Instructional Design of Online Courses in Mozambique: The Use of eBooks as a Strategy to Improve Learning

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ABSTRACT

The potential of electronic books (ebooks) has been discussed widely, due mainly to their role in helping the user transform passive reading into interactive and dynamic learning, while promoting better retention and appropriation of materials. Taking this premise, the present study follows an exploratory and qualitative approach, discussing how the use of ebooks can improve learning, motivation, dynamism and interactivity in Distance Education. This study was supported by a bibliographic review and a survey method through an online questionnaire used as data collection instruments. The sample consisted of students who attended distance courses taught by the Open University ISCED – UnISCED in Mozambique. The scientific literature studied, and the results from the field research, show the practicality of using ebook as a learning resource and they facility the interactivity.

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INTRODUCTION

The COVID-19 pandemic made sure that the development and expansion of Digital Information and Communication Technologies is irreversible, as is the growing interest in subjects related to Distance Education (DE). Every day new applications, technologies and systems appear, and digitalisation increases its presence in the e-learning area, in addition to the high demand of those who wish to start or continue their studies following this learning model. Digital information and communication technologies are part of this new educational scenario, especially with regard to educational practices through digital devices that present themselves as disruptive innovations in this process, such as laptops, tablets and smartphones, which, in addition to increasing the phenomenon of mobility, are also linked directly to historical transformations pointed out in digital era. It is understood that education represents a fundamental space to make it possible for people to be inserted in this culture consciously and critically, while having the opportunity to access and understand the need for appropriation of digital technologies (Lima & Bidarra, 2017).

Research on mobile learning has covered a variety of themes, but the most common has concentrated typically on enabling applications and systems (Krull & Duart, 2017). An increasing number of studies have focused on the use and affordances of smartphones and tablets (e.g. the use of specific apps), rather than on the instructional design of educational content. Another relevant factor, perhaps the most significant change so far, has been the emergence of social media, generating huge amounts of data and connecting users across the world. This has implications for students as open and distance teaching universities need to encourage socialisation by means of digital media. Often these integrate mobile learning with social networking, gamification, and augmented reality. But a more in-depth research is needed to show how to reconcile mobile hardware and software, lesson content, teaching methods, and educational goals (Sung et al., 2016).

Therefore, a disruption of pedagogical models that are in line with this digital technological evolution in the educational sector is imminent. In this sense, it is believed that the teaching materials used in Distance Education in particular the electronic book, that is, the ebook, can be one of the instruments that contributes to this paradigm break (Michels, 2017). So, the ebook appears as one of the technological advances in order to incorporate in a single offline support multiple digital channels, such as image, audio, video and text (multimedia). Therefore, the ebook is a sophisticated digital book that can be read on supports such as laptops, tablets, smartphones and e-readers (Pinsky, 2013).

However, a large part of distance teaching in Higher Education Institutions (HEIs) do not yet explore this potential, they do not use interactive ebooks as part of their didactic material in the teaching and learning process, and prevailing didactic material (PDF files) similar to that of the classroom / traditional teaching. This contributes to a characteristic lack of interest, demotivation and weak dynamics in students, culminating in low pedagogical achievement and / or dropout. This is the starting point of our research, which aims to discuss the adoption of ebooks as a strategy to improve learning, and increase motivation and overall dynamics in Distance Education as these digital resources can promote the retention and appropriation of knowledge by the user (Figueiredo & Bidarra, 2015), distancing itself from the traditional static models. Ultimately, it is up to the content production team to know how to create and use these media as interactive resources that facilitate learning in a motivating and attractive way for students.

In this context, ebooks are presented as an opportunity to evolve the Teaching and learning process, contributing to success and also to minimising learning difficulties in distance learning (Silveira, 2000). Therefore, starting from the point of view that many distance learning institutions still do not use ebooks in the teaching and learning process, this study aims to explore the use of interactive ebooks in an distance learning course in Mozambique, at the Open University ISCED (UnISCED). Bearing in mind that the current generation of students tends to respond better to learning based on interactive and dynamic resources, since many are consumers of videos, images and infographics (Franco, 2020), it is essential to know how UnISCED can explore the use of interactive ebooks in the context of a mobile learning (m-learning) and electronic learning (e-learning) scenario.

