AN ENVIRONMENT FOR MOBILE EXPERIENTIAL LEARNING

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ABSTRACT

In experiential learning courses students acquire new knowledge through learning that takes place in real-life scenarios. By utilizing mobile devices to conduct observations outside of the classroom, learners can arrive at a broader and deeper understanding of their inquiries. In this paper, we propose a learning environment that integrates mobile technology in an overall experiential learning approach. The proposed environment is separated into a host system where information is stored and mobile devices that are directly connected to the host system via applications that allow for ethnographic research and knowledge production. We depict the relevant components and features that are required for an effective implementation of the proposed model. Finally, we introduce a real-world application of the m-learning environment and highlight the benefits of mobile technology in experiential learning settings.

KEYWORDS

Experiential learning, mobile learning environment, ethnography, course design, observation

1. INTRODUCTION

As mobile technology has recently become more widely available, convenient and less expensive, various forms of mobile learning developed into a key trend in educational applications (Petrovic & Brand, 2009; Wu 2012:817). The ubiquitous availability and location-independent usage of mobile devices has made mobile technology particularly interesting for applications in contexts of real-world learning. As opposed to in-class learning, a context-oriented usage of mobile devices allows learners to research and acquire knowledge directly in the field (Petrovic, Kittl & Edegger, 2008).

This way of experiential learning contrasts starkly with modes of cognitive and behaviorist learning theories (Corbett 2005:482). While research on mobile learning has grown significantly in the recent past (Kukulska-Hulme & Traxler, 2007), there has only been little research on how mobile technologies could enhance the specific processes of experiential learning. We suggest that there is enormous potential in applying mobile learning in higher education courses where students are to conduct fieldwork or apply knowledge in real world settings. Thus, a coherent model that integrates mobile and experiential learning into a single framework could aid instructors and learners in applying alternative learning methods.

This paper seeks to address the question of how mobile learning can support learning by experience and observation. After a brief overview about mobile and experiential learning, a generic model for the implementation of mobile technologies in higher education is proposed. The emphasis of the model is on facilitating learning by experience and observation. In chapter three, we demonstrate how the proposed model can be applied in a higher education scenario. Finally, the paper concludes with suggestions for improvement and recommendations for future directions in mobile and experiential learning.

2. MOBILE AND EXPERIENTIAL LEARNING

2.1 Mobile Learning

The proliferation of ICT and its implementation into learning has shown to have significant effects on pedagogical practices (Nachmias, Mioduser, Oren, & Ram, 2000). Mobile technology -- as a subset of ICT -- is likely to play a future key role in learning practices, considering current penetration rates of mobile devices and the growing number of features. Each successive generation of mobile devices has introduced an array of new features such as video and audio recorders, music players, e-mail, Wi-Fi connectivity alongside the numerous applications typically found in mobile apps stores (Wu 2012:817). With a steadily growing number of features and an increased availability of mobile devices, the greatest potential of mobile technology may be found in supporting learning activities that are taking place outside of the classroom. Thus, mobile technologies could become central components of learning environments that focus on learning through experience and observation.

2.2 Experiential Learning

Experiential learning is a holistic learning theory with an emphasis on knowledge creation through direct experience and observation as opposed to cognitive learning theories that emphasize cognition over affect (Kolb 2000). The experiential learning model assumes that "knowledge results from the combination of grasping and transforming experience" (Kolb 1984:41). While *grasping experience* includes Concrete Experience (learning by experiencing) and Abstract Conceptualization (learning by thinking), the two dialectic modes of *transforming experience* comprise Reflective Observation (learning by reflecting) and Active Experimentation (learning by doing). Proponents of experiential learning suggest that learners choose different combinations of these modes in any given learning situation.

Since the first publications on experiential learning (Kolb, 1971; Kolb, Rubin & McIntyre, 1971), the concept has gained much popularity in the discourse of learning theories. Experiential learning has been applied in a variety of scopes, topics and research area: education, management, computer and information science, psychology, medicine, nursing, accounting and law (Kolb 2000). The sheer variety of applications makes experiential learning an interesting starting point to develop mobile learning solutions with an emphasis on learning that takes place in concrete reality.

