Mobile Learning Future Views

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Abstract: The major goals of this study are 1) to compare both Finnish (n=4) and international MOBIlearn project mobile learning experts (n=14) future views on the mobile learning, and 2) to test the theoretical model of Mobile Learning Components. The first goal was studied with a Delphi method in three stages. Firstly, a scenario using a SWOT analysis was built on the basis of future views of four Finnish mobile learning experts. Secondly, the scenario was presented to international experts participating in the MOBIlearn project. Thirdly, Finnish and international experts future views were compared. The second goal, validity of mobile learning components, was studied by presenting an incomplete list of the components to international experts along with a narrative scenario, and asking if something was missing. The results showed that the Finnish and the international MOBIlearn experts shared mostly the views on the future of mobile learning, but the international experts tended to be more skeptical in their views. Finnish experts emphasized personal aspects of learning in their future views, when MOBIlearn experts saw community issues more relevant. Theoretical framework of this study consisting of the Mobile Learning Components was supported by the international mobile learning experts with exception of "continuity and adaptability", and "support for time and learning management".

Introduction

Numerous attempts to conceptualize mobility show that it is not a uni-dimensional construct. For example the Computer Supported Co-operative Work (CSCW) approach concentrates on depicting mobile technology and varying information needs in different situations (Churchill & Wakeford, 2002; Luff & Heath, 1998). The concept of mobile learning is often defined as learning that takes place with the help of mobile devices. It is easy to notice that the concept of mobile learning should not provide a narrow and technically defined utopian image of the mobile learning based on the single characteristic of a mobile device. Laurier (2002) remarks that studies showing technologies somehow causing work to be faster, more mobile and more connected-up, commonly misinterpret the technologies and their users. It is forgotten how the management of time and place concerning the use of the technology is also joined with people slowing down, staying in one place and keeping the network connection sometimes closed. Moreover, when people tend to access information sources and learning objects via different devices from different locations, there are many usability, compatibility and accessibility related questions still open that hinder mobility and mobile learning.

In this study we approach the concept of mobile learning by comparing future views of two expert groups, the Finnish and the MOBIlearn[1] project international mobile learning experts. The major goals of this study are: 1) to compare Finnish and international mobile learning experts future views on the mobile learning, and 2) to test a theoretical model of mobile learning components (Syvänen, Nokelainen, Ahonen & Turunen, 2003).

The first goal is studied with a Delphi method in three stages. Firstly, a scenario using a SWOT (Strengths – Weaknesses – Opportunities – Threats) analysis was built on the basis of future views of four Finnish mobile

[1] MOBIlearn is a worldwide European-led research and development project exploring context-sensitive approaches to informal, problem-based and workplace learning by using key advances in mobile technologies. The project belongs to EU's Frame Program 5 projects on the branch of the Information Society Technologies. For more information, see http://www.mobilearn.org

learning experts. Secondly, the scenario is presented to international experts participating in the MOBIlearn project. Thirdly, Finnish and international experts future views are compared. The second goal, validity of mobile learning components, is studied by presenting an incomplete list of the components to the international experts along with a narrative scenario, and asking if they wanted to add something to the list.

Theoretical framework

The mobile learning components model was created as a theoretical framework for evaluation and design for mobile learning materials and environments, as many usability and pedagogical design and evaluation principles do not yet clearly cover the mobile use or learning activities.

The model was defined as: "*1. Continuity and adaptability:* how to support flexible learning in varying contexts?", "*2. Learning as a personal process:* are the learning products taken personally?", "3. *Contextuality in learning:* is the context of learning better recognized in mobile learning process?", "*4. Accessibility:* what kind of skills and access is requested?", "5. *Support for time and learning management:* how to support learner's self-monitoring and regulatory processes?" and "*6. Flexible interaction:* how to enhance communication between peer-learners?". This model works as a compilation of key elements that have been presented in the earlier studies of mobile learning and the use of mobile devices in learning process. The components of mobile learning have been applied to our earlier studies and operationalized into an on-line self-rating Mobile Learning Questionnaire (MLQ) targeted for Finnish comprehensive school students (see Syvänen et. al. 2003).

