THE MoTIF PROJECT

NEEDS ASSESSMENT REPORT

ADL

Advanced Distributed Learning

Contents

Background

Mobile learning introduces both exciting capabilities and complexity into the learning design process, but with very few guidelines.

In 2012, ADL published a paper on investigating instructional design theories and models for mobile learning (Berking et al., 2012). The authors discovered that mobile learning best practices had not been identified within the overall context of following a design process, Instructional Design (ID) model, or learning theory. In the paper, the authors proposed a conceptual framework of mobile-specific considerations made during the analysis and design phases of ADDIE (Analysis-Design-Develop-Implement-Evaluate). The authors proposed this framework could also incorporate considerations for performance support and contextual learning opportunities. Ideally, the framework would serve as a vehicle for instructional designers to focus on improving performance and augmenting skills—not just knowledge transfer.

In 2013, ADL began exploring the intersection of multiple design and research methods and determined that a unique Design-based Research (DBR) approach was required in order to deeply explore learning activities and design approaches that leverage the unique capabilities of the mobile platform. DBR can produce both theories and practical educational interventions. The interventions can
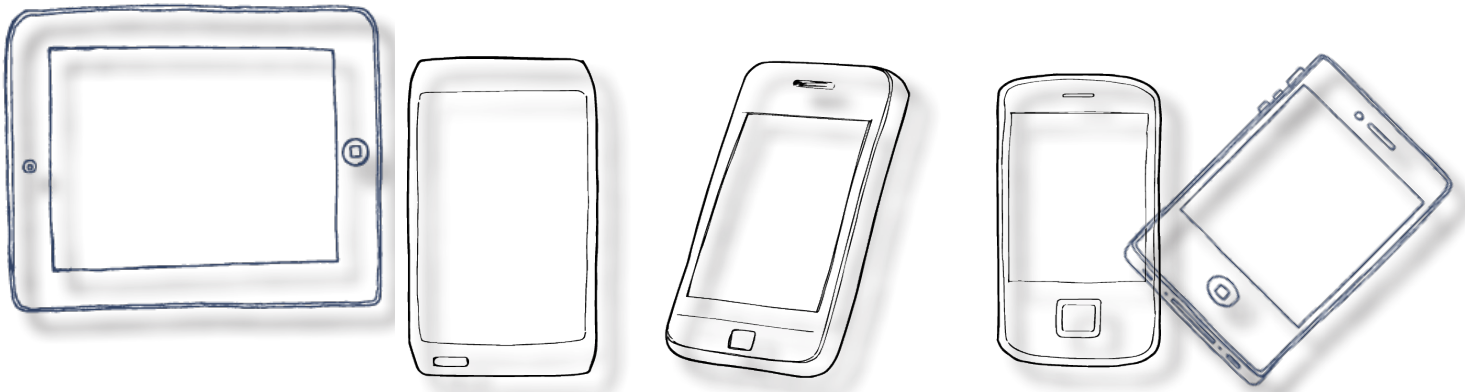
include such things as strategies, materials, products, and systems—as solutions to the problems—but will also advance the researchers' knowledge about the characteristics of these interventions and the processes involved in designing and developing them (Bannan-Ritland, 2009). The specific types of outcomes that the researchers of the MoTIF project expect to produce by following a DBR approach include, but are not limited to the following:

- Domain Theories - theories about the context and outcomes within the instructional design domain and mobile learning paradigm.

- Design Framework – a workflow process and decision support steps that will serve as a set of design principles for determining a particular approach or strategy.

- Design Methodologies – guidelines for how to implement the framework and the expertise that is required.

Mobile learning introduces both new technological capabilities and complexity into the learning design process, but with very few guidelines. DBR has been recently introduced as a modern approach suitable to address

complex problems in educational practice for which no clear guidelines or solutions are available (Plomp, R. and Nieveen, N., 2007). These efforts to follow a DBR approach in order to methodically identify and validate the requirements for a mobile learning framework became a research project, called the Mobile Training Implementation Framework (MoTIF). Although the acronym chosen for this project may seem to imply a focus on a training framework, the actual intent is for designers to also consider alternatives and enhancements to help augment their learning design strategy.

