

The impact of Spanish university radio stations that operate on iVoox (2011-2021): presence, number of plays, and formats used to present audio content

El impacto de las radios universitarias españolas en iVoox (2011-2021): presencia, escuchas y forma de presentar los contenidos sonoros



Ignacio de Lorenzo Rodríguez. Professor at the School of Communication and the ISSA School of Applied Management of the University of Navarra. Ignacio de Lorenzo is also Director of the University Rankings Unit at this institution. He holds a degree in Journalism, a PhD in Communication from the University of Navarra, and a specialisation in Big Data. His areas of research focus on journalism reflection and its history in Spain, university radio, rankings of higher education institutions, and the use of data for the strategic management of universities. University of Navarra, Spain idelorenzo@unav.es ORCID: 0000-0001-6891-5440



Eva Lus Garate. Coordinator of *Radio Universidad de Navarra*, where she oversees the programming. She also manages the voluntary work of student collaborators from the degrees of Journalism and Audio-Visual Communication, in addition to working as a lecturer for the practical training classes related to Radio Communication, Genres, Programmes, and Production. Moreover, Professor Garate lectures in English for the subject entitled Multimedia Communication, which is aimed at students of the Screen Studies and Global Journalism programmes. Since 2022, she has held the position of president of *ARU (Asociación de Radios Universitarias de España)* [the association of university radio broad-casters of Spain]. As such, Professor Garate is also the Spanish representative of the organisation known as the *RIU (Red Internacional Universitaria*) [international university network], in her role as the institution's vice-president, and is also part of the European work group entitled, World College Radio Day. University of Navarra, Spain elus@unav.es

ORCID: 0000-0003-1380-6460

 $Received: 30/06/2023 \ \text{-} \ Accepted: 30/11/2023 \ \text{-} \ Early \ access: 18/12/2023 \ \text{-} \ Published: 01/01/2024$

Abstract:

This paper examines the presence and impact of Spanish university radio stations that operate on the iVoox platform by analysing more than 64,000 programmes using techniques involving Big Data. The initial findings show that iVoox is a key player in disseminating the

Recibido: 30/06/2023 - Aceptado: 30/11/2023 - En edición: 18/12/2023 - Publicado: 01/01/2024

Resumen:

Este trabajo examina la presencia y el impacto de las radios universitarias españolas en la plataforma iVoox a través del análisis, con técnicas de Big Data, de más de 64.000 programas. Los resultados muestran primero que iVoox es un importante difusor de contenidos

How to cite this article:

de Lorenzo Rodríguez, I. and Lus Garate, E. (2024). The impact of Spanish university radio stations that operate on iVoox (2011-2021): presence, number of plays, and formats used to present audio content. *Doxa Comunicación*, 38, pp. 453-479.

https://doi.org/10.31921/doxacom.n38a2027

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audio content of these stations, which has led the broadcasters to meticulously maintain their presence on this platform by separating the content into various channels and programmes, adding specific descriptions, and tagging their audios. Moreover, a group of broadcasters that continually appears on the platform with a higher level of programme production has also been identified, which has a strong impact as well. Finally, it has been noted that the more topicoriented programmes of these broadcasters, especially those focusing on cultural dissemination, have a greater impact on this channel.

Keywords:

University radio; podcasting; big data; iVoox; listeners; social impact; universities.

sonoros de estas emisoras, que justifica que la mayoría de ellas hayan cuidado su presencia en la herramienta, separando los contenidos en diferentes canales y programas, añadiendo descripciones específicas y etiquetando los audios. Además, se identifica un grupo de emisoras con aparición continuada en la plataforma y mayor producción de programas, que también obtienen mayor impacto. Por último, se indica que los programas de estas emisoras más centrados temáticamente, especialmente los que se fijan en la divulgación cultural, tienen un mayor impacto en este canal.

Palabras clave:

Radio universitaria; podcasting; big data; iVoox; oyentes; impacto social; universidades.

