Learning based on library automation in mobile devices: The video production by students of Universidade Federal do Cariri Library Science Undergraduate Degree

Aprendizado sobre automação de bibliotecas baseado em dispositivos móveis: a produção de vídeos pelos discentes do Curso de Biblioteconomia da Universidade Federal do Cariri

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Abstract

The video production for learning has been evident over the last few years especially when it involves aspects of the application of hardware and software for automation spaces. In Librarianship Undergraduate Degrees the need for practical learning focused on the knowledge of the requirements for library automation demand on teacher to develop an educational content to enable the student to learn through videos in order to increase the knowledge about information technology. Thus, discusses the possibilities of learning through mobile devices in education reporting an experience that took place with students who entered in March, 2015 (2015.1) Bachelor Degree in Library Science from the *Universidade Federal do Cariri* (Federal University of Cariri) in state of *Ceará*, Brazil. The literature review includes articles publicated in scientific journals and conference proceedings and books in English, Portuguese and Spanish on the subject. The methodology with quantitative and qualitative approach includes an exploratory study, where the data collection was used online survey to find out the experience of the elaboration of library automation videos by students who studied in that course. The learning experience using mobile devices for recording of technological environments of libraries allowed them to be produced 25 videos that contemplated aspects of library automation having these actively participated in production of the video and its publication on the Internet.

Keywords: Information technology. Librarianship. Mobile devices. Mobile learning. Videos.

Resumo

A produção de vídeos para aprendizagem tem se evidenciado ao longo dos últimos anos, principalmente quando o assunto envolve aspectos relacionados à aplicação de hardware e software para automação de espaços. Nos Cursos de Biblioteconomia, a necessidade de aprendizagem prática voltada para o conhecimento dos requisitos para automação de bibliotecas exige do docente que ele desenvolva conteúdos educacionais que permitam ao discente aprender por meio de vídeos, com o intuito de incrementar o conhecimento sobre tecnologia da informação. Dessa forma, este artigo discute as possibilidades da aprendizagem por meio dos dispositivos móveis na educação, relatando uma experiência ocorrida com discentes que ingressaram no semestre 2015.1 do Curso de Biblioteconomia da Universidade Federal do Cariri, no estado do Ceará. O levantamento bibliográfico observou artigos de periódicos científicos, anais de eventos e livros em inglês, português e espanhol sobre o assunto. A metodologia com abordagem quanti e qualitativa abrange um

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estudo exploratório, cuja coleta de dados utilizou-se de questionário online para conhecer a experiência de elaboração de vídeos sobre automação de bibliotecas, pelos discentes que estudavam no referido curso. Estes participaram ativamente da produção do vídeo e de sua publicação na Internet. *A experiência de aprendizagem usando dispositivos móveis para gravação dos ambientes tecnológicos das bibliotecas permitiu que fossem elaborados 25 vídeos que contemplavam aspectos relativos à automação de bibliotecas.*

Palavras-chave: *Tecnologia da Informação. Biblioteconomia. Dispositivos móveis. Aprendizagem móvel. Vídeos.*

Introduction

The late 20th and early 21st Century mobile devices evolution was the result of a process of development of telecommunications and wireless networks that enabled the industry of information technology to offer consumers devices with ever smaller features and more capable to take advantage of the mobility of these users. The generation of mobile devices has been developing since the time of personal computers (desktop), passing through laptops, tablets and smartphones. Each of them has been adding features and applications such as access to wireless networks, email applications, productivity and entertainment software to listen to music and watch videos recorded in memory or accessed via the Internet. This evolution previously mentioned has provided educators and researchers with a pedagogical look that resulted in the development of applications for mobile devices that promote teaching, learning and research in this area (KUKULSKA-HULME; TRAXLER, 2007).

In this context, it is possible to observe the development of mobile devices, especially smartphones, which have increased their functionalities over the years which have given rise to several platform providers for the development of applications for this type of equipment. Already in the educational context it was possible to observe as historical antecedents that propitiated student mobility, the development of the information society in the midst of a globalized economy where Information and Communication Technologies (ICT) had a determining role and in 1999, when it was established The Bologna Declaration which advocated employability, mobility of European citizens and increase of international competitiveness of European higher education (BIANCHETTI, 2010; GÓMEZ *et al*., 2003; GONZÁLEZ-GUITIÁN; MOLINA-PIÑEIRO, 2008). Coupled with this, in the national educational context Passsarelli and Junqueira (2012) observed in a study with 18,000 Brazilian children and youngs between the ages of 6 and 18 who used technology in their daily life, referred in that research as "Interactive Generation", that the interaction with digital devices and technologies, penetrates and spreads through the daily life of these children and youngs so that they tend to prefer rather screen-mediated interactivity than personal conviviality and physical materiality of reading experience, studying or social entertaining in the interior of their homes. However, it is still worth mentioning that the socioeconomic differences between Brazilian regions still have an impact on the ownership and access to the screens.