Therefore, the main question guiding this study is: how to explore the potential of interactive ebooks in an online distance learning course in Mozambique? More specifically, we wanted to identify how UnISCED online distance learning students currently deal with digital resources in the learning process; highlight the aspects to consider when developing and implementing an ebook for online distance learning; and explore how the combination of this learning model and interactive ebooks in the context of online distance learning can improve learning, and increase motivation and dynamism.

As regards the structure, this paper contains five parts. The introduction, where we set the context for the research, starting with the issue of justification, then the formulation of the problem, and the general objective. In the second part the literature review is presented, namely the concepts of ebook and Distance Education. This is followed by the third part, describing the methodology used in the research. Then in the fourth part we present the analysis and interpretation of the results obtained through the literature review and field research, comparing what was collected in the field with what is stated in theory. We close with final considerations and the conclusions reached in the study, in the fifth part.

LITERATURE REVIEW

ICT AND DISTANCE EDUCATION

The transformations that Information and Communication Technologies (ICTs) have imposed in today's society are irreversible, and it is already striding along a path that leads beyond the Knowledge Society: it is no longer enough to have knowledge about something; we need to learn how to learn (Azevedo, 2009). Frequent transformations change what is known, new situations arise – such as the COVID-19 pandemic – which determine a new dynamic and change in paradigm. For Lévy (1999), following an optimistic perspective in relation to technologies, information technology is seen as intellectual technology, which engenders new ways of thinking about society, of understanding the learning processes and our relations with the world.

Therefore, these authors point to a notion of "real time" brought about by the digital transformation, which has a fleeting and ephemeral character. Information will never be (re) read or reinterpreted like the texts of past centuries, because digital technologies, undoubtedly decisive in contemporary times, altered man's view of himself, of the world and of many diverse contexts, such as the economy, politics, communication, business management and, of course, education (Santaella, 2013).

Education is inserted in this scenario of transformations and the way it presents itself today results precisely from these changes. Currently, there is no way to talk about education without dealing with digital technologies, due to its relevance in different aspects, circumstances, possibilities and, in many cases, needs. This and the widespread access to the Internet, made information more democratic (Lemos, 2010 cit. in Lima, 2018), making the school no longer seen as the only (or the main) channel of knowledge and training within society.

Looking at this perspective, if education is influenced strongly by the transformations that society undergoes over time, such influence is even more marked in Distance Education (DE), whose current characteristics are the result of this technological evolution. According to Behar, Passerino and Bernardi (2007). the implementation of digital technologies in Distance Education has been promoting pedagogical strategies that increase the development of competences and skills, autonomy, the formation of learning communities, social networks, characteristics that were hitherto restricted (in many cases still necessary) to the environment in which conventional/traditional education is implemented. Quality Distance Education must promote extensive two-way communication, guaranteeing the voice and authorship of all participants (Rocha et al., 2017).

Looking at the current technological world, Lévy (1999) states that Distance Education is a modality that explores certain distance learning techniques, including hypermedia, interactive communication networks and all intellectual technologies of cyberculture. But the essentials are found in a new style of pedagogy that favours personalised learning and collective network learning. Analysing the above concepts, the authors approach Distance Education from various perspectives; however, it is generally perceived that this teaching modality occurs in

circumstances where the teacher/tutor is physically and geographically separated from the student, applying the use of technologies to mediate the teaching and learning process. Therefore, the relevance of the availability and mastery of the use of tools based on new information and communication technologies is highlighted here as a determining factor for the success of the process.

In this regard, we find relevant the "21st Century Competences" put forward by Voogt and Pareja Roblin (2012), covering major skills for success in our digital and networked world:

- *Creativity* – the ability to develop from scratch new solutions to emerging problems (communication, digital literacy);

- *Critical thinking* – the capacity to read, interpret, and evaluate new information (citizenship, communication, digital literacy);

- *Problem solving* – the ability to make decisions and implement the best solutions (communication, collaboration, digital literacy);

- *Productivity* – the ability to be more productive and apply higher-level skills (ICT competences are important here).