1. Introduction

We are currently immersed in the third phase of podcasting, which is known as "big podcasting" (Quah, 2019), or the "*audification era*" (Espinosa de los Monteros, 2020). This is a period in which the dissemination of sound content in the form of podcasts has reached the pinnacle of its development in terms of formats, production and, above all, its success with the audience. This has been stated by Terol et al. (2021) in their analysis of these platforms in the Spanish-speaking market, further adding that 20 years after the birth of the podcast, "we are witnessing an unrelenting expansion of audio in an ecosystem where traditional industry players, digital native projects, and technology companies with a global presence are competing" (2021:476).

The rise of podcasting has caused a disruptive change that has forced a reaction by the old players, who have been forced to take immediate action in order to harness the opportunities offered by the new medium, as well as to compete with formidable newcomers in the audio content market. Among these traditional players is university radio, whose origins in Spain can be traced back to before the digital expansion at the end of the 20th century, with the launch of the first eight ventures (Martín Pena, 2013). Over the last ten years, the university radio sector has undergone profound changes in many aspects: the production of content, the way it is disseminated, and its relationship with audiences, among others. These global changes have been reflected in a timely manner by academic thought in this area of broadcasting. For example, Marta Lazo et al. (2021) has examined the role of university radio as an educational project in the digital environment. Other researchers have explored the opportunities offered by the new media for the dissemination of science (Contreras Pulido and Parejo Cuéllar, 2013). Still others have taken a more specific approach in examining how the new formats affect programming, which has been a key focus of academic reflection in the last two decades, and something that we will examine in greater depth in this study.

Among other reasons, the interest in university radio programming is justified by its potential connection with the purposes of these university actors. Academic research aimed at university radio in Spain has established public service as the core of its mission (Aguaded and Contreras, 2011a:409). Thus, university broadcasters should not limit themselves to being closed laboratories, or simply "intramural" radio, and should aspire to reach beyond the university community. They must have an

impact. As stated by De Lorenzo as far back as 2011, we cannot forget that university radio stations are media, first and foremost, so their main work instrument is radio programmes. Thus, the public service aspect advocated by Aguaded and Contreras is essentially achieved through the radio programmes produced: broadcasters educate and disseminate culture through them; students are trained as future professionals by producing programmes; and finally, the broadcast becomes the starting point for interacting with audiences. In any case, in order for university radio stations to fulfil their objectives and make an impact, they must first ensure that people listen to their programmes (Aguaded and Contreras, 2011b:6).

However, until the present time the study of university radio programming has been limited by the difficulty of making the transition from analysing programmes (genre, topic, duration, student participation, etc.) to examining their impact. The first factor impeding this transition is the difficulty of quantifying the impact of a university radio station's programming. For years, research on university radio stations in Spain has been more concerned with the ways in which they have an impact than with specifying the results of their activity with figures. Thus, in the early stages, researchers considered the legal acknowledgement of these broadcasters as the main way for them to make an impact, or as an impediment if legal recognition did not exist. Obtaining FM broadcasting licences was seen as the most direct and clearest way out of the amateur broadcasting quagmire. The licence was the "real Gordian knot" of the future of university radio, according to Ortiz Sobrino, "which would determine its survival and, above all, its social impact" (2018:15). Who would have thought that the digital revolution, often seen as a threat to the industry, would be the Alexandrian sword that would break the licence constraint? Marta Lazo et al. make the following assessment:

"The migration of university radio stations to the Internet has put an end to the problems described above [...] and it offers not only legal coverage, but also the economic and operational flexibility denied to radio broadcasters by FM. Broadcasting on the Internet has a much lower cost, is more flexible, and is simpler than conventional broadcasting" (Marta Lazo et al., 2021: 156).

Thanks to podcasting, university broadcasters were no longer so dependent on the FM antenna, and could reach generations who used *Spotify, iVoox,* and *Apple podcast* on their mobile phones more than the conventional radio app (Miller, 2017: vi and vii). Spanish university radio stations had already been pioneers in experimenting with these new channels since their origins (Fidalgo, 2012), yet among all the digital tools available, *iVoox* became one of the main ways for university radio stations to disseminate content. Moreover, in many cases it became their main broadcasting channel. Marta Lazo et al. (2021:158) have reported that out of 32 broadcasters in their study, 20 used *iVoox* as a tool for storing and disseminating audio content. Since its launch in 2011, *iVoox* has offered broadcasters a way to play their content, not only on the *iVoox* platform or mobile app, but also through the *iVoox* widget on their own websites. Just two years after being founded, *iVoox* was already a major channel of dissemination by university radio stations, given that 54% of them had already had a channel on the platform, while their presence on other online sites was much lower, such as *iTunes* (13%), *Spotify* and *SoundCloud*, on which they were not present (Martín Pena et al., 2023:264). These figures for the rapid expansion of podcasting contrast with the fact that it was not until 2019 that *Apple* started to replace *iTunes* with *Apple podcast*. Moreover, in this same year *Spotify* made a full commitment to this format by acquiring *Gimlet Media* and *Anchor*.