ADL determined that the MoTIF project would benefit significantly from the Integrative Learning Design Framework (ILDF) DBR model, as it would inherently help to identify and validate the scope and details of creating a new mobile learning framework. The ILDF is a specific DBR model that incorporates process efficiencies from multiple disciplines such as instructional design, software development, and product development as well as established educational research methodologies. It was conceived from the need to analyze and share research-based knowledge that is often lost because it is not always carefully documented (Bannan-Ritland, 2009). The decision and

design processes for creating mobile learning as part of the MoTIF project will offer several new opportunities to generate best practices and guidelines, and following the ILDF model will inherently result in documenting and refining them.

In order to justify the development of a mobile learning framework, an in-depth needs assessment was warranted to best understand the current challenges and perspectives of the education and training community. This is the first step when following the ILDF model. The needs assessment is a systematic way to help researchers study the state of knowledge, ability, interest, or attitude of a target audience or group involving a particular subject (McCawley, 2009). It is intended to help guide the researchers in determining and analyzing the needs, or "gaps" between the current conditions and desired end state. The discrepancy between the current condition and the desired end state must be identified to appropriately characterize and identify the requirements.

NEEDS ASSESSMENT OBJECTIVES

Education and training professionals making the transition from eLearning to mLearning are especially interested in how to leverage their existing instructional design knowledge and skills. Mobile learning presents new opportunities for both the design and delivery of learning. These new opportunities are often driven by the unique hardware capabilities of mobile devices coupled with their convenient size and portability, translating into real affordances for improving performance and learning in our work and daily lives. However, these opportunities are often not leveraged in the instructional design process. The MoTF project researchers believe these missed design opportunities have led to the following outcomes:

• Many designers and developers are creating new mobile content and converting existing eLearning courses by only resizing them to account for the smaller screen and user interface differences.

• Often, there is no consideration for optimizing the learning experience by leveraging the hardware capabilities of the mobile device or utilizing alternative approaches such as spaced repetition or performance support.

The objectives identified for the needs assessment were not merely dependent on gathering information about the target audience and their existing knowledge or skills. The objectives required a deeper investigation into the target audience's perceptions about mobile learning, mobile learning design, and mobile device capabilities and preferences. The following objectives were used to conduct the needs assessment:

1. Determine if there is a perceived need to identify and document the unique capabilities of the mobile platform and their use cases for learning.

2. Determine if there is a perceived need to identify alternative learning approaches that are appropriate for the mobile platform.

3. Determine if there is a perceived need for a mobile learning-optimized design model.

The needs assessment objectives were used to guide the selection of the sample population, sampling strategy, data collection methods, instrument design, and analysis procedures.

TARGET AUDIENCE

The target audience of this needs assessment included any education or training professionals with a potential interest in implementing

Methodology

mobile learning. The global education and training community across all industry and organization types has the potential to influence and benefit from a mobile learning framework. Therefore, the researchers administered the survey and conducted the focus group and interviews with the largest possible international audience in order to increase the likelihood of a rich and diverse data set.

SURVEY PROCEDURES

Based on the target audience and objectives of this needs assessment it was not feasible, practical or theoretically sensible to conduct random sampling. Therefore, ADL followed multiple non-probability sampling approaches to attract the most representative responses of the target audience.

Design-based research usually requires that samples of respondents and situations for data collection be relatively small and meaningful. The potential to obtain relevant information tends to decrease as opportunities for qualitative data collection (such as interviews and focus groups) are limited with generalized population samples. To avoid uncertainty in data interpreta-

tion, often multiple mixed methods and sources are applied (Plomp, 2007). Therefore, ADL employed a mixed method approach to include surveys, interviews, and a focus group to collect both quantitative and qualitative data. A detailed account of survey procedures are provided in the MoTIF Project Mobile Learning Survey Report (Berking et al., 2013).

