

PEDAGOGICAL WORK WITH WEB RADIO: AN EXPERIENCE REPORT IN REMOTE TEACHING CONTEXT

EL TRABAJO PEDAGÓGICO CON RADIO WEB: UN RELATO DE EXPERIENCIA EN
CONTEXTO DE ENSEÑANZA REMOTA

O TRABALHO PEDAGÓGICO COM WEB RÁDIO: UM RELATO DE EXPERIÊNCIA EM
CONTEXTO DE ENSINO REMOTO¹

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Abstract

The Information and Communication Technologies (ICT) applied to education represent innovations that facilitate pedagogical work. In the context of remote teaching due to the Covid-19 pandemic, educational systems have been forced to adopt creative paths and experiences involving ICT in their educational processes. Thus, the objective of this article is to present an experience report in remote teaching at a Public University about the use of web radio for educational purposes. The methodology used in the reported experience is the qualitative research approach with the technical procedure of action research. The article describes the technical procedures of assembly, transmission, process management, content production, as well as audience data and impressions of Pedagogy students in two disciplines. Among the results and conclusions, the educational potential of using web radio can be highlighted, as well as the research paths that can derive from it.

Keywords: Education; Radio; Communication; Information Technology; Teaching.

Resumen

Las Tecnologías de la Información y la Comunicación (TIC) aplicadas a la educación representan innovaciones que facilitan el trabajo pedagógico. En los contextos de enseñanza remota debido a la pandemia de Covid-19, los sistemas educativos se vieron obligados a adoptar caminos y experiencias creativas que involucran TIC en sus procesos educativos. Por lo tanto, el objetivo de este artículo es presentar un informe de experiencia en la enseñanza remota en una universidad pública sobre el uso de la radio web con fines educativos. Como metodología del informe de experiencia, se utiliza el enfoque cualitativo de investigación con un procedimiento técnico de investigación-acción. En el artículo se describen los procedimientos técnicos de montaje, transmisión, gestión de procesos, producción de contenidos, así como datos de audiencia e impresiones de estudiantes del curso de Pedagogía en dos disciplinas. Entre los

¹ The experience report in this article follows all ethical procedures. Names of people, brands and products were omitted and the terms that name them were replaced by generic designations.

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resultados y conclusiones se puede señalar el potencial educativo del uso de la radio web, así como los caminos de investigación que pueden derivar.

Palabras clave: Educación; Radio; Comunicación; Tecnología de la Información; Enseñanza.

Resumo

As Tecnologias de Informação e Comunicação (TIC) aplicadas à educação representam inovações que facilitam o trabalho pedagógico. Nos contextos de ensino remoto em função da pandemia de Covid-19 os sistemas educacionais foram forçados a adotar caminhos e experiências criativas envolvendo TIC em seus processos educativos. Destarte o objetivo desse artigo é apresentar um relato de experiência no ensino remoto em uma Universidade Pública sobre a utilização de web rádio com fins educacionais. Como metodologia da experiência relatada se utiliza o enfoque qualitativo de pesquisa com procedimento técnico de pesquisa-ação. No artigo se descreve os procedimentos técnicos de montagem, transmissão, gestão de processos, produção de conteúdos, bem como dados de audiência e impressões de estudantes de curso de Pedagogia em duas disciplinas. Entre os resultados e conclusões pode-se apontar para o potencial educativo do uso de web rádio, bem como os caminhos de pesquisa de que podem derivar.

Palavras-chave: Educação; Rádio; Comunicação; Tecnologia da Informação; Ensino.

Introduction

In the wake of the imperative of remote teaching practiced due to the public health emergency caused by the Covid-19 pandemic, Public Universities have devised strategies to fulfill their social functions of teaching, research, and extension. Universities have now implemented, on a large scale, their already developed expertise in Distance Learning through Virtual Learning Environments (VLE), adapting it to an intermediate modality between face-to-face and distance learning, called Remote Teaching. Hodges et al. (2020) identify important elements for establishing terminology for remote teaching and add the term "emergency" to distinguish it from the modality of distance learning, which is based on experiences planned from the outset to be online. On the other hand, remote teaching represents a temporary shift for the alternative application of instruction due to the circumstances of the health crisis, involving the use of fully remote teaching solutions that would otherwise be delivered in person or as hybrid courses.

