M-learning System for Learning how to Prepare a Negotiation

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***Abstract*—The advance of Internet and mobile technologies makes the use of these elements become increasingly comprehensive, and distance learning is an area that takes many advantages of these technologies. Some tools and systems help this process, but the most important tool is e-learning. A more contemporary version of e-learning is the one found in mobiles devices, the m-learning system. The rapid advance of these technologies and their high dissemination determine this area as an important point in the decision makers' learning process. Following this point of view, this paper proposes a learning tool involving aspects of e-learning and m-learning for negotiators. This work will discuss how these tools can support professionals during the learning process of preparation step of negotiations. What is more, comparative and initial results will also be presented.**

Keywords – e-learning; m- learning; negotiation

I. INTRODUCTION

Nowadays, the demand for trained professionals, with a deeper and more extensive knowledge of specific subjects keeps everyone uptodate and obliges them learning new things in different areas. However, due to limited free time that people have, some new forms of learning and/or some new learning tools should be used to achieve this goal.

Distance learnig is not something new. It is a form of learning that does not require a classroom, where people (teachers and students) must be present at the same time, something often unconvenient for a particular group of people [25].

This form of learning can be supported by tools that use technologies, called e-learning. These tools can also be used as a complement to traditional methods, providing materials for online study.

According to 2010 census, Brazil has 194 millions inhabitants. It is amazing to know that this number is lower than the number of mobile devices – 202 millions [13]. What was once a luxury is now an item of easy access.

Due to this growth, which does not happen only in Brazil, appeared m-learning, i.e. e-learning applied to mobile devices. Inspite of the technological limitations of these small devices, they are powerful tools in the distance learning process because they can be accessed anywhere and anytime.

This article proposes a mobile learning tool in the negotiation area. This paper is divided as follows: the next section shows a review of literature about e-learning, mobile devices, m-learning and negotiations; the third section discusses the integrated web system, used for negotiation students to learn how to prepare a negotiation, along with the engaged m-learning system; the fourth section makes a comparison with other m-learning tools and the tool proposed; the last section presents the conclusion and further investigations.

II. BACKGROUND LITERATURE

This section brings background literature of four important topics to this work: e-learning, mobile devices, mobile learning and negotiation.

A. *E-learning*

The use of technologies and tools to facilitate the teaching and learning process is what is commonly called e-learning [8]. Because of this, it is also usually related to distance learning, but is not restricted to it and can be used as support for traditional classes [9]. Its nature teaches that the learning process can be done anywhere, because then student is not restricted to a specific place or time, such as classroom, not restricting student to teacher's available time, taking the process and the material used in the learning process to the Internet [7].

The growth of the Internet and advance of technology have allowed an unprecedented breakthrough of e-learning [8]. Its use, however, was not confined with the context of traditional teaching in schools and universities. Its advantages have also been noticed in professional environment, making them use this type of tool [9].

E-learning has many benefits including its accessibility and the amount of time and money it saves. Flexibility is one of the e-learning highlights because it allows students to study at night, keeping their day jobs, fitting the learning time when it better suits their busy schedules. The student dictates the pace of learning as suits him best, as well as the learning style [17].

The downside of e-learning is that students need to have computers and Internet access, and knowledge of these technologies to use them, which should be considered in developing countries. Even though e-learning can fit any time the student wishes, it still requires available time just as traditional education method does. It can result in lack of motivation for the student. Instructors may not always be online to help the students, which can lead to isolation of a student. The communication provided only by electronic means can also cause misunderstandings by both sides [17].

B. *Mobile Devices*

There are many kinds of mobile devices in the market, and choosing one can turn to be success or failure decisive factor of an m-learning system. Below there is a list of

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devices, their uses in m-learning, and their pros and cons [15]:

