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Student perspectives about mobile learning initiatives at Open University of Brazil: the mobile phone issue

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ABSTRACT. The objectives of this study were to verify if students of Open University of Brazil approve of mobile learning (m-learning) initiatives, to identify the students' perspectives about m-learning, to develop a model of instructional design for m-learning environments, and to quantify student satisfaction with the presented model. 1,328 students agreed to participate in this study, all students of Open University of Brazil. They were questioned about their perspectives on m-learning at this university and if they agree with this educational model. The students agreed with the possible implementation of m-learning at this university, especially through mobiles phones. Collectively, the main ideas that the students offered to improve the efficiency of knowledge construction were classified into three groups: theory, practice, and interactivity. They also agreed with an instructional design model that was developed and shown to the three groups.

Key words: distance education, technology, public management, educational paradigm.

RESUMO. Perspectivas dos estudantes sobre iniciativas de aprendizagem móvel na Universidade Aberta do Brasil: a questão do telefone móvel. Os objetivos deste estudo foram verificar se estudantes da Universidade Aberta do Brasil aprovam iniciativas de aprendizagem móvel (m-learning), identificar as perspectivas dos estudantes sobre m-learning, desenvolver um modelo de design instrucional para ambientes de m-learning, e quantificar a satisfação dos estudantes com o modelo apresentado. 1.328 estudantes concordaram em participar deste estudo, todos estudantes da Universidade Aberta do Brasil. Eles foram questionados sobre suas perspectivas sobre m-learning nesta Universidade e se concordavam com este modelo educacional. Os estudantes responderam que concordam com a possível implementação do m-learning nesta universidade, especialmente através de telefones móveis. Coletivamente, as principais idéias que os estudantes ofereceram para melhorar a eficiência da construção do conhecimento foram classificadas em três grupos: teoria, prática e interatividade. Eles também concordaram com o modelo de design instrucional que foi desenvolvido e apresentado para os três grupos.

Palavras-chave: educação a distância, tecnologia, gestão pública, paradigma educacional.

Introduction

The Open University of Brazil (OUB) is an integrated system consisting of public universities at undergraduate and postgraduate levels and municipal, state and federal governments. OUB specializes in providing educational programs for people who have difficult spatial and temporal access to university programs for training and obtaining certificates (BRASIL, 2006). This university provides distance education, the method used for teaching and learning is entirely electronic, similar to the Open University of United Kingdom (THE OPEN UNIVERSITY, 2010), with physical classes in strategic locations, such as those geographical areas with low levels of human development and a low basic education index.

This educational method requires associated technology to maintain the electronic learning (e-learning) environment in which the students asynchronously carry out unique but related educational tasks. These responsibilities include observing and studying the learning objects, interacting with the teachers and other students, and participating in reviews and discussions that help them construct knowledge (ANAGNOSTOPOULOS; BIELIKOVA, 2010). E-learning is essentially applied and trained by desktop and laptop computer (SUN et al., 2008).

Currently, the students who attend this university must have access to a computer and broadband internet connection to perform activities and access the learning materials. In countries like England and The Netherlands, students of open universities have financial aid programs and scholarships to purchase

computers and access to broadband Internet connections (THE OPEN UNIVERSITY, 2010; THE OPEN UNIVERSITEIT NEDERLAND, 2010). In Brazil, CAPES (Coordination for the Improvement of the Higher Level Personnel) promotes funding opportunities such as the Pro-Institutional Equipment/CAPES, Equipment System/OUB, and Pro-System Equipment/OUB, which provided more than nine million (US$) in 2010 to purchase equipment for OUB (CAPES, 2010). This money could be allocated to students to purchase equipment. In addition, federal institutions in Brazil (e.g., University of Brasilia) and some public agencies (e.g., the National Library of Brazil) already allow the free use of their wireless broadband internet connections.