Therefore, many Universities have undertaken, in a short period of time, in-service training for the swift implementation of this modality, adapting the resources of Information and Communication Technologies (ICT) already used in distance learning for the use of teachers accustomed to face-to-face instruction. In this regard, numerous innovations have emerged from this convergence, as this action has provided an opportunity for teachers' expertise to intertwine with technological tools, leading to the emergence of new perspectives and uses of technology.

Indeed, nowadays, when we hear about Information and Communication Technologies (ICT), the Internet and its potentialities immediately come to mind, from websites, streaming, and podcasting to virtual encyclopedias. However, this characterization also includes computers and their peripherals, fixed and mobile telephony, television, technologies associated with images and sounds, as well as remote access means. Thus, a diverse range of artifacts that are part of contemporary society are encompassed here, rapidly infiltrating all sectors of human activity. Therefore, ICT can be defined as a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information. These technologies include computers, the Internet, a wide range of technologies (radio and television), telephony, among others (Tinio, 2005).

Given the contemporary technological profusion, the allure of working with ICT in education is undeniable, especially when combining the availability of tools and knowledge of their operationalization with pedagogical strategies. With the decreasing costs of ICT equipment, facilitated access to tools that converge on the internet, such as podcasts, videos, websites, blogs, and those of the so-called Web 2.0, can be observed. However, the knowledge of their utilization remains a significant barrier, particularly for a generation of professionals whom Marc Prensky³ (2001) refers to as 'digital immigrants.' This term describes individuals who were born before the digital era and had to learn a new language to navigate the realm of digital technologies.

³ Marc Prensky is an internationally acclaimed thinker, speaker, writer, consultant, and game designer in the fields of education and learning. He is best known as the inventor and advocate of the terms 'digital natives' and 'digital immigrants,' which he described in a 2001 article. His professional focus lies in educational reform and assisting teachers in changing their pedagogical practices to make them more effective in teaching 21st-century students.

On the other hand, education has been under pressure from society regarding the use of ICT in its practice, perhaps not explicitly, but indirectly, given the increasing digitization of various aspects of everyday life, technological advancements in various spheres of human action, the growing access to the internet, the widespread use of mobile devices, and the gradual rise of active methodologies in education that require technological interactivity. However, due to the circumstances brought about by the global pandemic, the use of ICT has become imperative. Additionally, one can observe that contemporary students are increasingly immersed in the use of digital technologies. Despite the persistence of the so-called digital divide, characterized by inequality in access to and use of Information and Communication Technologies (ICT) and the internet in society, it is becoming increasingly common to see students arriving at school equipped with mobile phones, tablets, laptops, and other resources that are often 'prohibited' by administrators and educators and, in some states, even by legislation, from being used in the classroom. However, due to the emergency situation of public health, the use of technology has become an urgent necessity, forcing teachers and students to learn how to utilize it in education. This study consists of an experiential account in the field of Information and Communication Technologies, including its justifications, research problem, objectives, methodology, and theoretical framework. Thus, the aim of this study is to present an experiential account that occurred during remote teaching in a Public University regarding the use of an old technological instrument that, in the context of the public health emergency, proved to be satisfactorily suited for pedagogical purposes. This instrument is the radio and its applications in a new form, namely web radio streaming.

- Justifications

The incorporation of ICT in education does not necessarily imply the facilitation of learning, but by integrating various pathways in knowledge delivery, it expands this possibility. However, as Martinho and Pombo (2009, p. 528) attest, 'the enthusiasm and hope placed in technologies cannot be taken alone as the elixir for all the ills that afflict

schools.' There is no purpose in incorporating a new technology in education if there is no change in methodology to operate it. However, given the circumstances brought about by the pandemic, a conformation to new methodological and technological paths was experienced and experimented with, almost compulsorily.

In this regard, the lack of preparation in teacher training regarding the use of ICT led many teachers to seek alternatives to learn how to deal with technology on their own, and they were not always successful, resulting in frustrations and giving up on the endeavor. However, the circumstances necessitated these acquisitions as an imperative for the professional practice of teaching at all levels of education. Despite the longstanding reference made by Freire, Prado, Martins, and Sidericoudes (1998, p. 1-2), who express that the "implementation of Informatics in Education requires that each teacher invest in their own development so that their pedagogical practice can benefit from this technological tool" (our translation), it is not always possible and encounters resistance.

