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Perspectives and Trends in Education and Technology

Selected Papers from ICITED 2022

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Preface

This book—Perspectives and Trends in Education and Technology: Selected Papers from ICITED22—from the SIST Series is composed of the best selected papers accepted for presentation and discussion at the 2022 International Conference in Information Technology & Education (ICITED'22). The ICITED is a multidisciplinary conference with a special focus on new Technologies and Systems in the Education sector and was held between July 14 and 16, 2022. The ICITED'22 was supported by the Higher School of Advertising and Marketing (ESPM), Rio de Janeiro, Brazil and by IADITI—International Association for Digital Transformation and Echnological Innovation.

The International Conference in Information Technology & Education is an international forum for researchers and professionals in the education sector, which enables the discussion of the latest innovations, trends and concerns in several areas, in the education sector, associated with information technologies and systems. It is an event for professionals in the sector, in search of technology solutions, where academics, IT experts, and business managers meet to discuss new ideas that help them maximize the potential of learning processes through technology.

The ICITED'22 Scientific Committee is composed of a multidisciplinary group of 189 experts who assessed some 228 papers from 22 countries, received for each of the main topics proposed for the conference: (a) ICT and Virtual learning; (b) Pedagogical & Didactical Innovations; (c) Technologies issues in Education in the different scientific areas; (d) Quality in Education; (e) Technological Issues in Education and Research; (f) Educational Software and Serious Games; g) Curriculum Design and Innovation; and (h) University-Industry Collaboration; SPECIAL SESSIONS: DTLP'22—Digital Transformation in the Teaching and Learning Process; FoE'22—Future of Education.

The papers accepted for presentation and discussion at the conference are published by Springer and will be submitted for indexing by ISI, SCOPUS, EI-Compendex, Google Scholar, and SpringerLink. We thank all those who contributed to the ICITED'22 conference (authors, committees, workshop organizers, and sponsors).

We deeply appreciate your involvement and support, which were crucial to the success of the conference.

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Contents

Planning and development of the MOOC-DTS "Digital Tutorial Space": case study in a University Tuna

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Abstract. Digital innovation is currently a hallmark of higher education institutions due to the need to remain at the forefront of technology, but also to ensure a more current, inclusive and participatory teaching-learning process. The university tunas of these institutions also seem to be an example of innovation in the digital sphere as they use digital technologies to simplify their internal processes, but also as a means of promoting and disseminating information and advertising through the web. In this follow-up, the use of technologies in the context of musical training also seems to have a preponderant role in the acquisition and improvement of skills of the members that make up these groups. Considering the interest in the combination of university tunas and technologies, this research was developed to present the planning and development processes of a Massive Open Online Course (MOOC) on the Udemy platform, called Digital Tutorial Space (DTS). This MOOC-DTS aims to contribute to the improvement of the individual musical quality of the tuna members through digital technologies, enabling everyone to learn anywhere and anytime, without geographical or temporal restrictions. For the accomplishment of the study, the research-action methodology was adopted in this work within the scope of RaussTuna – Tuna Mista de Bragança, from the Polytechnic Institute of Bragança, Portugal. While in the planning phase the technical-pedagogical structure and the design of the course contents were thought, in the development phase the course was built and all the contents to be inserted in the MOOC were produced.
Keywords: Digital Tutorial Space, MOOC, Music, University Tuna.

1 Introduction

The world will never be the same after the pandemic phase that devastated us. New windows of opportunity have emerged, some based on existing digital technologies, others based on educational information and communication technologies that have been improved over the last two years. We can say that today people in general use digital technologies more and better and feel a growing need for them to gather, work, teach, learn or even for fun.

The growth and expansion of technologies in the world made the digital transition possible in many sectors of economic activity in Portugal. Examples of this are health,

justice, social solidarity, education, culture, banking, companies, defense, public administration, but also in the life of every citizen in all its dimensions. One of these dimensions has to do with the ease we currently have in accessing the internet through any digital device, whether from home, work, coffee house or car, or from any other location. Access to the internet through mobile devices means that we are practically always connected to the network, namely, applications, services, social networks and a multitude of tools on the web that make it possible to transact goods and services, but also to establish communication and the interaction between people and institutions. The dependence we have today on being constantly connected to the internet, the fact that access to the network allows contact with practically everything and the experiences taken in online teaching (mostly due to the covid-19 pandemic) are determining factors to stop and reflect on the implementation of music teaching or music training at a distance, that is, through digital technologies. The musical training that we refer to in this research falls only within the scope of university tunas, particularly in RaussTuna – Tuna Mista de Bragança (TMB), Instituto Politécnico de Bragança, Portugal.