Distance learning courses still suffer with a certain amount of prejudice, often from the educational community itself, especially in Africa, namely in Mozambique, but they are recognised as strategies or possibilities for expanding academic education (Mattar, 2013 cit. in Lima, 2018).

We must emphasise that, in Africa, Distance Education is not something new; according to Schlickmann et al. (2007), the model has been used since the 1940s. In the 90s alone, there were more than 140 public and private institutions offering higher education at a distance in sub-Saharan Africa, although the population's access to ICTs, was far from desired. Furthermore, Distance Education in Africa has been undergoing changes, due, in part, to the technological changes that the continent is undergoing, based mainly on the search for relevant information and communication technologies and the fact that DE is one of the means available to the student (Schlickmann et al., 2007). Because Education is key to a sustained and developed society, it needs constant improvement to be adapted to a context in which emerge innovative technologies and a new profile of student who has access to various digital resources. It is in this context that Distance Education has been gaining prominence in the world, in Africa, and in Mozambique, with many adopters, both students and tutors. For this reason, in Mozambique, the government has made efforts to increase the number of individuals with access to ICTs and the Internet, both in cities and in rural areas.

In this context, HEIs are called to rethink their pedagogical commitments and proposals related to digital media cultures, interwoven with aspects rooted in digital era, involving issues pertinent to mobility, portability and connectivity; the production and sharing of information; digital/social/cultural access and inclusion; and the culture of participation, among others. We live in a context of great possibilities for authorship and greater social, political and cultural involvement/participation (Lemos & Lévy, 2010). Therefore, education professionals must make a commitment to rethink their teaching dynamics considering not only the changes observed, but the needs and possibilities of using digital technologies in pedagogical practices in a scenario favourable to transformations. It may be essential to adopt pedagogical practices that consider the elaboration, availability and use of resources and devices that are consistent with the call for cultural changes (Lima & Bidarra, 2017).

INTERACTIVE EBOOKS FOR FLEXIBLE LEARNING

Currently, the potential of interactive learning objects for teaching and learning has increased, such as ebooks, i.e., electronic books especially designed for e-readers, tablet and computers that help you to have an experience of more interactive and dynamic learning by displaying the content in a much more flexible way (Ebner et al., 2016).

Nevertheless, the world of new technologies is unstoppable and those who do not adapt to them run the risk of being marginalised. The new generations were born in the age of the computer *boom*, therefore, the methodology of the learning processes has to change (Ayestarán, 2012).

In this sense, it can be seen that the digital transformation of teaching and learning, changing everyday with new digital resources coming to this sector, such as ebooks, providing the opportunity to transform reading from a passive to an interactive learning experience (Figueiredo & Bidarra, 2015).

Therefore, the literature presents many studies of ebook use, in the study by Singhose et al. (2013 cit. Ebner et al., 2016) an existing textbook in the field of mechanics was implemented in an iBooks format. For the presentation of complex mechanical processes, interactive elements like image galleries and animations were used.

On the other hand, Gonçalves (2014), states that the ebook can be used successfully in teaching at different levels of education, as it can help students expand their learning beyond the immediate limits of curricular instruction to promote new learning concepts.

The research study from Fenwick et al. (2013) the researchers create an interactive exercise to integrated in an e-book. It was a textbook for the programming language "Prolog" using the authoring tool Apple iBooks Author, a prototype of a textbook in iBooks format was developed. The focus of the interactive elements was on image galleries and multiple choice exercises which are already included by default in iBooks Author.

Therefore, Bidarra, Figueiredo and Natálio, in the study presented in 2015, concluded through preliminary tests carried out with the prototypes created by the authors themselves that the Ibook (interactive books) technology and the EPUB3 standard have excellent usability and pedagogical potential for learning the ebook model because it allows students to experiment with different routes and to distinguish what is important from what is secondary, allowing them to create and annotate material from different sources, in addition to encouraging the exploration of new problems (Bidarra et al., 2015).

Furthermore, interactive ebooks have more than words and images; they give the opportunity to merge text, animation and interaction. Interactive books, which can be used on different platforms, bring significant possibilities for combining a series of devices as pedagogical approaches, in addition to the integration and the provision of information (Roosen, 2012).