In this sense, the present study makes a conceptual review of learning through mobile devices and the use of ICT in education that allows to glimpse the use feasibility of these technological resources for the support of teaching in the undergraduate Course of Librarianship of the *Universidade Federal do Cariri* (UFCA, Federal University of Cariri). Thus, it reports a teaching experience when students of this course used tools to produce videos on the automation of libraries supported by mobile devices.

Digital natives and the use of mobile devices

With the rise of the Internet, an entire generation was born and raised surrounded by digital technology, known as "digital natives", these young people have high expectations about ubiquitous learning. However, they do not know how they can use all this technology to support learning, and so they are still very dependent on teacher guidance. In this way, the mode of communication has changed dramatically in relation to the predecessor generation. (GARDNER; ENG, 2005). In this context, it was possible to perceive the emergence of "Web 2.0" that highlights the participation of users and expresses value in the creation of content by the user (MILLER, 2005). According to Evans (2009), many of these expectations

for change reflect the nature of experiences with Web 2.0. Evans (2009) further emphasizes that interactivity and mobility are the most obvious and active aspects of this change in college students, and sociability is an important aspect of interactivity.

It is worth mentioning that with the advent of Web 2.0 and the development of mobile devices it was possible to glimpse the emergence of the "Mobile Web 2.0". According to Arroyo (2012) the term "Mobile Web" is used to refer to web access from devices that can be used in a situation of user mobility. In this way, Internet users are undergoing transformations in society that allow them to acquire knowledge quickly through Web search tools. Leka and Grinkraut (2014, p.3, our translation) point out that:

> The use of ICT and social networks have become indispensable for an innovative class proposal. However, the traditional educational process must be respected, since the use of technological proposals through information and virtual communication are complementary tools to classroom[2].

Given this, it is possible to reconcile the use of social networks where the teacher mediates with the students through groups created in these spaces to complement or debate the content here presented in the classroom. Next, the concepts involved in these changes in education with the introduction of learning through mobile devices are highlighted.

Mobile-learning

Several studies have highlighted the pedagogical possibilities and benefits of using mobile devices (cell phones, smartphones, tablets, laptops, etc.) in order to produce and allow access to educational content anywhere and at any time (DIAS *et al*., 2014; GROMIK, 2012; RATHS, 2014; VAN DER MEIJ; VAN DER MEIJ, 2014). This production of educational content through videos can boost the expansion of knowledge and enable multiple articulations in the educational field (SILVA; OLIVEIRA, 2010, p.1).

> Thus, Mülbert and Pereira (2011) define mobile learning or mlearning as 'the concept that represents learning delivered or supported through handheld devices such as PDAs, smartphones, iPods, tablets and other small digital devices that carry or manipulate information'. The authors report that the term mobile learning appeared first in a 2001 scientific publication, highlighting the trend and potential of this methodology as the future of learning, based on the advantages of studying anywhere and time[3].

Fonseca (2013) points out that it is necessary within this teaching modality, mobile learning, that those involved, in this case, students and teachers, are prepared and willing, so that this appropriation can in fact mean transformation and generate gains for Education. However; Fonseca (2013) considers that a lack of battery or broadband insufficiency may compromise the work, vital for mobility, access and sharing which are the main gains of introducing mobile devices in education.

When looking at the future of teaching it is possible to highlight some recent approaches in which introduction of technologies mainly the use of mobile devices becomes more evident. According to Gomes (2012) the Horizon Report, which is a report covering the technological trends in education developed by the New Media Consortium (NMC), in its 2012 to 2017 issue, had already provided 12 tools that would be present in Brazilian schools in this period. Among them, we can highlight the popularization of devices (cell phones and tablets) and the use of applications that involve technologies for them (geolocation and networks), as well as their appropriation using social networks and distance learning.