Based on the research-action methodology carried out, this study aims to present the planning and development processes of a Massive Open Online Courses (MOOC), on the Udemy platform, called Digital Tutorial Space (DTS). The DTS is an online space where all TMB members can acquire knowledge and musical skills through technologies, regardless of geographic and temporal restrictions. It is a space that encourages learning and musical practice, without the need for members to travel to TMB facilities to learn individually, mainly to acquire the bases. Although the role that MOOC-DTS plays in the evolution of TMB members is recognized, it becomes evident that it does not replace group musical practice, but is just another contribution to encouraging the acquisition of musical and artistic skills.

2 Digital Technologies in University Tunas

University tunas are musical groups of academic traditions, usually made up of students from higher education institutions. Tunas can be divided into three typologies - male, female and mixed - which are distributed across most Portuguese higher education institutions and others abroad. There are aspects that seem to be transversal to all tunas, regardless of their typology, such as: dissemination of local and regional culture; promotion of Institutes and Universities; use of academic attire; presentation and posture on stage; the diversity of instruments (essentially color-dophones) used in the performances; the type of songbook adopted (popular songs and original themes); musical streets and academic serenades; the bohemia tunae; participation in tunas meetings and festivals, among many others. However, in addition to the characteristics like all tunas, there are other identity traits that are effectively specific to each tuna. These characteristics result from several factors, such as: historical and sociocultural framework; the context and culture of higher education institutions and locations where they are based; the principles, statutes and internal regulations of these groups; values and traditions, among others. RaussTuna – Tuna Mista de Bragança (TMB) is

an association governed by private law and seems to be an example of a tuna that has its own characteristics: democratic participation; inclusion; individual freedom; respect for peers; cultural heterogeneity and diversity; orientation towards social causes; and even entrepreneurial and innovative spirit. It is precisely in the innovative dimension that another project of this tuna is located, in particular, the MOOC-DTS. Although the project includes the planning, development, implementation, use and evaluation phases of the MOOC-DTS, this article only addresses the planning and development phases. However, before talking about the project, it is important to address the issue of connectivism as a way of framing the MOOCs in this study.

To frame network learning, Siemens [1] proposes connectivism as a learning theory for the digital age that approaches knowledge as something distributed in a network of connections. Connectivism intends to respond to the needs of 21st century students and to the new realities arising from technological development and economic, social and cultural transformations [2] and can be considered as "the integration of principles exploited by chaos, network, and theories of complexity and self-organization. Considering that "the most generalized application of connectivist learning are the Massive Open Online Courses (MOOC)" [3], in this research, we sought to plan and develop a MOOC to support the Digital Tutorial Space (DTS) of TMB. MOOCs offer "new range of challenging possibilities to expand access to quality education, as they allow the creation of large communities of practice" [4].

According to Siemens (2013), MOOCs "are a continuation of the trend in innovation, experimentation and the use of technology initiated by distance and online learning, to offer massive learning opportunities" [5]. This type of courses therefore emerge as an opportunity to change the practices of tuna members and as a technological innovation, since "from the HEIs' point of view, MOOCs serve to promote universities, favoring the recruitment of new students and also as a field for pedagogical experiments" [6]. These two principles – dissemination and recruitment – can and should be applied at the TMB level, since a MOOC, due to its size and projection, also seems to enhance the promotion and dissemination of the TMB brand and image and, consequently, attracting young people to tuna.

According to Siemens [7], generally, MOOCs can be of two types: cMOOC and xMOOC. The cMOOCs are context-centric and correspond to a connectivist perspective. The activities focus on the participant and his/her relationship with the other participants in the search for information and knowledge. The course materials are shared among all and the teacher directs, helps and guides the participants' learning. xMOOCs are courses focused on content and with a more rigid organization, limiting creativity. In short, cMOOCs privilege the connection between the different participants, emphasizing the sharing of resources between all the participants, while the xMOOCs are based on the distribution of content in video lessons, with the teacher continuing to assume a leading role.