iVoox, which is the true "Iberian exception" to this market, promotes itself as the leading Spanish-language podcast and radio platform. Although the *Digital News Report* 2023 (Amoedo et al., 2023:165) states that podcast consumption in Spain through

iVoox is on a downward trend (from 20% in 2021 to 16% in 2023), today it is the third platform in this country. *Spotify* (30%) and *YouTube* (29%) are the only platforms ahead of *iVoox*, followed by *Google podcast* (13%). All the others have less than 10%. The growth of these tools among university radio stations, which Martín Pena et al. (2023:268) have defined by the term *platformisation*, has far-reaching implications for these radio producers. One is specifically the direct benefit resulting from an increase of research into university radio programming, which is clarifying how the impact of university radio is occurring:

"Consequently, platformisation is much more than a scenario. It is a fundamental part of the strategy for getting to know the audience, because it defines their practices, reveals the dynamics of production and content circulation and, most of all, because this approach allows us to observe *the digital footprints left by the audience*" (López et al., 2023:2, italics added by the authors).

The reason for this novel development is that previous studies of university radio programmes have faced at least three challenges in gathering impact and audience data. The first was the difficulty of recording in detail, as well as encompassing the reality of sound, which by its very nature evolves over time from day to day, and from season to season. The second impediment was the local nature of university radio stations, along with their variety and number, which meant that the data was dispersed, and in many cases ephemeral. A significant part of previous studies gathered information on the content of university radio stations by asking their directors about their programming, which was a management challenge, or by reviewing the available websites, which were not always up to date or complete. The third obstacle, possibly as a consequence of the above, is that researchers have been faced with the difficulty of obtaining quantitative impact data regarding plays, likes, and comments. As university radio stations are not included in the *Estudio General de Medios* (EGM) [General Media Study] they do not have demoscopic information on their listeners. Moreover, until recently the sources for evaluating their own impact were indirect, and in many cases subjective.

Consequently, the embracement of *iVoox* by university broadcasters offers an opportunity to overcome these difficulties. Firstly, *iVoox* offers the advantage of compiling on its platform a register of the complete programming of most Spanish university radio stations. Secondly, it offers information on the number of plays, likes, and comments on all uploaded programmes. For these reasons, *iVoox* allows us to access the *digital footprints*, as indicated by López et al.

As mentioned above, this research builds upon previous attempts to analyse the programming of Spanish university radio stations, all of which are useful. Although the authors do not intend to carry out an exhaustive review of such research, they would like to establish some points in common. Most previous research has concluded that this programming either is, or should be, alternative, a term that has also been used to define the entire university broadcasting sector. According to Marta Lazo and Martín Pena (2014:16), González Conde (2000) had already mentioned university radio stations as alternative, referring to *Radio Complutense*, and Gallego (2007) also used the term to describe the sector. This concept has also been used outside Spain with regard to college radio stations, yet in the United States and Canada, as two examples, it focuses specifically on the music that is broadcast on these stations (see Freeman 2022:352 or Desztich and McClung, 2007:199). In Spain, Aguaded and Contreras (2011b:6) were the first to specifically emphasise that, in the struggle for impact and audience share, university radio programming must do things differently by trying to develop content and programmes that are alternative. However, the definition of this term as applied to programming, which has had some success in research literature, does not have one unique meaning: sometimes it refers to more specialised content (Aguaded and Contreras 2011b:6); in other cases, it is defined

by its opposition, or complementarity, to what is produced by commercial radio or, in other words, alternative is any content that is not being produced in that field (Espino Narváez, 2014:32); finally, alternative has been referred to more recently as programmes that are alternative because of what they achieve, as when they "assist in developing communication that is fairer and more democratic, which is at the service of citizens" (López et al. 2023:2, citing Vázquez, 2012). In any case, in his approach to Canadian college radio, Fauteux (2015) had already described the difficulty of defining alternativeness in this sector.