In this sense, Bergmann (2016) emphasizes that classroom inversion establishes a framework that offers

[2] *A utilização das TIC e das redes sociais tornaram-se indispensáveis para uma proposta de aula inovadora. Porém, o processo educacional tradicional deve ser respeitado, pois, a utilização de propostas tecnológicas através da informação e comunicação virtual, são ferramentas complementares a aula presencial.*

[3] *"De acordo com a definição de Mülbert e Pereira (2011), mobile learning ou mlearning "é o conceito que representa a aprendizagem entregue ou suportada por meio de dispositivos de mão tais como PDAs (Personal Digital Assistant), smartphones, iPods, tablets e outros pequenos dispositivos digitais que carregam ou manipulam informações". Os autores relatam que o termo mobile learning aparece pela primeira vez em uma publicação científica no ano de 2001, onde se destaca a tendência e o potencial desta metodologia como futuro da aprendizagem, pautada nas vantagens de estudar em qualquer lugar e tempo".*

students a personalized education tailored to their individual needs. It is worth mentioning the teacher should establish guidelines to make this customization as detailed as possible, although this requires the selection of several aspects in order to evaluate what will be learned and developed by the student.

Thus, Schneider *et al.* (2013) points out that some authors have presented the concept of Flipped Classroom as a possibility of a differentiated curricular organization, allowing students to play the role of the subject of their own learning, recognizing the importance of content mastering for the extended understanding of the real and keeping the teacher as a mediator between the elaborated knowledge and the student. Valente (2014) emphasizes that the presence of ICT in education did not promote changes in the classroom, but they provoked deep transformations in Distance Learning. Valente (2014) also points out that the term "distance learning" and "e-learning" are used with the same meaning where e-learning is seen as a new version of Distance Learning mediated by ICT, where another modality of e-learning is when part of the activities are carried out entirely at distance and part is held in the classroom, characterizing what has been termed hybrid teaching, blended or blended learning.

With this, it is intended to highlight the materials and methods addressed in this research and then to do the analysis and discussion of the results.

Methodological procedures

The present article is descriptive since the descriptive research "has as its primary objective the description of the attributes of a given population or phenomenon or else the establishment of relations between variables[4]" (Gil, 2009, p. 42). This research aimed to describe an experience of hybrid teaching that involved the use of distance learning tools and activities that involved the use of technological tools in a computer lab.

The study was divided into three stages. At first, a bibliographical survey was conducted in order to know details about the production of videos in the classroom and its contemporary pedagogical approaches observing the use of information technology and more specifically of mobile devices. In a second moment an action research was carried out to deal with the development of videos on library automation.

> Action research has emerged from the need to bridge the gap between theory and practice. This kind of research is characterized by seeking to intervene in practice in an innovative way already in the course of the research process itself and not only as a possible consequence of a recommendation in the final stage of the project (ENGEL, 2000, p.182)[5].

In this sense, it was defined what tools would be used to develop the video about library automation in a practical way what was intended to approach theoretically. In the third and last moment, by means of the obtained results with the production of the videos an online questionnaire was developed to obtain students' perception about the process. In this case, the questionnaire had open and multiple-choice questions aiming to deal with qualitative and quantitative aspects so that the students' perception in this learning process would be characterized and observed. According to Lakatos and Marconi (2003) qualitative research works with subjective data, beliefs, values and opinions.

The research population consisted of students who participated in the discipline activities, which were a total of 25 students, yet only 22 answered the questionnaire freely. The Chart 1, the links for the 25 elaborated videos are presented.

Results

The Librarianship Undergraduate Course of the *Universidade Federal do Cariri* (UFCA, Federal University of Cariri) presented in 2015.1 in its curriculum five

[4] *"como objetivo primordial a descrição das características de determinada população ou fenômeno ou, então, o estabelecimento de relações entre as variáveis"*

[5] *"A pesquisa-ação surgiu da necessidade de superar a lacuna entre teoria e prática. Uma das características deste tipo de pesquisa é que através dela se procura intervir na prática de modo inovador já no decorrer do próprio processo de pesquisa e não apenas como possível conseqüência de uma recomendação na etapa final do projeto".*

compulsory subjects that are of the curricular unit of Information Technology. They are Informatics Applied to Librarianship and Information Science, Information Technology 1 and Information Technology 2, Documentary Informatics and Generation and Use of Databases. In order to support hybrid teaching, the provision of digital content and activities that promote distance learning, the teacher used the *Sistema Integrado de Gerenciamento de Atividades Acadêmicas* (SIGAA, Integrated Academic Activities Management System) platform which offers didactic resources such as publication of archives, links to websites, discussion forums, and activities where students interact by uploading files or commenting on the issues covered during class in an online forum. In this case, the tool allows those students who have access to the Internet to carry out activities and consult educational material when outside the classroom, which characterizes the Flipped Classroom approach.