However, the increasing popularity of ebooks, whether they are read on mobile devices or non-portable computers, raises pertinent questions, as presented by Bates (2016): Does the form or configuration of a book still matter? Is a book still a book if downloaded and read on an iPad or Kindle, instead of printed text? The author himself replies that, for the purpose of acquiring knowledge, a physical or digital book is no different.

Bates discusses the convenience of both models in terms of practicality, citing, e.g., the ease of the word search engine in the digital model. Furthermore, an ebook provides the reader with a richer and more interactive experience than would the physical book. Therefore, with the ebook, the way of reading itself changes somehow (Chartier, 2003). So, ebooks allowed the emergence of this new concept of reading: reading is no longer just decoding written codes, but also includes deciphering images, or understanding the relationships between words, images, graphics, texts, drawings and diagramming (Santaella, 2004). It is up to the reader, therefore, to choose the motivation (intellectual or affective) provided by the author for a given subject. Therefore, regardless of whether it is in digital or printed format, ebook features are desirable for all learning materials. However, for the reasons already presented above, in DE these characteristics go beyond desirability: they are absolutely fundamental for learning, motivation and dynamism in the teaching process. Through these studies, it is possible to note the positive impact that the interactive ebook may have in education, since it has the potential to, at least, increase student involvement, as well as better interactivity by using electronic devices.

EMPIRICAL STUDY

As an Open Distance Education institution, UnISCED follows an online teaching approach, making its services available through an e-learning platform (Moodle). It also distributes tablets and laptops for its students so they are able to access these resources as well as digital manuals (pdf). However, even with these widespread online practices some face-to-face activities such as exams are still prevalent, as well as printed manuals that are sold to students in resource

centres, which ends up making learning less interesting and costly for students. It is easy to see that the current generation of digital students tend to react better to learning based on interactive and dynamic resources, since many no longer have a culture of reading only printed books due to their scarcity and price, and they are keen users of videos, images, infographics, etc. in their learning activities (Franco, 2020).

In this study an exploratory qualitative research was carried out, using a survey method to collect data without formal and structured instruments and emphasising subjective information as a means of understanding and interpreting the experiences (Gerhardt & Silveira, 2009), and to explore participants perceptions more fully. Taking into account the main objective of the study, the research tried to verify the students' perception about the use of ebooks as an educational resource for Distance Education. Data collection was implemented through an online questionnaire of open and closed questions, using Google Forms, thus making possible the use of existing technology among students and assuring a wide coverage given the particularity of the non-physical presence of the target population of study.

Being qualitative research, the question of statistical representativeness did not arise (Albarello et al., 1995); therefore, the choice was made of a convenience non-probabilistic sampling process composed of students of the Information Systems Management degree course at UnISCED. There was a response from 32 participants and the principle of confidentiality and secrecy of the information was respected. The identification of the participants was not requested, but we decided to collect age and location data for reasons of the study. The participants were questioned about the frequency of Internet access and whether they would consider using an ebook as a learning object. The data obtained was recorded and stored in an online database, and subsequently analysed and evaluated. More detailed information is presented in the next session.