To complicate matters even further, according to Álvarez Villa and Ramírez Queralt (2005), alternative does not necessarily mean experimental. Thus, although these authors describe university radio as alternative, they found only a slight presence of experimental formats and content in university radio programming. Moreover, they found that creativity in university radio was limited to music or fiction.

In short, the effort to distinguish themselves from the commercial sector would require specific content more closely linked to culture, university information, and the dissemination of science. According to Perona (2012), the programmes that were becoming more prevalent on university radio focused on social aspects (equality, solidarity, and human rights), as well as scientific research, cinema, new technology, employment, travel, and book reviews. Music and its dissemination have also played a prominent role in the programming of Spanish university radio stations. Moreover, Martín Pena and Piñeiro (2020:201) argue that the programming of university stations has a strong edu-communicational and didactic aspect, which is especially aimed at future communication professionals.

Another novelty provided by university radio programming does not refer to the topics, but to the format, which is the so-called *mini magazine*. As pointed out by Perona (2012), this type of programme combines various sub-genres such as interviews, talk shows, news, and debates into a relatively short time space. According to this author, the mini magazine is "one of the methods for transmitting content that is most highly valued by university radio stations" (2012:44). The short time frames that comprise the mini magazines can also become independent within university radio through micro spaces, which are not exclusive to the sector. These types of short, independent sound programmes, which are often interspersed in blocks of music, could be considered an optimal tool in the search for both quality based on original content developed with more care and its dissemination in social media, as well as for innovative teaching (De Lorenzo, 2012).

Thus, based on these premises in relation to university radio programming, this paper explores the way in which *iVoox* has been embraced by these Spanish sound producers, how it is reflected in their programmes, and the impact obtained in the process. With the use of big data techniques, this approach will allow us not only to acquire the necessary techniques for an analysis based on *iVoox* data, but also to draw conclusions that can be extrapolated outside the field of university radio stations. *iVoox* offers the opportunity for the authors of this paper to confirm their findings in relation to the previous programming aspects based on objective indicators and a comprehensive approach.

2. Methodology

The first step was to define the research questions of this study and associate them with specific indicators that could be obtained from the *iVoox* platform, which are as follows:

Research question	Indicators used
1. How has <i>iVoox</i> been embraced by Spanish university radio stations?	 Percentage of use of the platform among university broadcasters Distribution of utilisation of the different broadcasting formats offered by <i>iVoox</i>: opening a channel or using the widget integrated into the website Use of other alternative or complementary platfor- ms
2. How is the programming uploaded to <i>iVoox</i> by Spanish university radio stations?	 Evolution of loaded programming: number of programmes and hours Grouping of broadcasters according to programme production, hours, and evolution Frequency of programme duration, especially micro spaces and mini magazines Monitoring of the platform's standard rules: a. Grouping of content into channels. b. Description of programmes c. Use of tags
3. What is the impact of university radio stations through <i>iVoox</i> ?	 Evolution of the number of plays obtained over time by university radio stations Grouping of the stations according to the number of plays obtained Number of plays of the programme durations Number of plays per station Number of plays by category

Table 1. Research questions and indicators used for the analysis

Source: created by the authors

The first stage of the research was to review the existing literature on the programming of university radio stations which, on the one hand, provided support for the theoretical framework presented in the introduction to this paper. On the other hand, it has allowed the authors to determine the sample of radio stations to be analysed. The lists of Marta Lazo and Segura (2012) and Perona (2012) were used as a starting point to establish as complete an overview as possible of all Spanish university radio stations, which was verified by the history of university radio stations in Martín Pena et al. (2023). Firstly, 40 stations were identified. Next, the content dissemination methods used by each radio station were studied, reviewing their websites and checking whether *iVoox* was among their channels, or whether it was their main channel. In addition, the use of the platform's widget on their websites was verified, which allows university stations to offer the content of their channels on *iVoox* without the user having to enter *ivoox.com*.

