

## THE APPLICATION OF MOBILE DEVICES IN ACTIVE LEARNING AT THE UNIVERSITY: A REVIEW OF LITERATURE

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### Abstract

The use of technology as an instrument to support learning is presented as a trend that is on the rise, because their versatility and adaptation to change have become an indispensable tool in the training practice of university students; from that a theoretical research was carried out on how the application of mobile devices in active learning in a university environment is approached in Ibero-America; the purpose is to give an account of what has been produced and researched regarding this topic and it is interference in the teaching and learning process. Heuristic and hermeneutics were used as methodologies for their construction. It includes the findings published between 2014 and 2018. It was determined to consider only the articles presented in indexed scientific journals, as well as extensive reports of international congresses held in Latin America and Spain. During the research, doctoral theses related to the topic to be treated were found, so they were also considered for analysis. A bibliographic matrix was designed in the Excel program where all the texts that made up the universe were cataloged, and then the documents were selected applying the filters with respect to the topics related to mobile devices and active learning in higher education. The analysis of the results was based on a qualitative methodology; they reflect that the researchers agreed that there is a wide potential for the pedagogical use of mobile devices, however, are still little used to support active learning in a university environment; likewise, it is highlighted that students prefer to use these devices for activities related to leisure and entertainment. It also appears that personal environments of mobile learning are shown as technological scenarios of recent introduction in university education, however, it is necessary to expand the research that allows measuring the impact that these methodologies have on the educational process.

**Keywords:** *Mobile devices, active learning, university.*

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### 1. Introduction

The technology as a support in the learning has been a subject treated by diverse experts in the last years, reason why it has appeared like a tendency that goes in ascent, this due to its versatility and constant adaptation to the change, in such a way that in these times have become indispensable for the formative practice of university students.

On the other hand, mobile devices have become not only a tool, but a necessity for the population, since their use has exceeded, and currently they report more than seven million subscriptions to mobile cell phones (Union, 2015), situation which has also impacted the educational field in which applying mobile phones to support the teaching-learning process is known as mobile learning, which has been implemented in some universities, where it is being applied in various educational activities, directly related to the process education (Humanante-Ramos, García-Peñalvo, & Conde-González, 2016).

Thus, the creation of technological environments that allow for improved learning, brings with it an evolution in the way in which a class is guided, as well as in educational models that seek to adapt to the constant change that technological progress has had. In this way, mobile learning also aims to respond to the educational demand of this century, providing greater flexibility to learn at the time and place that is decided, achieve significant learning through the design of instructional environments, customize the learning experience and greater effectiveness of learning by promoting active attention by students (Vargas Medoza, Gómez Zermeño, & Gómez Zermeño, 2013).

In order to successfully carry out the application of mobile learning in active learning, it is very important to design teaching activities that are in charge of the teacher, in such a way that it is the teacher who plays a fundamental role so that the technology can be used in educational processes, based on interactive content and, above all, fostering new possibilities and forms of communication between the actors in the educational environment (Henríquez Ritchie, Organista Sandoval, & Lavigne, 2013).

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In this sense, one of the most important challenges facing teachers today is to take advantage of the potential offered by mobile devices to motivate student learning (Basantes, Naranjo, Gallegos, & Benítez, 2017); the previous thing through didactic activities that allow to surpass the contradictions that the traditional school has had and that in this way impel the active learning.

However, few studies have been done to know the impact that the application of mobile devices has on active learning in the university, in such a way that from the previous premises it was to carry out a theoretical investigation regarding how it is approached in Iberoamerica this topic, this with the purpose of giving an account of what has been produced and researched regarding this topic and its interference in the teaching and learning process.

## 2. Methodology

The objective of this work was to conduct a review of the literature that included the background, a descriptive and analysis of the publications and reports that had been made in the Ibero-American countries in relation to the application of mobile devices in active learning, addition to achieve an understanding of the topic by identifying the methodologies used and the thematic lines addressed, for which heuristics and hermeneutics were used as methodologies for the construction of the same.

With regard to the heuristic phase, the investigation and compilation of diverse sources of information were carried out in relation to the subject that concerns us, this with the aim of collecting it and afterward contextualizing it. The search for information was made in Spanish and in the geographical area known as Ibero-America.