Therefore, in order to avoid this situation that hinders the process, as the teacher needs to pause to learn and consequently retains gaps instead of just updating, their training should focus on conscious, reflective, and creative preparation regarding the use of technologies. From this perspective, we believe that teachers in general, and specifically those in the Public Education System who were not adequately prepared in their initial training but are currently in practice, should be provided with stimulating methodological elements for the optimized use of technological resources. In this regard, any in-depth and well-founded discussion on this matter in itself serves as a motivating justification for undertaking studies that contribute to the better implementation of conscious use of ICT.

As mentioned above, the scope of ICT use in education is extensive, and this becomes evident in current times where the context of the health emergency has led to remote teaching. However, the narrative presented in this experiential account aims to contribute with information about the use of radio and its potentialities. Initially, it specifically refers to web radio, as traditional broadcasting, due to legal regulations, hinders any initiative without the procedures that meet the specificities of the law. Nevertheless, for research purposes, broadcasting in small distances was also

experimented with, such as within the school space, classroom, or even in rural education, using low-power and low-cost transmitters. However, given the popularization of smartphones and their applications that enable the broadcasting of web radios, the focus of this experiential account is centered within this framework.

- The problem that guided the experience and research and its objective

Given the profusion of technical resources that loom large in the realm of information and communication technologies, it is imperative to establish boundaries for study and research in order to explore the potentialities of these resources in a more comprehensive manner. Thus, the research conducted for this experiential account specifically focuses on the utilization of web radios in education, combining the understanding of a language known to all and commonly used for various purposes, from news to entertainment, with its potential use in teaching. In light of this, the main problem that motivated the research is as follows: considering the type of language that radio employs, even in its current form as web radio, and in the face of the proliferation of technological tools applied to education, can radio still contribute as an aid to the teaching and learning process as an educommunication tool?

As an intention of this work, we aim to present an experience with the use of web radio that contributes to the development of a teaching methodology utilizing radio, enabling teachers to learn and incorporate this instrument into their pedagogical practices. This includes using radio redundantly or as support in their daily activities, in a conscious, reflective, and creative manner. By doing so, teachers can enhance their students' learning, while also understanding the applicability and potentiality of its use.

In light of this, it is necessary to discuss and understand the phenomena surrounding the incorporation of ICTs in today's society and their utilization and appropriation as educational tools for knowledge acquisition. After all, practicing teachers and students are immersed in this modern universe that extensively uses ICTs, and formal education, mediated by teachers, cannot ignore this reality as if it were unimportant or had no influence on the scientific development of individuals, especially considering the demands placed on education during these pandemic times.

However, the question of whether the use of technologies changes education is difficult to answer. Tinio (2005), in his report on ICT in Education, mentions that the educational effectiveness of ICT depends on how they are used and for what purposes. And like any other teaching tool, ICTs do not work for everyone, everywhere, in the same way.

Considering the arguments presented above, it becomes urgent and opportune to conceive a teaching methodology from the perspective of the technological training of practicing teachers, and the use of radio seeks to revive its application in aid of education, considering the need to provide them with support for the optimized use of this resource. This need is an imperative of contemporaneity, and therefore, careful observation, study, analysis, and experimentation in this area justify undertaking studies that contribute to the better implementation of training in this line.

The various realities experienced by teachers in their teaching profession show that often they work through routine processes in which the interest in their continuing education or reflective action on their praxis is set aside. Thinking about the task of "teaching" brings up a series of concerns, including curriculum content, teaching planning, materials and teaching strategies, school routines, and overall organization of content for knowledge production. This has become a complex task in the face of the challenges of the present time. A teacher who was prepared with a focus on the mere transmission of content finds themselves unfamiliar with the current reality of rapid changes, especially in the technology available today. Therefore, it is crucial to improve the acquisition of new elements that could assist them in their practices with the aim of enhancing their students' learning. Hence, it is of utmost importance to offer these teachers the opportunity to experiment with new techniques focused on specific resources each time. For this reason, the work with web radio, as outlined in this experiential account, is presented.

