Volume 13 Issue 18
Originally issued as G7

Global Journal of human social science
Linguistics & Education
Volume 13 Issue 7 Version 1.0 Year 2013
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-460X & Print ISSN: 0975-587X

Integrating Mobile Learning Resources and its Repercussions on Instructional Design and Teaching Processes in the Virtual Environments

By María Soledad Ramírez Montoya
Universidad Tec Virtual del Sistema Tecnológico de Monterrey, México

Abstract - The objective of this research was to analyse repercussions on instructional design and teaching when integrating mobile devices with virtual learning environments. The study was conducted in a graduate program, at a university in Mexico offering distance programs. The methodology followed was exploratory and descriptive, conducting open interviews with faculty, program directors, and educational and innovation technology directors to explore two units of analysis: mobile learning devices and virtual environments. From the results obtained, it became evident that working with mobile devices in virtual environments has repercu-ssions at different levels: organizational, structural, social, technological, ways of thinking and actions. These results contribute information concerning the integration of new generation devices to virtual environments and may lead to future studies.

Keywords : *mobile learning resources, curriculum design, teaching processes.*

GJHSS-G Classification : *FOR Code: 930203*

Strictly as per the compliance and regulations of:

© 2013. María Soledad Ramírez Montoya. This is a research/review paper, distributed under the terms of the Creative Commons Attribution-Noncommercial 3.0 Unported License http://creativecommons.org/licenses/by-nc/3.0/), permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Integrating Mobile Learning Resources and its Repercussions on Instructional Design and Teaching Processes in the Virtual Environments

María Soledad Ramírez Montoya

Abstract - The objective of this research was to analyse repercussions on instructional design and teaching when integrating mobile devices with virtual learning environments. The study was conducted in a graduate program, at a university in Mexico offering distance programs. The methodology followed was exploratory and descriptive, conducting open interviews with faculty, program directors, and educational and innovation technology directors to explore two units of analysis: mobile learning devices and virtual environments. From the results obtained, it became evident that working with mobile devices in virtual environments has repercu-ssions at different levels: organizational, structural, social, technological, ways of thinking and actions. These results contribute information concerning the integration of new generation devices to virtual environments and may lead to future studies.

Keywords : mobile learning resources, curriculum design, teaching processes.

I. Introduction

The accelerated advance in technological development creates many innovation possibilities within virtual learning environments when integrating them with curriculum design and educational practices. Such is the case presented in this study, where mobile learning devices were incorporated into a graduate course, generating novel ways to deliver educational programs.

This article presents research results concerning the repercussions on curriculum design and teaching derived from integrating mobile devices with virtual learning environments. The subject matter is addressed through exploratory and descriptive research, with two units of analysis that should be considered to achieve meaningful learning: mobile learning devices and learning environments.

The paper is divided in four sections. It begins with the nature and dimension of the research topic; where the context, the history, and the problem are established. The second section presents the conceptual framework and the units of analysis (mobile devices and learning environments). The third section addresses the method; with information on the sources, instruments, units, and data analyses. Finally, the fourth section presents results and conclusions.

II. Nature and Dimension of the Research Topic

The objective of the first section of the article is to present the problematic situation evidenced through the research. It begins with the contextual location where the research took place, the first actions related to the idea of integrating mobile devices, and delimits the research problem regarding its repercussions on curriculum design and instructional practices when mobile devices are used in virtual environments in a graduate program.

Context of the Research: Where does the Experience of Integrating Mobile Devices to Learning Environments take place? The research presented in this article was obtained from a recent experience during a graduate program supported by mobile wireless devices, as part of a distance program offered by a private university in Northern Mexico.

The institution where this program is offered conceives mobile learning as the convergence of "e-learning" and the use of mobile technology, where three important flexibility elements are incorporated; those of time, space, and place; while trying to reinforce the capability for interaction, communication, and support in the teaching-learning process. From this standpoint, the institution decides to integrate mobile learning within its programs as a complement to the educational processes while also designing new programs which will incorporate mobile devices as a natural element.