Udemy was created by Eren Bali and is an example of a platform that supports xMOOC. The contents of the courses offered are quite diversified (development, business, finance and accounting, IT and software, office productivity, personal development, design, marketing, health and fitness and music). According to his website (www.udemy.com), Udemy currently has 49 million students, 64,000 instructors,

185,000 courses, 75 languages, 10,500 partners and 680 million course registrations. It should also be noted that most Udemy courses offer certificates of completion. Pedagogies and tools for teaching classes depend exclusively on the teacher, for example, courses with slides, videos, quizzes, exercises and even live classes can be published. The platform also has a chat and community system so that students can interact with each other and/or with instructors, whether to discuss various topics or ask questions.

This platform has courses designed by institutions and organizations, but any user is also free to create a course as long as they pay attention to the parameters and rules established by Udemy. The MOOC that we planned and developed was as an individual and not as a company or institution. For now, it makes no sense to put the MOOC in the institutional perspective, since it still must be implemented, used and evaluated. If it is successful in acquiring the musical skills of tuna members, we can consider placing it in an institutional perspective, otherwise we will have to better assess the situation. In any case, it is only later after its use that we can verify, analyze and evaluate the results with the implementation of the MOOC.

3 Methodology

For the development of this work, the research-action methodology is adopted. The methodological choice is due to the fact that it is the most suitable for carrying out the research in terms of the importance it gives to group decisions, the commitment to improving a concrete problematic situation and the need to involve the participants at all stages of the research process [8]. Through this methodology it will be possible to present and characterize the planning and development processes of the MOOC-DTS which includes a set of phases that were fundamental to guarantee the quality of both processes so that the course is suitable for the musical training of all the members of tuna.

In this research, qualitative research techniques are used, being applied, as data collection instruments, the individual semi-structured interview and the information contained in the researcher's diary resulting from the participant observation. The interview was applied at the beginning of the process, in September 2021, to 20 members of the TMB, with half of the interviews being conducted with females and the rest with males to ensure parity in the study. Through the interview, it was possible to assess the perspective of future users of the MOOC-DTS, both in terms of the technical-pedagogical structure of the course and in terms of how the contents will be presented to the respective participants in the MOOC-DTS. In fact, the presentation of the contents is an absolutely central aspect of the course, as it is the main gateway for the registration and loyalty of participants in the course. If the content is appealing, well-organized and well-prepared, and obvious, of good quality, it's expected the results both in terms of participation-loyal and in terms of musical training/acquisition of musical skills will be quite positive. If this situation does not occur, then it means that the course is of poor quality and, therefore, the participants become demotivated and end up giving up.

Still regarding the data collection instruments, it is important to mention that participant observation was also adopted, insofar as the authors of this research were part of the MOOC-DTS project and as such had the opportunity to assist and participate in the processes either of planning and development of the MOOC. The participation of the authors of the study made it possible to acquire a set of knowledge and skills through experience, which were absolutely central and indispensable aspects to guarantee the quality of the MOOC-DTS. At the same time, web searches were carried out on courses in MOOC format to better understand all the fundamental steps in the planning and development processes of a MOOC to adapt and readapt the MOOC-DTS.

Content analysis was performed in Microsoft Excel, mainly data from conversations between interviewers (authors) and respondents (RaussTuna members), as well as all data recorded in the researcher's diary from participant observation.

4 Presentation and discussion of results

4.1 MOOC-DTS planning process

The MOOC-DTS planning process had a set of iterative phases that were articulated and made it possible to establish the technical-pedagogical support of the course. This set of phases is presented below:

Phase 1 (Auscultation of the group): The first concerns had to do with the need to listen to all members of tuna, especially those who have greater needs to acquire and improve knowledge in the area of music, whether at the vocal and instrumental, whether at an artistic or choreographic level. In the process of listening to the members, we were able to obtain crucial information for the development of the MOOC-DTS, namely, on the most appropriate pedagogy for the teaching-learning process, the digital tools most conducive to understanding the tutorials, but also, the way content should be presented to ensure greater understanding and capture of the videos.

