs presentation:**

(o) **Matching = matched** - All irrelevant or variable characteristics of the example and non-example are as similar as possible

(p) **Fading = yes** - Help information used early in the instruction should decrease as instruction progress and be gradually replaced by directions to the student

(q) **Range = easy-to-hard** - Instances should represent a range of difficulty from easy to hard

**For legs.N practice**

(r) **Matching = unmatched** - Critical characteristics of the example and non-example are as different as possible
(s) **Fading FB = yes** - Feedback information used in practice should decrease as practice progresses.

(t) **Range = haphazard** - Difficulty of practice instances should be random

**For legs.N performance**

(u) **Matching = unmatched** - Critical characteristics of the example and non-example are as different as possible

(v) **Help = no** - No attention focusing help is given

(w) **Feedback = none** - No feedback is given

(x) **Response delay = untimed** - Responses are untimed, allowing the learner as much time as necessary to respond.

(y) **Criteria = sliding** - Accuracy criterion will vary depending on the accuracy of performance demanded by real-world use of the knowledge.

(aa) IF CMX = high THEN number of items =>5

(bb) IF CMX = low THEN number of items = 3-5

(cc) IF DVG = high THEN number of items =>5

(dd) IF DVG = low THEN number of items = 3-5

* Number of instances necessary for adequate instruction will depend on the complexity (CMX) of the phenomenon, the variance that occurs within the class of events included and the difficulty of the classification

* When assessment of an objective requires more than one item with the same input-output form, each item should vary (DVG) from each other in such a way to represent the variation present in the real-world.
SCENE 3: COPYRIGHT LIMITATIONS

Rule 8: Performance Level: Use Content Type: Concept

Objective:
Learners will identify works that would be included as part of Public Domain and Creative Commons

Instructional method:
The information is presented with the definitions and characteristics that differentiate different types legal exemptions related to use of copyrighted work. (a,b,g). Different types of copyright limitations to exclusive rights are elaborated on and include several matched examples using visuals and text. (c,j,l,m). The example section is followed by practices, which asks the learner to classify items to the appropriate type of intellectual property type then feedback is given. (k). Learners have control over pace and learning parameters through navigational features. (n).

Evaluation:
Learners will correctly identify different types of copyright limitations. (r,u).

Primary Presentation Form (PPF)

(a) EG + Eegs + legs.N + legs.N
* An expository presentation consisting of a generality followed by an example, and a series of practice inquiries.

PPF Content

(b) EG = Definition - The presentation to the student consists of the name of the concept, superordinate class to which the concept belongs, a list of the attributes and values which distinguishes he class from coordinate classes.
(c) Eeg (set of instances) = Examples - The example presented to the student consist of specific objects, symbols, or events or representation which illustrates the attribute value of the definition
(d) IG.N (new set of instances) = Classify - For the learner practice, give a new specific object, event, or symbol not previously used in the Eeg set and student is asked to identify or recall its name. If given the name the student is asked to select the new specific object, event, or symbol the name refers to.

Secondary Presentation Forms (SPFs)

With EG:
(c) Mnemonics = yes - The use of memory aids can be given to assist the learner in remembering the generality.
(f) **Prerequisite information = yes** - Definitions of concept components comprising the generality are given.

(g) **Alternative representation = yes** - Generality is also presented in a different way (i.e. diagram, chart, formula, other words)

**With Eeg:**

(h) **Help = yes** - Information added to the content to help the learner relate the instance to the generality

(i) **Alternative representation = yes** - Instance is also presented in a different way (i.e. diagram, chart, formula, other words)

**With Iegs**

(j) **Alternative representation = yes** - Instance is also presented in a different way (i.e. diagram, chart, formula, other words)

(k) **Feedback = ca+h** - The correct answer is given as feedback. An expository presentation of the problem is presented after the student attempt.

*Inter-display Relationships*

**For all presentation:**

(l) **Divergence = divergent** - Critical characteristics of examples should be as different from each other as possible.

(m) **PPF isolation = yes** - The primary presentation form is clearly separated and identified for the student by auditory or graphic conventions.

(n) **Learner control = yes** - Learners have control over the pace, presentation forms, speed or any other learning parameters that can be controlled in the environment.

**For EG + Eegs presentation:**

(o) **Matching = matched** - All irrelevant or variable characteristics of the example and non-example are as similar as possible

(p) **Fading = yes** - Help information used early in the instruction should decrease as instruction progress and be gradually replaced by directions to the student

(q) **Range = easy-to-hard** - Instances should represent a range of difficulty from easy to hard

**For Iegs.N practice**

(r) **Matching = unmatched** - Critical characteristics of the example and non-example are as different as possible
(s) **Fading FB = yes** - Feedback information used in practice should decrease as practice progresses.
(t) **Range = haphazard** - Difficulty of practice instances should be random

**For legs.N performance**

(u) **Matching = unmatched** - Critical characteristics of the example and non-example are as different as possible
(v) **Help = no** - No attention focusing help is given
(w) **Feedback = none** - No feedback is given
(x) **Response delay = untimed** - Responses are untimed, allowing the learner as much time as necessary to respond.
(y) **Criteria = sliding** - Accuracy criterion will vary depending on the the accuracy of performance demanded by real-world use of the knowledge.

(aa) IF CMX = high THEN number of items =>5
(bb) IF CMX = low THEN number of items = 3-5
(cc) IF DVG = high THEN number of items =>5
(dd) IF DVG = low THEN number of items = 3-5

* Number of instances necessary for adequate instruction will depend on the complexity (CMX) of the phenomenon, the variance that occurs within the class of events included and the difficulty of the classification
* When assessment of an objective requires more than one item with the same input-output form, each item should vary (DVG) from each other in such a way to represent the variation present in the real-world.
SCENE 4: ACADEMIC EXCEPTIONS

Rule 10: Performance Level: Use  Content Type: Principle

Objective:
Learners will interpret general applications of fair use based on critical attributes.