The experience report occurred with the group of students that was enrolled in the period of 2015.1 in the discipline of Informatics Applied to Library Science and Information Science of UFCA. The group was composed of 26 students, 22 students answered the questionnaire: they were six men and 16 women.

Among these 22 students, 13 were *Juazeiro do Norte* residents, six of them resided in *Crato*, one in *Jardim*, one in *Mauriti* and one in *Jaguaribe*, which is in the region of the *Jaguaribe* Valley, according to Figure 1. Students' age range included people aged between 18 and 22 (11), 26 and 30 (4), 31 and 35 (1), 41 and 45 (1) and also 2 who were over 51.

Chart 1. Link to the videos created by the students.

Seq.	Video Link	Place Recorded	Time
1	https://youtu.be/NQOZos6Q690	Centro Cultural BNB	05:13
2	https://youtu.be/iRAx0CUSZGY	UFCA	07:41
3	https://youtu.be/qaJR3sUVlVc	IFCE Crato	09:45
4	https://youtu.be/ntEcCAfdBdU	IFCE Crato	08:07
5	https://youtu.be/DBd7mWPlKoo	UFCA	05:25
6	https://youtu.be/zE6tpHL-z6k	UFCA	07:03
7	https://youtu.be/KnaFd-qMef8	UFCA	07:48
8	https://youtu.be/_IhYDZFZi7g	UFCA	10:14
9	https://youtu.be/BjjJdx_pOMs	IFCE Crato	08:24
10	https://youtu.be/q7R77tyrXX0	UFCA	06:06
11	https://youtu.be/bhtH-D2bzVc	Centro Cultural BNB	08:46
12	https://youtu.be/Nl6xZZdcLiE	UFCA	08:08
13	https://youtu.be/gGLwQufBLbE	IFCE Juazeiro	09:51
14	http://youtu.be/TVo-kXSay9Y	UFCA	05:31
15	https://youtu.be/VREtO7PxcJo	UFCA	09:09
16	https://youtu.be/Bf62Lvg8U1Q	UFCA	05:19
17	https://youtu.be/klulOYUs7Wo	UFCA	03:29
18	https://youtu.be/Fk0zwwHMwNE	Library not registered	06:36
19	https://youtu.be/aAqdiCiiH2Q	UFCA	07:02
20	https://youtu.be/4LTIHQnm0Jc	*Centro Cultural BNB*	06:48
21	https://youtu.be/9mlwUbl4HbA	Library not registered	03:09
22	https://youtu.be/-PqvZkPaYKo	UFCA	05:18
23	https://youtu.be/klk_6YlR03w	UFCA	06:17
24	https://youtu.be/JfoVNiTZ1Ic	UFCA	05:05
25	https://youtu.be/cjqJtWgvNA4	UFCA	09:53

Note: BNB: Banco do Nordeste; UFCA: Universidade Federal do Cariri; IFCE: Instituto Federal de Educação, Ciência e Tecnologia do Ceará.