2.3 Experiential Learning and Observation

In higher education, experiential learning is commonly found in masters, business or research courses, where students frequently work on real world problems. Usually, in these projects students are required to do more than merely reading textbooks and learning for assessments, especially if only little knowledge on a given topic is available. Here, direct observation of real life practices plays a key role in gaining a deeper understanding and acquiring new knowledge.

A workable method for learning through observation may be derived from ethnographic approaches. Albeit ethnographic methods are first and foremost research tools (as opposed to learning tools), their direct "in the field" characteristics seem to be valuable for paedagocial activities. Through ethnographic experiences students develop a profound understanding of their field of study and learn to place knowledge into a meaningful context. As ethnographic methods are usually applied directly in the field, mobile technologies could be effective facilitators in making learners geographically independent. Therefore, a combination of mobile learning technologies with experiential and observational learning approaches could open up new alleys for real world inquiries in higher education.

2.4 Opportunities for Mobile Learning

In this paper, we argue that mobile learning is particularly useful in experiential learning contexts, where learners acquire knowledge through discovery and exploration outside of the classroom. We suggest that a specific set of e-learning and m-learning tools can facilitate and enhance experiential learning processes. The concrete environment and its components are presented in chapter three.

A mobile learning environment that concentrates on the experiential aspects of knowledge acquisition needs to satisfy the key elements of experiential learning and observation as derived from Kolb (2000), NIU (2012) and Wurdinger & Carlson (2010):

- Learning takes place as a result of being personally involved
- Learning takes place in concrete reality
- Learning takes place through experiencing the tangible, felt qualities of the world
- Learning takes place through reflecting on what happened
- Learning takes place in active experimentation
- Learning takes place through challenging real world problems
- Learning takes place through debriefing and discussion
- Learning takes place in a semi-structured environment
- The role of instructors is to facilitate rather than to direct student progress

3. AN ENVIRONMENT FOR MOBILE EXPERIENTIAL LEARNING

In this section, we propose a learning environment with strong focus on experiential learning processes. Figure 1 shows the design of the environment, which is separated into an information system that acts as a host for all types of information and activities, and multiple client systems. While the single host system is typically managed by the instructor, students may utilize their private mobile equipment to capture information.

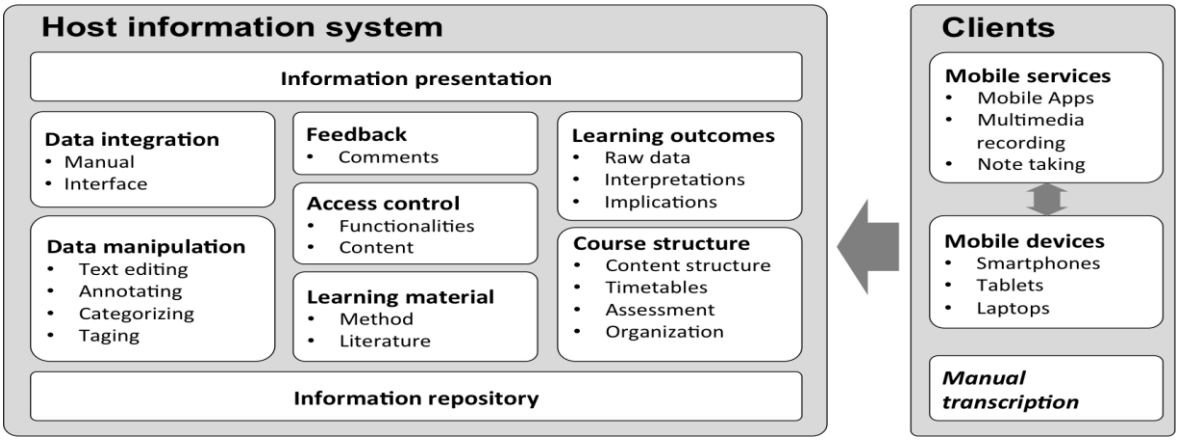

Figure 1. The architecture of an environment for mobile experiential learning

Depending on the structure of the course design, captured information is either automatically imported or manually transferred into the system. The host system may therefore consist of structured and prepared data only, or also include raw and edited material from observations. In the next section, we describe both parts in detail and expand on the design of the environment.

