Identify Research Priorities and Needs for Mobile Learning Technologies in Open and Distance Education: A Delphi Study

Abstract

The main purpose of this paper was to identify, categorize and rank the future research priorities and needs for Mobile Learning Technologies. Based on the main purpose of this study, the key research inquiries are: 1) What are the major research issues and challenges identified by the online workers for Mobile Learning Technologies over the next ten years?; 2) What are the major research categories identified by the online workers for Mobile Learning Technologies over the next ten years?; 3) What are the major research priorities identified by the online workers for Mobile Learning Technologies over the next ten years?; and 4) What are the major research needs identified by the online workers for Mobile Learning Technologies over the next ten years?. This is a quantitative study that utilizes both quantitative and qualitative data to provide detailed information to the researcher for the data collection. The Delphi Study was used to represent a constructive communication device among a group of experts. A total of 72 participants (24 female and 48 male) were selected and all of them completed all three rounds of the study. These experts identified top research issues and challenges, categories, priorities and needs for Mobile Learning Technologies.

Keywords: Research needs and priorities, mobile learning technologies, open and distance education, Delphi Study, distance education

Identify Research Priorities and Needs for Mobile Learning Technologies in Open and Distance Education: A Delphi Study

Introduction

A gradual systematic development of current difficulties, dilemmas and arguments in *Mobile Learning Technologies*, and the ways they are being faced and should be overcome. The need for clear definitions and critical actions has never been more pressing. On one hand, *Mobile Learning Technologies* in distance education has been modeled and influenced by a variety of new communication technologies. There are patterns and customs of *Mobile Learning Technologies* which has been brought over from novel improvements in online communications. On the other, as noted by Burniske and Monke (2001), we should carefully identify future research needs and priorities which have affected and modified the developments of *Mobile Learning Technologies* in a post-modem world to learn how to break down the digital walls. These two issues are indispensable elements which involve higher education institutions in developing an accurately unique democratic system and technology plan for distance education.

For diverse imperatives, such as technological mandates, public dissatisfaction with *Mobile Learning Technologies*, influence of responsible online workers, and the priorities and needs of *Mobile Learning Technologies* through a critical approach can be performed not only with increasing frequency, but also with growing quality in empowering online communications. *Mobile Learning Technology* researches should address practical and technical issues, and also concentrate on the philosophy of interactive online communications by critically revising ultimate goals and objects of online programs. *Mobile Learning Technologies* have provoked serious studies. However, there is little evidence that the future researches have had an impact on Open and Distance Education. Online workers (such as online communication designers, online

learners, online support staff, online managers, online stakeholders, etc.) need to routinely read researches in *Mobile Learning Technologies* and other ways to up-to-date oneself keep current with research findings. Furthermore, these workers should incorporate researches into their decision-making and focus on the future trend of *Mobile Learning Technologies*. Identifying future research needs and priorities for *Mobile Learning Technologies* is committed to the suggestions that underline understanding of these improvements. The social, societal, and politic circumstances of a free society can be made available to online workers to have a simple view of their roles with *Mobile Learning Technologies* as distance education leaders on their own digital worlds as well as in the impacts of these technologies in the international milieus.

Purpose

In the recent years, there has been a rapid movement on the powerfully utilization of the approaches, methods and techniques of *Mobile Learning Technologies* for converging social, societal and political problems in the near future. One of the major issues appearing perpetually throughout this concern is that of how to identify global values, norms and ethics which may find priorities of importance among diverse needs in the digital world (Green, 2002; Hine, 2003; Kirby, 1999; O'Sullivan, Morrell, & O'Connor, 2002; Perrons, 2004). Therefore, establishing interactive online communication environments empowered by *Mobile Learning Technologies*, designed to change our future virtual life is doing and what it undertakes to do, is one of the most complicated problems faced by online workers. As mentioned by Dhillon (2002), making right decisions to maintain and improve online workers' social responsibilities in the information age is important not only because of our increased dependence on *Mobile Learning Technologies*, but because these online communication technologies pose complex challenges, which will have a greater significance in the near future as well. In addressing major research priorities and needs

as a way of scrutinizing the major research issues and challenges for *Mobile Learning Technologies* in the near future. These must be clearly identified and categorized as well as ranked on the basis of research and also on the online workers' values, norms and ethics toward the revolutionary communication technologies. The main purpose of this research, therefore, is to identify, categorize, and rank the future research needs and priorities of *Mobile Learning Technologies*. Based on the main purpose of this study and the concerns discussed above, these four research questions have been developed to prioritize the goals and directions:

1. What are the major research issues and challenges identified by the online workers for *Mobile Learning Technologies* over the next ten years?
2. What are the major research categories identified by the online workers for *Mobile Learning Technologies* over the next ten years?
3. What are the major research priorities identified by the online workers for *Mobile Learning Technologies* over the next ten years?
4. What are the major research needs identified by the online workers for *Mobile Learning Technologies* over the next ten years?

In short, this paper aims to provide a rich collection of the online workers' ideas about projecting the future trends of *Mobile Learning Technologies* and enriching the prospect analysis and practices in this area as a complex decision making process. The use of *Mobile Learning Technologies* will be different from the conservative implications developed in recent decades. Understanding the future research priorities and needs of these technologies can help online workers be more successful in their current professional roles.

The Background of the Study

Understanding the future priorities and needs of *Mobile Learning Technologies* can help online workers understand how to manage their role tasks, and give careful attentions to diverse

online community. Besides, they can understand their important roles and responsibilities how to establish global values, norms and ethics by utilizing *Mobile Learning Technologies*. Therefore, this article has combined the *Media Richness Theory* and *Radical Constructivist Theory* together as the theoretical and philosophical foundations of *Mobile Learning Technologies*. These theories can help the researcher conduct a Delphi study as well.