INTERVIEW PROCEDURES

During the survey administration period, the researchers obtained contact information from those interested in participating in interviews or focus groups for the MoTIF project. Interviews were conducted with mobile learning Subject Matter Experts (SMEs) in the late Fall of 2013. These SMEs were selected by ADL on the basis of:

- Stated desire to participate in interviews

- Including a wide range of perspectives from different sectors: higher ed, commercial sector, government, K-12, and DoD.

- International experts with experience in mobile learning research

- Reputation in regards to thought leadership in the mobile learning community

- Availability and interest in this project

The following SMEs were interviewed:

- Helen Crompton on 12/16/13. Assistant Professor, Old Dominion University

- Inge DeWaard on 10/29/13. Researcher, Open University of the United Kingdom

- Marguerite Koole on 11/13/13. Professor at Center for Distance Education at Athabasca University

- Federico Monaco on 12/22/13. Researcher, Università di Parma, Italy

- Aga Palalas on 11/13/13. Instructor, Capella University and international mobile learning consultant

- Rob Power on 11/12/13. Instructional Developer, Center for Teaching and Learning Innovation, College of the North Atlantic, Qatar

- Clark Quinn on 11/6/13. CEO of Quinnovation, Inc.

- Isaika Rafiu on 12/23/13. Kwara

State University, Malete, Ilorin, Nigeria

- Reuben Tozman on 12/11/13. CEO of SlideJar.com

- John Traxler on 10/29/13. Professor of Mobile Computing, University of Wolverhampton, UK

- Gary Woodill on 11/6/13. CEO of i5 Research

The interviews were primarily conducted by phone or web conferencing software, and scheduled for one hour. Two of the interviews were conducted via email due to technical difficulties. The interview setting provided followed the Question and Answer (Q&A) format with additional time reserved for open dialogue and reflection. The following questions were asked of each attendee:

1. What changes would you, or do you, make in the learning design process when designing for mobile?

2. Have you successfully developed any existing mobile learning content by following a particular process or model? If so, which one?

3. Have you heard of anyone else following a particular process or model in the design of their mobile learning content?

4. What alternative learning approaches (such as spaced learning, augmented reality) are enabled by mobile and how?

5. How do mobile capabilities enable particular learning strategies or new instructional design techniques?

FOCUS GROUP PROCEDURES

The MoTIF project researchers hosted a focus group discussion with five instructional systems design experts from corporate and the government sectors on December 6, 2013. These SMEs were selected by the ADL Mobile Learning team on the basis of the same criteria used for the interviews. Members included:

- Pamela Stern, Learning Strategist, Executive Producer (HPT practitioner role), Agile Learning Solutions

- Carol Wall, Air Education and Training Command (AETC), U.S. DoD, Instructional Systems Specialist/Project Manager (ISD role)

- Jeff Clem, Lockheed Martin, Performance Consultant, Sr Staff, Corporate Headquarters - Enterprise Operations, Talent & Organizational Capability

- Nancy Hill, Univ of Texas MD Anderson Cancer Center, Project Director (ISD role)

- Tinko Stoyanov, Managing Director, Infoart, Ltd. Bulgaria (Project Manger role)

Guiding questions for the open discussion with the focus group were presented as follows:

1. In your experience how do mobile devices enable particular learning strategies and opportunities for new instructional design techniques?

2. Have you used strategies such as spaced repetition or performance support or other alternative approaches for mobile learning?

3. How do you adjust to the unique opportunities of the mobile platform? Is there a specific instructional design model that you have used or developed exclusively for mobile learning?

The information and data collected in this needs assessment will help ADL to make informed decisions for developing, implementing, and evaluating interventions to address the identified needs.

Summarized Findings

The information and data collected in this needs assessment will help ADL to make informed decisions for developing, implementing, and evaluating interventions to address the identified needs.