Another option to facilitate more access to OUB and the educational system is mobiles phones, which could be financed by public agencies such as CAPES. M-learning is a modality of distance education that uses mobile portable equipment like mobiles phones and personal digital assistants with the basic principle of education "anywhere and anytime" (LIU et al., 2010). This equipment is small in size, and the population uses these devices throughout the day, mainly in the form of mobile phones. Students and teachers could thus be connected to a given course at any time of day (ANAGNOSTOPOULOS; BIELIKOVA, 2010).

Studies have showed that groups that practiced m-learning with mobile phones had higher educational efficiency than groups that only used electronic learning (e-learning). Specifically, these mobile learning groups showed increased access to the virtual learning environment (35% on average) and increased contact with the discipline (45% more time on average). Most notably, m-learning students demonstrated increased interaction with their teachers and other students (60% more messages on average), which led to higher scores on final examinations (17% on average) compared with classes that only utilized e-learning (CAVUS; IBRAHIM, 2009; MARCOS et al., 2010). In addition, students agreed with m-learning exclusively through mobile phones (97% on average).

The current challenge is to create an instructional design for this type of equipment and towards the OUB. The instructional design is an educational project that has several central aims. The first of these goals is to transfer information, ensuring non-ambiguity and clarity of understanding to students. Another objective is for students to retain information for further use and develop problem-solving skills. Importantly, though, resources must also be used efficiently by managing the cost and availability of materials and technologies. All of these challenges facilitate the cognitive view of knowledge construction (GAGNE; MERRILL, 1990; TATE et al., 2010).

The creation of an instructional design must first evaluate if the students agree with the utilization of m-learning at OUB, financed by the Brazilian government. Other topics that should be evaluated include student perspectives on the types of virtual classes and environments that would allow for the most effective construction of knowledge. Later, the model of instructional design should be shown to students to evaluate their satisfaction.

Thus, the main objectives of this paper were to verify if the students approve of the m-learning method, to identify the students' perspectives on m-learning, to create a model of instructional design for m-learning environments, and to quantify the satisfaction of the students with the presentation of the model.

Material and methods

This research was motivated by a discussion forum on the OUB social networking website. A total of 2,254 students at the OUB participated in this forum. Of these students, 1,328 agreed to participate in this research; these students included 823 students taking undergraduate courses (Licentiate's degree), 328 students taking specialized courses, 88 students taking undergraduate courses (Bachelor's degree), and 59 students taking technology courses. The students came from 25 states and 1 federal district of Brazil (Table 1), with an average of 51 students per state and district.

Initially, students were asked if they agreed with a future education program offered through m-learning at OUB, with a five-point answer scale ranging from agree to disagree based on previous literature (SANTANA; IMAÑA-ENCINAS, 2007). The perspectives of the OUB students toward an m-learning course, especially one that utilized mobile phones, were determined using the *Ad libitum* method (ALTMANN, 1974) through the open question: "What do you want in a course that uses m-learning (mobile phones) at OUB?" The answers of this question were classified and quantified. Of the answers, 95% of the perspectives will be used to design the model of instruction (ALTMANN, 1974; SANTANA; IMAÑA-ENCINAS, 2007; TATE et al., 2010).

The students' perspectives were used to build an instructional design model in accordance with theoretical principles (GAGNE; MERRILL, 1990; TATE et al., 2010). The formulated model of instructional design was shown to students who then offered their opinions on whether the model would effectively help the construction of

knowledge in the OUB courses through likert-type answers ranging from agree to disagree.

Table 1. Number of students who participated in this research.

State of Brazil (Federative Units)	Number of Students
Acre	0
Alagoas	43
Amazônia	52
Amapá	48
Bahia	42
Ceará	56
Distrito Federal	42
Espírito Santo	50
Goiás	56
Maranhão	59
Minas Gerais	48
Mato Grosso do Sul	62
Mato Grosso	51
Pará	55
Paraíba	44
Pernambuco	52
Piauí	48
Paraná	32
Rio de Janeiro	52
Rio Grande do Norte	57
Rondônia	65
Roraima	57
Rio Grande do Sul	63
Santa Catarina	45
Sergipe	53
São Paulo	44
Tocantins	52
Total	1,328
Average	~51

Results and discussion

Most students (94%) agreed with the establishment of an m-learning course at OUB that would be suitable for mobiles phones and financed by the Brazilian government (Figure 1). This result corroborates studies (CAVUS; IBRAHIM, 2009; MARCOS et al., 2010) that indicated that distance education students need mobile equipment because they work full-time during the day and cannot access the Internet for tasks unrelated to their work. Most (89%) OUB students said that they worked 6-8 hours per day and that the Web server does not allow access to OUB sites in workplace (SANCHEZ, 2008). Of these students, 45% require some financing from the government or banks to purchase equipment and pay for a broadband Internet connection (SANCHEZ, 2008).