This article addresses the *Media Richness Theory* to identify, categorize and rank the future research needs and priorities of *Mobile Learning Technologies* recognized by the online workers. *Media Richness Theory* is based on contingency theory and information processing theory that is one of the most widely used media theories. It argues that task performance is improved when task information needs are matched to a medium\'s richness or its "…*capacity to facilitate shared meaning* (Daft, Lengel, & Trevino, 1987, p. 358)." *Media Richness Theory* points out that media vary in certain uniqueness that affects personal ability to communicate rich information. According to Daft and Lengel (1986), information richness can be defined as the ability of information to change understanding within a time interval, and also media being capable of sending rich information better suited to tasks with equivocal information. Moreover, they mentioned that this theory concludes which media should prove most effective in what situations. As highlighted by Kahai and Cooper (2003), empowering online communications via *Mobile Learning Technologies* as richer medium can have significantly positive impacts on design quality that effects of participant deception can be mitigated by employing a critical pedagogy approach. As mentioned by Kurubacak (2006), based on these concerns, online workers appraise the quality of online communications whereas they decrease ambiguity about authentic practices. In this context, the critical pedagogy approach can decrease ambiguity through the theory of *Media Richness* for empowering online communications. As highlighted

by Kahai and Cooper (2003), empowering critical online communications as richer medium can have significantly positive impacts on generating democratic online societies.

The American psychologist Glasersfeld as the founder of *Radical Constructivist Theory* (1987; 1991; 1995), which is part of a larger constructivist movement in the philosophy and sociology of science (Schwandt, 1994), and discuss two main issues (Glasersfeld, 1989, pp. 162): 1) knowledge is not passively received but actively built up by the cognizing subject; and 2) the function of cognition is adaptive and serves the organization of the experiential world, not the discovery of ontological reality. Glasersfeld claims that knowledge is the self-organized cognitive process of the human brain (1987; 1991; 1995). That is the process of constructing knowledge regulates itself that knowledge is a construct rather than a compilation of empirical data. Therefore, it is impossible to know the extent to which knowledge reflects an ontological reality. As discussed by Raskin (2002), Glaserfeld's radical constructivism emphasizes the ability of human beings to use the understandings they generate to help them navigate life, and asserts that human perception is adaptive in the same vein sees human cognition as a closed system. In this context, *Mobile Learning Technologies* can provide learners with being capable only of knowing when their constructions of events fail, but are never capable of knowing truth in any kind of direct and objective manner. Replacing an emphasis on the validity of human perception with an emphasis on its viability can help online workers understand the future priorities and needs of *Mobile Learning Technologies*.

Mobile Learning Technologies provide online workers with radical constructivist communication milieus combined with the principles and strategies of the *Media Richness Theory* (Daft and Lengel, 1986; Daft, Lengel, & Trevino, 1987) that helps online workers concentrate on significantly decreasing the boundaries of time and space. This is an alternative

approach to the problem of knowledge and knowing about the future priorities and needs of *Mobile Learning Technologies*. Coming to know is this process of dynamic adaptation towards viable interpretations of experience that online workers construct necessary knowledge of a real world. *Media Richness Theory* help online workers look closely at the extent that the human environment affects their learning experiences. As described by Corrent-Agostinho and Hedberg (2000), a radical constructivist learning environment based on *Media Richness Theory* has four general principles: 1) learning is a process of construction; 2) learning occurs through social negotiations of meaning; 3) learners are immersed in authentic contexts; and 4) reflective thinking is an ultimate goal. These generic principles can be implemented in practice and direct how *Mobile Learning Technologies* can be incorporated. Doolittle (2006) discusses that *Radical Constructivism* is concerned with the construction of mental structures, the position of cognitive constructivists, and the construction of personal meaning. In this sense, *Media Richness Theory* and *Radical Constructivism Theory* can be the theoretical and philosophical foundations of this study to gather invaluable information in detail about the future priorities and needs of *Mobile Learning Technologies*. As discussed by Doolittle (2006), recognizing these social interactions as a source of knowledge helps online workers build a viable model of experience formed within an individual influenced by the global context within which an activity was experienced.

Method

This is a quantitative study that aims to identify, categorize, and rank the future research priorities and needs for *Mobile Learning Technologies*. Furthermore, this study provides the participants with identifying the major research issues and challenges for *Mobile Learning Technologies* over the next ten years emerging from the complex problems of people and natural sources. For these reasons, this research utilized both qualitative and quantitative data to provide

the information in detail to the researcher for the data collection. Moreover, the combination of these methods helped the author generate new perspectives and stimulate new directions in the data analysis. The methodology combinations provided data triangulation from a variety of data sources, and also methodological triangulation from multiple methods (Patton, 1990). Therefore, the researcher overcame the natural prejudices that may derive from a single research method. The researcher was a center of the analytic process and had a very crucial role on the credibility issue.

Despite considerable variance in application of the technique, the Delphi Study was used in this study to represent a powerful communication device among a group of experts. The Decision Delphi application was utilized to reach decisions amongst a diverse group of people with different ideas for the solution (Woudenberg, 1991). As noted by Helmer (1994), facilitating the formation of a group judgment in this Decision Delphi was the reliable exploration of ideas and the production of suitable information for decision making. This helped the researcher optimize the use of group opinion while diminishing the contrary qualities of interacting groups. As mentioned by Adler and Ziglio (1996), furthermore, this application was conducted in the study based on a structured process for carefully collecting in-depth knowledge from a group of distance education experts by means of a series of questionnaires interspersed with controlled opinion.