SURVEY IMPLICATIONS

The following is a list of key findings from the survey. For a complete list, you can download the original survey report provided at the MoTIF project website, http://motif.adlnet.gov.

- A total of 56 countries were represented in the survey. The target audience included educators, instructional designers, instructors/trainers, content developers, managers, researchers, and students. Around 47% of the respondents were knowledgeable about instructional design.

- Sixty-one percent of the respondents use tablets most often for mobile learning, while 29% preferred smartphones. This might be attributed to the fact that tablets simply have bigger screens, but it could also depend on what type of content is considered as mobile learning.

Do people view smartphones equally with tablets in terms of their potential for learning? This response warrants further investigation and analysis with the community during Phase2 of the project.

- Respondents felt that there is a lack of understanding within the education and training community as well as their organization about how and when to use the capabilities of the mobile device for learning. The MoTIF project will attempt address this lack of understanding fully in the design of interventions in Phase 2.

- Touchscreen interaction was the capability most selected for requiring a better understanding of in regards to its applicability for mobile learning. This high response identifies an area of special interest and emphasis among the target audience. The sense of touch and is an area that could potentially require a deeper level of research and understanding of cognition and haptic perception.

- There is a high level of confidence in performance support as an optimal approach for mobile learning. Performance support is commonly used in education, training, and workplace settings, but the concept of mobile performance support as a type of new or innovative mobile learning strategy could provide a new opportunities to appeal to instructional system designers, curriculum designers, and trainers.

- A majority of the respondents (60% strongly agreed, 26% agreed) indicated there should be a re-evaluation or analysis of existing learning materials or courses before converting them to a mobile format.

- The researchers also asked the respondents to what degree they agreed or disagreed with the

idea that a compilation of mobile learning examples categorized by capabilities could be useful in designing mobile learning projects. The largest number of responses (361) and the mean for this statement fell within "agree." The second largest number of responses (285) was from respondents who strongly agreed with this statement. When combined, these top two selections accounted for 78% of the responses, indicating strong demand for education and training professionals to have access to examples when starting a mobile learning project.

INTERVIEWS & FOCUS GROUP IMPLICATIONS

The following summarizes important themes that emerged from both the interviews and focus group, organized by general theme headings.

Instructional Design Model for Mobile Learning

One participant indicated, and others concurred, they had spent a fair amount of time researching this topic and they did not come across an instructional design model or framework that is a good fit for mobile learning. Several participants agreed this could be attributed to confusion about what types of devices are truly mobile. Some people include laptops, but laptops are not as portable as smartphones and require a much different design approach and strategy. When identifying a mobile learning strategy it must account for the mobile device being instantly accessible, support user-generated content, and the fact that learning can take place anywhere, anytime.

Most participants concurred they thought it would be helpful to have a mobile learning-optimized design model. One interviewee emphasized that there is a need for both theoretical models as well as "how to" models. Ideally, these elements would be

seamlessly integrated into one model. The elements of learning theory and learning technology are often not separate, and are co-constructing each other, as one entity.

Several interviewees also stressed that agility in the design process is important for mobile learning, but not easy to do properly. An effective ID model for mobile learning should provide structure for the planning, collaboration, communication, and documentation it requires. A model should not be specifically tailored for mobile products per se, respondents said. However, it should drive creative consideration of and guidance for a wider palette of learning experiences (i.e., "activities", not "content") and learning theories (like "enactivism") that are optimized with mobile technology.

One interviewee reported using ILDF (ie, the DBR model used for conducting the research in the MoTIF project) as a highly effective process for design production, not just for research. She reported using ILDF as a way to dynamically improve the design itself while the project is in progress. Feedback loops aren't only useful for improving the product, but also help improve the process in the current project and future projects. The interviewee stated that a mobile learning design model should be a fluid entity that is being reinvented continuously as the project progresses. The model should not be thought of as a solid predetermined process at the outset. There is intrinsic value in the activities of piloting, analyzing, and iteratively incorporating feedback. However, she said that it may not be practical in many cases, as it adds these as significant extra tasks and time on top of traditional instructional design activities.