Instructional method:
The information is presented with the general definition of fair use and the four standards (a,b). A couple of scenarios based on real court cases and decisions are presented as examples of divergent instance in how fair use and the standards are interpreted (c,e,f,l,p,r). The example section is followed by practices, which asks the learner predict court outcomes based on the fair use standards (d,e). The practice is followed by feedback on what the court decisions were and how the standards were interpreted (j,k). Learners have control over pace, help elements, and learning parameters through navigational features.

Evaluation:
Presented with various scenarios, learners will determine best practice for applying copyright and fair use principles. Selection will be compared to the “ideal” answer with explanation. (w,x,z).

Primary Presentation Form

(a) EG + Eegs + Iegs.N + Iegs.N
* An expository presentation consisting of a generality followed by an example, and a series of practice inquiries.

PPF Content

(b) EG = Proposition - The presentation to the student consists of the name of the process along with the concepts and events associated with the process. May also be a formal law or principle.
(c) Eeg (set of situations) = Explanations - The presentation to the student consists of the name, a specific situation where the principle applies, and an execution of the events involved in the process
(d) IG.N (new set of instances) = Predictions - For the student practice, give the name of the principle, a condition, or what condition caused a particular event to occur. The student should predict in a new situation.
Secondary Presentation Forms (SPFs)

With EG:
(e) Help = yes - Information added to the content to help the learner relate the instance to the generality.
(f) Prerequisite information = yes - Definitions of activity components comprising the generality are given.
(g) Alternative representation = yes - Generality is also presented in a different way (i.e. diagram, chart, formula, other words)

With Eeg:
(h) Help = yes - Information added to the content to help the learner relate the instance to the generality
(i) Alternative representation = yes - Instance is also presented in a different way (i.e. diagram, chart, formula, other words)

With Iegs
(j) Alternative representation = yes - Instance is also presented in a different way (i.e. diagram, chart, formula, other words)

(k) Feedback = ca + h - The correct answer is given as feedback. A rework of the activity is presented after the student attempt.

For all:
(l) Divergence = divergent - Critical characteristics of examples should be as different from each other as possible.
(m) PPF isolation = yes - The primary presentation form is clearly separated and identified for the student by auditory or graphic conventions.
(n) Learner control = yes - Learners have control over the pace, presentation forms, speed or any other learning parameters that can be controlled in the environment.

For EG + Eegs presentation:
(o) Chunking = yes - The learner is required to remember less than 7 new items at one time.
(p) Matching = matched - All irrelevant or variable characteristics of the example and non-example are as similar as possible
(q) Fading = yes - Feedback information used in practice should decrease as practice progresses.
(r) Range = easy-to-hard - Instances should represent a range of difficulty from easy to hard

For Iegs, N practice
(s) Matching = unmatched - Critical characteristics of the example and non-example are as different as possible
(t) Sequence = progressive part - Chunked items are presented progressively until the whole sequence of the events or steps are present for assessment.
(u) Fading FB = yes - Feedback information used in practice should decrease as practice progresses.

For Iegs.N performance

(v) Chunking = no - Discrete items do not need to be grouped into smaller individual pieces.
(w) Matching = unmatched - Critical characteristics of the example and non-example are as different as possible
(x) Help = no - No attention focusing help is given
(y) Feedback = none - No feedback is given
(z) Response delay = untimed - Responses are untimed, allowing the learner as much time as necessary to respond.
(aa) Criteria = high - It is expected that learners’ accuracy in responding is high.

(bb) IF CMX = high THEN number of items =>5
(cc) IF CMX = low THEN number of items = 3-5
(dd) IF DVG = high THEN number of items =>5
(ee) IF DVG = low THEN number of items = 3-5
* Number of instances necessary for adequate instruction will depend on the complexity (CMX) of the phenomenon, the variance that occurs within the class of events included and the difficulty of the classification
* When assessment of an objective requires more than one item with the same input-output form, each item should vary (DVG) from each other in such a way to represent the variation present in the real-world.
SCENE 5: OBTAIN PERMISSION

Rule 6: Performance Level: Remember Generality  Content Type: Procedure

Objective:
Learners will recall the process for obtaining copyright permissions.

Instructional method:
The information is presented with the three step process of obtaining copyright permission \((a,b,j)\). An example situation is presented with a review of the steps and additional helpful information for the learner \((c,e,f)\). The example section is followed by practice, which asks the learner to state the order of the steps in the process and identifying instance when they need to secure permissions from the copyright owner. The practice is followed by feedback on the correct answers \((g,k,l,m)\). Learners have control over pace, help elements, and learning parameters through navigational features \((i)\).

Evaluation:
Learners will recall the process for obtaining copyright permissions \((k,l,m)\)

Primary Presentation Form

(a) EG + Eeg + IG.P + IG.P
* An expository presentation consisting of a generality followed by an example, and a series of instances where the student responds by stating the definition.

PPF Content

(b) EG = Activity - The presentation to the student consists of the goal and name of procedure; the steps, conditions, loops and sequence involved in executing the steps. Often a flowchart
(c) Eeg (reference example) = Demonstration - The example to the student consists of a procedure and the conditions. The steps are then performed for the student.
(d) IG.P = State Steps - For the student practice, paraphrase the activity and have students state the steps to execute

Secondary Presentation Forms (SPFs)

With EG:
(e) Mnemonics = yes - The use of memory aids can be given to assist the learner in remembering.