Of the final number of 30 stations identified as *iVoox* users, two of them (*Unizar* and *Universidad de Vigo*) were removed from the list because they were channels that offered only one programme rather than their entire radio production. Thus, the list of *iVoox* radio stations for the analysis was as follows:

Table 2. Spanish university radio stations analysed with a presence on *iVoox*

1.	Europea Radio (Europea¹)	15.	Radio UPV (UPV)
2.	Inforadio (Inforadio)	16.	Radio URJC (URJC)
З.	iradioUCAM (UCAM)	17.	Radio US (RadiUS)
4.	Ondacampus (Ondacampus)	18.	Radio UVA (UVA)
5.	Radio Campus Universidad la laguna (ULL)	19.	Ràdio VOX-UJI (UJI)
6.	Radio CEU (CEU)	20.	RUAH (RUAH)
7.	Radio de la UA (UA)	21.	Uburadio (UBU)
8.	Radio UAL (UAL)	22.	UNEATLANTICO Radio (UNE)
9.	Radio UMH (UMH)	23.	UNED (UNED)
10.	Radio Universidad de Navarra (Navarra)	24.	Uniradio Huelva (UniRadio Huelva)
11.	Radio Universidad de Salamanca (Salamanca)	25.	Uniradio Jaén (UniRadio Jaén)
12.	Radio Universitaria de León (León)	26.	Universidad de Loyola (Loyola)
13.	Radio UOC (UOC)	27.	Universidad de Murcia (Murcia)
14.	Radio UPF (UPF)	28.	UVic Ràdio (UVIC)

Source: *iVoox*, created by the authors

The second step was to extract the necessary data from the platform in order to carry out the research, which required consideration of how content is structured in that environment.

Figure 1. Structure of the content on *iVoox*



Source: created by the authors

On *iVoox*, a content producer groups audio files (editions) into programmes and then assembles these programmes into channels, following the diagram in Figure 1. Therefore, to identify the impact of a broadcaster, we needed to locate all the editions of the programmes that had been included in the channels, along with the data we were interested in compiling in each case. Starting with all the university radio stations identified, together with their channels on *iVoox*, a *Python* programme was created. With the aid of software packages *Selenium* (version 3.141) and *Beautifulsoap* (version 4.12), it was possible to go down the list of all the radio stations, as indicated by the arrows in the figure, through all the programmes, and ultimately find

¹ Hereafter, we will use the short version of the stations' names (in brackets) to refer to them.

the editions published on *iVoox*. The following information was obtained from each of the available editions by *web scraping* (extracting text by using HTML):

Varible	Description
Title	Title of the specific edition of the podcast
Description	Description of that edition. It was analysed with fuzzy logic to classify it as generic or specific
Tags	List of all the tags assigned to the edition
Categories	List of the categories applied to the specific channel
Duration	The <i>iVoox</i> format was transformed (minutes: seconds) into seconds
Comments	Number of comments made about the edition
Downloads	Number of times the edition was downloaded
Likes	Number of likes obtained
Publication date	Publication date of the podcast
Programme	Name of the podcast in which the edition is included
University radio station	Name of the university radio station
iVoox URL	Webpage address where you can listen to this edition of the programme, which can serve as a reference

Source: *iVoox*, created by the authors

Given the complexity and volume of the data, to ensure its quality and comprehensiveness, a total of three extractions were made: in March 2020, March 2021, and June 2023. As the data capture was performed in real time, directly from the *iVoox* website, there was a possibility that part of the data would not load correctly on some occasions, or that access to the pages where each edition is shown would not be complete.

This situation justified the three extractions of all the content (incorporating the new loaded programmes in the second and third extractions), even though this triple access meant obtaining data that was repeated. Thus, some 209,594 records were included in a database created for this purpose.

To consolidate the information, the first step was to eliminate the repeated data from among the different extractions by using the values of the radio station, the programme title and edition, the description, and the duration in order to discriminate the

different editions of the programmes gathered. In numerous cases where several recordings of the same programme were available, only the most up-to-date and complete version was used.