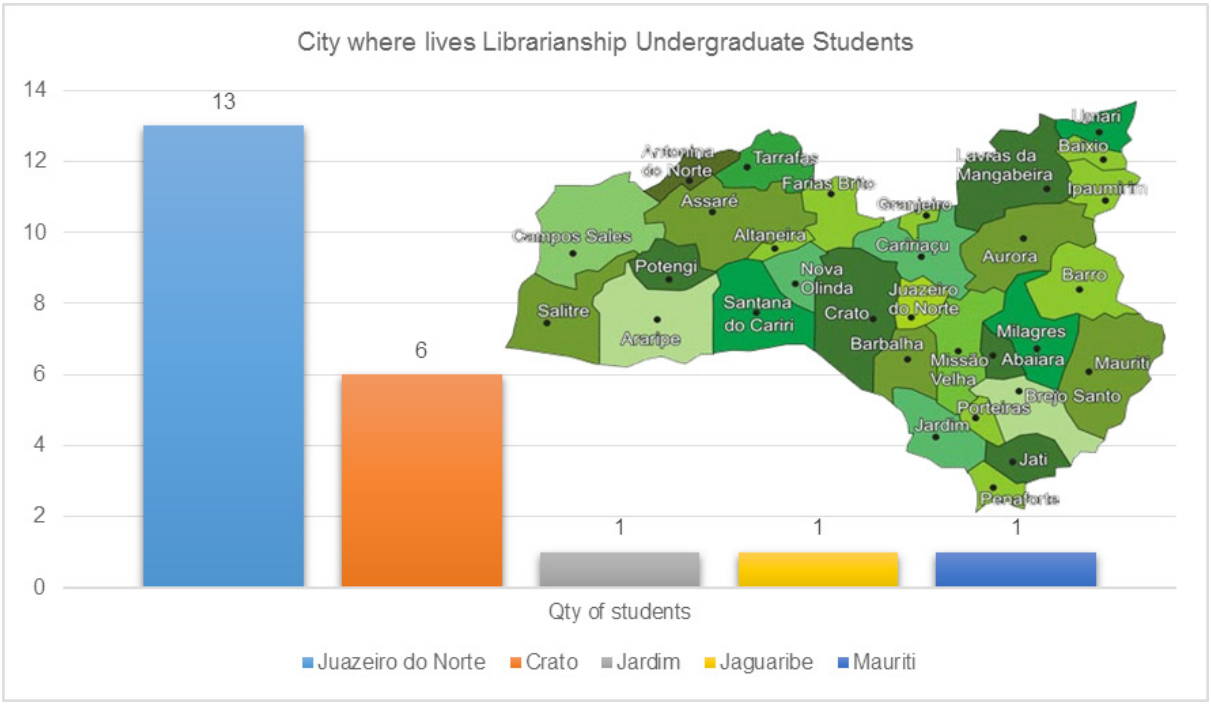

Figure 1. City where the students live.
Source: Prepared by the author (2016).

It can be considered that if we merge the two age groups of lower ages we will obtain the majority according to Figure 2. In this situation, it can be emphasized that the digital natives were predominant and thus, they showed easiness to carry out the activities placed in the distance learning platform in SIGAA.

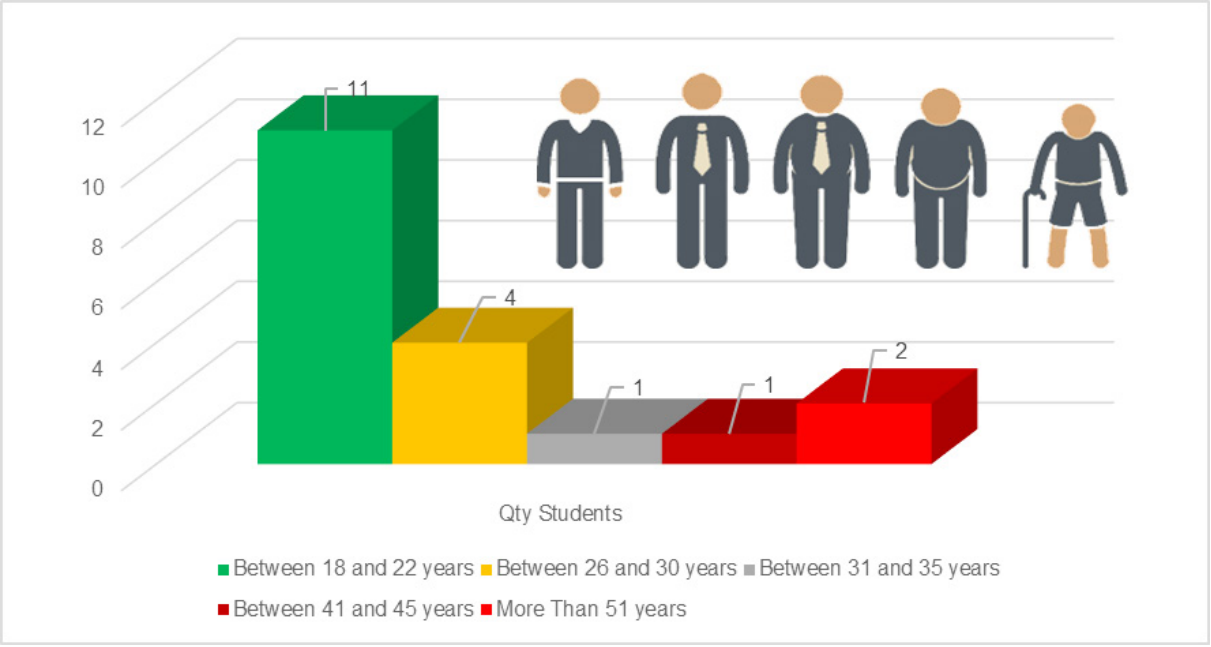

Figure 2. Age group of students.
Source: Prepared by the author (2016).

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The activity consisted of the elaboration of a video that allowed to present the technologies for library automation. Through a documentary survey on the Internet, manuals, catalogs and guides of library automation suppliers were found that could help students use the Library 3M solutions catalog[6], the RFID Brazil library product catalog[7] and other library product catalogs as a source of information (Macrosolution and Bibliotheca[8]) for libraries, as well as videos, specific blogs, books and papers on library automation that were available at the UFCA *Juazeiro do Norte* campus library. It is worth mentioning that, because these library product catalogs belong to companies, they usually go through version updates. In addition, during the period in which this paper was prepared, the merger of Bibliotheca LLC with the division of 3M Library Systems took place.