Phase 2 (Research and learning): in this phase extensive research was carried out on MOOCs, namely on how to plan and develop this type of courses. In addition, the position of several specialists in the field was taken into account and the authors participated in MOOC courses oriented towards the teaching of music, in order to become acquainted with the functioning of these courses and acquire knowledge and useful experiences for planning and development of the MOOC-DTS. It is also important to mention that participation in MOOC courses was also important to understand the pedagogical dimension and was an indispensable contribution to answer unanswered questions, such as: How to teach music through technologies? How to ensure that those who participate in a MOOC can acquire skills and learn tuna's songs? In general, all these questions seem to have been answered with our research, with the consultation of specialists and with our participation in MOOC courses oriented towards musical training.

Phase 3 (Selection of equipment and hardware): in this phase, a rigorous and careful research was carried out on the equipment that would best suit the implementation of the project. The research was carried out on the web, but also through spe-

cialists in other areas, music producers and teachers, audiovisual technicians, multimedia specialists and other experts. Thus, in terms of equipment, the following were adopted: two cameras, a sound table with microphone, a green screen, two light sources, two tripods, an external disk and computers.

Phase 4 (Selection of digital tools): regarding digital tools, as previously mentioned, an extensive web search was carried out on the most appropriate tools for the realization of this type of project. However, we went further and also consulted specialists and technicians in the area that allowed us to obtain more knowledge and greater reliability and certainty in the answers to the software to be used for the production and editing of this work. Video editing and design software were used.

Phase 5 (Design of the pedagogical model): like the previous one, this was the most complex phase and took the longest to complete, as although it was articulated with the previous phases, it was the most important for the entire project. There were unanswered questions whose answer was vital for the development of this project: How can we teach music? How can we track learning? How can we ensure that participants really acquire skills and that they get to know tuna's original themes? Obviously, in addition to extensive search on the web, it was necessary to consult colleagues to try to understand the most appropriate pedagogical model to implement in the MOOC-DTS. We concluded that learning should occur at the pace of each participant, with flexibility, without haste or confusion. It should also have very practical examples, demonstrations, outlines of the staves and/or sheet music. Learning should also take place at the time the participant has availability and without any restrictions or limitations. Regarding the monitoring of learning, this should be done by the music coordination team either in the online modality or in the face-to-face modality as a complement. At the level of assessment, this could only be done in person, and it was up to the participant to show the musical coordination the skills he acquired during the course.

Phase 6 (Content model design): this was the second most complex phase, because without quality content, organized, properly structured, easy to understand for the participants, then MOOC-DTS would be a real failure. We did research, consulted with tuna members and experts in the field, and concluded that the content model to adopt would be videos, as they provided greater security and motivation for course participants. They could watch, practice what they saw and heard in the tutorials and then go back to watch and improve those learnings and knowledge. Due to these advantages, we adopted the video as the central typology of content for the transmission of musical skills, making these videos true learning tutorials.

4.2 MOOC-DTS development process

The MOOC development process consisted of two main stages, each with several tasks.

Stage 1 (Development of the MOOC framework)

The first stage was responsible for configure the course homepage, set the price of the course, curriculum creation and contents submission, set course messages and, finally, submission of the whole course for review.

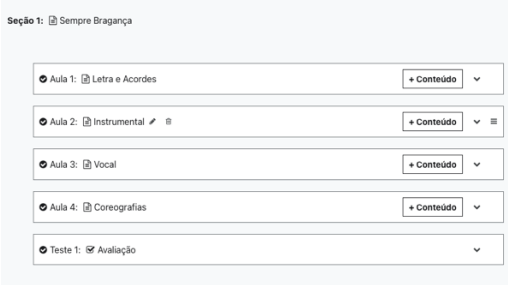

Fig. 1. Course structure

Task 1 (Configure the course homepage): in this task it is possible to write the title and subtitle of the course, as well as the description. It is also possible to define the language in which the course will be taught and define the level of difficulty of the course (beginner, intermediate and specialist). In addition to these settings, it is possible to choose the main topic of the course and the sub-theme. You can also upload a course image that meets our Udemy image quality standards to be accepted (750 x 422 pixels and .jpg, .jpeg, .gif or .png format).