This was decided because when talking about student learning, the volume of information found on the internet is quite significant, and it was determined that a specific search should be done, applying descriptors such as mobile devices, active learning, and mobile learning, and the combination between both, mainly.

To achieve the above, it was determined to consider only articles presented in indexed scientific journals, as well as extensive reports of international congresses held in Latin America and Spain. During the search, doctoral theses related to the topic to be treated were found, so they were also considered for analysis.

The research was carried out through a qualitative and interpretative design, of documentary type, which determined the procedure of selection, access, and registration of the documentary sample.

For this methodological section and according to Gómez Vargas, Galeano Higueta, and Jaramillo Muñoz (2015) a bibliographic matrix was designed in the Excel program where all the texts that made up the universe were inventoried and subsequently the documents were selected by applying the filters to topics related to mobile devices and active learning in higher education

In the Excel bibliographic matrix, a total of 257 documents of different type of material were reviewed, as previously mentioned; later, the selection of the sample was made using the filters that Excel allows, leaving a total of 52 texts: 38 articles, 10 extensive reports, and 4-degree papers.

According to the total number of documents considered for this work, which were 52. It was thought that this sample represented the information that exists in the Network, and it was sought that it fulfilled the following criteria: findings published in the last five years, among 2014 and 2018; that they were within the thematic axes referred to the mobile learning and active learning, all focused in the university scope; in such a way that it was determined that the data collected were representative to build this approach and literature review.

Thus, for the hermeneutic phase, the analytical content matrix was designed in Excel (Gómez Vargas, Galeano Higueta, and Jaramillo Muñoz, 2015), where the texts of the sample, written in vertical, were related to the categories of analysis that were taken from the descriptors established for the search of information and that were written horizontally. After the paragraphs or phrases were extracted where a topic related to one of the categories was developed to place it in the square.

### 3. Results and discussion

By reviewing and analyzing the information, important aspects were determined, among them, it was confirmed that few studies have been carried out regarding the relationship between mobile devices and active learning, mainly because most of them expose cases of use of the technology but without directly relating the subject that concerns us; although some investigations are interesting since they present data that at the time were taken into account for the educational process, however, there are still few who perform a general analysis that the use of mobile devices has in active learning or the relationship that these can have

In the results found, the studies carried out to publicize the design and development of activities based on mobile learning, as well as experiences on educational innovation stand out (Artal Sevil, Casanova López, Serrano Pastor, & Romero Pascual, 2017); case studies of educational research, as well as analysis of life stories, there are even articles that explain a conceptual model as innovation that allow us to foresee the potential of mobile learning (Mejia Trejo, Sánchez Gutiérrez, & De Jesús-Vizcaino, 2015), ( Vázquez Cano & Sevillano García, 2014). In the same way, publications were found showing the didactic functionality of mobile devices, describing the design and development of a mobile learning system as support for the teaching and learning process, as well as the influence of motivational factors when they are used. mobile technologies as an educational practice (Castro, et al., 2016), (Sánchez-Prieto, Olmos-Migueláñez, & García-Peñalvo, 2017), (Villalonga Gómez & Marta-Lazo, 2015).

Studies are also shown in which it is said that the use of mobile devices and apps is widespread among students, who make constant use of them (Briz Ponce, Juanes Méndez, & García Peñalvo, 2015). This investigation talks about that virtually everyone has mobile electronic devices, studies are presented in which they show important statistics on the subject of these devices (Union, ICT Facts Figures 2015, 2015) (Humanante-Ramos, García-Peñalvo, & Conde-González, 2016), (Mendoza Bernal, 2014), (Herrera Sánchez, Díaz Irizar, & Buenabad Arias, 2014).

In relation to the benefits obtained by using mobile learning, several articles were found, including lectures and doctoral theses, in which they state that these devices allow new ways of teaching and sharing, allow the construction of knowledge between groups and improve communication ; it is also said that mobile devices can enhance interaction inside and outside the classroom, stimulating motivation and communication, as well as critical thinking (Basantes, Naranjo, Gallegos, & Benítez, 2017). In particular, we talk about the potential that this type of learning can have, such as ubiquity and mobility as its main advantage, becoming tools and elements available for both teachers and students through which you can access information without import the place where they are or the type of subject or sector being studied (Briz Ponce, Juanes Méndez, & García Peñalvo, 2015).