DISCUSSION OF RESULTS

From the 32 participants, aged between 21 and 41 years old, when asked about the frequency of accessing the Internet (Figure 1), and which mobile device was most used (Figure 2), the answer was that they accessed the internet daily using mostly cell phones (smartphones), for a total of 26 students, while a minority of 6 students preferred a portable computer (laptop) and tablet, most of these are above 30 years old.
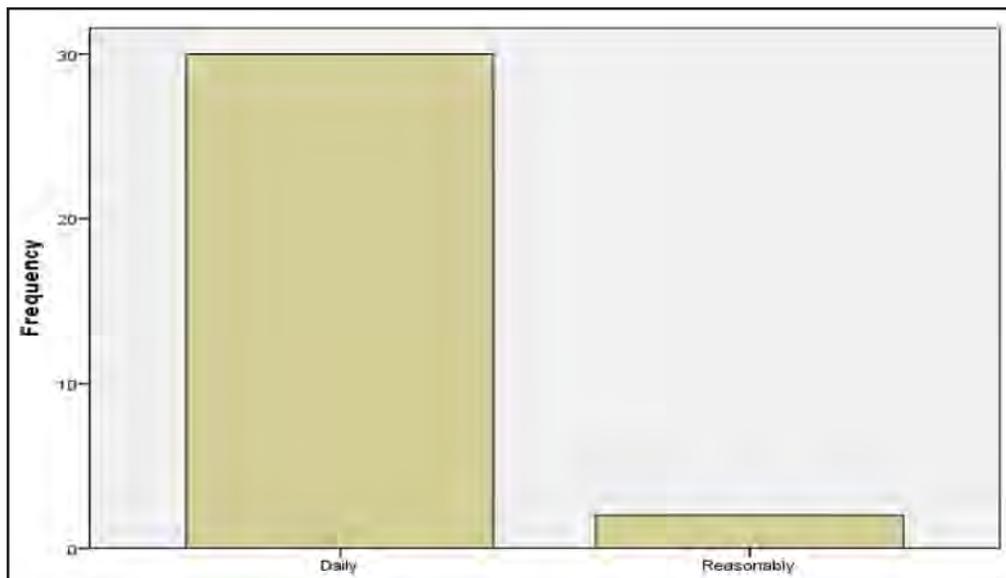

Figure 1 The frequency of access to the Internet.

Source: Franco & Bidarra, 2020.