- iPod: the Apple's device is used to download and listen to podcasts with video and audio lessons, and to exchange material between students and teachers. Its advantage, besides its popularity, is to have many add-ons that can be useful. Its disadvantages are the high cost, small screen and the need to use the iTunes program.
- MP3 player: as iPod, students can download and listen to Podcasts. This kind of device is compacted and lightweighted, but other devices can replace it in addition, it is an instrument that has only one way, i.e., there is no interactivity.
- PDA (Personal Digital Assistant): devices that can use the Internet, play audio and video, access e-mails, document editing and use communication assistants. For a mobile device, they have a large screen and also dispose of text entry. Their disadvantages are their size, once they are bulky, and inconvenience of the entry of long texts.
- USB Drive: storage tool that can assist in sharing audio and videos between students and teachers and that can be compatible with most computers. But it is a device with a well defined and single proposal: storage. Other devices can easly replace it, such as iPod and MP3 players.
- E-book reader: used to download and read books, can store several books, with the appropriate light for easy reading and text markup tools being its strong points. It has a large screen, for a mobile device, suitable for reading. However, it has a limited capability of reading different proprietary e-books formats.
- Smartphone: has the combination of several features of other devices such as the Internet access, storage, camera, video, mp3 player. From the other side, it has a high cost, a small screen for a mobile device, in addition to not being efficient in text input.
- Laptops/tablets: the most complete of the devices, having the Internet access, Bluetooth, storage, Wi-Fi, easy text input, audio and video player, large screen and other features. Its disadvantage is the high cost, and its size that is too large when compared to other devices and cannot be used while walking, for example, as MP3 players and smartphones.

In addition to these limitations of each device, only PDAs, Smartphones, Laptops, Tablets and some types of iPod are programmable. Due to the growth and practicality of smartphones, these were the ones chosen for the development of the m-learning system.

Even though smartphones are being used for the development of the m-learning system, there is still a very large range of devices to choose from, and each one has its own limitation. These limitations are key factors in choosing a device for the development of the tool [5]. In addition to the various instrument options there is also a range of platforms for development. For this work, the platform chosen was the Android platform, which is Linux-based, open source, created by Google along with other companies. The fact of it being present in several models of many companies was one of the key factors to the decision of using this platform, because it allows the user to choose which device best suits his/her needs, taking into account the usability, although the choice for a specific platform could be a negative point, due to its possibility to be outdated in a short period of time.

C. M-learning

M-learning is a type of e-learning, supported by mobile devices, which can also be seen as a complement to distance education [3][9]. It can be defined as an acquisition of any knowledge and/or skills through the use of mobile technologies, resulting in a change of behavior [10].

The m-learning nature has two key characteristics: it can be accessed anytime and anywhere, it is quite similar to e-learning, but even more effective, since the mobility these small devices give is much higher than that given by conventional computers. In fact, this character develops a third feature, in motion, since the use of these devices can be done while walking.

The benefits of m-learning tools, in addition to providing mobility, are learning through interaction with different people, the ability to archive and organize a wide range of information in the devices' memory and the easiness in creating documents, texts and attach them into a system, and reducing communication and cultural barriers, using channels that make the student feel comfortable [15][16].

Challenges in the field of m-learning occur mostly because of their computational limitations. Among these constraints we have the bandwidth speed limitation, low processor speed, small screen size and low resolution, complicated methods of input, low battery life and low storage capacity. But the main limitation is the low bandwidth and processing power [4]. In addition to these technological impediments, there are other unfavorable factors in the use of m-learning, such as the fact that students who are not familiar with the technology will have more difficulty than others, the speed at which updates occur may make some content obsolete quickly [15], the conservatism of educators, the need to produce new content, plus the high cost of a device and, in some countries, the high cost the internet connection (WAP, 3G, GPRS) may have [16].

D. Negotiations

The process in which two or more parties make decisions, seeking an agreement that brings benefits to all is called negotiation [11].

The negotiations are present in the daily life of all people, even though we are not aware of this fact. The joint decision of possible work themes by teachers and students is a simple example of a negotiation that can exist inside of educational environment, since the parties involved try to ensure that themes remain in their own liking.

Three concepts are important in the negotiation context: RP (reservation price), ZOPA (Zone Of Possible Agreement) and BATNA (Best Alternative To a Negotiated Agreement).

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[18] defines RP as the last favorable point to a party which accepts the agreement. The RP can be understood as the limit value of the price a buyer will pay for certain goods. Similary, for the seller, this value is the minimal accepted value for the purchase.

With the existence of both seller and buyer RP values, if there are intermediate values that satisfy both parties, there is a ZOPA. According to [18], ZOPA is an area that satisfies both parties involved, and then an agreement can de reached.