With Eeg:
(f) **Help** = yes - Information added to the content to help the learner relate the instance to the generality

**With IG**

(g) **Feedback** = ca + h - The correct answer is given as feedback. An expository presentation of the problem is presented after the student attempt.

---

**Interdisplay Relationships**

**For all:**

(h) **PPF isolation** = yes - The primary presentation form is clearly separated and identified for the student by auditory or graphic conventions.

(i) **Learner control** = yes - Learners have control over the pace, presentation forms, speed or any other learning parameters that can be controlled in the environment.

**For EG + Eeg presentation:**

(j) **Chunking** = yes - The learner is required to remember less than 7 new items at one time.

**For IG.P practice/performance**

(k) **Response delay** = short - Learner may have a short delay in responding to questions.

(l) **Criterion** = high - It is expected that learners’ accuracy in responding is high.

(m) **Number of items** = at least two - At least two instances are necessary for adequate instruction.
SCENE 6: ATTRIBUTION

Rule 1: Performance Level: Remember Instance  Content Type: Fact

Objective:
Learners will recall components to appropriately attribute and document use of material.

Instructional method:
The information is presented with the name and definition of attribution elements for crediting copyrighted works (a,b). An acronym (L.A.S.T) is used to help with memorization of the four attribution elements (e). Several visual instances with color coded identification of the attribution elements are presented as examples (i). The example section is followed by practice, which asks the learner to select the named attribute for the copyright work visually presented. The practice is followed by feedback on of the correct answers (d,f). Learners have control over pace, help elements, and learning parameters through navigational features (h).

Evaluation:
For examples of copyrighted work, learners will select attribution elements. (d,f)

Primary Presentation Form

(a) Eeg + Ieg + Ieg

* Fact presentation consisting of an Instance (example) and the student completing a series of statements

PPF Content

(b) Eeg = Pairs - The fact presented to the student consist of two parts (PAIRS) [A-B; symbol-symbol, object-symbol; event-symbol]

(c) Ieg = Name - For the student practice, the one element of the pair is given while the student supplies (NAMES) the second element.

Secondary Presentation Forms (SPFs)

(d) Ieg’FB = ca - The correct answer is given as feedback.
(e) Mnemonics = yes - The use of memory aids can be given to assist the learner in remembering the facts.

Interdisplay Relationships

For all:

(f) Random order = yes - The facts are presented in random order each time
(g) **PPF isolation = yes** - The primary presentation form is clearly separated and identified for the student by auditory or graphic conventions.

(h) **Learner control = yes** - Learners have control over the pace, presentation forms, speed or any other learning parameters that can be controlled in the environment.

For **Eeg presentation**: 

(i) **Chunking = yes** - The learner is required to remember less than 7 new items at one time.

(j) **Response delay = none** - Adequate learning is indicated by the learner have no delay in responding.

(k) **Number of items = 1 (for each item)** - One instance for each fact to be learned is necessary for adequate instruction.

**References**


Appendix F

Tutorial Evaluation

Campus

<table>
<thead>
<tr>
<th>Valley</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crafton Hills</td>
</tr>
<tr>
<td>District</td>
</tr>
</tbody>
</table>

Status

<table>
<thead>
<tr>
<th>Full-time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjunct</td>
</tr>
<tr>
<td>Staff/Administration</td>
</tr>
</tbody>
</table>

Indicate your division


Please check the PRIMARY purpose(s) that you are participating in this activity.

<p>| Improvement of teaching                  |
| Maintenance of current academic and technical knowledge/skills |
| Training for vocational education/employment preparation |
| Retraining to meet changing institutional needs               |
| Development of innovations in instructional techniques and program effectiveness |
| Computer and technological proficiency                         |
| Personal growth activity                                      |</p>
<table>
<thead>
<tr>
<th>The tutorial fulfilled its purpose.</th>
<th>5 – Strongly Agree</th>
<th>4 – Agree</th>
<th>3 – Neutral</th>
<th>2 – Disagree</th>
<th>1 – Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The tutorial was of value to you.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The topic was relevant and timely</td>
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<td></td>
</tr>
<tr>
<td>The resources and materials were useful</td>
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<td></td>
<td></td>
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<tr>
<td>The presentation style and techniques were appropriate for the topic being presented</td>
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<td></td>
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<tr>
<td>The tutorial was well organized.</td>
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<tr>
<td>The tutorial was enhanced by the use of technology.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>The mobile app was easy to use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The mobile app was easy to access and download</td>
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<tr>
<td>Technical issues were resolved effectively.</td>
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<tr>
<td>The tutorial increased my understanding of the material presented.</td>
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<tr>
<td>The tutorial will be valuable to my teaching/leadership practice.</td>
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<tr>
<td>The tutorial will likely result in positive changes in my professional practice.</td>
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<tr>
<td>The tutorial provided me with constructive feedback.</td>
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<td></td>
</tr>
<tr>
<td>The tutorial provided opportunities for meaningful collaboration and/or social interaction.</td>
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<tr>
<td>The tutorial modeled effective integration of technology into practice</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Would you recommend this activity to your colleagues?

[ ] Yes
[ ] No

Comments:

What did you learn as a result of participating in this tutorial?

What was the most beneficial/valuable aspect of this mobile professional development resource?

What recommendations do you have for improving this professional development resource?

Would you like to participate in the one-on-one interview to discuss your experience and perceptions about learning in a mobile learning environment?

If so please provide

Name________________________________________________

Email Address__________________________________________

Phone________________________________________________
Appendix G

Participant Interview

A. Background

1. How would you describe your comfort level with technology? How would you describe your comfort level with the mobile technology, devices, and applications (like phones, tablets & mobile apps)?