From the start, this scenario already favours the application of innovative media such as ebooks, to enhance mobility, portability and connectivity, among other aspects mentioned by Lemos and Lévy (2010), which are essential in DE processes.
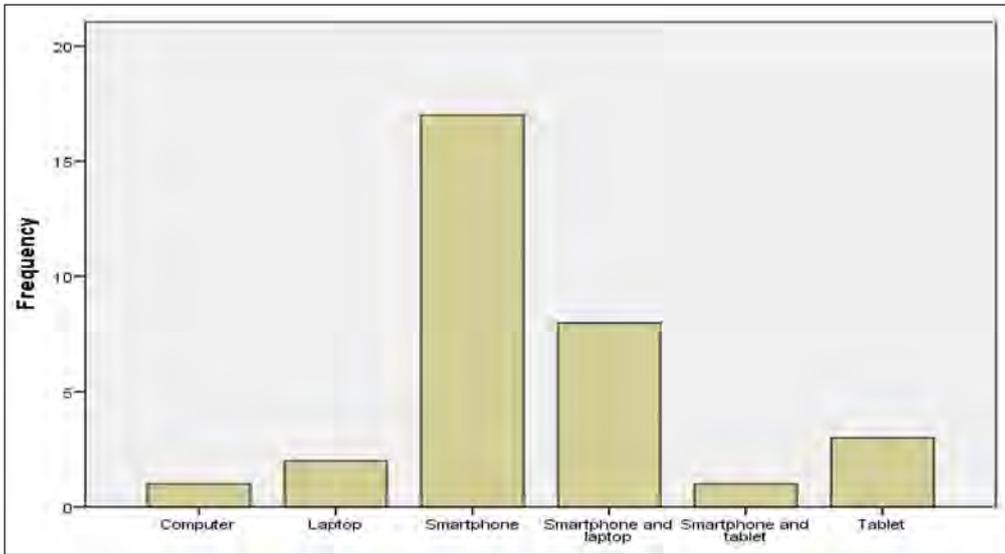
With regard to knowledge and experience in relation to ebooks' usage (Figure 3), most responded positively, with 25 students between 21 to 35 years old having already read and even using some books in this model in their daily lives, while the others (7), most of them above 35 years old, were unaware of the tool and never had the opportunity of accessing an ebook (Figure 4).
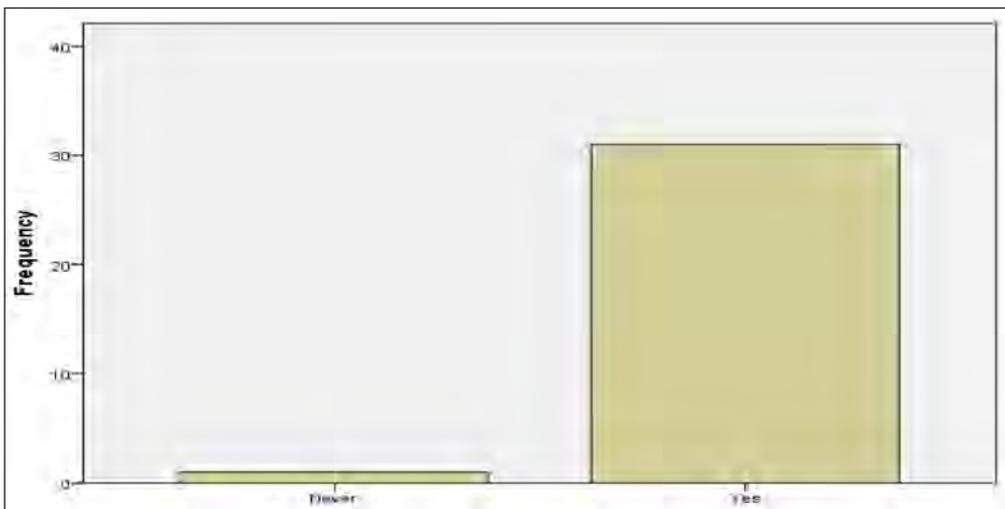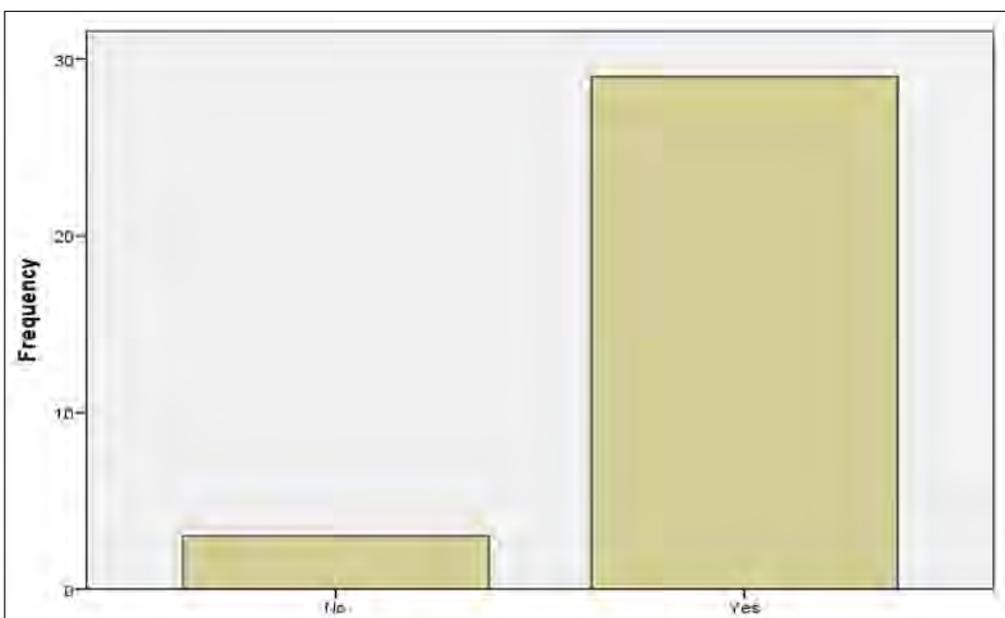