Research Setting and Participants

This research was conducted completely online during the 2005-2006 school year. The researcher sent email messages to the different professional listservs to both introduce her study and ask the digital people whether they would like to participate in this research voluntarily. 117 participants volunteered after the first call, 45 of them chose not to participate in this study. They

were excluded from the research study with no penalty. The researcher assembled an online panel of 72 online workers (24 female and 48 male) from across the world and including online administrators, online communication designers, online content providers, online learners, online support staff from the broad area of Open and Distance Education. A total of 72 participants were selected and all of them completed all three rounds of the study. These expert panelists identified top research issues and challenges, categorize, priorities and needs of the future researches for information dissemination and partnership development between online workers. After the data were collected from the Delphi study, strategic planning around the identified research main concerns resulted in a planning document to ensure ongoing needs and priorities of research with online workers to the year 2016.

Table 1 shows that there were three female online administrators whereas there were seven female online content providers in this study. These online administrators were senior professionals in distance education area. Of six female online communication designers, the five of them (83.3%) had at most five year experiences in their professional area. Of 24 female participants, the four of them (16.6%) were either freshman or sophomore learners at the different Colleges. There were only three female online support staff, who were junior online workers whereas there were no senior female online support staff.

Table 1

The Backgrounds of the Female Participants

The Professional Area in Distance Education	Online Administrators				Online Communication Designers				Online Content Providers				Online Learners				Online Support Staff			
Gender	0 - 1 Years	2 – 5 Years	6 -10 Years	11 - + Years	0 - 1 Years	2 – 5 Years	6 -10 Years	11 - + Years	0 - 1 Years	2 – 5 Years	6 -10 Years	11 - + Years	0 - 1 Years	2 – 5 Years	6 -10 Years	11 - + Years	0 - 1 Years	2 – 5 Years	6 -10 Years	11 - + Years
Female	-	-	2	1	2	3	1	-	-	1	2	4	2	2	-	-	2	1	-	-
Sub-Total 1	-		3		5		1		1		6		4		-		3		1	
Sub-Total 2	3				6				7				4				4			
TOTAL	24																			

Table 2 indicates that there were totally six male online administrators whereas there were 11 male online communication designers in this study. These online administrators were senior professionals in distance education area. Of 12 male online content providers, the five of them (41.7%) had at most five year experiences in their professional area whereas the rest of them had six or more than six year experiences. Of 48 male participants, the 10 of them (20.8%) were either junior or senior online support staff.

All participants were asked individually to read and sign the online informed consents form, which described the research in detail. Therefore, they participated voluntarily in this research.

Table 2

The Backgrounds of the Male Participants

The Professional Area in Distance Education	Online Administrators				Online Communication Designers				Online Content Providers				Online Learners				Online Support Staff			
Gender	0 - 1 Years	2 – 5 Years	6 -10 Years	11 - + Years	0 - 1 Years	2 – 5 Years	6 -10 Years	11 - + Years	0 - 1 Years	2 – 5 Years	6 -10 Years	11 - + Years	0 - 1 Years	2 – 5 Years	6 -10 Years	11 - + Years	0 - 1 Years	2 – 5 Years	6 -10 Years	11 - + Years
Male	-	1	3	2	2	6	2	1	2	3	2	5	3	3	1	2	2	3	4	1
Sub-Total 1	1		5		8		3		5		7		6		3		5		5	
Sub-Total 2	6				11				12				9				10			
TOTAL	48																			

Data Sources

This Decision Delphi Study began with a questionnaire designed by the researcher, and the survey was posted on a secure Internet Website to a small team and a larger group of experts. At the end of the survey, a series of questions seeking feedback about the survey was posted. After the questionnaire was returned, the researcher summarized the results. The evaluative portion was asked for specific feedback about survey content and layout, as well as addressing issues of issues and concerns, categories, priorities and needs of *Mobile Learning Technologies*. At the end of the evaluation form, a question was added asking if there was anything else they would like to address. Participants were advised to visit the Website and complete the survey and the evaluation form. They were allowed to complete the survey on the Website. The experts were allowed the opportunity to change their responses based on the results, and these second-round

and third-round results were revaluated by the researcher. This process continued until consensus was reached and also it would become clear that no consensus is possible.

A *Delphi Study* was designed to develop the instrument for the *Mobile Learning Technologies* survey. The incorporation of the Delphi method in the Internet milieu makes possible a number of significant refinements of the priorities and needs to the nature of *Mobile Learning Technologies*. The Delphi method was used to take advantage of the judgments of a group of experts for the purpose of making decisions, determining needs and priorities, and also making predictions. It provided an opportunity to obtain diverse opinions from a wide variety of experts across the world. Besides, the Delphi method allowed each expert to share her/his opinion, without being pressured by others in the group. The survey data was grouped according to the four sub-research questions: 1) the major research issues and challenges; 2) the major research categories; 3) the major research priorities; and 4) the major research need. As noted by Osborne, Ratcliffe, Collins, Millar and Duschl (2000), the number of rounds for a Delphi Study will be determined by how efficiently the panel reaches consensus. On the other hand, many Delphi studies confine themselves to three rounds due to pragmatic reasons. For such reasons of time, therefore, a three-round Decision Delphi application was chosen to determine the extent to which consensus exists among experts within the distance education community about the future research priorities and needs of Mobile Learning Technologies.