2. In what ways, if any, have you used your mobile devices for professional development activities? (Probe: identify Internet sites, find information, participate in webinars, research activities etc. What specific apps have you used?)

3. How did you identify mobile apps that could be used for professional development activities?

4. What do you believe was the most positive experience of professional activity using mobile technologies? What do you think made it successful?

5. What additional resources do you need, if any, to make more effective use of mobile technologies for your teaching/leadership development?

B. Mobile Technology & Device Integration Beliefs

6. How does use of mobile technologies differ from use of computers?

7. What are some of the advantages of mobile technologies in comparison to other technologies, such as desktop or laptop computers?

8. What are some disadvantages/drawbacks, if any, that occurred with professional use of mobile technologies?

C. Perceptions and Obstacles


10. What are the main obstacles, if any, you have faced in your efforts to use mobile technologies for professional and/or development purposes? (Probe: time for
identifying apps, identifying apps connected to the professional development goals, cost of apps etc., and ease of use)

11. What recommendations would you like to make to improve use of mobile technologies for professional development?
Appendix H

Request for Participation

Dear Faculty,

The Distance Education (DE) department is continually examining ways to offer structured training for the campus community that will be available face-to-face as well as online, through web-based and mobile tools. One opportunity we are examining is delivering training via mobile technologies. Mobile delivery of training presents an opportunity to reach more campus constituents, enable effective use of DE resources, and growth exploration of additional services for the district, faculty, and online education.

In the upcoming semesters, the DE department will be developing and piloting a mobile app designed for faculty development, specifically related to the integration of technology into the learning environment. In addition to gathering information for the district and how we can deliver training to the campuses, the data collected will be used as part of my dissertation related to instructional design theories and emerging technology.

As this is a project of the DE department, progress reports and updates will be shared with the district’s Distance Education Coordination Council, the campuses Education Technology Committees, and professional development committees. Final results of the research will also be shared with the district and potentially professional organizations, journals, and other community constituents. In addition, as part of my doctoral studies in Computing Technology in Education at Nova Southeastern University, FL, I will be using the data from the project to complete my dissertation on designing instruction for mobile learning environments.

I am requesting faculty participants who will like to be part of the study by completing the tutorial, the tutorial survey, and optionally participate in a short one-on-one interview about your learning experience. If you are able to participate in this study, please respond to this email (send to: tglazato@sbccd.cc.ca.us) and I will forward further information about the study and the process.

Any questions pertaining to the rights of the research participant should be directed to the Human Research Oversight Board (IRB), Nova Southeastern University. Phone: (954) 262-5369.

Thank you in advance for your help with participating in this research study!
Trelisa R. Glazatov, M.Ed., Ed.S
Instructional Technology Specialist
San Bernardino Community College District
Technology and Educational Support Services
1289 Bryn Mawr Avenue, Suite B; Redlands, CA 92374
Office: (909) 384-4318
Email: tglazato@sbccd.cc.ca.us
Appendix I
Consent Form for Participation in the Research Study Titled

*Applying the Component Display Theory to the Instructional Development and Design of an Educational Mobile Application*

Funding Source: None

IRB protocol #11071308Exp.

Principal investigator
Trelisa R. Glazatov, M.Ed., Ed.S. Graduate School of Computer and Information Sciences
Nova Southeastern University
Carl DeSantis Building, 4th Floor, Room 4056
3301 College Avenue
Fort Lauderdale, Florida 33314-7796
(954) 262-2074

Co-investigator
Martha Snyder, PhD. Graduate School of Computer and Information Sciences
Nova Southeastern University
Carl DeSantis Building, 4th Floor, Room 4056
3301 College Avenue
Fort Lauderdale, Florida 33314-7796
(954) 262-2074

For questions/concerns about your research rights, contact:
Human Research Oversight Board (Institutional Review Board or IRB)
Nova Southeastern University
(954) 262-5369/Toll Free: 866-499-0790
IRB@nsu.nova.edu

Site Information
SBCCD – Valley College
Office of Research, Planning, and Institutional Effectiveness
Dr. James Smith
701 South Mount Vernon Ave
San Bernardino, CA 92401
909-384-8600
What is the study about?

You are asked to take part in a research study. The goal of this study is to understand the problems in designing instruction for mobile learning.

Why are you asking me?

We are asking you to take part in the study because you are a faculty member at the San Bernardino Community College District, consisting of San Bernardino Valley College and Crafton Hills College. There will be between 10 - 15 participants in this research study.

What will I be doing if I agree to be in the study?

You will use a mobile application to complete a tutorial then answer a 23-question survey. Optionally, once you have completed the tutorial, you may participate in a one-on-one interview with the researcher, Ms. Trelisa Glazatov. In this optional interview, Ms. Glazatov will ask you questions about your use and satisfaction with the tutorial. The tutorial should take approximately an hour to complete. The survey should take you no more than 15 minutes to complete. The interview will last no more than 45 minutes.

Is there any audio or video recording?

The interview will be audio recorded. This audio recording will be available to be heard by the researcher, Ms. Glazatov, personnel from the IRB, and the dissertation chair, Dr. Snyder. The recording will be transcribed by a professional transcription service. Personal identifiable data will be deleted and replaced with subject codes. Access to recorded audio and transcriptions will be encrypted on a hard drive and limited to the research team. The recording will be kept securely in the San Bernardino Community College District’s Technology and Educational Support Services (TESS) office. The recording and transcription will be kept for 36 months from the end of the study. The recording and transcription will be destroyed after that time by deleting the files. Electronic documents such as forms, notes, and audio files will be deleted off the encrypted hard drive. Printed copies of information will be shredded and destroyed. Because your voice will be potentially identifiable by anyone who hears the recording,
your confidentiality for things you say on the recording cannot be guaranteed although the researcher will try to limit access to the recordings as described in this paragraph.