Mobile Learning as a Catalyst

A common theme that emerged strongly among participants is the idea that mobile learning has been a catalyst for increased attention

to a lot of hitherto not well known, accepted, or used pedagogical and learning approaches, since its unique affordances enable them (e.g. constructivist, self-directed learning, collaborative approaches). One person stressed that mobile is only one example of a learning technology that has done this, although mobile seems to be the currently dominant technology driving these changes. For example, desktop eLearning similarly gave birth to several new pedaogical ideas around the year 2000, shifting learning towards self-paced learning, away from instructor-facilitated.

Mobile Blurs the Line Between "Life" and "Work"

Another theme was that mobile design models should lead instructional designers to empower people to learn in naturally informal ways, without undue interference. This requires balancing structure and coercive learning with leveraging the natural inclinations of learners to want to learn and to integrate learning into their life activities or schedule.

A corollary to this is the challenge in design when using constructivist, self-directed, or collaborative approaches. The design should create authentic activities where learners actually want to talk to each other, share information, and work together. The design should not force it. One participant mentioned the issue of designing informal learning that relies on naturalistic, spontaneous conversations—how to encourage and not interfere with these vs require them and thus spoil the naturalistic, self-motivating aspects of peer-to-peer conversation.

In contrast, another participant emphasized that it is not enough to simply "get out of the way" of the learner in this regard; he believes that there is an element of forcing that must take place, i.e., collaboration doesn't necessarily happen unless there is some organized structure to impose it on students. Students have to not only be forced to some degree, but also taught how to effectively collaborate.

Performance Support

Finally, a strong theme throughout the interviews and the focus group is that mobile should drive consideration of performance support solutions instead of training. A participant recommended that distributed cognition, the Internet of Things (IoT), and worklife ecosystem dictates that instead of concentrating information into a specific, dedicated mobile learning experience, parse it out to users based on their environment, points of need, and natural workflows. This strongly implies more of a performance support approach, in which the natural environment is infused with support for learners.

Examples Catalog

Participants said that an examples catalog is a good idea for an intervention, but the MoTIF Project should ensure that users can extract patterns/principles from them and apply them to the unique particulars of their case. The examples should not be presented as templates that can be applied without modifications. Participants urged us to present counter-examples too, not just success stories.

Mobile as a Doorway

Another participant used the phrase, "designing a doorway" and pointed out that curation of existing content is greatly influencing the design process. Current practices focus on making sure students know how to discover relevant content using search engines, suggested links, and quality criteria. In other words, designers can provide access points, not always new designs of content.

Skeuomorphism

A participant reported that a big problem is skeuomorphism in the learning space, for example, classroom learning principles automatically applied to elearning, desktop elearning content applied to mobile, etc. This participant warned that there is now a shift towards considering mobile a unique discontinuity that requires its own rules and principles. Eventually, she said, the new technology transforms and reinvents the learning models, and this is happening now.

Mobile Capabilities and Context

Designers need to better understand mobile device capabilities in order to effectively design mobile learning. These are potentially critical resources in the toolkit of the ISD. A participant said that situated learning, which is very important to K-12 learning, is enabled by mobile capabilities such as the camera, location sensors, and connectivity. No longer are learners limited to creating a photo only to have to wait to go back to the classroom to discuss and analyze them. Mobile capabilities afford learners the opportunity to record the raw observations and analyze the data on the spot. Discussion can take place in the field using a mobile device. Students can conduct further observations, make conjectures, etc. and remain in context. Interview participants stated that design approaches should consider the ability to add context to the learning experience.

Priority Needs

A needs assessment is not complete unless plans are made to utilize the findings and prioritize the needs in a practical way. The criteria for assigning priorities among the identified needs are based on the strength of the responses for the findings associated with each objective. Overall, +1 point was assigned for a positive response, 0 for a neutral response, and -1 for a negative response.

Objective 1: Determine if there is a perceived need to identify and document the unique capabilities of the mobile platform and their use cases for learning.