Data Analysis

This Delphi Study process essentially provided an interactive communication structure between the researcher and experts in the distance education in order to identify, categorize and rank the future research needs and priorities for *Mobile Learning Technologies*. Both qualitative and quantitative questions asked the experts and the information was then analyzed and feed

back to each person, via further questions, and their responses were analyzed again recycled for feed back, and so on, until the goal was reached, that was when a consensus was reached which offered synthesis and clarity on the question. As noted by Rockwell, Furgason and Marx (2000) and Osborne, Ratcliffe, Collins, Millar and Duschl (2000), each step of this three-round Decision Delphi Study is described below:

In the first round of Delphi panel, the items were rated from *very important* to *very unimportant*. The first round instrument was posted on a World Wide Web page. All of the panel participants accessed and answered the questionnaire electronically. Seventy-two panel members participated in the first round. In the second round of Delphi panel, mean scores were calculated for each item from the first Delphi Panel response using a five-point scale (*very important* =1; *important* = 2; *neither important or unimportant* = 3; *unimportant* = 4; and *very unimportant* = 5). For the Delphi panel's second instrument, the mean score was marked on an importance scale for each of the original items; panel members were then asked to rate the accuracy of the mean scores using a three-point scale comprised of *should reflect More Importance, is an Accurate representation of importance* and *should reflect Less Importance*. From the comments written in on the first round, eight new items were added to the second round questionnaire. Respondents were asked to rate the importance of these items using the same five-point scale employed in the first round instrument. Seventy-two panel members completed the second round instrument. Finally, in the last round of the Delphi Study, *frequency distributions* were calculated for the accuracy ratings given to each of the original items. The mean scores of the second round were adjusted based on the net difference between the proportions of responses, demonstrating the item was judged either *more important* or *less important*. The adjusted means were added to the instrument for a third round. The third round instrument again asked for a rating of the accuracy

of the mean scores using a three-point scale (*should reflect More Importance*, is *an Accurate representation of importance* and *should reflect Less Importance*). In this study, methodically facilitating the online communications took place via several stages of the researcher asking questions, undertaking analysis, and providing feedback.

Three faculty, who were experts in distance education, coded the participants' responds in the reliability check process. Therefore, this Decision Delphi study process, as a recognized research technique, helped to strengthen the validity of the results considerably. As mentioned by Patton (1990) and Turoff and Hiltz (1996), the anonymous and iterative nature of this process allowed the participants to submit their diverse opinions and make their critical decisions without meeting in person. Finally, this Decision Delphi application can be broadly used to generate forecasts in *Mobile Learning Technologies* (Cornish, 1977), and to empower expeditious understanding about the future consequences of present choices (Amara and Salanik, 1972). In this study, the forecasting was a probabilistic, reasonably definite statement about the future based on an evaluation of alternative possibilities, and included "…*all efforts to project technological capabilities and to predict the invention and spread of technological innovations*…" (Ascher, 1979, p. 165).

Findings and Discussions

The present study focused on identifying, categorizing, and ranking the future research needs and priorities for *Mobile Learning Technologies*. This paper also discusses on the different factors that were necessary to take into account in attempts to investigate the major research issues and challenges identified by the online workers for *Mobile Learning Technologies* over the next ten years. This section reports the findings and embraces various insights that answer the research inquires emerged during the data analysis. These data collected from a three-round

Decision Delphi Study, which reflected exactly the participants' ideas, opinions and beliefs toward the future use of *Mobile Learning Technologies*. These helped the researcher present the authentic findings of this study in-depth. The findings of the study provide exhaustively pragmatic analysis and discussions of four main areas identified by the online workers for *Mobile Learning Technologies* over the next ten years: 1) the major research issues and challenges; 2) the major research categories; 3) the major research priorities; and 4) the major research needs. Furthermore, the overall findings of this study are briefly summarized and discussed at the end of this section.

Technological and pedagogical improvements dramatically impact communicational outcomes and applications that the design, development and delivery of *Mobile Learning Technologies* can be a balance between conceptual and theoretical knowledge (Attwell, Dirckinck-Holmfeld, Fabian, Kárpáti and Littig, 2004; Bolliger and Martindale, 2004; Bonk, 2001; Broadbent and Cotter, 2003; Chen, 2001; Ketterer and Marsh, 2006; Martins and Kellermanns, 2004; McLean, 2006; Oakley, 2004; O'Neill and Palmer, 2004; Paulson, 2002; Roffe, 2002; Rossi, 2004; Rovai, 2003; Yang and Cornelious, 2005). Therefore, the research-based explorations of distance education should cover both foundations and applications. Rockwell, Furgason and Marx (2000) strongly highlight that distance educators feel that the research and evaluation activities of distance education should focus on interactions and collaborations among institutions, distance learners, teacher preparation programs and educational outcomes. These extremely imperative topics should urge online workers to not only plan but also perform strategically to secure new supports for the maintenance of existing and development of prospect programs. In this context, the future researches of *Mobile Learning*

Technologies may be able to offer powerful evidence of research into the affective experience of online workers.

The Major Research Issues and Challenges

The major research issues and challenges were those which provide online learners with diverse solutions to one of the future's most pressing dilemmas, problems and barriers (Table 2): How can online workers best prepare themselves for different situations of technological, pedagogical and social leadership in the global online world. Online workers were concerned about three main areas in the major research issues and challenges for *Mobile Learning Technologies* over the next ten years: public responsibility, management of online society, and specialists who are participating in building the technological and social change.