The concept of BATNA, introduced by [19], says that all negotiations should have an alternative, just in case the agreement is not reached. The better the BATNA is, the more power you have to negotiate, increasing the chances of an agreement to improve. Negotiation process can be divided into four phases: preparation, value creation, value division and execution [12].

The phase in which negotiators define BATNA, try to improve the relationship and make their positions is the preparation step [19]. In this phase, the negotiators should also define ZOPA [18].

The next step, after the preparation step, is the value creation. In this stage, the parties should explore the interests of the others, generating alternatives to increase mutual gains [20]. The value disivion is the stage where division forms are discussed, among the standards and criteria of division [20].

The final step is the execution. The arrangements for monitoring and verification of the decisions are established in this step. After that, the negotiators work continuously to improve their relationship and to resolve their differences fairly [6][12].

Among these, the preparation step is the most important, being the one where information is collected in order to facilitate the agreement by identifying the interests of all parties [2].

III. M-LEARNING PROPOSAL

The m-learning tool proposed here is a part of Negotiation Support System. This NSS involves training, preparation, risk management and negotiation modeling tools, as illustrated in Figure 1. The m-learning contemplates the area of Mobile Statements, Knowledge Management and Visualization Methods, as seen in demarcated area at Figure 1.

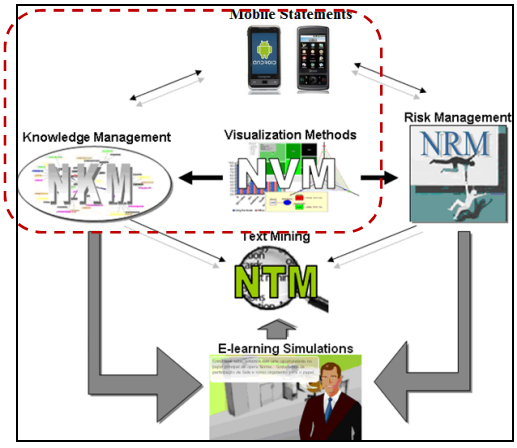

Figure 1. ENEG environment [14]

The proposal highlighted in this paper discusses how the learning elements – e-learning and m-learning – can help in the negotiation preparation.

A. *Preparation Step in the Web Site*

The preparation of a negotiation is the most important phase of negotiation [2], what is more this phase is the main point where the negotiation students should investigate deeper.

This step has interfaces to facilitate input of data about the negotiation, divided into 10 elements: Context, Interests, Options, Relationship, Power, Communication, Criterion, Legitimacy, Concession and Time [6].

For each of these elements there are facilitators to the externalization of the negotiator knowledge. The information about each of these elements can be informed by free text, which is more suitable for more experienced negotiators. For students of negotiation this way of data input is complicated. For those, other kind of input is available, in the checklist form, and public and private reports are also ready to be used.

Figure 2 shows the initial interface of the preparation step, in the NSS environment, contemplating the Context element.

Figure 3 shows the final stage of preparation, presented in a radar chart that, through mining all elements text inserted before, ponders which are the most relevant for the negotiation. This chart also takes into the account the risks associated with each element as it is inserted into the risk management module.

B. *Using the Mobile System during Preparation Step*

Mobile devices, even with all its technological and usability limitation, can become important tools in the learning process [5]. And it is not different when learning about negotiation.

Figure 2. NSS Preparation Interface [14]

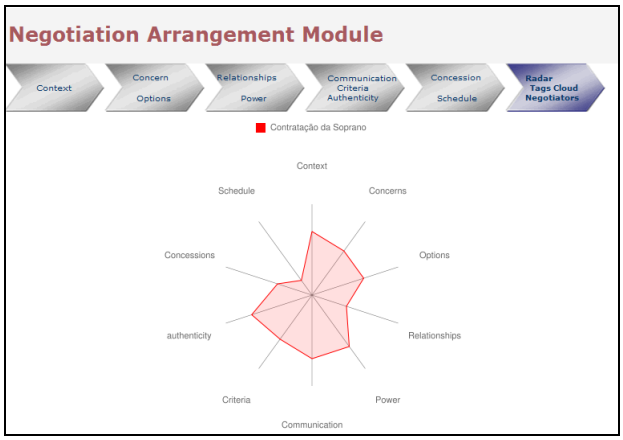

Figure 3. NSS Preparation Interface [14]

Figure 4 shows the integration structure between the mobile platform and the web platform, in the context of data preparation for negotiatons.