On the other hand, a series of filtering tasks were also carried out in order to isolate the sample required from the noise, and to ensure that it accurately reflected the sound production of the university broadcasters analysed. As such, programmes of less than 60 seconds and more than three hours were excluded, as they were considered to be commercials or indicative programmes, in one case, and the other was complete broadcasts of events. All programmes referring to *Euroconexión* or *ARU* (*Asociación de Radios Universitarias*), were also limited, as the authors considered that these offer content produced for the exchange of material within these associations, and it was thought that they are broadcast on several stations at the same time.

A comparison between the different extracts showed that broadcasters are not consistent in uploading content, and on some occasions, there is a gap of time between the date of production and the upload to the platform. On the other hand, even though *iVoox* was launched in 2010, and the first university broadcasters began using the platform in 2011, many of them uploaded content from previous years. As such, in order to clearly reflect the production in the first years, the time limits were set from 2011 to 2021.

Thus, the total sample consisted of 64,094 different programme editions, with a total of 43,419 hours of programming. By contrasting this information with the aforementioned literature review, the authors affirm that this study is the most extensive and detailed analysis to date regarding the programming of Spanish university radio stations.

Before analysing the results obtained, it bears mentioning the impact indicators and the justification for using the number of plays as the reference variable. There are three possibilities offered on *iVoox* to measure the impact of a programme: plays, likes, and comments. In total, the content published by the university radio stations has been played 9.2 million times (145 on average), received 63.1 thousand likes (0.98 on average), and some 15.3 thousand comments (an average of 0.24).

Thus, one like is attained for every 146 plays and, to obtain one comment, an average of 603 plays are necessary. This concurs with assertions made by Gallardo Camacho and Pulido Núñez (2022), who point out the difficulty of gaining audience participation in digital radio. The plays indicator will be used as the reference for two reasons. Firstly, because of the high correlation between these three impact variables, especially between plays and likes (0.97 Pearson), and likes and comments (0.70 Pearson), although it is a bit lower between comments and plays (0.65). Secondly, because likes and comments offer less information for analysis, as many programmes fail to score on both indicators (82% do not receive any likes and 95% have never achieved a single comment).

3. Results

3.1. The use of iVoox by Spanish university radio stations

Regarding the first research question, the definition of the sample as described above made it possible to collect data on how *iVoox* is used by Spanish university radio stations to broadcast programmes.



Figure 2. Podcasting, *iVoox* use, and alternatives in Spanish university radio stations

Source: created by the authors using Flourish software based on university radio websites and iVoox

Of the university broadcasters originally identified, 35 provide archives in podcast format, regardless of whether they maintain a live stream or not. As shown in Figure 2, 30 of these broadcasters (85%) have a channel on *iVoox* to publish content, and in 53% of the cases (16 out of 30), it is the only channel they have for broadcasting their content. Other options, that are sometimes used as a complement, include public sound broadcasting tools such as *Spotify* and *Soundcloud*, among others (17.5% of all broadcasters use them, but only 2 exclusively), and other systems developed ad hoc by the broadcasters themselves (30% in-house, according to the figure). Based on the above-mentioned timeline of when the different platforms appeared, some university radio stations (2) initially used *iVoox* technology to broadcast their podcast content, yet in recent seasons they have moved to *Spotify* as well.

3.2. Programming uploaded to iVoox by Spanish university radio stations.

The second research question regarding how the programming produced by Spanish university radio stations is uploaded to the *iVoox* platform, we must first examine the evolution of what has been produced over the 11 years analysed.



Figure 3. Evolution of the number of programmes and hours produced by Spanish university radio stations that have appeared on iVoox

Source: *iVoox*, created by the authors

By taking a comprehensive view, it can be seen in Figure 3 that the output of university broadcasters over time has been increasing since 2011, both in total programme production and in hours produced, with the figures doubling from 2011 to 2021. The figure also indicates that since 2019, the gap has widened between output and hours produced, the origin of which will be outlined further along.