Self-criticism, self-evaluation and self-discipline must be the three key issues for empowering public responsibility with *Mobile Learning Technologies*. This is important for online workers so as to indicate a gradually increasing awareness of the challenges to prepare in multicultural online societies. Managing powerfully online societies requires that online workers must clearly analyze and delineate global ideas and trends from varying viewpoints and philosophies. They have to equally share commitment to wards the values of independent online societies. The specialists, who are participating in building the technological and social change, as future leaders, will embrace the whole range of diverse situations imbued critical decisions, reformist movements and radical actions for global public good. Online workers, therefore, should focus on preparation for their leaderships with *Mobile Learning Technologies* that derive from being familiar with democratic global online societies. Finally, online participants highlighted that it was extremely vital to realize the dialectic relationship between personal

technology and everyday learning, and less important to provide learners with ubiquitous access to information.

Table 3

The Major Research Issues and Challenges for Mobile Learning Technologies

How important is it to	
Very Important (_= 1.000 to 1.499[a])	
1.035	realize the dialectic relationship between personal technology and everyday learning?
1.043	provide critical reflects the diversity of learners?
1.057	promote strong interdisciplinary research agendas?
1.129	develop the multicultural standards of accreditation for *Mobile Learning Technologies*?
1.133	provide learners with novel opportunities for synchronous online communications?
1.258	support a range of knowledge based activities coupled with the increasing use of mobile technologies?
1.276	evaluate the usability of mobile applications?
1.295	develop individual technologies that support a person through a lifetime of learning?
1.319	adopt appropriate mixed research methodologies?
1.346	increasing access to learning opportunities in diverse societies?
1.378	promote a lifelong learning increasing the skills of the global workforces?
1.403	provide learners with all the knowledge they need to flourish throughout a lifetime?
1.421	provide learners with best practices for utilizing *Mobile Learning Technologies*?
1.461	offers new possibilities for interactive online communications?
1.485	support learning outside formal educational settings over a learner's lifetime?
1.493	access to a wireless network change the dynamics of learning-in and out of the classroom?
1.497	manage the social, societal and cultural impacts of research in *Mobile Learning Technologies*?
Quite Important (_= 1.500 to 1.999[a])	
1.509	support learning communities including new forms of improved critical thinking skills?
1.613	cope with various network conditions which must be taken into consideration?
1.697	forecast the exact situations of the mobile application use?
1.783	focus on limited bandwidth and unreliability of wireless networks?
1.794	investigate the rationale for implementing *Mobile Learning Technologies*?
1.844	develop models of diverse learners which embrace the widely varying timescale?
1.861	improve a sustainable economy for *Mobile Learning Technologies*?
1.937	develop the effective use of new mobile technologies?
1.965	improve gradually educational excellence?
1.991	provide location-based services for educational networks?
Somewhat Important (_ = 2.000 to 2.499[a])	
2.101	access to learning to broaden from traditional approaches to become part of real- life?
2.184	provide appropriate strategies for managing changes for technology implementation?
2.465	cover a variety of research topics ranging from the technologies through to socio-cultural research?
Neither Important Nor Unimportant (_ = 2.500 – 2.999[a])	
2.861	provide learners with ubiquitous access to information?

[a] **Scale: 1** = Very important **2** = Important **3** = Neither important nor unimportant **4** = Unimportant **5** = Very unimportant

The Major Research Categories

The major research *categories* were those that helped to define the important and urgent research areas of *Mobile Learning Technologies* (Table 4). Online workers emphasize that their new roles, multicultural curriculum global patterns influenced by *Mobile Learning Technologies* and interactive synchronous communications as well as cultural biases and stereotypes must be some of the most important research categories in the future. *Mobile Learning Technologies*, furthermore, must supply full and accurate information on which the learners can base their judgments or public. There must be enough adjustments, agreements, diverse alternatives in integrating Mobile Learning Technologies into curricular activities. The multicultural issues of the rights of digital citizens should look for the various opportunities and respects that each person has her/his own ethics, values and norms connected to the societies they live in.

A brave step must be taken to expand the extent of stakeholder's involvements in the immediate future. Existing programs, therefore, run by different educational institutes from the world reevaluate their programs in light of current inside and outside trends. The *Mobile Learning Technology*–based programs should focus on the cultural biases and stereotypes and philosophy of mobile learning as well as current trends that influence the technological managements and leaderships. Besides, mobile courses should be delivered with the potential of coping with both the individual and global responsibilities for critical decision-making in social, societal and political online milieus. All courses supported by *Mobile Learning Technologies* can be referred to not only bring about excellence to distance education but education for equal

freedom as well. Therefore, online workers can moderate online courses to deal with the development of global issues.

Table 4

The Major Research Categories for Mobile Learning Technologies

How important is it to	
Very Important (_= 1.000 to 1.499[a])	
1.121	changing roles
1.234	multicultural curriculum
1.237	global patterns influenced by *Mobile Learning Technologies*
1.301	interactive synchronous communications
1.357	cultural biases and stereotypes
1.389	the philosophy of mobile learning
1.397	current trends that influence the technological managements and leaderships
1.411	global values, ethics and norms
1.427	trends outside of the organizations
1.466	stakeholder involvements
Quite Important (_= 1.500 to 1.999[a])	
1.516	higher accountability
1.683	funds for *Mobile Learning Technologies*
1.941	infrastructure developments
Somewhat Important (_ = 2.000 to 2.499[a])	
2.267	computer hardware and software developments
2.378	internal institutional trends
Neither Important Nor Unimportant (_ = 2.500 – 2.999[a])	
2.531	interactive asynchronous communications
2.736	best practice models
2.811	faculty reward systems

[a] **Scale: 1** = Very important **2** = Important **3** = Neither important nor unimportant **4** = Unimportant **5** = Very unimportant

Online workers would like to focus on the diverse views, biases, opinions, stereotypes and prejudices of management in *Mobile Learning Technologies*. On the other hand, ranking as less important are computer hardware and software developments, and internal institutional trends. There are meager means of getting the internal viewpoints across without involving

hardware and software developments in distance education. Results indicate less interest in investigating interactive asynchronous communications, providing online workers best practice model and faculty reward systems.