However, the participants who answered positively to the previous question, when asked if they had enjoyed the experience of having read an ebook on a smartphone or laptop, and if they consider this as an effective tool for their education (Figure 5), all responded positively, with the exception of one participant.
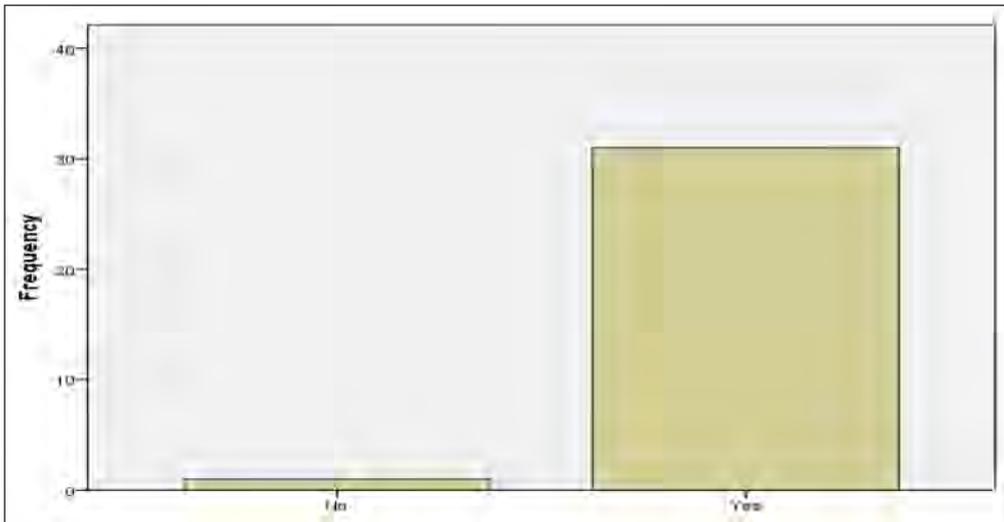
Furthermore, in answering the question, *what is their opinion about the interactive ebook?* First, we provided a prototype of ebook (Figure 6) to the participants so they could test and answer this question with knowledge and wisdom.
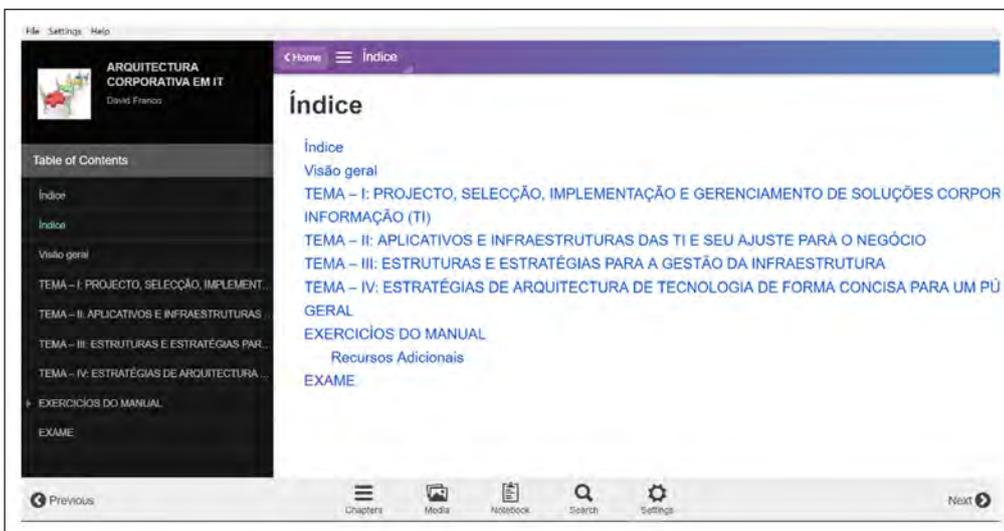
As we presented the prototype to the participants (of students that already read and even using some books in this model and students that never read and even using some books in this model) they were at first sight impressed by the high level of interactivity and multimedia implementation made in the ebook. As some participants answers shown below:

