POSSIBILITIES OF MOBILE LEARNING IN RURAL CONTEXTS

J. Zambrano, T. Orrego, E. Ramirez

Universidad Pontificia Bolivariana (COLOMBIA)

Abstract

The possibilities of mobile learning began to draw attention in the educational field, especially in the countries of emerging economies, for two fundamental reasons, the first, the penetration of mobile telephony in the population and the second, the importance that has taken the mobile phone in everyday life. This has allowed new ways of approaching formal knowledge, through new emerging technologies; as are mobiles.

It is worth highlighting the fact that some countries (France and Chile) have opted for non-use and even prohibition, while in others (United States, Spain, Colombia and Argentina) there is a growing concern for the implementation of mobile learning in different areas educational, this suggests circumstances must be faced when implementing this type of technology, on the one hand, the issues related to classroom distraction and on the other, students' motivation and interest in academic subjects.

The rural context away from the traditional dynamics of incorporation and technological integration welcomes a new possibility in the use of mobile technology in education. However, the investigation of experiences related to these possibilities leaves more questions than answers; a lack of structural, systematic and systemic foundations of mobile learning can be glimpsed.

The documentary research carried out reviewed more than 40 academics texts and 43 experiences reviewed on rural education, flexible models, ICTs and found that although there are experiences on the possibilities of ICTs in rural areas, there is a decontextualization of them that does not allow to use their maximum potential, because they do not recognize the environments where they are applied.

Keywords: learning, mobile, rural.

1 INTRODUCTION

The inquiry and different strikes around the topic of mobile learning has been important to certain extent to modern societies, in this case, we are looking for the relevance and consolidation of it in development countries. In first world countries mobile learning has turned into other scenarios due to the already tackled sociological, economical and educative rationales, instead developing countries are now looking for those characteristics to look for the different enhancements and improvements that apparently mobile learning provides. Hence, there are still some boundaries or hurdles to overcome in terms of mobile learning sedimentation in the educative field that a meaningful number of scholars and governments are trying to sort out nowadays in the world due to the trending topic that mobile learning is.

Mobile learning has been settled as one of the trends of education in today's educative field, ([1], [2], [3]) with possibilities to face technological traditional educational challenges, the impact of mobile devices within the daily life experience offers a unique opportunity in terms of the rationales of education. The access to data, the ubiquity, the immediacy are aspects and characteristics of mobile devices that proposes different opportunities but also threats in the different learning scenarios.

This paper introduces the research done around the different experiences of mobile learning in two main ways, on the one hand, academical, because it scopes, tracks down and narrows down the last ten years of research done and published in academical journals about the topic, and on the other hand, practical, that retrieves various experiences of government entities and non-government entities about the programs, strategies and projects of mobile learning around earth.

2 METHODOLOGY

The first stage, academical, was done through different indexers and databases akin: Google Scholar, JSTOR, Redalyc, Scielo, Scopus, Springer and Web of Science, in addition this data collection was put together with the help of different online institutional repositories of universities throughout
Colombia with the aid of descriptors such as: learning, mobile and rural; the three of them researched in English and Spanish language. The second stage, practical, did a process of documental research aimed to identify, filter and analyze those documents that resembled and described results of diverse contexts in terms of mobile learning and it was also included some key terms such as: learning, mobile and smartphone usage. The research was initially done through Google Scholar with the descriptors: successful experiences, ICT integration and education.

3 RESULTS

3.1 Academics
The results concluded in an urgent and ongoing request for the implementation of the mobile learning, due to the number of users promoting and acquiring mobile learning as an alternative in formal and non-formal contexts. Those processes are being carried out through the different mobile platforms, akin: streaming services, offshore work, access to the data, virtualization of services, social media, access to livestreamed music and videos, instant messaging and so forth. The Table 1 shows and sums up the results of the researches about mobile learning.

The international level proposes a meaningful amount of scholar’s convergence ([4], [5], [6], [7], [8], [9], [10], [11], [12], [13], [14], [15], [16], [17], [18], [19], [20], [21], [22], [23], [24], [25], [26], [27], [28], [29], [30], [31], [32], [33], [34], [35], [36], [37], [38], [39], [40], [41], [42], [43]) about the adoption of mobile learning as a significant tool. With that being said, a tool that could be used in the different spheres of science, in this case, the educational environment holds an interesting path to be walked; therefore, there is a lane that traces a way to the transformation of the technological paradigms in a significant way.

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The trends about mobile learning, in the academic texts reviewed are focused on three aspects. On the one hand, the acknowledgement of mobile learning as an alternative of learning inside the informal sphere, where the subject in a natural way is capable to demonstrate through the various applications, modules, interfaces and so on, experiences of invisible learning; that refers to the incorporation or addition of brand-new mechanics or, procedures or ways of treatment of the mediated contents, through the application of experiences of repetition; that little by little it is going to be incorporated to its daily life routine.

