

University of Baltimore

College of Liberal Arts

Dissertation Proposal

Student Information:

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| Degree: | Doctor of Science in Information and Interaction Design | | |
| Specialization: | Mobile/Educational Applications | | |

I. Title: *Provide a tentative title for your thesis. It should be concise and precise so as to allow other researchers to correctly infer the topic of your research.*

Investigating the role of a multi-touch textbook using the principles of human centered design

II. Problem or Hypothesis: *State clearly the research problem you intend to investigate. You should be able to define your problem or hypothesis in no more than 100 words.*

Augmenting the Family Connections Intervention Manual (DePanfilis, Lane, Girvin, & Strieder, 2006), the proposed qualitative study will seek to answer the question, "How do multi-touch textbooks on an iPad facilitate learning and memory of a complex knowledge domain?" The goal is to discover if and how learning occurs and if learning can be retrieved on a mobile device. The application will incorporate aspects of cognitive theory which have been demonstrated to promote good learning and memory. Additionally, the development and pilot testing of this application will occur during this study.

III. Review of Related Literature: *Others have contributed to your field historically, philosophically, or experimentally. What closely related problems, ideas, or solutions will you build on and use in your research? What contribution do you expect your research to make to the literature? Please limit your response to 250 words.(Once literature review is completed, factors such as how will be incorporated.)*

The research on the effectiveness of mobile learning is inconclusive. Most studies have emphasized the technology of mobile learning and have not explored the effectiveness of mobile applications based on theoretical principles about learning and memory from cognitive psychology and human centered design. Yet, research has shown that mobile learning can be beneficial in the contextual learning environment (Koole, 2009). By understanding the limitations of mobile devices, and developing approaches based in human centered design, these issues will be addressed. Mobile information technologies could be developed to promote effective learning and retrieving of information in practice settings.

This research will build upon the current educational instructional technology methods, learning and cognition principles, as well as mobile technology literature. This study might contribute to our current knowledge of the effectiveness of mobile design principles, and could assist in the determination of whether existing principles should be followed, or whether new principles need to be developed to further empower and engage the mobile user.

IV. Procedure or Method:

Briefly describe how you plan to investigate the problem you have identified. Your description may consist of an outline of research techniques or procedures, proposed chapter headings, or other pertinent information. Please limit your response to 500 words.

| Type of Data | Description |
|---|---|
| *Contextual Inquiries (10 participants) Method – Field Interviews | Understanding the current processes, workflows, and environmental factors |
| *Survey (Unlimited participants for a two week timeframe) | Collection of data on demographics, learning methods, technology skills, mobile technology resources and experience, practice setting information retrieval methods, future use of technology |
| Use Cases (Method–Field Interview) | Examine Workflows (Coordination, strategy, and information structures) |
| Audience and Task Analysis | Assess current tasks and develop proposed task flows |
| Test Participant Screener | Identifies target user groups needed for multi-touch textbook user research testing. |
| Test Scripts | Developed for tests in assisting with prioritizing tasks (frequency, criticality) and decide which tasks to test. |
| *User Research Testing/Innovation Diffusion Theory/Retroactive Think Aloud - (12 participants at University of Maryland School of Social Work) | Collection of evidence and evaluation |
| * Indicates the data collection from participants | |

The researcher plans to investigate this problem by conducting 10 contextual inquiries from experienced practitioners who have learned and retrieved practice-based knowledge using a paper-based manual. The goal would be to understand how these practitioners used the traditional paper format to learn and retrieve policies and procedures to serve their clients. The researcher will focus the questions based on gaining an understanding of the practitioners current tasks, work processes, and environmental factors of the practice setting.

The next step would be to collect information from social work educational community about the their current learning and retrieval methods in field practice settings. The researcher will also want to assess the practitioners technology skills, mobile device use, and motivational factors for adopting new technology. Based from the output of the contextual inquiries and surveys, use cases will be developed to assess the coordination, strategy, and informal structures of the current learning and practice environment. Development of the multi-touch textbook prototype will begin once the response from the contextual inquiry interviews and surveys have been

assessed and compiled. The graphical views of the screen layout and design will be developed to create an interface and prototype of the multi-touch textbook using storyboards. Learning and cognition principles such sensation, attention, memory practice, semantic organization, multi-modal and context will be incorporated into the multi-touch textbook in hopes to promote effective learning and retrieval of information.

The innovation decision process based from the innovation diffusion framework will be used to determine to either adopt or reject a decision to not adopt the Family Connections Intervention multi-touch textbook prototype. This process asks the user if there is a benefit of considering this innovation as being better over the current idea it replaced (Rogers, 2003). The multi-touch textbook user research testing will include 12 participants at the University of Maryland School of Social Work in Baltimore, Maryland. A test participant screener will be developed and used to select a purposeful sample of participants.