3.1 Host Information System

The host information system builds the foundation for the entire learning environment. The design of the host information system is of significant importance for all activities and therefore for the assessment of a course in terms of motivation and learning outcomes. In this section, we break down the system into its components and describe corresponding functions.

Information repository: The repository holds all types of course-related data, such as field notes, content, findings, presentations, as well as learning materials. It acts as a database and therefore data protection and backup strategies are essential.

Data integration: Data gathered by students are directly stored in the learning environment. The system has to provide mechanism such as input forms for manual data input and data upload. However, the more integrated way to send data to the host is by utilizing mobile services with direct host integration. Specific interfaces allow an automatic import of data collected by mobile devices (e.g. upload learning and research knowledge directly from the field).

Data manipulation: For students it is essential to be able to change or reorganize content at any time. The preparation of raw data for final assessments also requires formatting functionalities for structuring text and media entries. Optionally, image processing and annotation features are useful for multimedia content. The opportunity to categorize and tag content chunks allows a fluent organization of stored information.

Access control: A common learning environment needs to offer opportunities to control data upload and manipulation on a per user or group level. Students must not be permitted to manipulate or access unpublished content of other students. This measure helps to prevent copying from other students as well as deleting content accidentally. Moreover, specific features of the learning environment may be restricted according to the requirements of the course.

Feedback: Similar to in-class courses, an effective e-learning environment needs to offer possibilities to give direct feedback. Commenting functions allow instructors to give comments on assessments and students to give feedback to colleagues.

Learning material: All required learning material provided by instructors should be available directly in the learning environment. This includes material that relates to methodology as well asto key literature. Optionally, information on the usage of the learning environment may be provided.

Learning outcomes: All gained new knowledge during the course should be available at the system at any time. The interpretation of gathered data is an essential step within the knowledge creation process and therefore mandatory. Also implications for various scenarios should be given to demonstrate the applicability of the gained insights.

Course structure: The learning environment is represented according to the structure and organization of the course. The provided learning material as well as newly generated information needs to be structured according to the overall course design. It is crucial that timetables, assessment criteria and other essential administrative information is readily accessible.

Information presentation: Besides the defined functionalities and components, an often-underestimated factor for student motivation is the actual presentation of the learning environment and its content. While many systems largely focus on pedagogical aspects of environments, the representation of information and user experience must not be underestimated. A pleasant design, high system usability and appropriate visualization on mobile devices are key for an efficient learning environment.

3.2 Mobile Clients

While instructors define the host system, students use their own equipment as clients to collect and transfer the data. Thus, clients are entirely managed by students and cannot be accessed or prepared by instructors.

Mobile clients: Students use their preferred devices such as smartphones or tablets to collect data and information. Hardware systems have to match defined minimum criteria in terms of video, photo or audio quality. Depending on the conducted fieldwork, aspects like power consumption or available storage for captured media are to be considered.

Mobile services: A special focus is placed on services for mobile devices. Available software in form of mobile apps specifically designed for fieldwork activities simplifies the process of data collection. Ideally, the host system allows mobile clients to directly integrate mobile captured content into the main system.

Manual transcription: It is crucial to have implemented effective back-up strategies, in case of misuse or system breakdowns. Also, the classic notebook can be used for data collection, transcribing and entering the data manually in the host system after fieldwork has been completed.

4. APPLYING THE ENVIRONMENT IN HIGHER EDUCATION

The general architecture of the proposed environment was realised in a master course in Information Systems in 2013. In our use case, a group of 25 students was divided into five sub-groups of five students each. The central topic of the course was related to customer experience research, where existing innovative business solutions were evaluated. While methods like surveys or interviews rarely suffice to determine real-world customer experience, observation and ethnographic fieldwork have proven more adequate to thoroughly assess customer experience. In this course, five innovate approaches of customer experience were investigated in real world situations.