**What are the risks and dangers to me?**

Risks to you are minimal, meaning they are not thought to be greater than other risks you experience every day. For faculty participant, the risk of loss time will be limited to approximately 2 hours, comprised of completing the tutorial and the optional interview. The optional interview will be schedule to accommodate the faculty participants’ workload and other academic obligations. In addition, being recorded means that confidentiality cannot be promised. The researcher will try to limit access to the recordings as described in the previous paragraph regarding audio and video recording. If you have questions about the research, your research rights, or if you experience an injury because of the research please contact Ms. Glazatov at (909) 384.4325. You may also contact the IRB at the numbers indicated above with questions about your research rights.

**Are there any benefits to me for taking part in this research study?**

If you complete the tutorial, you will be able to submit the completion for 1 hour of professional development credit. You do not have to complete the survey and/or the interview to receive professional development credit.

**Will I get paid for being in the study? Will it cost me anything?**

There are no costs to you or payments for participating in this study.

**How will you keep my information private?**

The questionnaire will not ask you for any information that could be linked to you. The transcripts of the tapes will not have any information that could be linked to you. Any personal identifiable data will be deleted and replaced with subject codes. Access to recorded audio and transcriptions will be encrypted on a hard drive and limited to the research team. The audio and transcription files will be destroyed 36 months after the study ends. Electronic documents such as forms, notes, and audio files will be deleted off the encrypted hard drive. Printed copies of information will be shredded and destroyed. All information obtained in this study is strictly confidential unless disclosure is required by law. The IRB, regulatory agencies, or Dr. Snyder may review research records.

**What if I do not want to participate or I want to leave the study?**
You have the right to leave this study at any time, including during the tutorial, survey, or optional interview, or refuse to participate. If you do decide to leave or you decide not to participate, you will not experience any penalty or loss of services you have a right to receive. If you choose to withdraw, any information collected about you before the date you leave the study will be kept in the research records for 36 months from the conclusion of the study and may be used as a part of the research.

Other Considerations:

If the researchers learn anything, which might change your mind about being involved, you will be told of this information.

By signing below, you indicate that

- this study has been explained to you
- you have read this document or it has been read to you
- your questions about this research study have been answered
- you have been told that you may ask the researchers any study related questions in the future or contact them in the event of a research-related injury
- you have been told that you may ask Institutional Review Board (IRB) personnel questions about your study rights
- you are entitled to a copy of this form after you have read and signed it
- you voluntarily agree to participate in the study entitled Applying the Component Display Theory to the Instructional Development and Design of an Educational Mobile Application

Participant's Signature: ___________________________ Date: ________________

Participant’s Name: ______________________________ Date: ________________

Signature of Person Obtaining Consent: _____________________________

Date: __________________________
Appendix J

Approved IRB Documents
MEMORANDUM

To: Trelisa Glatzov, Ed.D.
Graduate School of Computer and Information Sciences

From: David Thomas, M.D., J.D.
Chair, Institutional Review Board

Date: January 17, 2014

Re: Applying the Component Display Theory to the Instructional Development and Design of an Educational Mobile Application
IRB Protocol No. 11071308Exp

I have reviewed the revisions to the above-referenced research protocol by an expedited procedure. On behalf of the Institutional Review Board of Nova Southeastern University, Applying the Component Display Theory to the Instructional Development and Design of an Educational Mobile Application is approved in keeping with expedited review category # 6 and 7. Your study is approved on January 16, 2014 and is approved until January 15, 2015. You are required to submit for continuing review by December 15, 2014. As principal investigator, you must adhere to the following requirements:

1) CONSENT: You must use the stamped (dated consent forms) attached when consenting subjects. The consent forms must indicate the approval and its date. The forms must be administered in such a manner that they are clearly understood by the subjects. The subjects must be given a copy of the signed consent document, and a copy must be placed with the subjects' confidential chart/file.

2) ADVERSE EVENTS/UNANTICIPATED PROBLEMS: The principal investigator is required to notify the IRB chair of any adverse reactions that may develop as a result of this study. Approval may be withdrawn if the problem is serious.

3) AMENDMENTS: Any changes in the study (e.g., procedures, consent forms, investigators, etc.) must be approved by the IRB prior to implementation.

4) CONTINUING REVIEWS: A continuing review (progress report) must be submitted by the continuing review date noted above. Please see the IRB web site for continuing review information.

5) FINAL REPORT: You are required to notify the IRB Office within 30 days of the conclusion of the research that the study has ended via the IRB Closing Report form.


Cc: Dr. Ling Wang
Dr. Martha Snyder
Ms. Jennifer Dillon
RE: Request for Participation

Dear Faculty,

The Distance Education (DE) department is continually examining ways to offer structured training for the campus community that will be available face-to-face as well as online, through web-based and mobile tools. One opportunity we are examining is delivering training via mobile technologies. Mobile delivery of training presents an opportunity to reach more campus constituents, enable effective use of DE resources, and growth exploration of additional services for the district, faculty, and online education.

In the upcoming semesters, the DE department will be developing and piloting a mobile app designed for faculty development, specifically related to the integration of technology into the learning environment. In addition to gathering information for the district and how we can deliver training to the campuses, the data collected will be used as part of my dissertation related to instructional design theories and emerging technology.

As this is a project of the DE department, progress reports and updates will be shared with the district’s Distance Education Coordination Council, the campuses Education Technology Committees, and professional development committees. Final results of the research will also be shared with the district and potentially professional organizations, journals, and other community constituents. In addition, as part of my doctoral studies in Computing Technology in Education at Nova Southeastern University, FL, I will be using the data from the project to complete my dissertation on designing instruction for mobile learning environments.