Method

The research design of this study is based on Delphi-method. The primary function of the method, widely applied in the research field of future research, is to find relevant arguments concerning future development by equally noticing the different expert groups views (Linstone & Turoff, 1979, 3; Kuusi, 1999, 77). The idea is to iterate experts' views, thus giving them at least one opportunity to re-evaluate the original answers. Experts comment other expert's views anonymously and are asked to discuss about the underlying reasons for the differences. These arguments can be then used in building different future scenarios. Scenarios are precise, personal and fictitious stories that portray people, specific events, products and environments. (Bell, 1997, 317).

The future views of four Finnish experts gathered up in interviews were analyzed with the SWOT analysis. The SWOT analysis has been originally produced as a strategic management tool for business to analyze the internal Strengths and Weaknesses and the external Opportunities and Threats of the activity (Robbins & Coulter, 1996, 244-245). The SWOT tool is useful in analyzing any other activities as well. The SWOT analysis of future mobile learning practices began with internal strengths and weaknesses from a learner's point of view. The possible effects of the future mobile learning practices were then evaluated as external opportunities and threats.

The study

Finnish mobile learning experts

The first part of data was collected from the four Finnish mobile learning experts with interviews in January – March 2003. Three of the Finnish experts were male and one was female. One of the Finnish mobile learning expert works as a researcher at the Technical University of Tampere and has experience of developing a mobile learning platform. He studies the usage of wireless communication technology. Two of the experts work at the University of Helsinki, Educational Centre for ICT, as a project manager and a researcher. Both of them have experience studying use of mobile devices at a primary school level, especially in the field of teacher training. The last expert works at Turku School of Economics and Business Administration. She works as a project manager of Finland Futures Research Centre and has experience on studying future-oriented way of learning.

The SWOT analysis was performed in order to better categorize the Finnish experts views about mobile learning

and to compare their views to the MOBIlearn project international experts' views. The future views of the Finnish mobile learning experts (Table 1) were constructed into a narrative scenario in order to make it easier for the MOBIlearn experts to reflect their own views about this area. The story contained also themes presented in Mobile Learning Components model. In November 2003 a questionnaire containing the story and some multiple choice and open questions was published in the Internet and linked to the MOBIlearn project homepage.

Table 1. The future views of the Finnish experts.

Interaction-interactivity	Flexible and rich one to one, one to many communication which brings with itself need to recognize the right media to right task.
Community-individual	An individual learner is able to contact without impediment a learner community which makes the learner feel himself committed member or the community.
Positionality-contextuality	The mobility of the media supports learning activities to take place in unexpected meaningful contexts.
Personal-intimate	The pervasiveness of the media and making notes of personal observations brings with itself possibility to contact an individual learner on a more personal level and make the learning products felt more personal.
Learning management-continuity	The mobile devices are seen as personal learning managers which can help in sustaining continuity in the learning process.
Informal learning	Mobile learning activities are expected to be most meaningful in work life and different from traditional formal education practices.
Skills	Learning activities taking place with the help of mobile devices require new learning skills.
Development	The future technical development and the pricing of the mobile internet decide whether activities will be possible or economically sound.
Experientalism	Adding edutainment to the mobile learning activities may have effects on the learning outcomes.
Motivation	Problems arising from everyday situations may present meaningful and motivating learning contexts.
Role of the instructor	Instructor has more responsibility in bringing continuity to the activities.

International mobile learning experts

The second respondent group consisted of the international experts participating in the MOBIlearn consortium. The estimated number of the expert population is about 50. As we got 14 responses, the response rate is only 28%. Two of the international respondents were females. The experts represent following research units from eight countries: The Open University (UK), Sheffield Hallam University (UK), Danish University of Education (Denmark), Indira Gandhi National Open University (India), Athabasca University (Canada), University of Zurich (Switzerland), OtterSurf Laboratories (US), Fratelli Alinari SpA (Italy), Texas Instruments (US), Ciberespacio SL (Spain) and University of Wisconsin (US). Five of the respondents were researchers, three were directors, one was principal lecturer and one was professor. Their special areas cover systems design & integration, curriculum, distance education, mobile learning, -content, learning technology and knowledge representation. The international experts were asked to estimate their competence in the area of mobile learning on a 1 (beginner) to 5 (expert) scale. Both the median and mode was 4.