For the activity of preparing the video some video editing software were considered (Windows Live Movie Maker[9]), a software used to register the screen capture, which can be named Screencasting (Screenr[10]), a software for slide presentation editing (Microsoft Powerpoint or Libreoffice Impress), a software for downloading videos (Atube Catcher or similar).

When considering mobile-based learning, it was selected as hardware tools computers or laptops equipped with Microsoft Windows operating system, digital camera or smartphone with camera for video recording in Cariri academic libraries. Thus, students said they had a total of 11 multi-functional printers, 17 laptops, 14 smartphones with cameras, nine desktop computers and four tablets. It is noteworthy that some marked that they had got more than one of the indicated equipment.

The evaluation consisted of the range of technologies presented, where the more technologies were addressed the greater the number of points of the activity. The video should make use of presentation slides describing the content of the technologies, incorporate videos from the Internet, make a brief tutorial of the information library system through registering a screen capture with audio recording - screencast, and also make use of transition and animations including background music as long as the video did not exceed 10 minutes of playback. Students should request permission to record the video presenting an automation technology in a *Cariri Cearense* library (academic or specialized) in Northeast Brazilian region.

In general, the production of videos requires the video editor user to have access to the Internet in order to search for content that can be incorporated into the video by making a remix of something that has already been produced. Thus, it was sought to know if the students had access to the Internet. Thus, nine students said they had access to the Internet via fiber optic cable, eight via radio, eight via 3G/4G mobile data network and only two said they had no Internet access at home. In addition, it may be mentioned that some students accessed the Internet via more than one technologies. Figure 3 shows the types of Internet access by students.

[6] Library 3M Solutions Catalog in Brazilian Portuguese. Available from: <http://solutions.3m.com.br/wps/portal/3M/pt_BR/Bibliotecas/Home/InformacoesAdicionais/CatalogoEletronico/>. Cited: Apr. 20, 2015.

[7] RFID Brazil library product catalog. Available from: <http://www.rfidbrasil.com/rfid-0>. Cited: 20 mar. 2015.

[8] Macrosolutions library product catalog. Available from: <http://www.bibliotheca.com/3/index.php/pt-br/>. Cited: Mar. 20, 2015.

[9] Windows Live Movie Maker. Available from: <http://windows.microsoft.com/pt-br/windows-live/moviemaker>. Cited: Mar. 20, 2015.

[10] Screenr. Available from:<http://www.screenr.com/>. Cited: Mar. 20, 2015.

