A SWOT ANALYSIS OF BRING YOUR OWN DEVICES IN MOBILE LEARNING

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ABSTRACT

In current education there is a trend called bring your own devices (BYOD), this refers to the policy of use of resources that allows students to bring their own mobile device to use in the classroom. BYOD allows students and educators to take advantage of technological tools to improve learning and instruction. Mobile devices in a BYOD environment provide educational experiences beyond the boundaries of a classroom. This trend was born in companies, where their employees are allowed to take to their workplaces personal property devices such as: laptops, tablets and smartphones. This generated several disadvantages and problems related to the security of the information. In education, many teachers and parents consider that mobile devices are a tool only for communication and entertainment and would become a distraction in the classroom. As noted, although technology and especially mobile devices have enormous potential to be used in education, there are also several factors that could limit their adoption. This article makes use of the literature review to perform a SWOT analysis of the use of BYOD in m-learning.

KEYWORDS

BYOD, Learning, m-Learning, Mobile Devices, SWOT

1. INTRODUCTION

Nowadays, the use of mobile devices is relevant in all aspects of life, especially in the educational field. This mobile technology creates new opportunities and improved learning experiences for all students, regardless of the level of education (Sanusi and Oyelere, 2017). Learning with the help of mobile devices is becoming an integral component of the modern education system. Two of the most important characteristics of m-learning are ubiquity and portability which, allow mobile users to access learning resources from anywhere and at any time (Khan et al., 2016).

Mobile technologies achieved amazing improvements for both devices and wireless networks, so today, smartphones and tablets are considered the main representatives of this category (Zappatore et al., 2015). Mobile devices in bring your own devices (BYOD) environment are gaining popularity in education due to the following reasons: most students are familiar with a mobile device they are more economical and portable compared to a laptop; portability and ubiquity make them suitable for use in the classroom. In addition, students are eager to use technology today, especially mobile devices and interactive tools (Giannakas, et al., 2015).

These new mobile technologies can play an important role in current education, informs (Mahalingam and Rajan, 2013). However, many of the teachers do not possess the necessary skills to implement a pedagogical approach supported by technology. For this reason students do not develop skills or meet the anticipated learning challenges as they gain limited support from their teachers.

This article is structured in four sections. The first section provides a brief description of the BYOD trend and defines several studies in which it is evident that BYOD is being used as a support in learning. In addition, the hypothesis and the problem are established which, deals with the investigation. The second section indicates the method used to perform the SWOT analysis and summarizes the strengths, opportunities, weaknesses and threats of BYOD in m-learning. The third section discusses of the results

obtained. Finally, the fourth section presents the conclusions and provides a direction for future research. The results obtained are useful for academics who seek to include mobile devices in the teaching-learning process. The study can also be useful for educational institutions that are looking to explore innovative approaches that include emerging paradigms such as BYOD and mobile technology as support in the learning process.

2. BYOD IN EDUCATION

BYOD is a technological trend that proposes student-centered learning. Mobile devices in a BYOD environment provide teachers the ability to quickly assess students by generating almost instantaneous feedback. BYOD allows students and teachers to use the technological tools that make learning and teaching more efficient and productive (Stork et al., 2014). In traditional education, the only source of knowledge within a classroom was the teacher, without his presence the classroom is simply an empty room without any resource to learn. With BYOD, each student has access to information from around the world such as: events, places, organizations, people and other students directly and instantly (Wong, 2014). Learning in a BYOD environment tends to be easy and efficient since users are familiar with their personal devices, rather than having to learn how to operate a new device. This feature can contribute to greater learning in less time. With the help of BYOD, educators and students are learning together, thus developing communication, collaboration, critical thinking and creativity (Stork, Rose and Wang, 2014).

Although the BYOD trend gained momentum in organizations and their employees, due to many advantages such as: increased user productivity, reduced costs in purchases of hardware and software, increased mobility, flexibility, employee satisfaction, etc. (Zahadat et al., 2015). Currently, there are many initiatives that involve the BYOD trend to provide new and better ways of teaching and learning. Some studies claim that BYOD can be used to improve student engagement and collaboration (Song and Wen, 2017). Students appreciate the interaction that BYOD offers between teachers and students, they see it as a positive addition to their learning (Dobbins and Denton, 2017).

In addition, BYOD offers digital opportunities for independent learning, in and out of class and encourages innovation in teaching and learning (Stork, Rose and Wang, 2014). In Mahalingam and Rajan (2013) argue that although new technologies can play an important role in education, teachers still lack the necessary skills to implement a constructivist approach supported by technology and this leads students to get support limited to develop critical skills.

Although, the benefits are obvious there are several institutions of higher education impose a total ban on the use of mobile devices by students within the classrooms. They indicate that these devices cause distraction and are a problem for the management of the class (Olasoji et al, 2014). In addition (Olasoji et al, 2014) indicates that several professors confess that they have no idea of the benefits that technology offers in learning or how they can use mobile devices in their teaching practice. Despite all the advantages indicated in the research presented, there are also limitations and barriers that prevent the adoption of BYOD in teaching and learning environments based on m-learning. It is for this reason that a SWOT analysis involving BYOD in m-learning is presented below.

3. METHOD

The method used to carry out this investigation was a review of the literature. A search was carried out with keywords related to higher education, mobile devices, m-learning and the BYOD trend. Information was downloaded from scientific databases in which a greater number of articles related to technology, mobile devices and BYOD trend were observed. In order to avoid a theoretical expiration, the items searched belong to the last six years. The search strategy and the article exclusion criteria are detailed below.

