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Computers in Human Behavior

journal homepage: www.elsevier.com/locate/comphumbeh

Full length article

Learning with mobile technologies – Students' behavior



Laura Briz-Ponce ^{a, *}, Anabela Pereira ^b, Lina Carvalho ^c, Juan Antonio Juanes-Méndez ^a,
Francisco José García-Peñalvo ^a

^a University of Salamanca, Spain^b University of Aveiro, Portugal^c University of Coimbra, Portugal

ARTICLE INFO

Article history:

Received 12 March 2016

Received in revised form
7 May 2016

Accepted 12 May 2016

Available online 25 May 2016

Keywords:

Mobile application

Medical education

Mhealth

Mobile learning

TAM

Innovation

ABSTRACT

The increasing growth of mobile technology in our Society has become a reality. This paper was designed to research about the different factors and drivers that could influence students' behaviour into the usage of mobile technologies for learning.

The methodology was based on a quantitative survey grounded on the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology. Data were collected from medical students in University of Coimbra.

This model pointed to a behaviour pattern based on the experience and application by medical students, correlating with a strong attitude towards using mobile technology for learning (57%) and willingness to recommend it (40.5%).

In line with previous studies, Social Influence raised to be an important factor towards the Attitude and Behavioural Intention of using Mobile Learning. In addition, according to the results, the student's ease of perception seems to be the main factor affecting the Social Influence (31.9%) and the reliability for recommending this technology for learning was the main factor that affected the Behavioural Intention. Findings provide support for Technology Acceptance Model and the implications of these findings are discussed within the context of Innovation in Education.

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1. Introduction

During the last decade, the number of mobile lines in the world has been increased significantly. In fact, according to the last report of International Telecommunications Unit (ITU, 2015) there were more than 7.000 million users in the world with a mobile line by end 2015. In Europe, ITU estimates the mobile users penetration around 125% and the Internet rate will reach 75% by end 2014.

These figures show the importance that these new technologies have in the Society. This trend has affected different sectors as Education, Medicine, and Communication. The way people interact among them and the way they have to communicate each other have evolved completely, incorporating the mobile gadgets and the mobile technologies as part of them.

Due to this reasons, there have been some researches about the

inquiries and the use of mobile technologies in education and learning (Briz-Ponce, Juanes-Méndez, & García-Peñalvo, 2014a; Huang, Lin, & Chuang, 2007; Tsinakos & Ally, 2013). This publications report the importance of these resources in the learning process, claiming that many Universities are implementing mobile learning to provide flexibility or even to prepare students and teachers for the developing digital area. The United Nations Educational, Scientific and Cultural Organization (UNESCO) have recommended Governments to adopt technological infrastructure to ensure equal access to mobile connectivity in order to allow students accessing to an important and increasing range of learning possibilities. This Organization has affirmed that m-learning has a great potential in the quality of learning and enhancing the good student's results (UNESCO, 2009).

The drivers that could influence in students' behaviour to use mobile technologies for learning, have been considered an engaging factor to assay in many researches (Arteaga, Duarte, & García, 2013; Briz-Ponce & García-Peñalvo, 2015; Chen, 2011; Hong, Thong, & Tam, 2006; Lee & Lehto, 2013; Sánchez & Hueros, 2010; Sezer, 2016; Thakre & Thakre, 2015).

* Corresponding author.

E-mail addresses: laura.briz@usal.es (L. Briz-Ponce), anabelapereira@ua.pt (A. Pereira), icarvalho@huc.min-saude.pt (L. Carvalho), jajm@usal.es (J.A. Juanes-Méndez), fgarcia@usal.es (F.J. García-Peñalvo).

For example [Thakre and Thakre \(2015\)](#) explain what are the main uses of smartphones by students, reporting that communication, learning and entertainment are the most popular ones.

[Briz-Ponce and García-Peñalvo \(2015\)](#) makes a description of a TAM model applied to medical students making a confirmatory factorial analysis in order to explain the relationship between the dimensions included in the study. [Lee and Lehto \(2013\)](#) makes a research based on a TAM model as well reporting the determinants that may influence in the behavioural intention to use new technologies.

[Sánchez and Hueros \(2010\)](#) make an analysis of virtual teaching platforms for distance learning and the use of TAM whereas [Sezer \(2016\)](#) reveals that the factors of gender and the academic success affects significantly towards students' attitudes towards e-learning.

The authors [Hong et al. \(2006\)](#) make a comparison between three models in order to understand the usage behaviour of mobile Internet.