Preceding the experience with the use of web radio for educational purposes, a position on the subject emerged as a hypothesis, which was clarified throughout the course of the experience. It was believed that, based on the premise that teachers have limited time, as argued by themselves, for their preparation on how to use technology

in the classroom through training courses, and lacking the possibility of self-directed learning since they are not immersed in it nor have the resources to learn on their own, in light of these arguments, concurrent learning alongside their praxis is justifiable and feasible. In this sense, it is understood that teachers, through experiential utilization of reflective and creative use of ICT resources in their initial training, while visualizing the production of pedagogical resources in disciplines, will likely achieve more effective results in vicarious learning and generate a real experience of success and the integration of ICT elements into their future pedagogical practice. In other words, being immersed in an experience where they are an active participant and contribute to their own development can provide them with an additional possibility for future use of a pedagogical tool.

Theoretical Framework

A theoretical framework should lay the foundations to support discussions within a research study. Therefore, when it comes to teacher training for technology-mediated teaching in general, and radio in particular, it is advisable to use an understanding of educommunication as a framework for study and experimentation. Educommunication is a construct resulting from the fusion of education and communication, and as Santos (2020, p. 6) emphasizes, “Educommunication is clearly based on the reality that mass media enter students' homes and school gates daily, without asking permission” (our translation). In this sense, it is assumed here that it is necessary to deal with the potentially educational elements that a tool like radio, which is known to everyone as a cultural asset, can contribute to education as a motivation for learning. Educommunication is a synthesis in this process, as proposed by the Communication and Education Center of the School of Communication and Arts at the University of São Paulo (NCE of ECA-USP). Educommunication aims to:

the construction of open, dialogical, and creative communicative ecosystems within educational spaces, breaking the hierarchy in the distribution of knowledge, precisely by recognizing that all individuals involved in the flow of information are producers of culture, regardless of their operational role within the school environment (NCE of ECA-USP, apud in CONSANI, 2007, p. 13). (Our translation).

In general, other works support the continuous experimentation with web radio in relation to educommunication. Among them, Moreira (2020) emphasizes the importance of the connection between communication and education and the concepts that emerge from this junction. Santos (2020) addresses fundamental discussions in educommunication studies, such as the role of the cultural industry, mass culture, and the relationships between individuals and media, while also providing technical contributions for the application of educommunication tools for teachers and students. In the same vein as Santos (2020), Carvalho (2020) presents studies focusing on mass media, cultural products, and youth consumption of media materials, with a focus on television. Soares (2011) provides contributions centered on a general view of educommunication, involving teachers and students in the management of educational communication within the school community.

For the implementation of the web radio experimentation, other theoretical references were used, which refer to the operational aspects of radio and web radio. In this regard, materials presenting elements of radio language and the history of radio (BARBOSA FILHO, 2003; CABRAL, 1996; DEL BIANCO & MOREIRA, 2002; McLEISH, 2001; JUNG, 2004; FERRARETTO (2014); LARochinski, 2017; CÉSAR, 2009, 2015) were employed to understand the trajectory that radio has traversed from its 'infancy' to its 'maturity' and its potential to continue using its language in other contexts such as education. Consani (2007) and Delanhese (2020) also contribute to the didactic use of radio in teaching and classroom settings.

To enable the productions to be used on the radio, Faxina (2020) and their contributions to audio editing for radio were consulted, as well as Ferraretto (2014), Callado (2018), and Comparato (2018) regarding scriptwriting and content production for radio. Silveira et al. (2020) and Priestman (2013) also provided insights into new radio languages, podcasts, and web radio itself.

When considering working with audio production techniques and internet streaming for the initial training of teachers in a radio language, the intention is not only to develop technical skills for the use of web radio but also to provide a platform for disseminating knowledge, skills, and competencies in various fields of knowledge, sciences, arts, the Portuguese language, and many others.

The acquisition of knowledge of the mentioned techniques can be seen as a collateral effect in the learning process. This experience, aimed at teachers in initial training who will teach the early years of elementary school, therefore, in their graduate profile, focused on serving children, seeks to establish creative and vicarious connections in that, in the process of formation, the teacher must also be familiar with the necessary techniques to serve as a mediator. Dealing with technologies requires not only the technical knowledge to operate tools but also the critical reflection necessary to assess the viability of their mediation, when to intervene, what type of intervention, when to suggest, and what type of suggestion.