Figure 4. Histogram of the duration frequency of programme uploaded to iVoox by Spanish university radio stations (five-minute ranges)

Source: iVoox, created by the authors

Figure 4 shows several areas where programmes durations are most frequent: in the micro space area between one minute and 20 minutes; around half an hour; around one hour, where the highest total value appears; and, much lower, is two hours of programming (115-120 in the figure). Generally speaking, when producing programmes, university broadcasters do not strictly adjust to the duration of traditional radio programming formats (half an hour, one hour, or two hours). By considering a margin of plus or minus 3 minutes over these limits, only 27% of all programmes are grouped in these durations, with this lack of time discipline remaining relatively constant from 2011 to 2021.

If we consider the evolution of these four groups over time, with a laxer consideration of the durations of these blocks², Figure 5 confirms that micro spaces and one-hour programmes have been significant in all periods, but that half-hour programmes have increased in recent years (rising by 17 percentage points if we compare 2011 with 2021), to the point of surpassing one-hour programmes in 2020. The total production of micro spaces has been decreasing, from 39% of all production to 20%. These changes in the duration of the content published explain the divergent development seen in the foregoing regarding the number of programmes and total hours produced from 2019 onward.

² Less than 15 minutes is considered to be a micro space; 15 to 45 minutes is considered a half-hour programme; 45 minutes to 1 hour and 15 minutes is thought to be an hour-long show; and the rest are considered programmes of more than an hour.



Figure 5. Evolution of the programmes according to the duration per group

Source: *iVoox*, created by the authors

The radio station with the most audio content published on *iVoox* is *Navarra*, followed by *Ondacampus* and *Inforadio*.



Figure 6. Total number of productions and hours of programming by broadcaster



The fact that the *Navarra* programming model has been based on micro spaces for many years misrepresents this account. Thus, according to the cumulative duration of the programmes, the highest positions go to *Inforadio*, *RUAH* and *Ondacampus*.



Figure 7. Heat map of production in minutes by according to each broadcaster

Source: *iVoox*, created by the authors

The heatmap shown in Figure 7 was obtained by summing the number of minutes produced monthly by each broadcaster, putting the figures into a table, and assigning each cell a shade of grey according to the number of minutes produced (between 0 and 15,790 minutes per month). This type of figure is commonly used to analyse large amounts of data in order to track the strength of a value. The darker areas of the figure indicate the months with the highest production in minutes, whereas the lighter areas correspond to those with the lowest production. This figure allows us to clarify certain aspects regarding the differences between the broadcasters studied as follows:

There is one group of broadcasters who have consistently produced and uploaded programmes to *iVoox* since 2011: these include *Inforadio*, *RUAH*, *Ondacampus*, *Europea*, *León*, *UNED*, *Navarra*, and *UA*.

Another group has also produced and uploaded a considerable amount of content, but more sporadically, at least since 2011: these include *Uniradio Jaén, UJI, URJC, Salamanca, UAL, UVIC, RadiUS, UPF, UNE, UBU, ULL*, and *UPV*.

Finally, another cluster of radio stations have produced and uploaded considerably less content to *iVoox*, and with less continuity as well, such as *Murcia*, *UOC*, *Loyola* or *CEU*, or have joined *iVoox* later, such as *UCAM* and *UMH*.

The figure also allows two details to be observed: firstly, all radio stations either do not produce content in the summer months, or they reduce their production considerably, as there are clear gaps in the middle of the years. Nevertheless, this is logical given the distribution of the academic year. Secondly, of the broadcasters who had been producing content continuously (25),

only 12% (3) stopped production during the worst period of the pandemic, which was the confinement. This is the reason for the absence of gaps in the first months of 2020. This is consistent with the actions of many other university radio stations in other countries, such as the United States (see Knopper, 2020, and Minsker et al., 2020). For some broadcasters, such as *Salamanca, Navarra, Huelva, UVIC, RadioUS* or *ULL*, the lockdown was an opportunity to produce more content than usual, compared to the same months of the previous year.

As noted above, *iVoox* is designed to allow a sound producer to group his or her content into different podcasts, or channels with their own autonomy and categorisation (Sellas, 2012). An alternative to this type of arrangement is to include all editions of the programmes produced under the banner of a generic podcast, such as *UNED*'s Science and Technology podcast, instead of singling out one podcast for each programme. However, this practice has been very limited among the university radio stations analysed.