The graduate program which initiates with mobile learning processes has the objective of: Developing integral business administrators capable of breaking the barriers of conventional arrangement in organizations and becoming transformational leaders who can achieve change and maintain high performance enterprises, by means of the effective use of Information Technology. There are three approaches in this graduate program: a) data processing resource management, b) observation, evaluation, and adoption of emerging information technology, and c) training in business design with data processing resources.

Author : Research Professor at the Graduates School of Education, in Tecnológico de Monterrey and The Dean of the Chair of "Research on Innovation in Education and Technology".
E-mail : solramirez@tecvirtual.mx

© 2013 Global Journals Inc. (US)

In the learning environments of this program, teaching resources have been incorporated to support students' learning through mobile technology devices: cell phones, smartphones, digital agendas, and portable digital audio and video players. The program began with four courses, two considered introductory to the program (Remedial and Administration) and the other two of specialization (Knowledge Administration and Competitive Strategy). The plan to introduce mobile devices was elaborated by the directors of the program, directors of the innovation centre at the institution, faculty, and multidisciplinary teams from the educational technology area (instructional designers, graphic designers, data processing designers, and Web programmers).

Context of the Research Problem: How does the Use of Mobile Devices arise within Educational Programs? Activities surrounding the notion of mobile learning at the institution this research concerns, began in the summer of 2006 with a project called "Aprendizaje en Movimiento" ("Learning on the Move"). As the project developed, its incorporation to programs of the institution was envisioned, and the name was changed to "Mobile Learning" with the purpose of allowing the users to become familiar with this style of learning.

Launching at the institution took place with two pilot projects. On one hand, the podcast was included as a method for delivering educational contents in several academic courses of distance programs; on the other hand, text-messaging via cell phones was included to establish communication to the students about the course contents. At the time, it was believed that the text-message quota could be exceeded since no multimedia messages could be incorporated to the course due to the lack of technological infrastructure and unavailable telecommunication services (Burgos, 2007).

As a result of implementing both projects, the institution decided to evaluate the telecommunication service technology available in the country, finding only one provider which could support third generation technology (bandwidth for audio and video messages and a delivery transfer system for both on demand). Therefore, the institution signed an agreement with this service enterprise to offer students the possibility to use these types of learning media at a considerably low cost.

Defining the Research Problem: What is involved when Integrating Mobile Learning Devices with Virtual Environments? Virtual environments can make multiple combinations in their educational designs, based on the conceptions of learning and the objectives to be achieved. Jonassen (2000) has stated that it can go from the objectivist concept of learning; which establishes that knowledge can be transferred by teachers or transmitted through technology and acquired by students where the educational design includes analysis, representation, and reorganization of the contents and the exercises to be transmitted with more anticipation and reliability; to the constructivist concept of learning which establishes that knowledge is elaborated individually and socially by the students based on their own interpretations of their experiences in the world, in this case the educational design determines that the teaching processes consist of experiences that facilitate the construction of knowledge.

From the theory of environment design, it may seem simple to set the combinations, delimitations, and formulations; but what happens when we engage in virtual environments where technological instruments intervene?; furthermore, what happens when new areas like mobile devices are approached?, what conceptions are present when we speak of "mobile learning"?, what impact do these conceptions have on educational design?, how are these designs put into practice?, how are mobile devices integrated with learning environments? These and other questions gave birth to the question that underlies this study: What are the repercussions on curriculum design and teaching when integrating mobile learning devices to virtual environments?

III. Conceptual Framework and Unit of Analysis

Two were the units of analysis addressed in this study, one is mobile learning devices and the other is virtual environments in their curriculum design and teaching elements. Each is described in this section, from a theoretical point of view, to establish the research elements.