Task 2 (Set the price of the course): it is possible to set the course enrollment fee where the list price that students will see in other currencies is determined using the price tier matrix. If the course is to be offered free of charge, the total duration of the video content must be less than 2 hours, which is not the case. In this sense, the premium instructor registration must be completed to set a price for the course. Once the linked payment method is approved, we will be able to set the price for the course.

Task 3 (Curriculum Creation/Contents Submission): in this task we can add course content such as lessons, course sections, assignments and more. We created 25 sections, each of which has four classes and each class corresponds to a specific area: lyrics and chords, instrumental, vocals, choreography. In the lyrics and chords it is intended that the participants learn the lyrics of the song and the respective chords (if the latter applies). Participants must also begin to feel and understand the tempo of the music and, at the same time, begin to shake as if they were in formation with the entire tuna. In the instrumental class, participants must learn the instrumental of the song according to the instrument they chose to play, as well as the respective chords or note lines (if applicable). They should also learn instrumental playing techniques (fingerings, basses, among others). The timing, technical control, rhythm and tuning of the instrument are also fundamental, as is waving as if they were in formation with the entire tuna. They must also learn to maintain their own instrument and treat it with esteem and care in order to preserve it as long as possible. In the vocal class, participants must learn to sing the song according to their vocal register, as well as apply techniques that allow them to improve their performance (breathing, vocal control, timing, dynamics, etc.). Technical control, rhythm and vocal tuning are also essential, as is waving as if they were in formation with the entire tuna. They must also learn to take care of their voice and treat it with esteem and care to preserve it for a better performance. Finally, in the choreography class, participants must learn the choreographies of the music that can be used in standard bearers (flags, capes, confetti, etc.)

For the realization of both typologies, time, technical control, posture, elegance and interaction with the public are also absolutely fundamental. They must also learn to maintain the materials and equipment related to the choreography and treat them with esteem and care in order to preserve them as long as possible. It is important to mention that this sequence of classes is repeated for each of the themes originating from tuna (each of the sections), making a total of 100 classes. Each of the sections has a multiple-choice test at the end that participants must complete to proceed to the next section.

Task 4 (Set course messages): in this task it is possible to write messages to course participants (optional) that will be sent automatically when they register or complete your course, encouraging them to interact with the content. If we don't want to send you welcome or congratulation messages, we leave the text box blank (we don't fill it in). We posted two messages, the first welcoming the MOOC and the second congratulating the completion of the process.

Task 5 (Submit for review): submitting a course for review will start the quality review process. The MOOC URL will be activated once the review team approves the course. After we submit the course, the Quality Review Team will evaluate it and provide feedback based on the Course Quality Checklist. Once approved, the course will be published and available on the Udemy marketplace.

Stage 2 (Production and publication of MOOC contents)

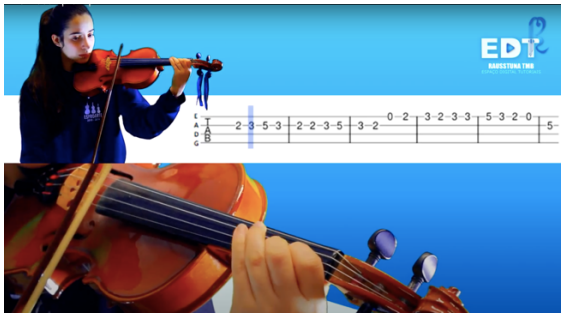

Fig. 2. Course content

Task 1 (Equipment assembly): The scenery and equipment (chroma key, lights, cameras and microphone) were set up, which was essential for the video recordings. The logistics were really big since they had to record different types of instruments and voices, so it was always necessary to change the position of the microphones but also of the cameras and lights depending on the type of instrument, position and height of the person. It was a task that required rigor and technical knowledge in light, image and sound.

Task 2 (Capture the videos): Capturing videos has been a very demanding and long process, since it is necessary to make several videos for each original theme, either to capture the diversity of instruments or to capture the types of voices and choreographies. It is a process that requires a lot of patience, persistence and resili-

ence. Every time a member of the TMB made a mistake, it was necessary to repeat everything. It's very tiring. It hasn't been an easy path but we'll make it.