> "*They are merely simple and easy to use, as they make it easier to study and interact with the devices that are used for reading them*"

> "*The interactive electronic book helps because it facilitates access to information, so physical books have a limitation for being updated*"

At the second sight the participants were impressed with the possibility of answers quiz/tests, watch videos to complements the text content, use scientific calculator in maths ebooks, play decision games as exercises for specific topic, access key texts per topic and direct access to internet link, the ability to copy and paste sections direct from the text, and others options directly on the ebook and this was made possible by using EPUB3 on development of the

prototype. Also, they were impressed with the possibilities of send doubts or questions and feedbacks of the topic or subtopic directly to the teacher of the subject through the ebook.

In fact, the participants were very positive about the interactive ebook, because, in their opinion, they acknowledged it to be a flexible, dynamic and practical tool for learning, as it facilitates the search for information and creates more interactivity. We might add that it motivates the student for different types of content that the book brings, not to mention the educational apps that have been appearing around the world. As they answered:

> "*Very good, it facilitates the moment when we are almost always with mobile devices.*"

> "*The electronic book is flexible and streamlines the teaching and learning process.*"

Finally, as for the question regarding whether to recommend the application of interactive ebooks for teaching-learning at HEI's particularly at UnISCED (Figure 7), 29 of the participants were positive, although 3 participants are of the opinion that a PDF resource is enough.
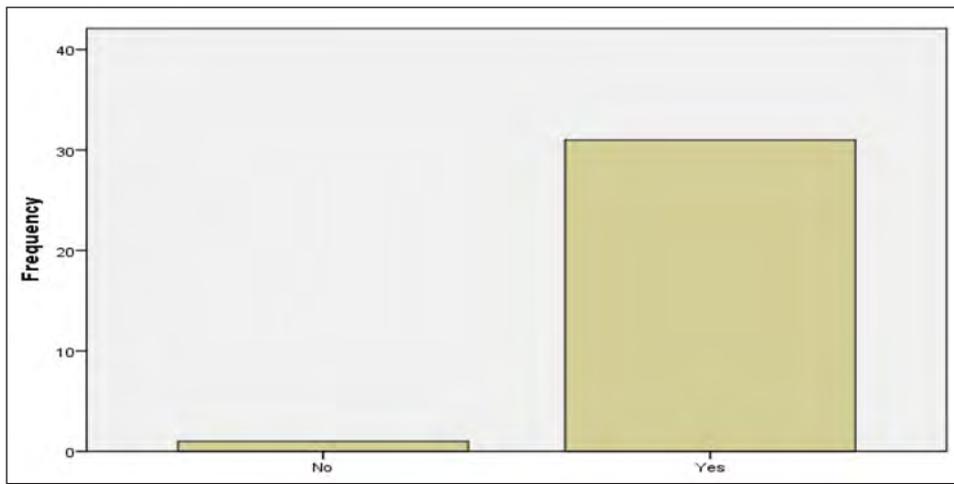
Figure 7 Recommendation the application of interactive ebooks for teaching-learning at UnISCED.

Source: Franco & Bidarra, 2020.

Globally, from the answers, it was possible to perceive the positive impact that an ebook can bring, as an interactive, dynamic, and portable digital medium, but also that still has to overcome some prejudices that exist in education. Also, it was noticed that there was a certain lack of knowledge about the interactive ebook and what differentiates it from other digital resources, due to the fact that there is no unanimity in some answers from the participants.

In addition, the results presented confirm the study by Lima & Bidarra (2017), carried out within a mathematics course, and also corroborate the study presented by Michels (2017) who finds the interactive ebook invaluable for the teacher to deliver the content of an online course as an alternative to the classroom experience, with all the advantages of interaction. Finally, the findings presented in this study can be important bases for the application of the ebook in the teaching and learning practices, especially in mobile learning and e-learning contexts, which demand more autonomy, dynamism, flexibility and interactivity in the process of knowledge acquisition.

FINAL CONSIDERATIONS

Concluding the study, it is possible to say that ebooks applied to DE through e-learning and m-learning offer new learning experiences, allowing students to carry out their activities with interactivity and practicality, thus achieving a greater degree of mobility, flexibility and dynamism. There was a change in the way students used ebooks and technology devices, showing a vast potential for teaching and learning applications. This is very important in times of COVID-19 pandemic, to supplement synchronous online learning with offline materials that students can engage with.

On the other hand, it was possible to realise that there are some limitations to the implementation of m-learning integrating ebooks because there is no full compatibility in the characteristics of the different mobile devices and ebook readers available on the market. This makes the process of successful pedagogical integration a complicated process. On certain

tablets and ebook readers it is not possible to read or work with some interactive elements, either because they simply do not support the type of media or because it is only possible to interact with widgets developed in a proprietary application.

Finally, there is a need for further study regarding the training of teachers who may adopt the application of interactive ebooks that respond to specific needs of teaching. We believe that, considering the current learner-centred approach and the emergent techno-culture, there is a need to provide a model with which institutions and instructors can design courses that have high motivational impact on students, and are related to authentic settings. By using today's flexible, interactive and immersive technologies with the appropriate pedagogies, we believe that it is possible to have students more motivated and we expect a more creative response to the world problems that surround them.

COMPETING INTERESTS

The authors have no competing interests to declare.

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