The following findings for Objective 1 resulted in a lower priority rating (1 point overall):

*   Only 2.6% or 22 of the respondents indicated that they had not seen any of the capabilities used for learning. [-1]

*   The mean responses from the survey fell under "slightly disagree" that there is a common understanding about mobile device capabilities or when to use them for learning. [-1]

*   Thirty-four percent strongly agreed and 43% agreed that a compilation of mobile learning examples categorized by capabilities could be helpful in designing mobile learning projects. [+1]

The following findings for Objective 2 and Objective 3 both resulted in a higher priority ratings than Objective 1:

Objective 2: Determine if there is a perceived need to identify alternative learning approaches that are appropriate for the mobile platform (3 points overall).

*   Survey respondents favored some form of re-evaluation or analysis of existing learning materials or courses before converting them to a mobile format. [+1]

*   There is a strong need for resources that educate designers on all of the considerations in presenting learning on mobile platform, and consideration of much more than just the variety of screen sizes and touch interactivity. [+1]

*   Performance Support and Just-in-time learning were ranked the highest in terms of mobile learning methods and strategies with the most promise. [+1]

Objectve 3: Determine if there is a perceived need for a mobile learning-optimized design model (3 points overall).

*   Mobile learning best practices have not been identified within the overall context of following a design process, ID model or learning theory. There is agreement that the instructional design process for mobile learning should be different than eLearning, but none of the participants could explain how it should be be different. [+1]

*   Around 90% of the survey respondents answered that they were not aware of an existing process or model for mobile learning design. [+1]

*   A majority of the survey respondents agreed that a new process/model optimized for mobile learning could improve their abilities. [+1]

Action Plan

The second phase of the project, Enactment, will involve initial intervention design, prototype articulation, and subsequent development of a more fully detailed intervention. The Enactment phase may also be influenced by feedback from users of the intervention. From this iterative feedback loop and process,

flowcharts, technical specifications, and storyboards are usually produced leading to the creation of prototypes.

Phase 2 will ultimately focus on capturing input from the target audience and selected experts, and then iteratively refining MoTIF so that it incorporates feedback from the target audience.

As a result of this needs assessment, the researchers confirmed that the higher priority need is to design a framework that supports the formation of a new mobile learning design process model that is specific to today's mobile devices. The lower priority need would involve creating a means of collecting mobile learning

examples, categorized by unique learning design attributes and device capabilities.

Intervention 1: The MoTIF Design Process Flowchart

The first intervention is based on the priority needs ratings in this needs assessment. Consequently, Objective 2 and 3 could benefit from an intervention that would define and refine a design process model while considering the contextual, pedagogical, and performance support aspects of mobile learning.

This intervention will attempt to integrate the research findings from the MoTIF project with industry best practices and theoretical models that are established in the learning technology community. As the findings are iteratively discovered, they are integrated into this intervention. The intervention will also act as a testing platform for ideas, a blueprint for further applied research topics, a vehicle for community input, and possibly a final product for publication.

A process flowchart serves as a logical starting point for defining a new design process model for mobile learning. The updated Dick, Carey, & Carey ISD model (2014) has been selected since it is a very well established model used as a standard in instructional technology degree programs and by practitioners. Some portions of the flowchart will be reproduced as they appear in their published works. Most portions, however, do not appear explicitly in Dick, Carey, and Carey (2014) as flowcharts; instead, they are abstracted from the theory and practice text-based information. This applies also to HPT and Performance Support elements; the former are derived from Mager and Pipe (1997) and the latter are derived from two sources: Gottfredson and Mosher (2011) and Rossett and Schafer (2007). The MoTIF project researchers have initially connected these concepts and augmented them to form the hybrid flowchart.

Intervention 2: Examples Catalog

The second intervention would address the higher priority of Objetive 1, and might result in catalog of examples or a collection of resources to help ISDs learn about, compare, evaluate, and possibly apply design ideas and examples during the critical planning stages of design.