The tool brings to the mobile device the entire negotiation preparation module and a few other features [1]. To keep the integration between these two platforms – mobile and web – web service is present. Web service is a tool for integrating applications, independent from the language and technology.

The tool, at startup, requests a login and password, which is the same used in the web system. After providing this information, the user will be directed to the negotiation preparation screen, containing the same five steps of the web tool. These steps are: Context; Interest and Option; Relationship and Power; Communication, Criterion and Legitimacy; Concession and Time. In addition to these five steps presented, the user can view the same charts/reports presented in the web tool.

Typing on a mobile device can become an obstacle to the widespread use of a learning tool. To circumvent this limitation, a feature of data input in the preparation module was included on the mobile system. Once the mobile devices have the basic functionality through voice communication, it becomes natural to use this as a form of data entry.

This mobile learning tool allows the input of voice data, accelerating and facilitating the insertion process. These voice recordings are associated with one of the ten elements of the negotiation where each element can cointain more than one recording [6].

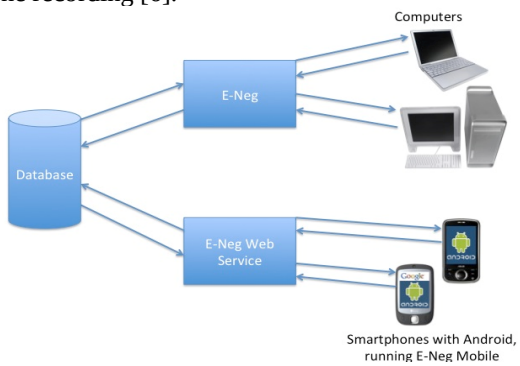

Figure 4. System Architecture

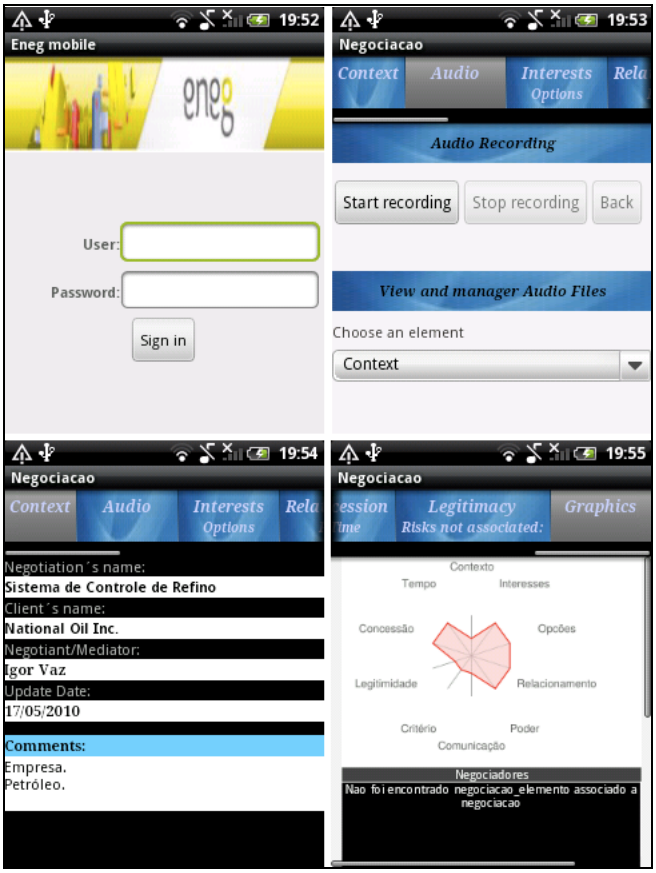

Figure 5. NSS Mobile Interfaces

Figure 5 shows the proposed mobile m-learning system interface. In this picture it is possible to see the login screen, display graphics, audio insertion and context step visualization.