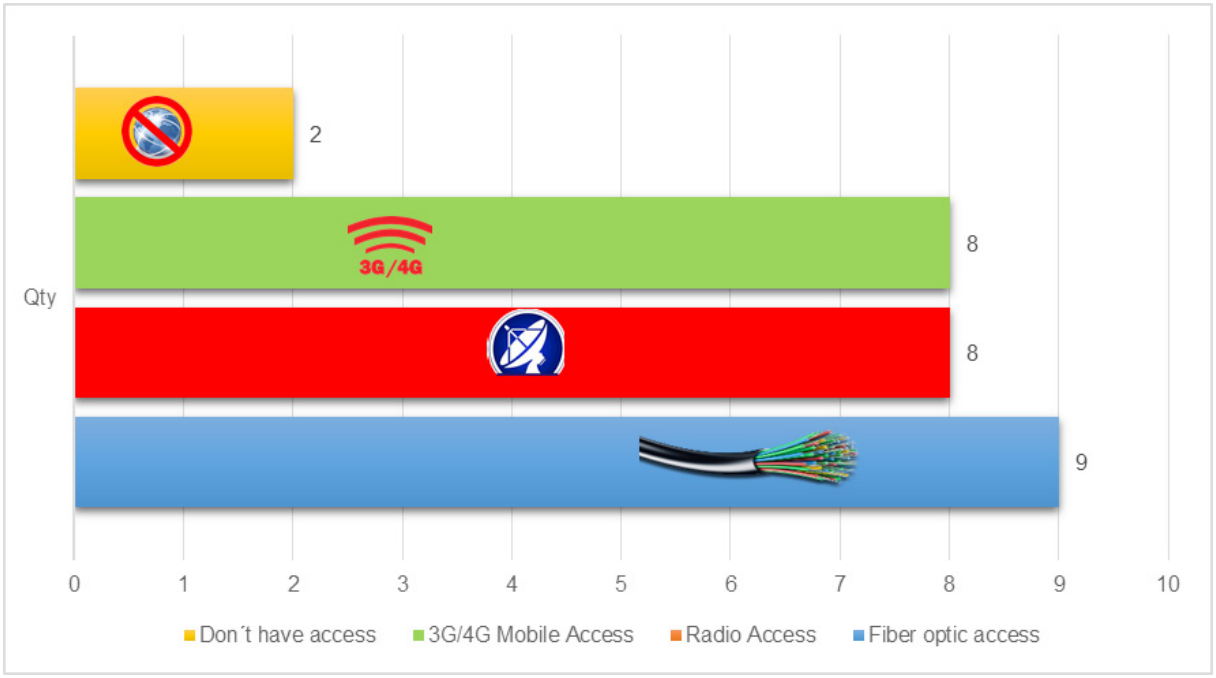

Figure 3. Type of Internet access by the students.
Source: Prepared by the author (2016).

Seeking to know which were the highlights of the experience of creating the video on library automation, an open question that let us to know which was this perception was elaborated, some answer extracts were highlighted as follows.

> *In addition to promoting knowledge and direct contact with library automation material, it is vital that the library scientist has knowledge of these materials, this was the positive point* (Student 1).
>
> *It was a very productive activity, where I learned a lot about library automation resources. Firstly, the visit to the UFCA library with interactivity and the resources used in it was a wonderful experience. Downloading and being able to use software, handling them was a useful learning* (Student 6).
>
> *I believe the activity itself of preparing the video has brought us closer to the reality of libraries. Having direct contact with automation systems and devices allowed me to know and learn a lot more about the subject* (Student 9).
>
> *Even with all difficulty it was wonderful* (Student 18).
>
> *It was a productive activity, because I learned to use tools I did not even know they existed. And it has led me to have new ideas like creating a blog to approach the subjects I have been learning in Librarianship course* (student 21).

In the same way, we tried to evaluate the negative aspects of the library automation video creation experience through an open question that made some students detail this.

> *The difficulty in finding the library systems in the region, the places that had some kind of library automation was minimal. And to frame everything in Movie Maker and record the video* (Student 5).
>
> *Exhaustive, regarding the assembly of the content and some doubts that later were clarified* (Student 7).
>
> *It took a lot of time editing the video, especially on the visual aesthetics of it* (Student 8).
>
> *It was very difficult for me because I had no contact with the library technologies* (Student 10).
>
> *Difficulty of finding many real examples of library automation in libraries of our region* (Student 14).

In short, it can be inferred from the students' speeches that in order to create a video, whatever the theme, separating the content takes time. Also, the difficulty in developing an editing activity in a software environment, which is at first unknown in addition to the lack of physical examples of libraries in this region where one can actually know this process of automation prompts many to consider this as a negative experience.

Thus, in order to bring the quantitative and qualitative aspects about the learning of library automation through videos, some affirmations using the Likert scale can be observed, which can be observed in Figure 4.