The Major Research Priorities

The major research priorities were those that relate to how the programs delivered via *Mobile Learning Technologies* are addressing specific curriculum areas by diagnosing communication problems and ensuring privacy for the distance learners as well as enhancing different capabilities for rich social interactions. In this case, the priority should be given to those strategies, which are completely in keeping with the global agreements to equality of diverse opportunities. As a result of these activist movements, online workers should expand their abilities to provide learners with exploring emerging practices relating to the use of *Mobile Learning Technologies* and adopting suitable applications that match the needs of the digital world.

To promote learning within authentic contexts and find new strategies based on learners' previous and current knowledge should affect the shaping of learning and communication events with new dimensions in providing interactive course materials to learners. On the other hand, online workers point out that encouraging online educators and technical developers to rethink their roles and responsibilities will help them plan and control their leadership roles in technologically surrounded learning settings. The appropriate use of *Mobile Learning Technologies* can help online workers focus on improving more diverse skills for context awareness in authentic concerns.

Online workers were less interested in connecting mobile devices to data collection devices and a common network, and identifying the different types of mobile technologies that were applicable.

Table 5

The Major Research Priorities for Mobile Learning Technologies

How important is it to	
Very Important (_= 1.000 to 1.499[a])	
1.124	address specific curriculum areas?
1.142	diagnose communication problems that learners have with *Mobile Learning Technologies*?
1.197	ensure privacy for the distance learners?
1.296	enhance different capabilities for rich social interactions?
1.352	explore emerging practices relating to the use of *Mobile Learning Technologies*?
1.378	adopt suitable applications that match the needs of the digital world?
1.391	design difficult activities simulated from real-life?
1.417	provide interactive course materials to learners ?
1.431	promote learning within authentic contexts?
1.469	prompt interactive communications within diverse culture?
1.473	find new strategies based on learners' previous and current knowledge?
1.494	develop strategies that map efficiently to the curriculum needs?
1.496	become more embedded with diverse skills for context awareness?
Quite Important (_= 1.500 to 1.999[a])	
1.507	encourage educators and technical developers to rethink their roles and responsibilities?
1.546	move more and more outside of the traditional classroom?
1.592	empower learning through social interactions?
1.637	ensure security for the distance learners?
1.644	assist in the management of learners and resources for online communication activities?
1.783	investigate advantages and disadvantages of each *Mobile Learning Technology*?
1.968	investigate a cost model for infrastructure, technology and services?
Somewhat Important (_ = 2.000 to 2.499[a])	
2.236	consider the use of mobile technologies for student administration tasks?
2.471	present a main guideline to empower current educational practices?
Neither Important Nor Unimportant (_ = 2.500 – 2.999[a])	
2.532	utilize new technologies for attendance reporting and reviewing student marks more effectively?
2.578	customize *Mobile Learning Technologies* for individual learners?
2.712	connect mobile devices to data collection devices or a common network?
2.794	identify the different types of mobile technologies that are applicable to learn?

[a] **Scale: 1** = Very important **2** = Important **3** = Neither important nor unimportant **4** = Unimportant **5** = Very unimportant

The Major Research Needs

The major research *needs* were those that helped online workers facilitate designing and delivering distance programs supported by *Mobile Learning Technologies*. Results indicated that although there were significant interests to link to multicultural activities in the outside world and consider the use of mobile technologies to support group learning, power, authority and ownerships could have a changed relationship in the novel technological milieus (Table 6). This must be a specific concern as the public, private and global forms of corporate attempts move to new dimensions in democracy, multiculturalism and other influence to online society. Besides, online workers underlined that providing learners with authentic guidelines as to how the real-life problems might be supported intentional online learning activities as well as drawn on context-aware applications to enhance the multicultural learning activities were important. The viewpoints of the experts indicated that the advent of *Mobile Learning Technologies* could build completely new communication and learning environments. These experts would like to concentrate on these technological developments that majority of their values, ethics and norms can be overwhelmingly affected by this digital world. Their general concern was t that they could adapt themselves to the learning and communication environments by addressing diverse issues along with more practical concerns such as cost, usability and relevance of pedagogical, methods dealing with multicultural issues that did not immediately inform practices, and considering the various intersections of context, technology and learners.

Results indicate very less interest in providing learners with the various potentials to escape the classroom whereas facilitating for informal online communications and developing strategies for the management of mobile equipment depend on the social, economical and technological growth of institutions.

Table 6

The Major Research Needs for Mobile Learning Technologies

How important is it to

Very Important (_= 1.000 to 1.499[a])

1.027 consider the use of mobile technologies to support collaborative learning?
1.136 transform learning into a part of real-life?
1.278 support digital interactions dedicated learning milieus?
1.279 engage in activities that do not correspond with the curriculum?
1.325 link to multicultural activities in the outside world?
1.368 consider the use of mobile technologies to support group learning?
1.371 provide effective technical supports to the faculty?
1.378 assist learners in the development of online communication skills?
1.383 construct critical cultural perspectives via *Mobile Learning Technologies*?
1.389 enhance different possibilities for online communications?
1.412 investigate issues of power and culture in *Mobile Learning Technologies*?
1.437 provide learners with authentic guidelines as to how the real-life problems may be approached?
1.475 support intentional online learning activities?
1.483 draw on context-aware applications to enhance the multicultural learning activities?