I am requesting faculty participants who will like to be part of the study by completing the workshop, the workshop survey, and optionally participate in a short one-on-one interview about your learning experience. If you are able to participate in this study, please respond to this email (send to: tglazato@sbcdd.cc.ca.us) and I will forward further information about the study and the process.

Any questions pertaining to the rights of the research participant should be directed to the

Human Research Oversight Board (IRB)
Nova Southeastern University. Phone: (954) 262-5369.

Thank you in advance for your help with participating in this research study!

Trelisa R. Glazatov, M.Ed., EdS.
Instructional Technology Specialist
San Bernardino Community College District, Technology and Educational Support Services
441 W. 8th Street
San Bernardino, CA 92401
Office: (909) 384-4318
Email: tglazato@sbcdd.cc.ca.us
NOVA SOUTHEASTERN UNIVERSITY
Graduate School of Computer and Information Sciences

Consent Form for Participation in the Research Study Entitled
Applying the Component Display Theory to the Instructional Development and Design of an Educational Mobile Application

Funding Source: None

IRB protocol #11071308Exp.

Principal investigator: Trelisa R. Glazatov, M.Ed., EdS. Graduate School of Computer and Information Sciences Nova Southeastern University Carl DeSantis Building, 4th Floor, Room 4056 3301 College Avenue Fort Lauderdale, Florida 33314-7796 (954) 262-2074

Co-investigator: Martha Snyder, PhD. Graduate School of Computer and Information Sciences Nova Southeastern University Carl DeSantis Building, 4th Floor, Room 4056 3301 College Avenue Fort Lauderdale, Florida 33314-7796 (954) 262-2074

For questions/concerns about your research rights, contact:

Human Research Oversight Board (Institutional Review Board or IRB)
Nova Southeastern University
(954) 262-5369/Toll Free: 866-499-0790
IRB@nsu.nova.edu

Site Information

SBCCD – Valley College
Office of Research, Planning, and Institutional Effectiveness
Dr. James Smith
701 South Mount Vernon Ave
San Bernardino, CA 92401
909-384-8600

SBCCD – Crafton Hills College
Office of Research, Planning, and Institutional Effectiveness
Keith Wurtz
11711 Sand Canyon Road
Yucaipa, CA 92399
909-389-3206

Initial__________________________Date__________________________
What is the study about?
You are asked to take part in a research study. The goal of this study is to understand the problems in designing instruction for mobile learning.

Why are you asking me?
We are asking you to take part in the study because you are a faculty member at the San Bernardino Community College District, consisting of San Bernardino Valley College and Crafton Hills College. There will be between 10-15 participants in this research study.

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You will use a mobile application to complete a workshop then answer a 23-question survey. Optionally, once you have completed the workshop, you may participate in an one-on-one interview with the researcher, Ms. Trelisa Glazatov. In this optional interview, Ms. Glazatov will ask you questions about your use and satisfaction with the workshop. The workshop should take approximately an hour to complete. The survey should take you no more than 15 minutes to complete. The interview will last no more than 45 minutes.

Is there any audio or video recording?
The interview will be audio recorded. This audio recording will be available to be heard by the researcher, Ms. Glazatov, personnel from the IRB, and the dissertation chair, Dr. Snyder. The recording will be transcribed by a professional transcription service. The recording will be kept securely in the San Bernardino Community College District's Technology and Educational Support Services (TESS) office. The recording and transcription will be kept for 36 months from the end of the study. The recording and transcription will be destroyed after that time by deleting the files. Because your voice will be potentially identifiable by anyone who hears the recording, your confidentiality for things you say on the recording cannot be guaranteed although the researcher will try to limit access to the recordings as described in this paragraph.

What are the dangers to me?
Risks to you are minimal, meaning they are not thought to be greater than other risks you experience every day. Being recorded means that confidentiality cannot be promised. If you have questions about the research, your research rights, or if you experience an injury because of the research please contact Ms. Glazatov at (909) 384.4325. You may also contact the IRB at the numbers indicated above with questions about your research rights.

Are there any benefits to me for taking part in this research study?
If you complete the workshop, you will be able to submit the completion for 1 hour of professional development credit. You do not have to complete the survey and/or the interview to receive professional development credit.

Will I get paid for being in the study? Will it cost me anything?
There are no costs to you or payments for participating in this study.

Institutional Review Board
Approval Date: JAN 1 & 2014
Continuing Review Date: JAN 15 2015

Page 2 of 3
How will you keep my information private?
The questionnaire will not ask you for any information that could be linked to you. The transcripts of the tapes will not have any information that could be linked to you. The audio and transcription files will be destroyed 36 months after the study ends. All information obtained in this study is strictly confidential unless disclosure is required by law. The IRB, regulatory agencies, or Dr. Snyder may review research records.

What if I do not want to participate or I want to leave the study?
You have the right to leave this study at any time or refuse to participate. If you do decide to leave or you decide not to participate, you will not experience any penalty or loss of services you have a right to receive. If you choose to withdraw, any information collected about you before the date you leave the study will be kept in the research records for 36 months from the conclusion of the study and may be used as a part of the research.