Task 3 (Video production): this task included recording the person with two cameras (focus and body), synchronization of cameras and audio and rendering in three files (focus, body and audio). Editing starts with the three files plus the intro animation file. During editing, various graphics files created in Adobe Photoshop are used (chords, flute buttons, etc.). Tabulation software is used to create the lines of the solo instruments and then transformed into an image. The tabs, chords and lyrics are synchronized and the solo notes are highlighted one by one in time. In the case of rhythms, arrows are placed to demonstrate the movement of the hand. This was a very complex task, as it involved editing all the contents collected by each of the themes. It required a lot of attention, rigor and advanced technical knowledge.

Task 4 (Bug check and improvements): this task was very important to verify the existence of errors or certain types of inaccuracy in the videos. Considering that these are music tutorial videos, it is difficult to combine the image, sound and guidelines that appear in the videos, so there may be some errors. Viewing videos and presenting them to other people is an essential and absolutely essential task to maintain the quality of videos and MOOCs in general.

Task 5 (Export and Publishing): this task in the production of content was the simplest and probably the least tiring. They were exported to mp4 format and later published in the MOOC on Udemy, having in mind trainees will watch, practice, and become better musicians.

5 Conclusions

The research allowed, in a general way, to present all the phases that constituted the MOOC-EDT planning and development processes.

The planning process took place in six major phases that were articulated and were absolutely essential for the development of the project: Task 1 (Auscultation of the group), which consisted of questioning the members of tuna about the technical-pedagogical structure and MOOC-DTS contents; Task 2 (Research and learning) where it was possible to do research, consult specialists in the area, participate in MOOC courses and acquire knowledge and skills in the field of music teaching in online format; Task 3 (Selection of equipment and hardware) where a rigorous and careful research was carried out on the equipment that would best suit the implementation of the project; Task 4 (Selection of digital tools) which made it possible to carry out a web search on the most appropriate tools to implement this type of project; Task 5 (Design of the pedagogical model) very important for the implementation of a pedagogical model more suited to the teaching of music through digital technologies, essentially resorting to the demonstrative method; Task 6 (Content model design) fundamental for the design of the content model to be adopted for the course which, in this case, were the videos given the flexibility they allow and the motivation they create in the MOOC-DTS participants. The planning process, although long and complex, was essential for the development of the course with the quality it deserved.

The development process comprises two stages: the first consists of the development of the MOOC framework and the second the production and publication of MOOC contents. The first stage included five tasks, namely: Task 1 (Configure the course homepage) where it is possible to write the title and subtitle of the course, as well as its description and other general settings; Task 2 (Set the price for the course) useful to set the value by the frequency in the course; Task 3 (Curriculum Creation/Contents Submission) allows creating classes and inserting the respective educational resources; Task 4 (Set course messages) is used to set welcome messages and others; Task 5 (Submit for review) for submission for publication review (acceptance or rejection) by the Udemy team. The second stage also included five other tasks, namely: Task 1 (Equipment assembly) the scenery and equipment (chroma key, lights, cameras and microphone) were assembled; Task 2 (Capture the videos) which was a very time-consuming process due to repetitions and the number of tracks per musical theme (one recording for each instrument, voice and choreography); Task 3 (Video production) where all the editing was carried out - combination of image, sound and animations; Task 4 (Bug check and improvements) important for error detection and for learning tests; Task 5 (Export and Publishing) mp4 export for upload to the course structure on Udemy.

In addition to the stages of development of the two processes presented above, the research allowed us to aggregate the areas of university tunas and digital technologies and, consequently, to understand the contribution that these technologies can make either to the simplification of the internal processes of the tunas or to the promotion and dissemination of the image with the ultimate objective of attracting new members to integrate these groups of young people. It is also important to mention that the topics addressed can constitute a greater reflection and debate, especially in the tunas' communities, on the importance of innovation and digital modernization within these groups.

Note: The second and last part of the study will be published in due course with the title "Use and evaluation of the MOOC-DTS "Digital Tutorial Space": case study in a University Tuna" (Part II).

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