The experts evaluated a scenario built upon the Finnish experts SWOT analysis with an online survey that was active in MOBIlearn homepage November 2003 – March 2004. The mobile learning components model is to be applied as a theoretical framework for both design and evaluation methods for mobile learning. The MOBIlearn experts evaluated the validity of the model in relation to the scenario. The overall concept of the study was to estimate the congruity of the Finnish and international experts conceptions of mobile learning.

The MOBIlearn experts were asked to evaluate the strengths, weaknesses, opportunities and threats of mobile learning presented in a narrative scenario. In the on-line questionnaire three out of six Mobile Learning Components were presented to respondent by random selection. The experts were asked to evaluate the components in the context of the story, and more widely, in the overall context of mobile learning. Half of the components were not presented in order to let the experts themselves define possible other missing aspects. By

randomizing the presented components we wanted to study their order of importance to the experts, and also to validate Mobile Learning Components model.

Findings

Next we present frequencies and percentages of the responses of MOBIlearn experts to the online surveys multiple-choice questions. The response scale for all questions was from 1 to 5. The story was presented to the respondents two times: First time was about the SWOT analysis of future views (Table 1), and the second time was about relevance of the Mobile Learning Components model.

The SWOT analysis

Most experts (9 out of 12, 83.4%) thought that the story was plausible or fully plausible. Mode of the responses was 4, and the response options for this question was (1) "not at all" – (5) "fully". When the experts were asked, "How balanced do you feel the weaknesses and the strengths were in the *story*?" the mode of answers was 4 indicating emphasis on strengths. When the question was specified to cover mobile learning in general, the mode had two values: 2 and 4(median 3). The mode of 4 for question "How were the threats and opportunities balanced in the *story*?" indicated that respondents felt the story covered more opportunities than threats. The mode dropped with this question to 3 when it was broadened to cover mobile learning in general.

As the SWOT of the Finnish and MOBIlearn experts were compared, the original categorizations of Finnish experts future views were applied also to the MOBIlearn experts' arguments. This was done in order to better compare the future views but the views also shared enough likeness in order to use consistent categorization (summary in the Table 2). However, additional future views occurred: "*Access to resources:* Ability to access information when mobile and multiple means to get in contact" and "*Information overload:* Increasing amount of information and communication".

Table 2. The SWOT analysis of the Finnish (F, n=4), and the MOBIlearn (M, n=14) experts' future views.

Strengths	F	M	*Opportunities*	F	M
Interaction-interactivity	•	•	Interaction-interactivity	•	•
Community-individual	•	•	Community-individual	•	•
Positionality-contextuality	•	•	Positional- contextuality	•	•
Personal-intimate	•		Personal-intimate	•	
Informal learning	•	•	Learning management-continuity	•	•
Learning management-continuity	•		Skills	•	•
Access to resources		•	Experientalism	•	
			Motivation	•	
			Access to resources		•
Weaknesses	F	M	*Threats*	F	M
Personal-intimate	•	•	Personal-intimate	•	•
Development	•	•	Positional- contextuality	•	•
Learning management-continuity	•	•	Interaction-interactivity	•	•
Skills		•	Learning management-continuity	•	
Information overload		.	Development	•	•
			Role of the instructor	•	
			Experientalism	•	
			Skills		•
			Access to resources		•

The Finnish and MOBIlearn experts raised mainly the same issues in mobile learning according to the SWOT analysis. The MOBIlearn experts saw the formation of mobile learning community more relevant than the personal learning, which mostly presented weaknesses and threats to the mobile learning.

The Mobile Learning Components analysis

When only half of the Mobile Learning Components were randomly presented to the MOBIlearn experts, four respondents agreed (33,3%) and four disagreed (33,3%) when asked "How well were the themes covered in the story?" and " How well do they characterize mobile learning in general?" They pointed out that communication needs of various work communities in mobile learning were missing (connection to component 6). In addition, our other preliminary conclusion that individual actors should be notified of relevant activities in relation to the community's goals (connection to component 2) was noticed missing by some respondents. The MOBIlearn experts also stressed that the individual actors awareness of other people, collaboration and contexts should be supported (connection to components 3 and 6). The experts pointed out that developing countries would value off-line access, and support is needed for synchronous and/or collocated situations and general access to material (connection to component 4).