Quite Important (_= 1.500 to 1.999[a])

1.521 address diverse issues along with more practical concerns such as cost, usability and pedagogical?
1.536 address multicultural issues that do not immediately inform practices?
1.615 consider the various intersections of context, technology and learners?
1.663 assign the necessary roles for supporting mobile learning?
1.678 support human-computer interactions (HCI)?
1.754 communicate with other devices of the same and/or similar types?
1.763 provide critical developments beyond the classroom experiences?
1.768 enhance new communicational activities powerfully?
1.854 enable learners to share data, files and messages?
1.896 support for administrative duties?

Somewhat Important (_ = 2.000 to 2.499[a])

2.356 provide learners with the various potentials to escape the classroom?

Neither Important Nor Unimportant (_ = 2.500 – 2.999[a])

2.504 facilitate for informal online communications?
2.861 develop strategies for the management of mobile equipment?

[a] **Scale: 1** = Very important **2** = Important **3** = Neither important nor unimportant **4** = Unimportant **5** = Very unimportant

Conclusions

The main purpose of this research is to identify, categorize and rank the future research needs and priorities of *Mobile Learning Technologies*. This paper contains a series of original ideas, viewpoints and insights identified by the distance education experts, as online workers (online administers, online communication designers, online content providers, online learners and online support staff), on the roles and responsibilities of *Mobile Learning Technologies* over the next ten years. Although several professionals kept strong judgments about the impact of *Mobile Learning Technologies* on the social, societal and political life, the experts in this study contributed to well-articulated viewpoints from real-life experiences and indicated different ways for future researches. The critical discourses, besides, coped with numerous main issues playing the present, also, including scientific, technological and pedagogical productivity in the future.

The collected data showed that not only did the intellectual curiosity encouraged by cutting-edge technological improvements, but also the diverse relationships were changed by power and ownership in distance education that led to the various opportunities of scholarly researches and inquiries for *Mobile Learning Technologies*. A group of experts from distance education provided us with the opportunity for continuing explorations of problems, dilemmas and barriers. Finally, the responses of these experts addressed the following three main categories seemed to prevailing: 1) the distinguishing qualities and factors of technological change strongly underline the role and responsibilities of the future researches; 2) the problems of social adjustments to technological change powerfully comprise the impacts on socio-cultural patterns and democratic way of life; and 3) the responsibilities and roles of online workers professionally generate new dimensions in the process of change.

Reference

Attwell, G., Dirckinck-Holmfeld, L., Fabian, P., Kárpáti A., & Littig, P. (2004). E-Learning in Europe–results and recommendations: thematic monitoring under the Leonardo da Vinci program. *The European Commission*. Retrieved April 17, 2006, from http://bildungplus.forum-bildung.de/files/e-learning.pdf

Amara, R., & Salanik, G. (1972). Forecasting: from conjectural art toward science. *Technological Forecasting and Social Change*, *3*(3), 415-426.

Ascher, W. (1978). *Forecasting: An Appraisal for Policymakers and Planners*. Baltimore, MD: Johns Hopkins University.

Bolliger, D. U., & Martindale, T. (2004). Key factors for determining student satisfaction in online courses. *International Journal on E-Learning, 3*(1), 61-7.

Bonk, C. J. (2001). Online teaching in an online world. Retrieved June 23, 2004, from http://www.publicationshare.com/docs/faculty_survey_report.pdf

Broadbent, B., & Cotter, C. (2003). *Evaluating e-learning.* Retrieved December 24, 2004, from http://www.e-learninghub.com/articles/evaluating_e-learning.html

Burniske, R. W., & Monke, L. (2001). *Breaking Down The Digital Walls: Learning To Teach-In a Post-Modem World*. Albany, NY: State University of New York.

Chen, Y. J. (2001). Dimensions of transactional distance in the World Wide Web learning environment: a factor analysis. *British Journal of Educational Technology, 32*, 459–470.

Corrent-Agostinho, S., & Hedberg, J. (2000). Radical constructivism and beyond the information given: emergent models from a postgraduate web-based course. *World Conference on Educational Multimedia, Hypermedia and Telecommunications 2000*(1), 244-249. Retrieved January 27, 2002, from http://dl.aace.org/1250

Cornish, E. (1977). *The Study of the Future*. Washington, D.C.: World Future Society.

Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design, *Management Science*, *32*(5), 554-571.

Daft, R. L., Lengel, R. H., & Trevino, L. K. (1987). Message equivocality, media selection and manager performance: implications for information systems. *MIS Quarterly*, *11*(3), 355-366.

Dhillon, G. (2002). S*ocial Responsibility in the information Age: Issues and Controversies*. Hershey, PA: Idea Group.

Doolittle, P. E. (2006). Constructivism and Online Education. Retrieved April 04, 2006, from http://edpsychserver.ed.vt.edu/workshops/tohe1999/text/doo2.doc

Glasersfeld, E.v. (1987). *The Construction of Knowledge.* Seaside: Intersystems.

Glasersfeld, E. v. (1989). Constructivism in education. In T. Husen and T. Neville Postlethwaite (eds.), *The International Encyclopedia of Education Research and Studies* (pp.162-163). Supplementary Volume 1. Oxford, UK: Pergamon.