IV. Comparison Among M-Learning Systems

To evaluate the proposed mobile tool, a comparisson with other m-learning tools was made. The tools used for this purposed are:

- MOBILE (Mobile-Based Interactive Learning Environment) [21]: is an m-learning environment using PDAs as devices by the students, while teachers use computers for uploading materiasls like content and schedule. It has chat to implement direct communication between teachers and students, and notes function, quiz and FAQ.
- Bluetooth-based E-learning System [22]: as the name implies, it is a learning system that uses Bluetooth technology as a mean of communciation, based on the client/server architecture. Students act as the client side using any device that supports J2ME technology and Bluetooth. The teachers act as the server side, using desktops or laptops. The need to be close to the Bluetooth server, due to the technology limitation, hurts the mobility nature of the m-learning tools.

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- Athabasca University Mobile Library Project [23]: the project brings the idea of moving the library content to the student, regardless of where and when he/she is - a virtual library in the palm of the hand. It includes a virtual reading room, search engines and journal databases. By identifying the platform running on device, the content shown is the one that best fits the specification of the machine, differing by the format displayed in laptops and devices running PalmOS and Windows CE.
- MOLT (Mobile Learning Tool) [24]: A tool that sends SMSs (Short Message Service) developed for running on a Windows PC connected to a phone via Bluetooth. The cellphone sends messages to students when the PC requests it. This system was developed for learning new words, increasing the students` vocabulary.

Table I was created taking into account the main characteristics of these four tools in comparisson with the proposed mobile tool. The characteristics analysed take into consideration the need of Internet or other kinds of connection. If there is a bidirectional communication, the information comes not only to students, but also from them. The devices and platforms are supported by each tool. The content type is available in each one and integrations are possible with other e-learning systems.

TABLE I. M-LEARNING TOOLS COMPARISSON

Characteristic	Tools				
	Proposed Tool	***MOBILE***	***Bluetooth-based E-learning System***	***Athabasca University Mobile Library Project***	***MOLT***
Communication way	Internet	Internet	Bluetooth	Internet	SMS
Bidirectional communication	Yes	Yes	Yes	No, download only	No, receive only
Devices	Smartphone	PDA	PDA, Smartphone, Cellphone, Laptop	PDA, Smartphone, Palm, Laptop	Cellphones
Access via Browser	No	Yes	No	Yes	No
Platform-specific	Yes, Android	No	Yes, J2ME at client side	No	No
Need installation	Yes	No	Yes	No	No
Works offline	No	In parts, if the content is already in the device	Independs of Internet, but depends of a Bluetooth connection	In parts, if the content is already in the device	No, needs to be at cover area to receive messages
Content	Interactive	Provided by teacher	Providede by teacher	Provided by library	Small texts
Easily adaptable to other knowledge areas	No	Yes	Yes	Yes	-
Integration with other e-learnng tools	Yes	-	-	Yes, with online library	-
Anywhere, anytime	Yes	Yes	No, needs to be close to server - Bluetooth technology limitation	Yes	Yes
Teacher independent	Yes	No	No	Yes	Yes

V. CONCLUSION AND FUTURE WORKS

Each person has his/her own way of learning, so there are different ways to teach. The traditional teaching, which is done in classroom, has proven to be effective, however, not everyone has access to this type of education.

Distance learning is an alternative to the traditional way of education, not limited to the classroom. Many institutions offer courses using distance learning.

With the Internet and technologies expansion, distance learning supporting systems has been developed, providing faster and greater interactivity. But these e-learning tools are not restricted to this function, as they also serve as complementary tools to the traditional methods, by providing educational materials and learning process.

Technology expansion, however, was not confined to the Internet, but devices have been shrinking and becoming more portable, like laptops, palmtops, PDAs, Handhelds, smartphones and tablets. With this technology, the learning process can have new tools, which can be accessed anytime, anywhere. The m-learning tools, however, still have the problem of low battery life, small screen and etc.

This paper shows a proposal for m-learning tools integrated with an e-learning tool, where negotiation students can learn how to handle the preparation step of negotiation, the most important part of it [2].

There are many evolutions that this tool can undergo. Transcription of audio files recorded by users, where the existing text mining can be done is the most obvious one. Besides, the tool expansion for supporting other negotiation steps can be developed, such as the risk management step.

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