Therefore, if the teacher incorporates their own technological learning into their teaching practice, they will be more likely to easily incorporate the learned resources for their use. With plausible techniques, they will likely produce their resources more quickly, optimizing their time and making the learning experience more enjoyable and effective for students. This will generate a real experience of success, which, according to Bandura⁴ (1986), is the most effective source of self-efficacy. In conjunction with this perspective, the teaching process of technology use aimed at here also followed the path of vicarious learning, in which learning occurs through observing the exercise of the teaching process by others, which, according to Bandura, is the second source of self-efficacy.

Methodological Procedures

The aim here is to establish the general lines of research and experimentation with web radio in education. The choice of this medium is due to the availability of material resources and the requirement of a certain level of skill in the use of specific software and hardware, such as computers or laptops, smartphones, microphones, audio editors, broadcasting software, among others.

⁴ Albert Bandura, a Canadian psychologist and author of the Social Cognitive Theory, addresses the psychological construct of self-efficacy, which can now be defined as referring to an individual's beliefs in their capability to organize and execute the necessary courses of action to produce achievements.

To achieve this, the application of web radio with pedagogical intentions was undertaken in two classes of two different disciplines in a Pedagogy course at a Federal University, during the remote teaching period. The research falls under a qualitative approach, and due to the application of web radio for pedagogical purposes, in terms of technical procedures, it is classified as action research, allowing for participatory observation, with planned active interaction with the research subjects. We understand that action research is a research modality that, as Severino (2007, p. 120) aptly mentions:

not only seeks to understand but also aims to intervene in the situation in order to modify it. The intended knowledge is articulated with the intentional purpose of altering the researched situation. Thus, while conducting a diagnosis and analysis of a specific situation, action research proposes changes to the group of individuals involved to improve the analyzed practices. (Our translation).

Despite the popularity of radio as a medium for information and entertainment transmission, its use in educational settings as a teaching strategy is not common. Therefore, working with podcast production and their dissemination through radio, whether using low-cost transmitters or internet streaming, as an educational activity strategy for initial teacher training, posed a challenge when tested, as it can even be compared to more traditional ICT usage such as video.

Continuing with the preparation of the experiment, after delineating the lesson plans for the two courses, namely, Education Research and Science and Technology Teaching, the scope of the programming to be broadcasted on the web radio was established. For the technical aspect of its operation, streaming was set up using freely available internet services, broadcast software operating from a local computer for daily program dissemination, and content production using audio editors as necessary material for distribution to undergraduate students majoring in Pedagogy enrolled in the aforementioned courses. As part of the evaluation, students were requested to provide written feedback voluntarily on various aspects, including their perspectives on innovation, the use of older technologies such as radio in education, and suggestions

for improvement and expansion of the web radio for educational purposes. The students who volunteered for this task provided their feedback via email.

In terms of the material resources used for the execution of the work, computers, smartphones, production and broadcast software, audio editors, sound resources, an online library of audio files, and a low-power FM transmitter were employed. However, it should be noted that the FM transmitter was only considered as a potential option for use in schools and classrooms, as its practical implementation was not possible during the period due to the pandemic. It is important to highlight that the aforementioned material resources used in this study are owned by the researcher.

The Experience, Technical Construction, and Operation of the Web Radio

In adherence to ethical considerations in this experiential account, the names of brands, services, and software used will not be mentioned. However, based on the characteristics described in the narratives, it is possible to find similar tools or equivalents through internet search engines. With that said, in the initial planning phase of operationalizing the web radio for educational purposes, free streaming services on the internet were sought. The intention was to offer the possibility of using web radio at the lowest possible cost, avoiding financial burdens for individuals. Thus, one of these services was identified, which not only offered free streaming infrastructure but also included an important feature in this type of service: the availability of something called Auto DJ. Auto DJ enables the continuous broadcasting of a programmed schedule (streaming) without the need for a computer to be constantly connected. When searching for such a service, it is advisable to use relevant keywords in search engines that include expressions such as "free streaming services for web radio with Auto DJ".

As is often the case, these services are located in different countries and offered in various languages. Therefore, one can rely on the abundant tutorials available on internet video repositories to understand how streaming works, what type of software is required to broadcast a program from a local computer using broadcast programs,

and how to configure the local streaming service. After conducting the necessary research and technical setup for structuring the web radio, a name and logo were created, and the educational scope of the programming was defined.