First Unit of analysis: What are Mobile Learning Devices? A mobile device is a processor with a memory with different input options (keyboard, screen, buttons, etc.) and several output options (text, graphs, screen, vibration, audio, cable). Some mobile devices associated with learning are laptops, cell phones, smartphones, Personal Digital Assistants (PDAs), portable audio players, iPods, watches with Internet connection, game platforms, etc.; connected to Internet or not necessarily (when materials have already been "saved").

In this sense, it is proper to define what mobile learning is. Mobile learning (m-learning for short or "learning in movement") has several definitions, depending on the point of view within the field of learning environments. A common ground could be found in the search for a conceptual specification of the term mobile learning in specific learning environments, that is, that there are two elements involved: mobility and learning, where the equality of both terms would help create a new definition in agreement with the educational design and the learning that are considered

© 2013 Global Journals Inc. (US)

valuable by the institutions. Here lies the importance of defining contextually how the term mobile learning is to be delimited and how mobile devices are integrated with learning environments (Ramírez, 2008; Ozdamli & Cavus, 2011). First study point for the research: conceptual delimitation of institutional mobile learning.

Second Unit of Analysis: Do Virtual Environments Change in their Design and Teaching Elements? Another point of agreement between the different m-learning definitions is found in the place where the learning occurs and this has a direct influence on the learning environments and their educational design. Moreover, the transition from e-learning to m-learning is characterized by a change in terminology (Laouris and Eteokleous, 2005; Taleb and Sohrabi, 2012). For example, e-learning includes such terms as computers, multimedia, interactivity, hypertext, distance learning environments, collaboration, media, simulated situation, etc.; m-learning speaks of mobility, spontaneity, objects, situated intimacy, connectivity, informality, GPRS (General Packet Radio Service), G3, Bluetooth, networks, situated learning, real situations, constructivism, collaboration, etc. Based on the terminology, it is evident that the e-learning environment is connected more to a classroom setup whereas m-learning is centred on more independent environments and time spans. Second study point for the research: process spaces.

The contents of a virtual environment constitute the central axis of the learning that will be promoted in an educational situation. In e-learning, the organization of the content can be arranged in different ways; that is by projects, units, themes, definitions; m-learning requires an atomistic content organization, similar to working with learning objects (Ramirez, 2007) where it is recommended to divide the topics into small units of content with complete information and being self-containable. Considering this, is it possible to convert learning contents from e-learning to m-learning? What aspects should be considered to carry out this conversion? Third point of study for the research: content.

While e-learning includes more activities such as reading, text, and graphics to describe instructions; m-learning has more use of voice, graphics, and animations to describe instructions, and field learning is promoted more (Sharma and Kitchens, 2004, cited and modified by Laouris and Eteokleous, 2005). But, it is important to mention that the design of activities does not concentrate on the "delivery of activities" (if voice is used instead of text, for example), but on the learning to be achieved, the content that is going to be transmitted, and the strategy that is to be used. Fourth point of study for the research: activity design.

Participant communication in a virtual learning environment is one of the most important aspects in achieving objectives. M-learning communication media, by being "connected" at all times at any place, enable instant communication (no need to find a place with computers connected to Internet) and include audio and video for teleconferencing; it is also important to determine what types of communication are convenient in virtual learning environments, what can be contributed through them, what capabilities the resources have, and what are the possibilities of compatibility between the users and the technological resources. Fifth study point for the research: communication.

Materials used in virtual learning environments are another point to consider (Ramírez, 2009). In e-learning environments, materials used are digitalized readings, remote laboratories, digital libraries, cases, problems, exercises, etc. In m-learning, the materials such as: videos, capsules, conceptual maps, graphics, photographs, audio, and learning objects must overcome the limitation of the size to which they are reproduced by the device, the size of the screen and the amount of data that can be stored in memory. However, Quinn (2007) mentions that, beyond these limitations, the most difficult task is to step away from linear thinking when designing the materials and have imagination to think more of the content to be transmitted than in the "delivery" limitations. Sixth study point for the research: materials design.