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- you have read this document or it has been read to you
- your questions about this research study have been answered
- you have been told that you may ask the researchers any study related questions in the future or contact them in the event of a research-related injury
- you have been told that you may ask Institutional Review Board (IRB) personnel questions about your study rights
- you are entitled to a copy of this form after you have read and signed it
- you voluntarily agree to participate in the study entitled Applying the Component Display Theory to the Instructional Development and Design of an Educational Mobile Application

Participant's Signature: __________________________ Date: _____________

Participant's Name: __________________________ Date: _____________

Signature of Person Obtaining Consent: __________________________

Date: __________________________

Institutional Review Board
Approval Date: JAN 16 2014
Continuing Review Date: JAN 15 2015

Initial: __________ Date: __________
James E. Smith, Ph.D.
Dean of Research, Planning, and Institutional Effectiveness
San Bernardino Valley College

Trelisa Glazatov, Ed.S.
Graduate Student, Nova Southeastern University

February 13, 2014

Dear Ms. Glazatov,

The San Bernardino Valley College (SBVC) Office of Research, Planning, and Institutional Effectiveness has reviewed the documents in your request to collect and analyze data on SBVC faculty as part of your research investigating Applying the Component Display Theory to the Instructional Development and Design of an Educational Mobile Application. You have been granted approval based upon the formal approval from your primary institution, Nova Southeastern University. If you make any changes to your methodology, please notify the IRB Committee at Nova Southeastern University and resubmit the IRB approval to the SBVC Office of Research, Planning, and Institutional Effectiveness along with the revisions.

The purpose of the IRB review procedure is to protect the rights, privacy, and welfare of SBVC students and faculty whose data is used in research studies. This includes archival data as well as data from participation in surveys, interviews, and observation. The SBVC IRB procedure requires all researchers, who request the privilege of using SBVC students or faculty as subjects, to have prior approval from their schools of origin and adhere to all ethical standards.

If you have any further questions please feel free to contact me at (909) 384-8600.

Sincerely,

James E. Smith, Ph.D.
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RESEARCH PROJECT APPROVAL FORM

The following guidelines apply to all external research projects involving Crafton Hills College. An external research project is defined as any research project or study that is outside the normal day-to-day operations of Crafton Hills College (CHC) and/or is under the direction of someone other than an employee of the College.

A typical example of an external research project is one conducted by a masters or doctoral student who wishes to ask CHC students or employees to participate in a study. Examples of normal day-to-day operations include program review, Student Learning Outcomes/Service Area Outcomes and projects which are part of a CHC course (e.g., research course).

1. Any individual, group or agency desiring to conduct research at CHC must obtain the written permission from the Faculty and Administrative Co-Chairs.

2. Before permission is granted, a written proposal must be submitted to the Dean of Institutional Effectiveness, Research and Planning. The proposal will include brief summaries of the rationale for the study, methodology to be used, and the expected outcomes (see below).

3. Normally, the CHC IRB cannot provide facilities of any type for external research projects (Click here to access the form to request the use of facilities).

4. Unless the College feels that participation in a particular project is both educationally valuable and a natural part of the course content, class time will not be used for any project. In any event, the faculty member's permission must be obtained before class time can be used.

5. Participation in any project must be voluntary and all participants should be informed as to the purpose of the project and the scope of their involvement.

6. As a condition of approval of the research study, it should be noted that CHC students or employees involved in any research project will not be identified when the findings are published. The name of the College will not be identified in any publications.

7. Approval of external research projects is based on many aspects including time involved and whether the project relates to the College's mission, vision, core values and goals.

This Research Project Approval Form is to be completed and approval received before research begins. The completed form should be sent to the Institutional Effectiveness, Research and Planning Office. The IRB Committee and/or the IRB Committee Co-Chairs will review the study, discuss changes/implications with the author and make the final approval decision. If the study is approved and the research conducted, a copy of the results must be sent to the Institutional Effectiveness, Research and Planning Office.

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<th>PROJECT INFORMATION</th>
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<tr>
<td><strong>Project Title:</strong></td>
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<tr>
<td><strong>Principal Investigator:</strong></td>
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<td><strong>Educational Institution:</strong></td>
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<td><strong>Mailing Address:</strong></td>
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<td><strong>Phone Number:</strong></td>
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<td><strong>Email</strong></td>
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<tr>
<td><strong>Faculty Advisor Name:</strong></td>
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<td><strong>Faculty Advisor Mailing Address:</strong></td>
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<td><strong>Faculty Advisor Phone Number:</strong></td>
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<td><strong>Faculty Advisor Email:</strong></td>
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Prepared by the CHC IRB Committee
Approved by the CHC IRB on February 26, 2013
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Answer All of the Following Questions:

1. What is the rationale or purpose of the study?
The purpose of the study is to identify key challenges and issues in using an instructional design model to guide the instructional development of a mobile app. This research will contribute to the field of instructional design and development by validating the efficiency of the Component Display Theory's use for a mobile learning environment and identifying the variables that will affect its usability. The application of the theory to a higher education setting and focus on faculty development allows the results to be generalized to similar learning settings and environment. The results will enable instructional design practitioners to have research-based results and a framework that can be adapted to their work and environment preferences.

2. What are the main goals or objectives or outcomes or research hypotheses of the study?
The prospect of learning through portable, personal devices is becoming a viable educational model as mobile tools and technologies continue to evolve. The tools and functions available on mobile devices, including communication, multimedia, and social tools, create an opportunity to examine how instruction can be developed for a mobile learning system. The questions for designers and educators are which instructional design (ID) theories are appropriate for the design and development of mobile learning and what limitations do current theories pose. Specific ID and development recommendations for a mobile learning system are lacking. In addition, there is an absence of research that validates current ID theories for mobile learning systems. Therefore, research is needed to examine how underlying theories, principles, and frameworks can be applied to the design and development of mobile learning systems.

There are many established ID models that can be examined in their application to the design and development of a mobile learning app. To further the design and development knowledge base, the aim of this study is to consider an appropriate model, the Component Display Theory (CDT), and examine the applicability of CDT to the instructional development and design process of an educational mobile application. The goal will be to examine design and development issues, validate and extend the CDT to the development of mobile apps, and recommend guiding principles for mobile learning system development as it pertains to development of content, presentation, sequencing of information, and feedback.