Generally, both free and paid streaming services generate HTML embed codes that can be incorporated into Virtual Learning Environments (VLE) and other web pages such as blogs. This is crucial for providing students with access to the web radio within the virtual classroom setting. Many services also offer smartphone applications, which can be easily found in the respective app stores associated with the equipment brands. Once these applications are installed, users can search for the desired web radio station by name within the streaming service.

Another important technical aspect pertains to broadcast software, i.e., programs that need to be installed on computers to function as audio stream servers for podcasts or music. Some software simply detects the audio stream from the player being used on the computer (desktop or laptop). In such cases, the entire programming with the desired audio files must be manually organized in a designated folder on the computer, ensuring the timing of each audio file aligns with the scheduled broadcasting time for students. These files are then played using a player software. However, this type of software may not be efficient due to the time it takes for programmers to synchronize the player's playback with the scheduled broadcast time. Alternatively, there are broadcasting software programs that make life easier by allowing files to be ordered in their windows according to the programmer's choice, regardless of their location on the computer or an external hard drive. This type of software automates the flow of files based on the designated schedule. Additionally, these software programs can even include programmed time announcements, allowing listeners to follow the schedule seamlessly. In the case of the present experience, the latter type of broadcasting software was used.

Another important detail to mention relates to internet bandwidth speed and the use of a dedicated computer for local streaming. The internet speed utilized was 50.0 Mbps for download and 6.5 Mbps for upload, which allowed for a comfortable upload flow. The station, in this case, refers to a laptop with internet access and broadcasting software, dedicated solely to web radio streaming. This laptop, running

the Windows 7 operating system with 8GB of RAM and a 500GB hard drive, remained powered on throughout the day, streaming the broadcast according to the established schedule communicated to the students. In the evening, when the Auto DJ feature of the streaming service was disabled, the radio's regular programming resumed. While turning off the laptop was an option, it could also remain constantly powered on with the scheduled streaming without any major issues. Taking a brief digression and considering primary education, for example, it would be possible to provide a dedicated streaming computer in schools, running broadcasting software with a schedule organized by teachers. It is even feasible to grant remote access to this computer for all teachers to create their own programming using software that allows such remote access. Naturally, a schedule would need to be established for each teacher to set up their programming to avoid conflicting access. Typically, broadcast software does not interrupt streaming during the process of adding audio files to the queue.

Once the technical aspects of the service were structured, content creation and production elements such as jingles were undertaken. To accomplish this, audio editing software was identified, which was also freely available on the internet. Editing software allows for the construction of podcasts with sound resources, such as background music, as well as the removal of noise and distortion to enhance audio quality. Internet search engines can also easily locate free sound libraries that can be utilized to enhance productions for the web radio, offering a range of options from jingles to sound effects. In the case of the disciplines for which web radio was implemented as a redundancy to pedagogical work, one type of production involved solely the audio from video lectures posted in repositories and the Virtual Learning Environment (VLE) of the university. To improve the audio quality of these video lectures, the sound was captured using an external recorder or smartphone recording application, rather than relying on the computer's audio card, as computer audio cards often do not have the best audio capture capabilities due to cost constraints. Among the endeavors undertaken in audio editing software was the addition of background music, for example. After this treatment, the audio was synchronized in the video editor and also used for subsequent broadcasting on the web radio on the specific day of the scheduled class according to

the teaching plan. It is possible to extract only the audio from a video and convert it to "mp3" files, the most commonly used format in broadcasting software, using other software tools or online services.

When mentioning above that web radio functions as redundancy, it is informing that in addition to other avenues for accessing content, such as video lectures available in the Virtual Learning Environment (VLE) and video repositories, students can listen to corresponding podcasts for the lessons on the web radio, following the daily schedule. In addition to producing podcasts from video lectures, another type of content was created, which consisted of news related to the topics covered in the disciplines. This involved the narration of specific articles, information available on the internet, and/or even articles and books. The narrations were recorded using recorders and microphones for subsequent treatment in audio editors. Many of them were created using Artificial Intelligence in the form of Text to Speech (TTS) systems, machine narration services that are increasingly professional and widely available on the internet.

Another type of content that was broadcast, always within the themes of the disciplines, was found on the Public Domain Portal, a governmental service that provides a vast collection of images, texts, videos, and audios in the public domain. In the case of web radio, we were interested in the podcasts.