On the other hand, as a transversal tool, due to the easy management of the data that it provides, mobile learning turns into a vehicle of collective and taxonomical awareness in the environment of non-formal scenarios. Finally, it suggests the consolidation of lanes of action that could be pertinent to allow the recognition of other tools like videogames as a meaningful device inside mobile learning and the different teaching practices, then the consolidation of a pedagogical and formative scaffold through mobile learning.

Finally, the third aspect to consider is the contemplation of different assessment frameworks and formative frameworks that could be implemented in the classroom, where all those nuances, quirks and features of the non-formal scenarios could be moved to the formal dimension in a strict sense, without neglecting the foundations of autonomy and numerous processes that set up the core of mobile learning.

The most common ground that the academical data collection showcased according to their content was directed to the field of understanding how to use mobile learning as an alternative or dimension to educate people through the different and current devices that are now flooding the modern society. Although, the usage of mobile learning as an alternative is highlighted and underlined several times, the addition and the development of a pedagogical framework to refer about mobile learning as a based founded approach remains as one of the concerns stated in the genetics of the data, likewise, another topic that is worked is the different possibilities generated due to mobile learning in constrained, hindered and restricted territories and finally, the forecast and possible aims in the future about the politics and expectancy of mobile learning; that vibrates as one of the relevant topics done in the different academical writing styles.

The population that is built, constructed and compiled around the different documents gathered in this paper are most likely to be students, teachers, professor and graduate students of different fields of knowledge that participated, nevertheless some documents are mainly focused on the recompilation of data around the topic of mobile learning and its development in the academical world in terms of pedagogical, semantics and contextual framework to reach a top notch quality in terms of educative goals and thresholds, finally there are some documents that talks about the different usage in terms of the development of apps and the different platforms that are currently meandering around the topic of mobile learning.

The consolidation of the data and the methodology through the different papers is most of it focus or directed on the qualitative side of research, because, the nature of the data is most likely to go towards the embracement of data surrounding qualitative inquiry that seeks in-depth understanding of social phenomena in this case mobile learning and its possibilities. Furthermore, most of the input found out portraits the concerns of today’s educational and current field of education to discover the different quirks and features of mobiles learning applied in educative scenarios, with the help of surveys and interviews in most cases.

3.2 Practice

The results of the research process were oriented in its bigger margent based on the repository provided by UNESCO that contains an index for mobile learning inside its digital library and from their database is where they have track and registry of the different effective experiences that aims to the institutional project “Lifelong Learning” being this one the main or principal resource analyzed.

The exploration of the different experiences ([44], [45], [46], [47], [48], [49], [50], [51], [52], [53], [54], [55], [56], [57], [58], [59], [60],[61], that fulfilled the purposes settled up by the research project standards, dropped out the enough evidence to frame a vast horizon, analyzed from different criteria, such as: population, objectives, range, coverage, focuses, validity, infrastructure, equipment, support, funding and results. This reflects the heterogeneity of the countries where the projects took place and also their level of development (Table 2)
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The models of integration of the ICT’s in the beginning dominated by the desktop computers and laptops, took as a main criterion, the way how the equipment’s were provided. It is explained based on that criterion [53], three models; the first one, that consisted in the equipment of specialized classrooms with computers, that should be booked by the teachers for their classes, in most occasions one device was shared by several students, the second one, where the regular classrooms were equipped of one or several computers with the final purpose to make the ICT’s accessible to the students and the teachers as active resources within the activities developed in the classroom with the purpose to get them integrated in the curriculum, and the third the model 1:1, meaning that each student and each teacher has access to a device, situation considered ideal to face a process of incorporation of the ICT’s, but whose main disadvantage was associated to the high cost of deployment and maintenance.

The aspects that emerge as facilitators to promote the different processes of mobile learning are the high penetration of mobile phones and familiarity with the usage of the mobile devices. The gathered experience by the different countries in the world, reveals that it was already overcome the stage where the projects of integration of ICT’s was thought as a process of equipment of the different schools and students and that this was a way to create a meaningful and automatic change in the educative practices, that portraits the national initiatives of mobile learning in Latin-America [53].

The turn around the objective of the projects is witnessed in a significant quantity of experiences of integration of ICT’s, whose targeted population was not restricted or aimed to only students or even focus on exclusively in formal academicals processes, but also to the improvement of the way of living of the inhabitants of the territories, zones or regions where these projects took place. This specifically situation is common in the projects that were identified in African countries, South east Asia and Latin America, locations where for example mobile learning is took as a possibility to get access to online educative formation in rural areas where the mobility is a factor that provides constrains and difficulties; and it is represented in several cases with less funding and also social inclusion.

The different experiences of mobile learning that were analyzed, show a wide variety of situated populations in terms of the ones that were compiled in this exercise, this just highlight one of the benefits that technology brings, considering that its high penetration in the market, usability, coverage and accessibility enhance the contribution done by educative and formative overcoming social, economic, cultural hurdles, among others. Precisely in those countries that show reduced indexes of development, according to the last being said, that is how it is achieved to witness that the most part of initiatives in African, south east Asia, middle east and Latin-American are enrolled to tackled or impact the most vulnerable communities that in fact inhabits the rural area or the countryside.