Regarding how mobile devices are applied in active learning in the university, findings are presented in which they mention the impulse that these devices can offer to have a real approach to knowledge and the possibility of creating and sharing knowledge, in addition to can support the organization and especially the communication of what is learned (Sahagún Jiménez, Ramírez García, & Monroy Iñiguez, 2016), in this same sense, in several studies has referred to the benefits that can bring with using mobile systems as a means to personalize student learning and encourage collaborative work as an active learning strategy, in addition to allowing the construction of knowledge among groups and improving communication, this is to enhance interaction inside and outside the classroom, There is also talk of effectiveness through the implementation of tools that allow students to take participate actively, generating collaboration and cooperation (Castro, and others, 2016), (Basantes, Naranjo, Gallegos, & Benítez, 2017) and (Fuertes, and others, 2016).

Among the studies stand out those in which research is presented related to cases in which mobile devices have been applied in order to achieve learning, highlighting that when working in this sense, it can be noted that the commitment of students is greater and favors autonomy and supports the development of competencies related to collaboration among peers (Silva Quiroz & Maturana Castillo, 2017); In this way, mobile devices are presented as an ideal medium for socialized learning, which implies integrating active methodologies that avoid the rigidity of traditional classes (Ramón Verdú, 2015).

Regarding the disadvantages that can also occur when using mobile devices as a tool to support learning, it is shown that there is a lack of development of cognitive skills that are required to incorporate this new methodology and above all how to use technology in favor of learning (Arce, 2017); in relation to the importance that teachers have for this type of methodologies to be successful in the educational field, it is said that one of the most important challenges for higher education is the training of teachers in the use of mobile devices inside and outside of the classroom for pedagogical purposes (For & SJ, 2017) and (García-Peñalvo & Ramírez Montoya, 2017).

Other works found show that despite the fact that the majority of university students have smartphones, they do not use applications that allow them to support their learning or to carry out academic activities, since a large percentage uses it only to play, chat and other activity related to leisure, (Herrera Sánchez, Díaz Irizar, & Buenabad Arias, 2014), that is, these tools can become a distraction that affects the improvement of the teaching-learning process (Fuentes, et al., 2016).

#### 4. Conclusions

The presented work reflects that the researches found agree that there is a wide potential of the pedagogical use of mobile devices, however, they are still little used to support active learning in a university environment; likewise, it is emphasized that students prefer to use these devices for activities related to leisure and entertainment, even though this may affect their academic performance.

It also shows that personal mobile learning environments can be used as technological scenarios of recent introduction in university education, however, it is necessary to expand the research that allows measuring the impact that these methodologies have on the educational process.

Similarly, it is concluded that the number of investigations carried out in Ibero-America is still incipient, this is because what is called mobile learning has not yet been completely clarified, since it is not necessary to determine when and in what situations it should be called mobile learning, this coupled with the impact it has on the teaching and learning process.

At the theoretical level, there is a scarcity of research and publications on the application of mobile devices as a strategy to motivate active learning. In the research, it is noted that mobile learning is a relatively new phenomenon, in such a way that the theoretical bases that sustain it are still in development and most of the approaches have been made from a technological point of view and not focused on a perspective pedagogical.

In this same sense, various results show that the use of mobile devices and apps are common among students, however, it is considered necessary to deepen the potential they can have for specific uses of various subjects in the university environment.

For its part, stands the pedagogical design serves one of the most important functions for the application of mobile devices have an impact on active learning, ie successful participation of teachers in design, development, implementation, and evaluation of learning is required through these innovative methodologies.

In this sense, García Aretio (2017) refers to the effectiveness of using mobile devices and technology as part of the educational process, noting that it can be performed almost similar to the actual classes manner, claiming that the trend is not exhausted, but which continues to include the break with new technologies, such as mobile and active learning.

Finally, it is important to continue with studies that deepen the pedagogical impact of technologies, as well as innovative methodologies and active learning, it is necessary to develop new research methods for this type of studies in which various aspects are studied. didactic of mobile learning.

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