Challenges for Integrative Design and Research in Mobile Learning

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Design processes and design decision-making related to mobile or other technologically-based learning environments present inherent challenges as described by Lawson (2004) in locating relevant information, structuring of a problem, creative insight, proposing a solution, and evaluating that solution. Design and development processes integrated with applied or empirical research cycles for the purposes of generating knowledge about teaching, learning or training while simultaneously working toward producing a useful innovation or intervention presents a more pronounced challenge. Integrating design and research processes involves leveraging data collection and analysis cycles of user/learner participation or co-construction of curriculum, artifacts or digital components to inform understanding about the learner's experience, context, and knowledge of content or process. The emerging design research approach (Bannan-Ritland, 2003; Kelly, Baek & Lesh, 2008; Plomp & Nieveen, 2009) provides a frame through which we might examine the unique considerations of mobile learning environments as well as the integration of applied and empirical research methods that attempt to uncover information related to agency, social, and cultural aspects that manifest in user/learner constructed content or participatory design experiences. In addition, the integration of design and research cycles may provide impetus for challenging some of the notions of traditional educational research particularly related to user-generated and participatory design contexts.

Co-design or participatory design experiences for learners can provide a unique opportunity or window into their cognition, attitudes, motivations, and orientation as well as the socio-cultural context in which the learning experience takes place. In traditional design and development efforts, this type of information has been rarely or adequately utilized and thoroughly analyzed for design and development purposes and if so, then typically discarded or lost. Design research as an emerging educational research approach strives to implement and formalize cycles of capturing and analyzing this valuable information through applied, qualitative or quantitative research cycles within the context of design. The goal of these cycles is to uncover and document the users'/learners' and/or stakeholders' knowledge and experience prior across several cycles and the spectrum of initial design to implementation. These cycles of investigation within the context of co-design or participatory design can generate knowledge about users, context and content while also directly inform design decision-making of the technology-based learning environment in an iterative, data-driven manner across a program of technologically-based design research.

The case of LiteracyAccess Online, a four-year design research effort to produce an informal learning Web-based environment for parents and children with disabilities, leveraged an integrative, iterative design and research process as well as implemented a socio-cultural design framework in a participatory design and development experience (see Bannan, 2008). Another NSF grant effort, the GO Inquire project addressing design and development of a Web-based support system to promote observational inquiry in geoscience at the upper elementary level, provides an example of Teacher Design Research or (TDR) where teacher involvement in design research cycles has the potential to contribute positively to both research and teacher professional development as well as technologically-based design and development. These examples, while not all directly related to mobile technology provide some insight as to how to leverage the integrated design research process to generate, document and contribute to knowledge about learners, learning, and socio-cultural considerations within the context of a technologically-based design and development effort.

The "mobile complex" as defined by Pachler, et al (in press), presents unique considerations and challenges

for integrating design and research cycles. Employing the lens of agency, cultural practices and socio-cultural and technological structures has the potential to promote improved articulation of a design research approach by attempting to target specific aspects of the learner experience and learning context across analysis, design, development and implementation phases. Attempting to capture and then analyze instantiations or aspects of situatedness of learning, user/learner generated content or contexts, and everyday, reflexive experiences that may be evoked through participation and engagement in design research process has the potential to inform both mobile design and research outcomes. Situated and temporal contexts unique to mobile technology-based environments require innovative data collection methods such as applied ethnographic methods as well as other techniques to capture and learn from the dialectical (Sharples et al, 2007) between and among user/learner, technology and the socio-cultural context. This paper/presentation will attempt to explore and map the integration of design and research processes to socio-cultural aspects of mobile-based learning environments identified by Pachler et. al, and apply these insights toward co-constructed or participatory design research efforts, specifically. It is hoped that this discussion will generate insights into how the challenges and benefits of an integrative design research approach may be leveraged in a co-constructed or participatory design experience related to mobile learning.

Related questions that may be considered toward that end:

How do we provide flexible design and research models and the integration of both to progressively and simultaneously improve learning and technologies, particularly in regard to the unique socio-cultural and transformative potential of mobile learning environments?

From a theoretical frame of the 'mobile complex' (Pachler, Cook and Bachmair, in press), how do we employ the important constructs of agency, culture and social structure in a systematic process of identifying, generating and determining directions for integrative design and research cycles?

What does the shift in the use of mobile devices as provoking informal, fluid, ubiquitous, user-contribution/participation and meaning-making experiences (Pachler, Cook and Bachmair, in press) mean for identifying or generating informal learning targets for design and research? What special considerations does the "mobile complex" evoke in how we collect and analyze data and the methods we might employ in a systematic, iterative and interventionist design research effort?

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