It is noticeable that in African countries, middle east countries and south east Asia countries, there is an emphasis aimed to the general population, a not only the one related to the educative system, taking charge of processes of literacy in elderly people; and added to the last being said the growing interest to cover the different situations of vulnerability and marginality result of the genre discrimination, specifically on women. Instead, in the region of Latin-America there is a still a major emphasis of this mobile learning initiatives directed and created for schools and student population, having into account that it does not complies or extends to their family scenarios or circles or even their contiguous circles. It also pops up in the Latin-American level an additional fundamental feature in the different political agendas about ICT’s, in which it pretends to give relevance to the teachers, going from a passive role, to an active and creative role that creates a meaningful impact in their pedagogies, whose importance and effectivity is being reflected in the improvement and strengthen in the learning processes, according to what has been already seen Lugo y Ruiz (2016).

From the investigation and tabulation of the experiences done by the UNESCO, it has been recognized the benefits of the usage of mobile phones in the processes of literacy, and also the enhancement in the motivation of the students and the possibilities of professional development centered in specifically vulnerable territories were the population was excluded due to their inhabitation of rural places faraway or zones of tough access.

Also, it is highly essential to obtain an institutional support of the host countries, first to settle good initiatives and secondly to achieve a meaningful impact in terms of volume in the benefited population, because in that sense, it will last longer in time, such situation is described in projects like: “English in Action” in Bangladesh, it achieved, through the usage of mobile phones, the improvement of the learning of English language in an approximate 25 million individuals. The processes of transience and volatility of the projects are more complex in the dynamics of consolidation, also the different projects reviewed and analyzed; almost all of them had funding and support coming from non-profit
organizations, foundations, non-government entities, organizations of international cooperation and educative entities.

The research done marks a coincidence and reiteration dealing with certain hurdles within the development of projects of ICT’s integration and mobile learning such as: a lack of government prioritization specifically to the mobility, the high cost of the connectivity to the internet, poor connection in coverage in the high end connectivity and weaknesses in terms of the infrastructure in the territories far away from the main cities.

As a variation to the 1:1 model in the implementation of ICT’s integration projects, it emerges an approach called “BYOD”, that stands for “Bring your own device”; in which both students and teachers make use of their own mobile devices in the execution of projects. This means a reduction in costs and execution times, but also carries a challenge in the margin, that consist in the acceptance of variety, limitations of the technological capacities, and the possible obsolescence of the devices of the targeted population.

4 CONCLUSIONS

The horizon of mobile learning evolves very fast, as the same rhythm that technology does it, involving educational processes in one way or another. So, this is why it is a remarkable growth in the number of mobile applications for educational to improve teaching and learning processes. It is this same situation with a lot of available apps that challenges our capacity to choose which one of them are good content, and actually they will have a real impact on the pedagogical process.

In addition, it makes the actors of the process, teachers and students to be consumers and the same time producers of digital contents who are using particular tools of the mobile learning. It has already been experiences of the mobile learning that focus in apps which they have been developed either by teachers or students.

However, it is a common point in all the documentation analyzed, to consider mobile learning as great opportunity that is necessary, to buff up and improve, as a strategy to face the different and latest educative challenges showed and represented basically in terms of drop outs, coverage and expenses, making an emphasis in the rural contexts and the marginal and excluded populations.

Mobile learning is emerging as an alternative profiled as an aim to dynamize and promote different projects that alongside promotes a possible closure of the digital divide, fulfills the path to reduce the social divides and its inequities based on the genre, class, ethnicity, age, political perspective and physical disabilities.

ACKNOWLEDGEMENTS

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REFERENCES


[41] M. Boulahrouz, Lahmidi, “Aprendizaje móvil y ciudadanía espacial en la educación para el desarrollo sostenible. una propuesta para la enseñanza de las ciencias sociales en educación secundaria obligatoria”, Tesis doctoral, 2018


[46] Albert Forn, Jasmine Castro and Mar Camacho, mSchools: Transforming the education landscape in Catalonia (Spain) through a systemic and inclusive mobile learning programme. Case study by the UNESCO-Fazheng project on best practices in mobile learning, 2019. Retrieved from: https://unesdoc.unesco.org/ark:/48223/pf0000366726?posInSet=1&queryId=9691d4b4-b9f6-4fe8-8084-82d206a30a04


[50] Alexandre Fernandes Barbosa, Antonio Abello Rovai and Grace Kelly Gonçalves, Empowering students to become agents of social transformation through mobile learning in Brazil. Case study by the UNESCO-Fazheng project on best practices in mobile learning, 2019. Retrieved from: https://unesdoc.unesco.org/ark:/48223/pf0000366724?posInSet=1&queryId=8d3ea270-84f8-4c01-bbd4-8d8f4f1cd8c4