The testing will occur in a time-ordered sequence of knowledge, persuasion, decision, implementation and confirmation based from the diffusion of innovation framework (Rogers, 2003). The tests will include five tasks using the traditional and multi-touch textbook of the Family Connections Intervention Manual (DePanfilis, Lane, Girvin, & Strieder, 2006). The room will contain two web cams depicting the participant's facial expressions and touch movements of the paper manual and multi-touch textbook tasks. The retroactive think aloud method (Summers, 2010) will ask questions after the application's meaningfulness. This method will replay the screen view of the prototype test giving the participant the opportunity to explain the choices made during the test.

The output of the tests will be in video format and will be destroyed one year after the study has been completed. By building changes from the traditional to the multi-touch textbook for the audio/visual function, content function, glossary function, and navigation function for the table of contents; a determination will be made to verify if the multi-touch technology met the actual outcome. The results will also determine if the multi-touch textbook prototype was utilized in the actual way originally proposed. Conclusions of the qualitative research will show if the multi-touch textbook was useful for participants and did the development of the multi-touch textbook make it easier for practitioners to learn and retrieve the information.

| PROPOSED SCHEDULE | | DATE |
|-------------------|---|---|
| STEP 1 | CONTEXTUAL INQUIRY/USE CASES- Case studies, Examine Workflows, Audience and Task Analysis | May 10th - May 18th (10 participants) |
| STEP 2 | SURVEY - Collection of data on demographics, learning methods, technology skills, mobile technology resources, practice setting information retrieval methods, future use of technology | May 10th - June 1st (Unlimited participants) |
| STEP 3 | DEVELOP PROTOTYPE - Multi-touch eBook | June 1st - September 21st |
| STEP 4 | User Research Testing/Innovation Diffusion Theory/Retroactive Think Aloud | September 22nd and September 29th at UMB SSW- 15 Participants |
| STEP 5 | FINISH DISSERTATION - Final First Draft - 11/26/12 Second Draft - 2/1/13 Third Draft - 3/1/13 Final Submission - 4/8/13 | 4/8/13 |
| STEP 6 | DEFEND | The week of April 22nd through 26th |

| Proposed Chapters | | |
|---|---|----------|
| HEADINGS | SECTION | DATE |
| Introduction | Background Problem Statement Purpose of the Study and Delimitations Theoretical Perspective Research questions Rationale for Qualitative Methods | 5/9/12 |
| Literature Review | Information Technology in Social Work Mobile Learning/Environment The Physical Mobile Device Information Content and Design Learning/Acquisition | 5/31/12 |
| Mobile Design User Interface Considerations and Design Requirements | Device Note-taking functions Navigation Glossary Audio/visual materials Collaborative Interaction Environment Mobile Learning Dynamic Content Heuristic Evaluation Human Centered Design Principles | 6/14/12 |
| Interface Development | Branding/Color Conceptualization Emphasis Navigation Tools Workflows Visual Structure User Experience Implementation | 9/21/12 |
| Research Methodology | Research Design Population (Social Workers), Sample and Participants Data Collection (Contextual Inquiries, Surveys, Use Cases, Test Participant Screener & Scripts, and Usability/Diffusion Innovation Theory Testing) | 10/28/12 |
| Last Section | Ethical Considerations Conclusions References Appendixes Instruments | 11/26/12 |

V. Selected Bibliography:

Please list a representative sample (no more than 20) of the primary bibliographic sources you plan to use in your thesis or dissertation. Please provide full citations for each source listed.

Ally, M. (2009). *Mobile Learning: Transforming the Delivery of Education and Training*. Athabasca, AB: Athabasca University Press.

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Ruskin, K. J. (2010). Mobile Technologies for Teaching and Learning. International Anesthesiology Clinics, 48 N2-(3), 53. doi:10.1097/AIA.0b013e3181e5c1a1

Seong, D. S. K. (2006). Proceedings of the 3rd international conference on Mobile technology, applications & systems - Mobility '06. In *the 3rd international conference* (p. 25). Presented at the the 3rd international conference, New York, New York, USA: ACM Press. doi:10.1145/1292331.1292359

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Traxler, J. (2007). Defining, Discussing and Evaluating Mobile Learning: The moving finger writes and having writ . . . The International Review of Research in Open and Distance Learning, 8(2), Article 8.2.2.

VI. Student Signature:

Julie Gilliam

Signature Date - April 22, 2012

VII. Faculty Approvals:

| <u>COMMITTEE ROLE:</u> | <u>MEMBER NAME: (typed)</u> | <u>SIGNATURE:</u> | <u>DATE:</u> |
|------------------------------|-----------------------------|-------------------|--------------|
| Thesis Advisor | Dr. Deborah Kohl | | |
| Committee Member | Dr. Bruce DeForge | | |
| Committee Member | Dr. Anastasia Salter | | |
| Director of Graduate Studies | Dr. Kathryn Summers | | |