Once the themes for each lesson were established, research was conducted to find free podcasts, such as those mentioned above, for broadcasting on the web radio within its programming schedule. As the web radio served two disciplines, a specific schedule was established for each discipline on the corresponding class days, with repetitions on the following day. To inform students about the programming, the schedule was posted below the corresponding web radio embed in the discipline's VLE, allowing students to consult it and follow along.

Although the web radio streaming service featured Auto DJ, as mentioned earlier, this type of application was generally used for music programming to keep the web radio running during the night and early morning. However, since this service relies on the files to be broadcasted, there is a need to upload the files to the service, which can be limited depending on the hosting provider. Auto DJ can provide random

programming, but it is also possible to establish a sequential schedule, in which case the podcasts from the video lectures, for example, can be included in the Auto DJ.

Although there is some work involved in managing the programming to be broadcasted, the initial effort for setting up the streaming process occurs only once, as described in the technical section above. Since the experience of this web radio was solely operated by the author of this article, a certain degree of dedication to its functioning, which still remains, is necessary. However, with ongoing research, the intention is to incorporate student-produced content into the programming in a spontaneous and voluntary manner, so that over time it can evolve into an assessment product and even provide assistance in technical operations through monitoring. In this future endeavor, comprehensive training in all the aspects mentioned becomes necessary to transfer knowledge in both content production and system operation.

It should be noted that all the programming broadcasted on the web radio for the two disciplines was produced, selected, and operated by the researcher. The students only played the role of listeners due to social isolation and the fact that the goal of the experiment was not to train or educate the students to operate the radio or produce content at that time. These contents, in turn, addressed the elements present in the disciplines according to the syllabi and course plans.

- Functioning and Audience

Typically, every streaming service, as described above, has its dashboard or control panel where one can monitor the size of the audience and the times of highest access, for example, providing valuable information for better program balancing. Observing the data from the web radio created for educational purposes and specifically to serve the two disciplines under the responsibility of the author of this article revealed some specific insights: the audience is dispersed throughout the day and increases during the time slots when the podcasts of the classes are aired, both on the day of the class and on its repeat the following day. As the web radio also broadcasts a world music program, it is noteworthy that there is a higher audience engagement with this type of

content. This is perfectly understandable since the current configuration of the web radio only serves as redundancy to other communication and dissemination channels inherent to the disciplines, such as activities on the virtual learning environment (AVA) with text and book postings for reading and the monitoring of class presentations and video lectures in the context of remote teaching. What is interesting to note is that the audience engagement is spontaneous, as the syllabi shared with the students present the web radio as an additional instrument for exposing the discipline, without the obligation for its listenership. Initially, there was no requirement for students to use it compulsorily as a tool.

- Perception of Students (Pre-Service Teachers) about the Web Radio

In the spirit of the optional use of the web radio experienced in this educational project, students who wished to contribute with their feedback on the utilization of the web radio in the presented formats were invited to email their impressions to the author. As no questionnaire or other research instrument was developed for this purpose, precisely due to the degree of freedom and spontaneity in the web radio's listenership, only general impressions were requested within specific criteria, as previously indicated in the methodology. These criteria included indicating whether the experience represented any innovation, whether there was still room for the use of an old technology like radio in education, and recommendations for improvement and expansion of the web radio's utilization for the defined purpose.

Although the response rate to the solicitation was low considering the total of approximately 60 students enrolled in the two disciplines, with only 10 students providing feedback, many students cited academic workload from various disciplines as a reason for not being able to voluntarily contribute. However, among the students who did contribute, several elements stood out in their considerations.

Regarding the perception of innovation, there were more affirmative positions than negative ones. In terms of agreement or disagreement about the potential for innovation, the following two reports can summarize the provided positions. In agreement, one student provided the following account:

I understand that the use of radio, even web radio, is not common in teaching during a period of normalcy, where everyone attends face-to-face classes. However, in this pandemic moment, I found it innovative to expand the contact of the discipline with students through another form beyond Moodle or live sessions. What's best is that there was no imposition or obligation to listen to the web radio. As the professor mentioned, it was merely a redundancy to other ways of following the discipline. But I think that even when we return to face-to-face teaching, the professor should continue this work" (Written statement from a participant in the disciplines).