Six perspectives appeared as the most requested by students for learning environments to mobile phones (Figure 2). These perspectives were classified into three groups according to the activities related to distance education (GOVINDASAMY, 2010). The first group represented perspectives on theoretical topics. The theory applied in OUB courses is basically in text format, which discourages freshmen. The students complained that some texts are difficult to understand because of highly technical language or because the texts are poorly prepared. This problem is discussed between the teachers and managers of distance education. These educators noted that there is a lack of textbooks, and books should be appropriate, interactive, clear and self-explanatory to help students become autonomous in constructing knowledge (ARTINO, 2008; KEEGAN, 1993).

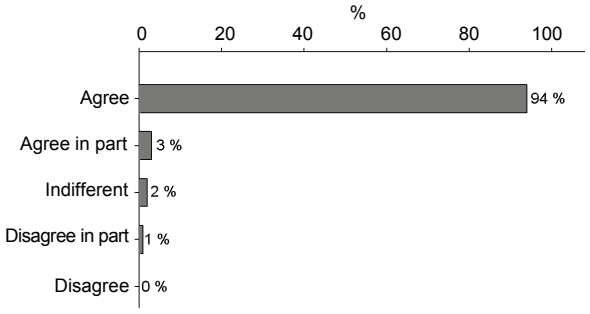

Figure 1. The answers of students of Open University of Brazil about if they agree or not with implantation of m-learning to the courses of Open University of Brazil (n = 1,328).

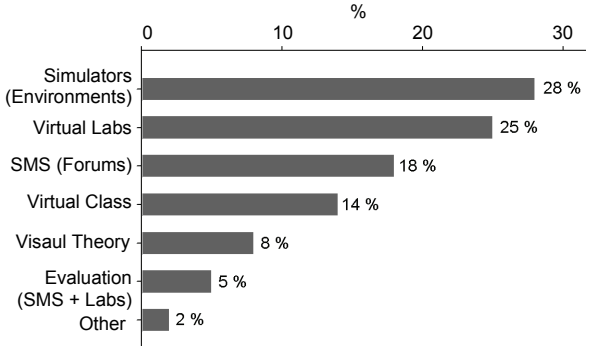

Figure 2. Main answers about what perspective to course with m-learning towards to Open University of Brazil (n = 1,328).

The second group of student recommendations focuses on practical lessons. The students' perspectives on using mobile phones emphasize more practical applications to build on theory. These topics include simulating environments or situations, and creating virtual laboratories and classrooms. One example of simulating environments is that of a forest where teachers and students could discuss spatial and temporal functions. When considering virtual laboratories, students suggested the idea of genetic experiments. Virtual classrooms were described as environments where all students participate in each seminar and use a class to train their teaching and oral ability in a public situation. This particular topic is especially important for students seeking a Licentiate's

degree who initially need oral and teaching practice in virtual classrooms so they can go on to physical classrooms (SANTANA; IMAÑA-ENCINAS, 2007).

The third group of categorized student recommendations concerns interactive and collaborative environments. All students indicated that a communication by SMS (short message service) is more efficient than a forum through desktop or laptop computer because the student may share new issues, questions and answer in the forums with other students or the teachers at any time or place. This could lead to a nearly synchronous, real-time forum. Researchers have shown that this is very important in nurturing the momentum of student insight. In this moment, students can immediately register the idea rather than lose the logical reasoning, creativity and subjectivity relevant to a topic in the course (PELLEGRINO, 2003). With this, the mobile phone would be very important for the education process because it would promote momentum while constructing knowledge.