3.1 Data sources and Search Strategy

The scientific databases were IEEE Xplore Digital Library, Scopus and Springer, two sets of keywords were searched: (1) keywords related to mobile learning; and (2) keywords related to the BYOD trend in education. The query string used to perform the searches were:

IEEE Xplore: Metadata (learning; BYOD) AND document title (mobile) AND Abstract (learning).
Scopus: Title (mobile and learning) OR (m-learning) AND Abs (BYOD) AND Key (learning).
Springer: The exact phrase (mobile) AND (learning) AND (BYOD).

For all the selected databases, the search was filtered by the type of content, only publications in journals and conferences were selected. To have the most up-to-date and relevant information on the subject, the selected articles were only from the last six years. The topics related to the search were: IT, Learning, Learning and Instruction, Education, Engineering, Psychology and Social Sciences. Owing that quantitative analysis generated too many records, more than 500 articles for each scientific library. It was decided to choose documents that were only found in conference and magazine publications related to education, learning and only written in English.

3.2 Search Results and Exclusion Criteria

In the search made we found 57 articles, of these we only chose those that were published in scientific journals and conferences. The analysis of the abstract and the introduction of each article defined the relevant articles to the topic of this research. These articles (46) were selected because in their content they included the terms searched as BYOD and m-learning, in addition the focus of these was in the educational context. For the analysis proposed by this research, a matrix of concepts was drawn up that involved all the articles and classified them according to their content of strengths, opportunities, weaknesses and threats regarding the use of BYOD and m-learning in the educational field. Of the selected articles, 15 provided information on strengths, 13 on opportunities, 13 spoke on weaknesses and 5 articles on threats, these summarized data can be seen in Table 1.

Table 1. Search Results

BDD \ SWOT	Strengths	Opportunities	Weaknesses	Threats	Total articles
IEEEXPLORE	8	6	7	3	24
SPRINGER	5	6	5	1	17
SCOPUS	2	1	1	1	5
Total thematic	15	13	13	5	**46**

4. DISCUSSES OF RESULTS

Once all the articles, summarized in Table 1, were analyzed in an exhaustive manner, the strengths and opportunities for the use of BYOD and m-learning in the educational field generate indisputable advantages. A great advantage for the adoption of this technology in the classroom is the generation of current students. Millennials have a different way of receiving and processing information, because they grew up in the era of the Internet, mobile devices and social networks. Despite all the advantages and initiatives found in the research, there are also weaknesses and threats that can represent barriers that prevent the adoption of m-leaning technology with BYOD in higher education. Some of these limitations are being addressed by several researchers to counteract them, there are currently several initiatives that indicate how to use mobile devices in education (Dobbins and Denton, 2017). Below is a summary of all the strengths, opportunities, weaknesses and threats in Table 2

Table 2. Results of SWOT analysis of BYOD in M-learning

Strengths	Opportunities	Weaknesses	Threats
1. Mobility 2. Ubiquity 3. Accessibility 4. Collaboration 5. Utility 6. Privacy 7. Adaptability 8. Portability 9. Multiplatform 10. Flexibility	1. High mobile penetration 2. Reduced costs of access to mobile internet 3. Great amount of educational app based on games 4. Learning independence, improved focus in the classroom and the link with the teacher 5. Interaction and instant feedback 6. Improvement of commitment and academic participation 7. Satisfaction of the mobile device user	1. Lack of training 2. Excessive number of applications 3. technological obsolescence of institutional mobile infrastructure 4. Low educational support, testing and applications 5. Low acceptance of the interested parties 6. Economic, technological and institutional policy factors 7. Applications not compatible with multiple mobile devices 8. Usability (screen, battery)	1. Security of personal and institutional information 2. Wide variety of devices and platforms 3. Android OS security threat 4. Costly, complex and incompatible applications on some mobile devices 5. Culture change of traditional teaching

The SWOT analysis presents several strengths and opportunities that derive from the use of mobile devices in educational environments. The most important characteristics are: mobility, ubiquity and portability, these allow mobile, independent and collaborative learning. Despite the advantages and benefits that BYOD offers in education, there are several challenges that must be overcome in order to properly implement BYOD in the teaching-learning model. The challenges that arise from the weaknesses and threats must be addressed, the solutions proposed must ensure, among other things, that there is a stable and reliable wireless network infrastructure. All educational institutions before committing to provide the services offered by the use of mobile devices focused on teaching and learning must strategically generate policies that support them. Frameworks or guidelines should be the basis of policies, guidelines should address issues such as the provision of adequate technological infrastructure, motivation to faculty and students, technological awareness, content design guidelines, technical assistance and professional and staff development.

5. CONCLUSION AND FUTURE WORK

A review of the literature is an instant photograph of the field investigated at a given time. Although the literature search was a rigorous process, many relevant articles may have been overlooked. Despite this, the research generated indicators that show the importance of measuring the impact of BYOD on teachers and addressing the impact of pedagogical approaches necessary, due to the variety of devices, functionality, operating systems and access to digital tools. The use of mobile devices and the new technologies of information and communication, both by students and teachers, generates significant changes and new ways of generating knowledge. The use of BYOD is advantageous for many reasons, above all, improving access to Internet resources and digital tools in support of teaching and learning. Despite the number of solutions and mobile learning applications currently available, there are still some limitations in terms of usability, associated costs, technological infrastructure, complexity, etc. For example, there are many educational applications available that only work on specific portable devices. This can increase the barriers in the adoption of BYOD in educational institutions. What has been said above opens new emerging paradigms that should be taken into account for future research. Students should be involved in educational experiences that make use of mobile devices, for example a combination of technologies (BYOD) and Mobile Crowd-Sensing (MCS).

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