The evaluation process is a relevant means to verify the achievement of objectives in learning environments. Basabe (2007) in a 25 institutions study of e-learning environments found that exams and essay rubrics were mentioned mostly to evaluate the students' performance, while self-evaluation and co-evaluation were less frequently mentioned. Application is asynchronous, at specific times using standardized instruments for massive testing, occasionally applying simulations, and lab experiments with a predominance of submitted written documents. These same evaluation instruments are being applied in m-learning, but their application varies and may be synchronized or non-synchronized, include personalized instruction, gradual performance, real-life cases and experimentation cases, except for submitted written documents (Contreras, Herrera, & Ramírez, 2009; Ramos, Herrera & Ramírez, 2010). This comparative view sets off the following questions: what impact do mobile devices have on evaluation design? , is it directly related to the teaching processes when using m-learning devices? Seventh study point for the research: evaluation.

IV. Research Method

This section describes the method followed for data collection, the population and sample, the data collection strategies, units of analysis and their construes, and it ends with the type of analysis which was followed.

© 2013 Global Journals Inc. (US)

The method to approach the research was exploratory-descriptive and consisted in determining the units of analysis, conceptualizing them theoretically, to determine the construes which would enable exploration of the situation by applying instruments to different sources, and to obtain data that would describe the situation.

a) Population and Sample

The participants purposely selected for the study sample were a program director, a director from the innovation area, two members of the faculty and the director of the educational technology team who participated in integrating mobile learning devices in the distance courses program.

b) Data collection

The instrument used to collect information was face-to-face open interviews conducted with the above mentioned. One of these was recorded as a videoconference to later perform an information analysis. During the interviews, data was inquired according to the two units of analysis, that is, mobile learning devices and virtual environments, from the curriculum design and teaching perspective.

c) Units of Analysis and Construes

To explore the units of analysis on mobile learning devices in the graduate distance program, the construes of history and conceptual delimitation were analysed. In the unit of analysis of virtual environments regarding curriculum design and teaching, the construes of determining learning, content, activity design, communication, materials design, and evaluation were analysed.

d) Data Analysis

The data collected was analysed triangulating the information between the different sources, crossing the information supplied for each construe, with the purpose of determining if the data remained the same.

V. Results and Conclusions

Results will be presented for each of the two units of analysis to answer the research question will end with some reflections.

a) First unit of Analysis: What are Mobile Learning Devices?

For the institution which is the object of our study, mobile devices are considered an additional resource which supports the teaching-learning process in the virtual environment, where the student remains the main constructor of his knowledge and the mobile devices are just an additional resource to those in his virtual environment.

To decide for integrating these devices, surveys were applied among the students and it was found that the majority had a cell phone; the delivery by the podcast method was evaluated and it was found that there was audio and video reproduction in iPods or cell phones. Based on this information, the institution conducted additional research with companies which had the required technology, to establish agreements which would enable a good content delivery.

It must be mention that the need to incorporate mobile devices in distance programs did not arise from the institution itself, but from students who expressed the need for flexibility to access the contents. On the graduate level, students are usually executives who have their “dead-times” at the airport, so they began to express a need to have access to the course contents away from the office and away from home. They wonder possibility of overcoming the online mode.

b) Second Unit of Analysis: Do Virtual Environments Change in their Design and Teaching Elements?

In the study performed, it was found that there is a change in the virtual environments, because the incorporation of mobile learning devices compels program directors, faculty, and instructional designers to think differently; to visualize the contents, the materials, and the strategies differently when students are to interact in different spaces and scenarios with these resources within independent learning situations different from what is considered a “static” experience.

There was also a change in the way of working the contents with these mobile devices; the study began with an analysis of the contents which were already on the e-learning platform to select the topics that could be transferred to a mobile device concrete version. Out of the 100% of the course, 30% of the contents will be handled with these mobile devices. It has been a teamwork effort where the academic areas and the technology and innovation area have evaluated technologies to enrich what already exists.