3. Who will be the subjects/participants? How many? Will they be compensated? If so, how?
The participants for the workshop, the workshop survey, and the optional one-on-one interviews are adjunct and full-time faculty currently teaching at Valley and Crafton Hills Colleges. It is anticipated that 10-15 faculty members in total will participate. The 1-hour self-paced mobile workshop will be offered as part of the Distance Education department's professional development offering. Upon completion, the participant will have a record of completion that can be submitted to their campuses professional development departments for credit.

4. Describe in detail all procedures to be performed on the participants (e.g., recruitment, surveying, debriefing, exposure to stimuli, etc.)?
For faculty participants, targeted emails and written communication will be sent to potential faculty based on their teaching status, full-time or adjunct, to complete the workshop and survey.
The learners will complete the workshop and workshop survey. The workshop is a self-paced mobile module and should take approximately an hour to view the lectures and complete the activities and assessment. The workshop will be delivered and completed by the participant using a mobile device, such as a mobile phone or tablet. The survey will take approximately 15 minutes to complete. The learners will have a 2 week time frame to complete the workshop and workshop survey.

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Approved by the CHC IRB on February 25, 2013
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Learners Participants who complete the workshop can optionally participate in an one-on-one interview with the researcher. The interview will be audio recorded. The researcher will explore the learner’s experience in the mobile learning environment. The interview will be approximately 30-45 minutes. The researcher will revise the instructional instance based on data and feedback received from the survey and interviews.

5. What assessment Instrument(s) (e.g., survey, focus group) will be used? Please provide the IIRB with copies.
   • Survey evaluation: A workshop survey will be used to gather learners’ reactions to the design instance’s appeal, usability, and perceived effectiveness.
   • Optional one-on-one Interviews: Semi-structured interviews with some of the participants will be conducted to identify strengths and weaknesses of the design instance and their experiences in the mobile learning environment. Interviews will be recorded, transcribed, and analyzed.
   • An expert review will be used to validate the application of the CDT to the instructional design of the workshop.
   • Work documents: Work logs and project management documents will be used to document the ID process and identify challenges for the instructional designers.

6. What are the potential risks to the participants?

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<tr>
<th>Risk/Discouragement</th>
<th>Likelihood</th>
<th>Magnitude/Duration</th>
<th>Risk Minimization</th>
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<tr>
<td></td>
<td>Minimal</td>
<td>Few faculty participant total time is approx. 1 hour. For the expert enrollees total time is approx. 4 hours.</td>
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<td>2 weeks is given for participants to complete the workshop and 4 weeks allow for flexibility. The expert enrollee has 4 weeks to complete the review of the instructional design. The optional interviews will be scheduled to accommodate the faculty participant’s workload and other academic obligations.</td>
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7. Describe how you will deal with confidentiality and anonymity?

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<tr>
<td></td>
<td>Moderate</td>
<td>Data collected for this research will be kept for 3 years after the end of the study.</td>
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<td>Personal identifiable data will be deleted and replaced with subject codes. Access to recorded audio and transcriptions will be restricted on a hard drive and limited to the research team.</td>
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Research records will be kept for 36 months from the conclusion of the study. All information obtained in this study will be strictly confidential unless disclosure is required by law. Records will be destroyed after the 36-month retention period. Electronic documents such as forms, notes, and audio files will be deleted off the encrypted hard drive. Printed copies of information will be shredded and destroyed.

8. How will you document informed consent? (Provide a copy of the informed consent form.)

A written consent form is sent to potential participants and explains the purpose of the research, procedures, risks, benefits, and alternatives to participate. The form also contains contact information for the researcher and the IRB offices to allow the potential participant to ask questions related to the study. Once a participant has had their questions answered, they will sign, date, and forward the consent form back to the researcher. The researcher will sign the consent form and forward a copy back to the participant.

9. What are the suggested date(s) for the study?

Proposed by the CHC IRB Committee
Approved by the CHC IRB on February 25, 2013
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The workshop will be offered during the spring 2014, summer 2014, and potentially fall 2014 if further data is needed.

10. How will the data be reported (e.g., articles, thesis, dissertation, presentations, etc.)?

Data will be reported as part of Trelisa Glazov's dissertation. As this is a project of the DE department, progress reports and updates will be shared with the district's Distance Education Coordination Council, the campuses Education Technology Committees, and professional development committees. Results of the research will also be shared with the district and potentially professional organizations, conferences, journals, and other community constituents.

11. If class or work time is needed, do you have an internal contact person who is already willing to comply? Which employees of the college have expressed interest in helping you gather data? (Note: using class time is discouraged)

N/A. The workshop is self-paced and can completed at the faculty's convenience. The optional interview will be schedule to accommodate the faculty's schedule. In addition, both campuses presidents have written a letter of support of the research.

12. Which classes will be used in the study? Have the faculty given permission for the study to be done in class? N/A.

Also include a HARD copy of your approved full proposal. This copy should include both the signature page of approval (or electronic equivalent) from your IRB and all material reviewed by your IRB.

When the project is completed, a summary of the key findings should be sent to the Institutional Effectiveness, Research and Planning Office (towrscraft@crafthills.edu).

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<tr>
<th>SIGNATURE &amp; DATE</th>
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<td>Faculty IRB Co-Chair</td>
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<td>Principal Investigator(s) Signature &amp; Date</td>
<td>February 18, 2014</td>
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Source: Mt. San Antonio College, IRB Proposal Form.
References


San Bernardino Community College District (2014). 2014 - 2017 Distance Education Department Goals.