The MoTIF project survey overwhelmingly revealed that a catalog of examples categorized by capabilities would be helpful. It is important to emphasize here that a general directory listing of software applications is not the intention. The MoTIF project is focused on solutions that leverage particular uses of software and hardware in the context of a learning experience or environment. New capabilities such as location awareness and video capture enable many alternative and informal learning scenarios. In addition, mobile technology provides opportunities for augmented reality, spaced repetition, collaboration, user-generated content, and just-in-time learning. The catalog is expected to showcase the particular learning approaches and pedagogical strategies, which are associated with examples, not just the technical design aspects. In this way, the catalog will emphasize the appropriateness of examples for particular learning needs, rather then encourage use of new mobile technologies for its own sake.

One potentially powerful use case for the catalog will link learning microstrategies to enabling mobile technologies, to aid and encourage ISDs to use the type of learning they are targeting as the starting point for their decision process. Ideally, the process of using the examples catalog would start with ISDs analyzing their objectives and the type of learning they need to address it, and then systematically point towards examples of mobile learning solutions that might work for, or generate ideas for, their situation. This use of the catalog can be viewed essentially as a design decision support tool.

Recommendations

As reported in the MoTIF project survey, 61% of the respondents reported that they most often used tablets for mobile learning, as opposed to 29% for smartphones. It is possible this dynamic is due to the larger screen sizes inherent to tablets, but it may also be a function of the type of content considered for mobile learning. This finding warrants further investigation and analysis for the future direction of the MoTIF project, but it also identifies a critical design and pedagogical dynamic for the mobile learning community as a whole.

According to a 2014 Pew Research Report on mobile technology, 58% of American adults have a smartphone and 42% of American adults own a tablet computer. A prior 2012 Pew Research survey found that 86% of smartphone owners have used their devices in the previous 30 days to perform at least one "just-in-time" or performance support activity. Performance support is often used in educa-

tion, training, and workplace settings where learning is complemented by on-the-job information assets and electronic aids. As a growing number of mobile devices and innovations continue to enter the landscape, education and training professionals are now interested in how to effectively design for a variety of mobile scenarios that can provide for more robust learning and performance support opportunities than traditional eLearning training courses do alone.

A recent survey report published by the eLearning Guild titled, "Making mLearning Usable: How We Use Mobile Devices" revealed several key findings that could impact the MoTIF project's future research focus. One of the several findings worthy of further investigation is how people hold and when they use mobile devices. People hold smaller devices such as smartphones in the hand and use them standing and walking, whereas larger devices are used more on surfaces and in stands, and more often while sitting (Hoober & Shank, 2014). There are also an increasing number of design implications as well as hardware expansion capability differences between smartphones and tablets as the market continues to evolve. It may not be possible to address all of the attributes of both tablets and smartphones without encountering a substantial amount of distinct differences such as accommodating user interaction preferences, screen sizes, and user behaviors. These differences might require exponentially complex considerations for each device type and form factor. The researchers intend to further investigate the design decision process for targeting tablets vs. smartphones for a mobile learning solution. While this project is initially focused on tablets and smartphones, further data collection and additional surveys may be required at later points in the project to further validate whether it will continue to be practical to focus on both.

Since DBR is intended to both solve real world problems and to generate design principles, it is well suited to help develop design theories, frameworks, and methodologies for mobile learning. However, while conducting the needs assessment it was revealed that several members of the target audience had actually used DBR as a process for mobile learning design, in itself.

While only the first phase (Informed Exploration) of following the ILDF has been completed for the MoTIF project, ADL is anticipating the logistical challenges associated with executing the third and fourth phases, Local Impact and Broader Impact, respectively. The iterative refinements realized in Phase 2 (Enactment) will drive the direction of Phase III, where the researchers will determine what will be considered for local impact and exactly who is expected to be impacted. The questions and several of the research methods provided in the ILDF model as well as an existing evaluation models (i.e. Kirkpatrick) will be considered. As part of the usability testing, the researchers will ask participants to analyze and apply MoTIF by attempting to design mobile learning content or completing a pseudo-exercise. This will allow the MoTIF project researchers to internally identify challenges, analyze the issues, and observe the application of the framework.