[Arteaga et al. \(2013\)](#) investigate the factors that determine the acceptance of WEbCT learning system among students and the findings published by [Chen \(2011\)](#) show that educational compatibility and expectancy are important determinants of e-learning acceptance.

Therefore, healthcare professionals are rapidly changing the use of mobile technologies. Clinicians consider that mobile technologies allow them to enable rapid access to clinical information and communicate among them ([Epocrates, 2013](#)). The main benefits reported of using m-learning was the convenience of getting information just when it was needed, accessibility, utility of mobile devices due to their compact size, portability, fast access to information, efficient use of time and flexibility ([Boruff & Storie, 2014; Wallace, Clark, & White, 2012](#)).

The purpose of this paper is to enhance the understanding of this issue, providing some insights about the different factors that could influence in students' behaviour using mobile technologies for learning, which will contribute to make Institutions or Universities promote their adoption and improve the needed resources to achieve a better quality in Education. In order to perform this research, it was necessary to design a survey that was distributed to the students of University of Coimbra.

2. Materials and methods

2.1. Participants

The study carried out within this research, performed a survey in University of Coimbra among medical students. One hundred and sixty participants were solicited in this University.

[Table 1](#) presents the detailed analysis of participants' demographic information and other data related with their ownership of mobile devices, operating system, frequency of use and experience.

It is important to notice that about 74.4% of students in the sample who reported gender were female. This percentage is not so strange as there is a majority of women in Medical Schools these days. According to the European Union, the percentage of female physicians has increased between 1996 and 2006 in almost all Member States. In fact, there were 35% of women in Medical Schools in 1996 and 41% in 2006 ([Corselli-Nordbald, 2009](#)).

More than half of participants were enrolled in their third year of medicine (51.9%) and most part of the students ranged from 18 to 21 years of age. Another important data is almost all participants (96.9%) owned a mobile device (Smartphone, Tablet or both). The Operating system most used for Smartphones between undergraduate students is the Android, whereas the iOs (iPad) is more

Table 1

Participants' demographic Information and other related characteristics (N = 160).

Variable	Participants' characteristics		
	Descriptive	Frequency	Frequency (percentage)
Gender	Male	41	25.6%
	Female	119	74.4%
Range age	From 18 to 25 years old	150	193.8%
	From 26 to 35 years old	10	6.3%
Year	1 ^o Year of Medicine	38	23.8%
	2 ^a Year of Medicine	15	9.4%
	3 ^o Year of Medicine	83	51.9%
	4 ^o Year of Medicine	24	15.0%
Ownership	Only Smartphone	45	28.1%
	Only Tablet	9	5.6%
	Smartphone and Tablet	101	63.1%
	None	5	3.1%
Operating system smartphone	iOS (iPhone)	46	28.8%
	Android	95	59.4%
	Windows 8	5	3.1%
	N/A	14	8.8%
Operating system tablet	iOS (iPad)	49	30.6%
	Android	45	28.1%
	Windows 8	13	8.1%
	Other	2	1.3%
	N/A	50	31.2%

popular for the tablets.

2.2. Procedure

The survey was distributed to the participants face-to-face during a class of first year, third and fourth year at University of Coimbra. The sampling method was non probabilistic (non randomly), accidental or convenience type ([McMillan & Schumacher, 2001](#)). Previously, it was necessary to request permission to the director of the department and the teacher responsible of the class in order to be allowed to interrupt the class. Therefore, a formal letter was sent to the director explaining all the process and a copy of the questionnaire in order they could check the data that will be collected. Once they received all the documentation, they provide the dates and the classes that could be interrupted in order to obtain data. Also, before filling the test, the students received information in class of this research and the contact email to answer any question they may have.

It is important to notice that all the data collected was anonymously and the participants were volunteer as they could refuse to fill the survey. All the data were obtained from October to November of 2015.

2.3. Instruments

The survey consisted of 53 questions grouped in two sections. The first section included 19 questions related with demographic and context information. This sections covers the main independent variables that were analysed in the result period. The second section included 34 items and was designed based on the TAM published by [Davis \(Davis, 1989\)](#) and the constructs reported by other article published in order to unify the different versions of the model ([Venkatesh, Morris, Davis, & Davis, 2003](#)). In addition, this study added one construct more referred to as Reliability and Recommendation ([Briz-Ponce, Juanes-Méndez, & García-Peñalvo, 2014b](#)).

In order to quantify the different dimensions or constructs, the survey used a 5-point Likert scale. The participants were asked to respond to each statement in terms of their own degree of agreement of disagreement. Likert scale is based on five possible answers

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