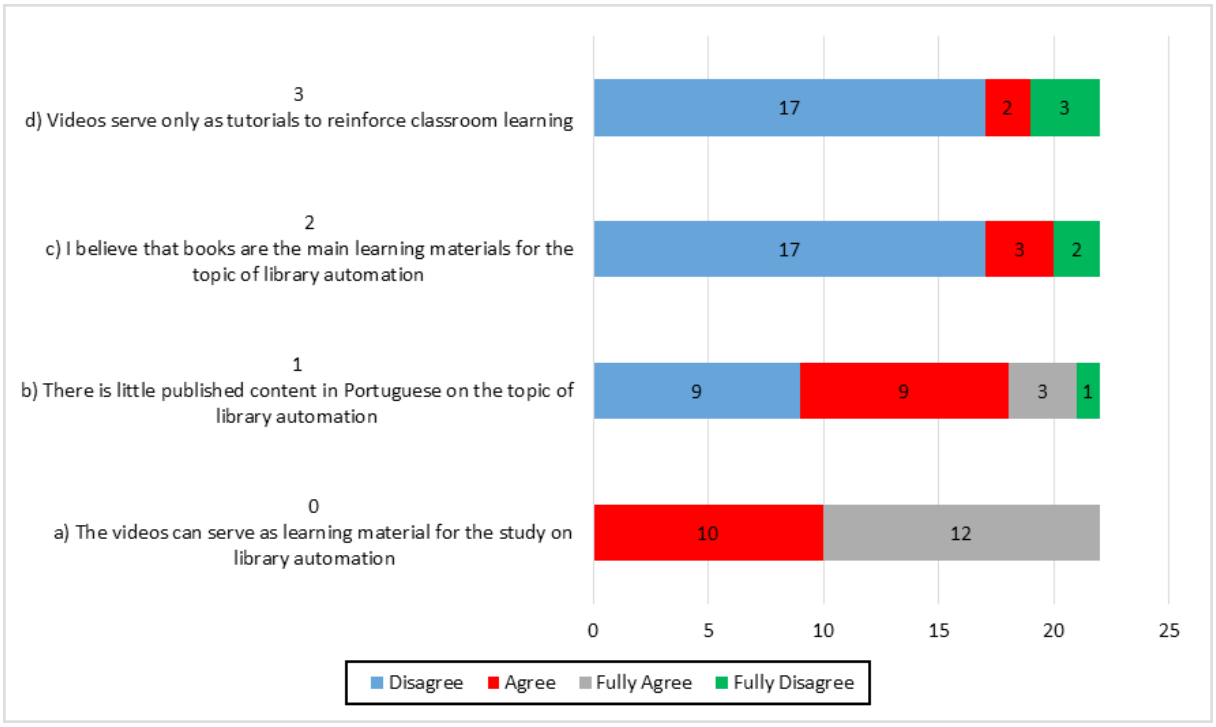

Figure 4. Affirmative learning about library automation through videos.
Source: Prepared by the author (2016).

It is highlighted by the answers that if we combine the answers Agree(A) + Fully Agree (FA) we have a large majority of the students who think that the videos can be used as material for the study of the theme of library automation. At the same time, if we join the Disagree (D) + Fully Disagree (FD) it can be pointed out that many disagree that the videos serve only as tutorials to reinforce classroom learning. Almost half of the class (A+FA=12 and D+FD=10) said that there is little content on the subject of library automation in Portuguese.

Finally, it is noteworthy that 17 Disagreed when considering that books are the main learning materials regarding the theme of library automation. In order to reinforce this quantitative result it is possible to highlight some comments about the use of the videos for the learning of library automation:

> *The videos will serve a lot for the study, not just as tutorials. Through the videos, we really learned what these systems are and which they are. Regarding the content in Portuguese, by the additional research I agree that there is very little translated content and that it is easier to find it on the Internet than in a book* (Student 5).
>
> *First of all, I believe that dynamic videos are very useful when it comes to studying. Tutorials help a lot to have a direction, and yes, there are Portuguese materials available on the Internet. Not only books are sources of information; there are also the websites and tutorials that help in the preparation of works* (Student 9).

It can be concluded that the students felt motivated for the development of the activity, noting that some were not very familiar with the hardware and software resources that were used for the video elaboration.

Conclusion

The proposal to develop a new pedagogical approach to teaching linking distance learning with

classroom learning known as blended learning has meant that this experience report obtained the expected success.

The fact is that Information Technology has provided new approaches to the development of teaching content that previously was only on printed paper and is now in digital support through texts, images, videos and audios that can help the student to stretch the reach of one's content learning within a space and time.

It is also worth mentioning that the production of content by means of videos for pedagogical purposes is a reality that can be favored by the distribution of them in platform of social networks. In this sense, it is worth mentioning that the creation of a group of students on a platform, such as Facebook, helps to disseminate and engage these students around the content from now on, allowing them to evaluate the videos and exchange experiences.

In addition, with the introduction of mobile devices in the classroom it is possible to provide students with extra content through QR codes and also access to videos that approaches the content of the subject. It is up to the teacher training students to install applications that read these codes so that during slides presentation in the classroom they will be able to access and decode an additional digital content prepared by the teacher that allows students to make use of the studies of the subject.

The arriving generation of digital natives at the university powers this pedagogical approach since they already incorporate quickly the technologies that are used for video production, as well as in their daily life they have access to platforms of social networks and videos to recover information and interact with colleagues in the classroom.

It is worth mentioning that the production of videos for automation of libraries goes through issues of copyright since it is possible to download videos and songs already available on the Internet to prepare a new video. In the videos prepared by the students, we sought to highlight what was the dissemination material of library automation companies and also scientific papers dealing with library automation requirements that may help future students in understanding this content.

Finally, in the sense of being able to develop future research can be highlighted as questions: (a) What kind of teaching approach does the contemporary student of librarianship have a greater learning facility? (b) Do mobile devices facilitate the learning process of students of librarianship or do you prefer the use of printed material by students?

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