Glasersfeld, E.v. (1991). Knowing without Metaphysics: Aspects of the Radical Constructivist Position. In F. Steier (ed.), *Research and Reflexivity* (pp. 12-29). London, UK: Sage.

Helmer, O. (1994). Adversary Delphi. *Futures*, *26*(1), 79-88.

Hine, C. (2003). *Virtual Ethnography*. Thousand Oaks, CA: Sage.

Holtorf, C. J. (1995). 'Object-orientated' and 'problem-orientated' approaches of archaeological research—reconsidered. *Hephaistos*, *13*, 7-18. Retrieved April 21, 2006, from http://members.chello.se/cornelius/hephaistos.html

Kahai, S. S., & Cooper, R. B. (2003). Exploring the core concepts of media richness theory: the impact of cue multiplicity and feedback immediacy on decision quality. *Journal of Management Information Systems*, *20*(1), 263–299. Retrieved February 10, 2006, from http://jmis.bentley.edu/articles/v20_n1_p263/

Ketterer, J. J., & Marsh, G. E. (2006). Re-conceptualizing intimacy and distance in instructional models. *Online Journal of Distance Learning Administration*, *9*(1). Retrieved March 08, 2006, from http://www.westga.edu/%7Edistance/ojdla/spring91/ketterer91.htm

Kirby, M. (1999). *Stratification and Differentiation*. London, UK: Macmillan Press.

Kurubacak, G. (2006). Evaluation of educational management systems. *Journal of Educational Technology*, *2*(4), 19-27.

Martins, L., & Kellermanns, F. (2004). A model of business school learners ' acceptance of a web-based course management system, *Academy of Management Learning & Education*, *l3*(1), 7-27.

McLean, J. (2006). Forgotten faculty: stress and job satisfaction among distance educators. *Online Journal of Distance Learning Administration*, 9(2). Retrieved July 02, 2006, from http://www.westga.edu/%7Edistance/ojdla/summer92/mclean92.htm

Oakley, B. II. (2004). The value of online learning: Perspectives from the University of Illinois at Springfield. *Journal of Asynchronous Learning Networks*, *8*(3), 22-32.

O'Neill, M. A., & Palmer, A. (2004). Importance-performance analysis: a useful tool for directing continuous development in higher education. *Quality Assurance in Education*, *12*(1), 39-52.

Osborne, J. Ratcliffe, M., Collins, S. Millar, R. & Duschl; Rick (2000). What "ideas-about-science" should be taught in school science? A Delphi study of the expert community. *Journal of Research in Science Teaching*, *40*, 692-720.

O'Sullivan, E., Morrell, A., & O'Connor, M. A. (2002). *Expanding the Boundaries of Transformative Learning*. New York, NY: Palgrave.

Paulson, K. (2002). Reconfiguring faculty roles for virtual settings. *The Journal of Higher Education*, *73*(1), 123-140.

Patton, M. Q. (1990). *Qualitative Evaluation and Research Methods*. Newbury Park, London: Sage.

Perrons, D. (2004). *Globalization and Social Change: People and Places in a Divided World*. New York, NY: Routledge.

Raskin, J. D. (2002). Constructivism in psychology: personal construct psychology, radical constructivism, and social constructionism. *American Communicational Journal*, *5*(3). Retrieved June 13, 2005, from http://www.acjournal.org/holdings/vol5/iss3/special/raskin.htm

Rockwell, K., Furgason, J., & Marx, D. B. (2000). Research and evaluation needs for distance education: a Delphi study. *Online Journal of Distance Learning Administration*. *3*(3). Retrieved March 17, 2003, from http://www.westga.edu/~distance/ojdla/fall33/rockwell33.html

Roffe, I. (2002). E-Learning, engagement, enhancement and execution. *Quality Assurance in Education*, *10*(1), 40-50.

Rossi, P. H. (2004). My views of evaluation and their origins. In M. C. Alkin (ed.), *Evaluation roots: Tracing theorists' views and influences* (pp. 122-131). Thousand Oaks, CA: Sage.

Rovai, A. P. (2003). A practical framework for evaluating online distance education programs. *Internet and Higher Education*, *6*(2), 109-124.

Schwandt, T. A. (1994). Constructivist, interpretivist approaches to human inquiry. In: N. K. Denzin and Y. S. Lincoln (eds.), *Handbook of Qualitative Research* (pp. 118-137). London, UK: Sage.

Turoff, M., & Hiltz, S. R. (1996). Computer-based Delphi processes. In M. Adler and E. Ziglio (eds.), *Gazing into the Oracle: The Delphi Method and Its Application to Social Policy and Public Health* (pp. 56-85). London, UK: Jessica Kingsley.

Woudenberg, F. (1991). An evaluation of Delphi. *Technological Forecasting and Social Change*. *40*, 131-150.

Yang, Y., & Cornelious, L. F. (2005). Preparing instructors for quality online instruction. *Online Journal of Distance Learning Administration*, *8*(1). Retrieved October 08, 2005 from http://www.westga.edu/~distance/ojdla/spring81/yang81.htm

Author Biography

Gulsun KURUBACAK is an assistant professor in distance education at the College of Open Education of Anadolu University. She undertook graduate studies at Anadolu University, Turkey (M.A. Educational Technology) and the University of Cincinnati, USA (Ed.D. Curriculum & Instruction), and also has worked a post-doctoral fellow at the College of Education at New Mexico State University, USA. She spent the 21 years focusing on the democratic and multicultural aspects of distance online communications, finding new answers, viewpoints and explanations for complex online communicational problems through critical pedagogy, and improving learner critical thinking skills through Project-Based Online Learning via online communications.