The MOBIlearn expert's responses indicated that the most important themes in the mobile learning in general are contextuality in learning (component 3) and flexible communication (component 6). The experts found the following two Mobile Learning Component to be the least important: (1) continuity and adaptability and (5) support for time and learning management. (Table 3.)

Table 3. Summary of the MOBIlearn expert's evaluations of the randomly presented themes.

	Was the theme present in the story?	How important is the theme in the mobile learning in general?	Was the theme accurately defined?
	1 (not at all) – 5 (fully) *Mode*	1 (not at all) – 5 (fully) *Mode*	1 (not at all) – 5 (fully) *Mode*
Theme A. Contextuality in learning; is the context of learning better recognized in mobile learning process? *(n=4)*[1]	4	5	4
Theme B. Continuity between learning contexts; how to support flexible learning in varying contexts? *(n=6)*[1]	2	3	3
Theme C. Flexible communication; how to enhance communication between peer-learners? *(n=7)*[1]	4	5	3
Theme D. Learning as a personal process; are the learning products taken personally? *(n=8)*[1]	4	4	3
Theme E. Time and learning management; how to support learner's self-monitoring and regulatory processes? *(n=5)*[1]	3	3	3
Theme F. Accessibility; what kind of skills and access is requested? *(n=6)*[1]	3	4	3

Note. 1 = The number of respondents for each dimension varies as the themes were grouped into six sub groups and randomly presented to the respondents as follows: Group 1 (Themes A, F and C), Group 2 (Themes F, C and D), Group 3 (Themes C, D and B), Group 4 (Themes D, B and E), Group 5 (Themes B, E and A), and Group 6 (Themes E, A and F).

The MOBIlearn experts, when asked to give additional definitions to the presented Mobile Learning Components, pointed out that *component 3* should cover especially the learning outside classrooms. There is need to differentiate "impaired" (busy, short and spontaneous moments which are not perfect for reflection) learning that takes place best in mobile devices and "traditional" (certain allocated time and place) learning. The experts suggested that *component 2* should stress the highly self-regulatory nature of mobile learning but also that there are other parties involved and influencing the individual learners learning activities. The international experts stressed the role of disabled and other non-standard groups in *component 4*. Finnish experts defined that component previously as functionality a learner requires from a mobile learning infrastructure (devices, networks). To make the component clearer, international experts suggested differentiating these two strands of accessibility. In the *component 6* it was pointed out by international experts that flexible communication requires

seamless cooperation of different types of communication methods and techniques. For example, enhancing learner's context awareness and the awareness of other people's availability opens up various new opportunities to communicate with other learners. The components 1 and 5 did not receive any additional definitions.

Conclusions

The major goals of this study were 1) to compare both Finnish and international MOBIlearn project mobile learning experts future views on the mobile learning, and 2) to test the theoretical model of Mobile Learning Components. The first goal was studied with a Delphi method in three stages. Firstly, a scenario using a SWOT analysis was built on the basis of future views of four Finnish mobile learning experts. Secondly, the scenario was presented to international experts participating in the MOBIlearn project. Thirdly, Finnish and international experts future views were compared.

The Finnish and the international MOBIlearn experts shared mostly the views on the future of mobile learning including 1) Interaction-interactivity, 2) Community-individual, 3) Positionality-contextuality, 4) Personal-intimate, 5) Learning management-continuity, 6) Informal learning, 7) Skills, 8) Development, 9) Experientalism, 10) Motivation and 11) Role of the instructor (Table 1). However, the MOBIlearn experts tended to be more skeptical in their views, pointing out two additional future views: 12) Access to resources and 13) Information overload. Finnish experts emphasized the personal aspects of learning in their future views, when MOBIlearn experts saw community issues more relevant.

The international mobile learning experts mainly supported theoretical framework of this study consisting of the Mobile Learning Components. The strongest components include (2) Learning as a personal process, (3) Contextuality in learning, (4) Accessibility and (6) Flexible interaction. The weakest components, i.e. those not mentioned by the international experts, were (1) continuity and adaptability and (5) support for time and learning management. With the present results we can conclude that while some of the Mobile Learning Components may require further development, their general structure seems to be valid.

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