Positions in this regard also indicate incentives for the continuation of the web radio even with the return of face-to-face teaching. This denotes various possibilities that the project can derive. Regarding the opposing understanding of it being an innovation, which can summarize the dissenting positions of those who provided their feedback, another student expressed the following viewpoint:

With the multitude of resources available today for education, I understand that one more resource, such as a web radio, may not be as attractive as many others because it is outdated. I believe that web radios focusing on entertainment and news already have limited listenership, as there is a vast supply. Therefore, despite the good intentions of the professor, I do not see its use as an innovation, considering that it is possible to find podcasts on any topic on the internet. Additionally, due to the non-obligatory nature of students listening to the web radio and the significant pressure we face to complete activities in remote learning across multiple disciplines, I don't find it very appealing. (Written statement from a participant in the disciplines)

It is evident that the opinion of the aforementioned student seeks to relate innovation to novel ways of doing something that is attractive and incorporates the novelty of tools, considering that a tool like a web radio or radio is something old and commonplace. However, it is possible to observe the concept of incremental innovation, frequently used in the field of business management, which involves improving a product or process that already exists. In the context of web radio usage, for example, it means using something old to create something new. The idea expressed by the student aligns with the concept of radical innovation, which involves the development of something entirely new, be it a product or a process.

Regarding opinions on whether there is still room for the use of an old technology like radio in education, the student's account above can also be used as a viewpoint on this matter. However, other accounts brought forth different opinions, such as the one presented by another student:

The more diverse the learning strategies are, the more opportunities a student will have to acquire a better education. I think the professor's experience with web radio can be very useful for many students who enjoy learning through listening. With numerous opportunities provided through the repetition of classes on the radio, only those who did not want to listen chose not to. As for whether there is still space for radio to be used in education, I believe that everything can be used in education. Tablets and smartphones can currently replace books, yet the use of books has not fallen out of fashion. Therefore, if it enhances learning, any technology is welcome. The ways individuals learn differ. (Written statement from a participant in the disciplines).

As for recommendations for improvements and expanding the use of a web radio for educational purposes, several contributions emerged, allowing for the possibility of exploring various paths. Among the viewpoints provided by the students, a few can be highlighted, such as the one expressed by the following student:

Students generally seek easier ways to complete the activities assigned by professors unless the criteria set by the professors prevent it. Therefore, even though it may be more demanding, I would recommend the professor to make the use of the web radio more mandatory. For example, including a podcast related to a topic from the discipline in the programming and linking an activity for students to complete, such as answering a questionnaire, summarizing a certain number of lines, or even recording an audio that could also be broadcasted on the radio... I don't know, I believe there is much to be explored in a web radio like the one created by the professor, including student involvement in managing the radio itself" (Written statement from a participant in the disciplines).

The aforementioned suggestion certainly points towards a more active participation of students in content production for the web radio and even in its management. This will give the work a more educational communication character, as according to Moreira (2020, p. 43), one of the areas within the universe of educommunicative practices is technological mediation in education: "An area focused on procedures and reflections on the presence of information technologies and their multiple uses, ensuring accessibility and democratic forms of management". Another educommunicative area is known as the pedagogy of communication, which, according to Soares (2011, p. 48), "remains attentive to the everyday aspects of didactics,

foreseeing the multiplication of the action of educational agents (the teacher and the student working together), opting, when appropriate, for action through projects”.

Projects, in turn, can be avenues for greater interaction between teachers and students around a web radio such as the one presented. As part of the pedagogical work organization, the teacher can request students to develop projects focused on radio language for creating content, delivering academic presentations, hosting a program, and so on. In essence, there are numerous possibilities for pedagogical applications that can greatly contribute to the improvement of learning outcomes in any subject matter.

Final Remarks

Among the possible conclusions drawn from this experimentation, considering the use of web radio for educational purposes as delimited in this experiential report, it is evident that there is potential for the incorporation of web radio in the organization of pedagogical work in these disciplines with a more active involvement of students, both as audience members and in the production and operation of the web radio itself, as suggested by the students themselves. This, to some extent, addresses the research problem.

Initially, due to its experimental and optional nature, the research and experimentation are still ongoing, as changing this nature also generates other interpretative pathways that need to be explored in the future. Although the genre of language in this type of media appeals solely to the sense of hearing, the mobilization of other types of knowledge occurs in various interfaces such as content production, technical operations, management, discussion groups, project development, among others, which expands the dimensions beyond passive listening and also opens up avenues for research, innovation, and creativity to emerge.

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