The design of activities with mobile devices in virtual environments represents a significant change, but so far, the teacher continues to have the role of content author and facilitator of the teaching-learning process. Although the e-learning processes at the institution already included multidisciplinary support in teaching, now, with the incorporation of these devices there is greater support from the areas of audio-visual production, graphic design, instructional design, data processing, and Web programming. With instructional design, an effort has been made towards developing interactive learning abilities, self-studying, reading, learning simulation, among others. Resources have been designed for audio-cases and defining scenarios where situations and questions are established so the students can learn about the situational definition of the strategy and may solve the problems presented. The director of the educational technology area is evaluating the possibility of implementing the design of activities which will modify the interactivity, using audio, video, surveys or quick tests (Lopez, 2007). Furthermore, it has

© 2013 Global Journals Inc. (US)

been mentioned that the experience is one of continuous learning, where new knowledge will be learned every day; the new learning will guide the efforts and have a direct impact on the design of learning activities.

As for communication of the participants in the virtual learning environment which has incorporated these mobile devices, communication channels have increased in number from the moment in which the reception of messages is instantaneous, and so the opportunity to have synchronous bidirectional contact and to download the resources for later reproduction anywhere has increased (for example, a conference).

Additionally, with the agreement signed between the institution and the enterprise, the student will be connected to the net at all times with no extra cost, as well as communicate with the users subscribed to the plan, for free. The difficulty here remains in the capabilities of the devices to store those resources, the bandwidth required, and the compatibility between the users and the technological resources.

The design of materials for these virtual environments has also changed. Lopez (2007) reports that work has been intense for the educational technology area, more human resources are being included than those forecast in his working days, scripts for audios and videos are being generated which have resulted in a re-learning of new formats that can be applied to mobile learning devices. There is a cumulus of previous experience, but the design of these resources has implied a new form of logistics and anticipated preparation to help the professor achieve his objectives. There has been much revision, learning from mistakes to make corrections and create standards for the designs. Finally, the evaluation processes of mobile devices in these virtual environments are being addressed through simulations and quick tests so the student can answer these instruments. These evaluation activities are directly related to the learning activities where these resources were also integrated. It might be in this section where one of the main challenges for mobile devices in learning environments can be found. The student will require a greater commitment to his own learning; he or she will assume responsibility of his learning processes and will find in self-evaluation (as a possibility) the way to assess his or her own learning process and make decisions to improve it. After presenting the results for the units of analysis, comes the research question: What are the repercussions on curriculum design and teaching when integrating mobile learning devices to virtual environments? Based on the results of this study, there are different types of repercussions in designing and teaching when incorporating mobile devices with virtual learning environments. These are organizational, structural, social, technological, ways of thinking and action. Quinn (2007) has stated that there is a large window of opportunity, but a different way of thinking is required, systematically, seeing the world from a wider perspective regarding performance, in the world of magic. The limits are no longer set by technology, the limit is our own imagination; new capabilities are on the way, so we have to think outside of the box, think of the possibilities of action for mobile devices. This paper is an open invitation to explore these actions, to investigate their effects, possibilities, impacts, relationships and competences which may generate knowledge on these devices of the new generation.

VI. Acknowledgments

To Alberto Herrera and Fernando Lozano, members of the research group in the research project “Innovation in Technology and Education”; as well as to the areas of educational technology, innov@te; faculty, and coordinators of the studied program for their support.