Another topic that emerged in the student feedback focused on m-learning evaluation. Students want most of the evaluation to comprise the sum of their participation in virtual labs/simulators/virtual classes with their register in forums (Figure 2). This evaluation format is already used by teachers of m-learning to assess student performance (CAVUS; IBRAHIM, 2009; MARCOS et al., 2010). These authors and others (SANTANA; IMAÑA-ENCINAS, 2007) described that when they increased student participation in virtual lessons, the students increased their scores on the final examinations.

The model was evaluated by students, and 91% agreed (Figure 3) with the model of instructional design developed for mobiles phones. The model of instructional design for the course was represented with three main groups (Figure 4).

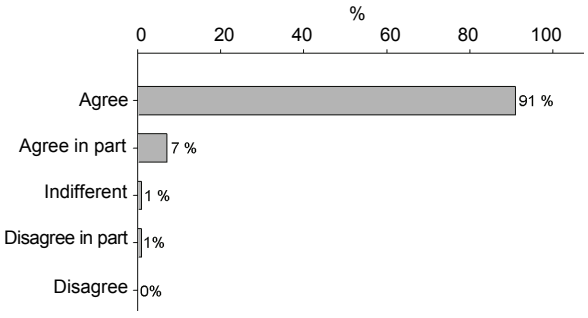

Figure 3. The answers of students of Open University of Brazil about if they agree or not with the instructional design showed to mobiles phones (m-learning) and towards to the courses of Open University of Brazil (n = 1,328).

Students found it easy to use and practical for the construction of knowledge and activities proposed for each course. Studies have shown that visual and interactive communication in education improves the assimilation of knowledge faster than through text format (GUTIERREZ et al., 2008; HODGDON, 1995).

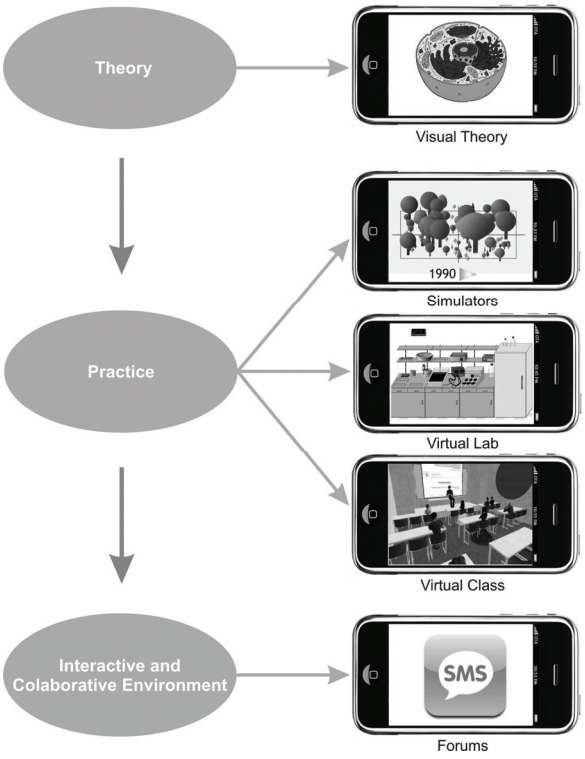

Figure 4. Examples of the instructional design and its educational environments for the mobile phone courses at the Open University of Brazil: this example demonstrates a biology course.

Conclusion

The students at OUB agreed with the future implementation of courses at this university with m-learning, especially mobile phones, with the Brazilian government financing both the equipment and a broadband internet connection. The main perspectives of the students to improve the efficiency of knowledge construction were divided into three groups. These categorizations included a theoretical group where students reported wanting a visual language theory, a practical group in which students suggested simulators, virtual laboratories and virtual classes, and an interactive group denoted by students' preference for interactivity through SMS. Students also agreed with the instructional design model derived from these three perspectives that they were shown. This paper confirms the hypothesis that OUB students are prepared for m-

learning courses through mobile phones, and such courses will likely help them construct knowledge.

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