During Phase 4, ILDF recommends that the researchers reflect on the refined solution and put it into practice. MoTIF could also result in a best practices guide targeting learning design principles for mobile learning. The guide could serve as a companion document to the framework itself. Further data will be collected and analyzed to determine whether the researchers should facilitate the diffusion and adoption of the framework. However, the factors influencing adoption and diffusion per Rogers' process model (Rogers, 1983) will need to be taken into account and incorporated within each design iteration.

Acknowledgements

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Peter Berking has more than 17 years of experience in a broad base of instructional design and development activities, for products ranging from technology-driven e-learning products and performance support systems to instructor-led courses. He is a subject matter expert in instructional design and advanced learning technologies, publishing articles for industry publications and presenting at conferences. Peter has been an Instructional Designer at the ADL Co-Lab in Alexandria, VA since 2008. He has supported ADL through papers, articles, consultations, workshops, presentations, course design, and prototypes. Formerly a K-12 educator, he is embedded on staff at ADL through Serco, Inc. in Rockville, MD, and has been Principal Instructional Designer at Serco since 1995. He has an M.A. in Instructional Research and Curriculum Development from U.C. Berkeley and a Professional Certificate in Instructional Design from Marymount University.

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Marcus Birtwhistle joined the Advanced Distributed Learning Initiative's Mobile Learning team as mobile technologies and systems consultant in 2012. His prior experience includes developing solutions for integrating people, processes, and technologies as Certified Knowledge Manager in support of the TRADOC / CASCOM Knowledge Management Office. He has an interest in strategic alignment of systems that enable people to leverage mobile technologies for superior outcomes through distributed learning and working. He has worked on improving the Army Force Generation cycle by leveraging operational experiences and knowledge gained on deployment, and improving intelligence sharing by integrating tools with processes. His background in international relations and organizations from The College of William and Mary informs both his understanding for the power of technology and mobile learning to transform learning, working, training, and education. He is a Systems Engineering and Technical Advisor (SETA) in support of the ADL Initiative.

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Dr. Shane Gallagher received his PhD in Instructional Technology from George Mason University and MA in Educational Technology from the University of New Mexico. He has led research and evaluation projects in game based learning and cognition, learning object content models, simulations, reusable pedagogical models, organizational readiness, and knowledge management. Shane has designed enterprise learning and knowledge architectures, learning and object content models, online and blended learning and knowledge environments for the Department of Defense Directorate for Joint Forces Development (J7), Office of the Secretary of Defense (OSD), the Department of the Air Force, and the Department of the Navy (DON). He has been recognized by NASA's Johnson Space Center for his work on assessing the Center on knowledge management readiness (10,000 personnel) by the JSC Chief Knowledge Officer and has accrued customer recognition and awards for thought leadership, innovation, and instructional design as well as an understanding of the government acquisition processes and budgeting cycles through his work with the DON.

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Jason Haag's interest and background is in learning systems, web technology, and standards. He spent eight years supporting the U.S. Navy's eLearning program in both engineering and management roles before joining the Advanced Distributed Learning (ADL) Initiative. He is currently employed by The Tolliver Group, Inc. and provides Systems Engineering and Technical Assistance (SETA) support for the ADL, sponsored by the Office of the Deputy Assistant Secretary of Defense (Readiness). He took on the duties of ADL's Mobile Learning Lead in 2012 and is part of the ADL Technical Team. His primary interest is mobile learning (mLearning) research, including instructional design and performance support, mobile device platforms & technology, interface design for learning, and best practices for implementation. Jason's professional affiliations include the following: the IEEE Education Society, the American Society for Training and Development (ASTD), the eLearning Guild, the International Society for Technology in Education (ISTE), and the International Association for Mobile Learning (IAMLEARN).

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