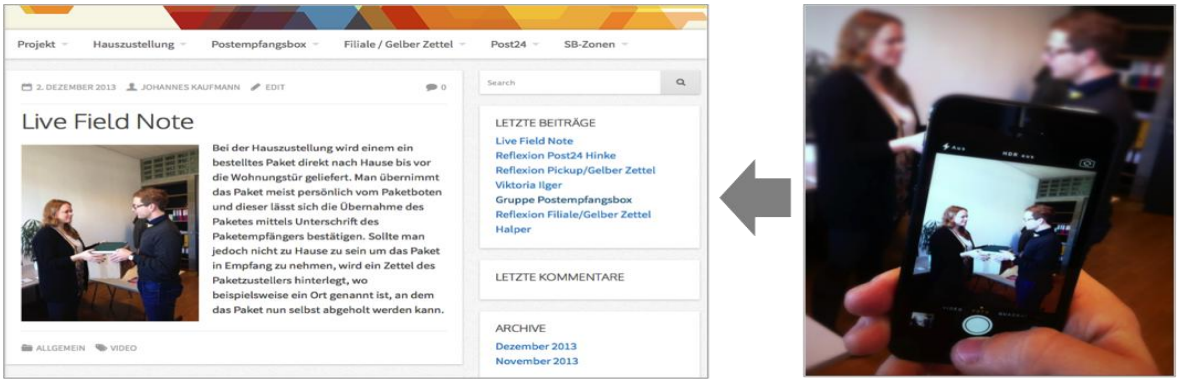

Figure 2. Interaction of host information system and mobile client in an experiential learning environment

The host system for the learning environment was based on the freely available WordPress blog software, which we modified for the specific requirements of the course (see Fig. 2). All pre-required learning materials and organizational information were made available on the system. Categories and menu entries were created for each student group to facilitate navigation throughout the environment. Instructors predefined subpages similar for all groups so each group and student can work within a coherent structure.

The key feature of the learning environment was the direct integration of mobile learning. Here, students used specific ethnographic apps and a native WordPress mobile app to directly post their field materials and learning experiences to the learning environment. Live notes, photos, videos, and audio recordings were uploaded, categorized and tagged to make them available to other students in real time on the platform. For instructors, only posts with specific tags were taken into consideration for assessments.

The feedback of instructors was provided in both, class and online. At the end of the course, students synthesized interpretations for all in-field cases and concluded with implications for future directions regarding the observed customer experiences. In this course, the template engine of the blog allowed us to design both a system with sound usability and an environment that integrated effectively with mobile technologies.

The proposed environment indicates that mobile learning may be particularly useful in experiential learning contexts, where learners gain new knowledge through discovery and exploration outside of the classroom. E-learning and m-learning tools seem to be enablers for experiential learning processes. The application of our m-learning model has demonstrated that a combination of standard software with (native) mobile apps could open up new pathways to facilitate experiential learning that takes places directly in the field.

5. CONCLUSION

Mobile experiential learning is particularly beneficial for students in higher education classes, where learning takes place in real-life situations. By applying already existing knowledge in combination with the gathering of new information through observation, students build and strengthen new knowledge. Especially for teaching in the areas of customer experience or innovation management, observational course designs enrich student outcomes. The proposed mobile learning environment allows the implementation of experiential learning courses with the utilization of students' mobile devices.

The organization in form of a course project implies that learning outcomes occur in a number of different ways. First of all, students learn how to work in teams and get tasks organized within their teams, which is a managerial capability. Second, students learn and practice important methodological approaches. More generally, they learn how to apply a research methodology to produce meaningful in-context knowledge. The collective participation of the entire group of students broadens and deepens the understanding of a specific real-world challenge that students engage with in an experiential learning process.

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