References Références Referencias

1. Basabe, F. E. (2007). Educación a distancia en el nivel superior. Mexico: Trillas.
2. Basabe, F. E. & Ramírez, M. S. (2006). Transforming teaching practices by empowering students with self-regulated learning strategies. In Panizo, L.; Sánchez, L.; Fernández, B. and M. Llamas. SIIIE´06 8th Internacional Symposium on Computers in Education. Universidad de Leon, pp. 231-240.
3. Burgos, V. (2007). Contextualizando el aprendizaje en movimiento. Videoconference of research paper recorded 18 September 2007; organized by the members of the research project "Innovation in Technology and Education": Herrera, A.; Gonzalez, G., Lozano, F. G. y Ramirez, M. S. Unedited resource for the purpose of research.
4. Contreras, J., Herrera, A. & Ramírez, M. S. (2009). Elementos instruccionales para el diseño y la producción de materiales educativos móviles. Revista Apertura de Innovación Educativa, 5(11). Available from: http://www.udgvirtual.udg.mx/apertura/num11/pdfs/Apertura%2011/TIC/TIC1.htm
5. Jonassen, D. (2000). El diseño de entornos constructivistas de aprendizaje. In Reigeluth, Ch. M. Diseño de la instrucción. Teorías y modelos. Un nuevo paradigma de la teoría de la instrucción. Madrid, España: Aula XXI Santillana.
6. Laouris, Y. and Eteokleous, N. (2005). We need an Educationally Relevant Definition of Mobile Learning. mLearn 2005 4th World conference on mLearning Conference theme: Mobile technology: The future of learning in your hands. Recovered 22 June 2007: http://www.mlearn.org.za/CD/papers/Laouris%20&%20Eteokleous.pdf
7. Lopez, O. L. (2007). Contextualizando el aprendizaje en movimiento. Videoconference of research

© 2013 Global Journals Inc. (US)

paper recorded 18 September 2007; organized by the members of the research project “Innovation in Technology and Education”: Herrera, A.; Gonzalez, G., Lozano, F. G. y Ramirez, M. S. Unedited resource for the purpose of research.

8. Ozdamli, F. & Cavus, N. (2011). Basic elements and characteristics of mobile learning. Procedia - Social and Behavioral Sciences, 28, 937-942.
9. Pinkwart, N., Hoppe, H. U. Milrad, M. and Perez, J. (2003). Educational scenarios for the cooperative use of Personal Digital Assistant. Journal of Computer Assisted Learning, 19, 3, 383-391.
10. Quinn, C. (2000). mLearning: Mobile, wireless, in your-pocket learning. LiNE Zine. Fall.
11. Quinn, C. (2007). Mobile magic: Think different by design. Conference presented 18 September 2007 at Conference Cycle at the Graduate School of Education and Innov@te Center of Tecnologico of Monterrey.
12. Ramírez, M. S. (2009). Recursos tecnológicos para el aprendizaje móvil (mlearning) y su relación con los ambientes de educación a distancia: implementtaciones e investigaciones. Revista de Investigación Educativa, 12(2), 57-82.
13. Ramírez, M. S. (2008). Dispositivos de mobile learning para ambientes virtuales: implicaciones en el diseño y la enseñanza. Revista Apertura de Investigación Educativa, 8(9), 82-96.
14. Ramirez, M. S. (2007). Administración de objetos de aprendizaje en educación a distancia: experiencia de colaboración interinstitucional. In Lozano, A. and V. Burgos, (comp.). Tecnología educativa en un modelo de educación a distancia centrado en la persona. Mexico: Limusa. Pp. 351-373.
15. Ramos, A. I., Herrera, J. A. & Ramírez, M. S. (2010). Desarrollo de habilidades cognitivas con aprendizaje móvil: un estudio de casos. Comunicar: Revista Científica de Comunicación, 34(XVII), 201-209.
16. Sharples, M. (2005). Learning as conversation: Transforming education in the mobile age. Proceedings "Seeing understanding, learning in the mobile age", Budapest, April 28-30, 2005, 147-152.
17. Taleb, Z. & Sohrabi, A. (2012). Learning on the Move: The use of Mobile Technology to Support Learning for University Students. Procedia - Social and Behavioral Sciences, 69(24), 1102-1109.

© 2013 Global Journals Inc. (US)