Only three stations have offered their sound content using this method: UJI with 3,708 spaces; *UNED* (in this case in three blocks, *Ciencia y Tecnología* [Science and Technology -423 spaces], *Ciencias Sociales y Económicas* [Social Science and Economics -2,638], and *Humanidades* [Humanities -755]); and *CEU* (with very few programmes [6]). The rest of the stations preferred to follow the logic of one programme, one podcast.

Two other aspects also reveal more about how the content is presented on the podcasting platform than about the programmes themselves. Firstly, the descriptions of the programmes. The spaces were automatically classified using fuzzy logic from *Python's FuzzyWuzzy* 0.18 package, based on whether the description was generic (appearing in more than one edition of a programme) or specific (not repeated). The majority of the university radio stations filled a the specific description of each of their spaces on *iVoox* in 70.95% of all cases. Afterward, the labelling of the programme editions was checked, and the correct number of labels were added. On average, *iVoox* spaces receive 3.97 tags, but more than 20.88% have no tags at all.

3.3. The impact achieved by Spanish university radio stations on iVoox

The third research question leads us to associate the aspects mentioned with the impact achieved. Despite the fact that the programmes produced were played an average of 145 times, the distribution of plays shows that most of the programmes (78.44%) were listened to between 0 and 50 times. However, the average is much higher for a long tail of spaces (21.56%) ranging from 50 listens to a record 126,185 plays.



Figure 8. Histogram of the distribution of plays

Source: iVoox, created by the authors. Outliers have been limited to 50,000 plays

Figure 8 shows a positive asymmetric distribution, with an extreme bias to the right, or in other words, most of the values are below the mean and a small group has a high impact.

This distribution indicates the need to separate the total compilation of programmes into two groups: the first is a high-impact group, comprised of any programme edition with an extreme value with regard to the total (an outlier); the second group comprises the rest of the content. To define an outlier, we employed the usual rule of considering this to be any value that is three times the inter-quartile distance of the distribution as follows: $Q3+(Q3-Q1)^*3$, or in other words, $41+(41-5)^*3=149$ plays. According to this rule, the two groups are composed as shown in Table 3:

	Editions		Plays				
	No.	%	No.	%	Average	Minimum	Maximum
High impact	6,310	9.84%	8,025,704	86.50%	1,271.90	150	126,185
Low impact	57,784	90.16%	1,252,140	13.50%	21.66	0	149
Total	64,094	100%	9,277,844	100%	144.75	0	126,185

Table 3. Impact groups

Source: iVoox, created by the authors

The high-impact group, which has only 9.84% of the total number of programmes, obtains 86.50% of the total number of plays. The overall average of 145 plays for each programme is therefore not representative of the total, as it results from the presence of this high-impact group. Thus, the median of 12 plays is more representative of this distribution. When separating the two groups, the evolution of the impact according to the date of uploading the programmes on the platform is clearer, as can be seen in the following figure:

Figure 9. Evolution of the annual average number of plays over time



Source: *iVoox*, created by the authors

It seems logical that older programmes³ have more plays, as they have been on the platform for a longer period of time. The difference between the two groups is clear: the high-impact group has an average of 573 editions per year (with a maximum of 1,101), and its impact reaches nearly 2 million cumulative plays in any given year, whereas the low-impact group, with an average of 5,253 editions per year (with a maximum of 8,400), never exceeds 160,000 total plays per year.



Figure 10. Average and median number of plays according to the duration of the space

Source: iVoox, created by the authors

Regarding the median of programme duration, programmes lasting more than one hour have the greatest impact (24 plays). The difference in relation to the average shown in Figure 10 is due to the presence of a series of high-impact content productions in the half-hour category, which distort the figures. In both cases, micro spaces have the least impact for all groups, using any measure of central tendency.

In order to understand the impact of each of the university radio stations, it is interesting to cross-reference the number of spaces produced with the impact they have obtained, as shown in Figure 11.

³ In any case, it is important not to confuse the programme upload date (the one used here) with the production date of the programme, which is unknown in the case of iVoox.



Figure 11. Number of plays and production by broadcaster

Source: iVoox, created by the authors

This figure allows us to differentiate between three groups of broadcasters:

- 1. The first group has an impact of less than 150,000 plays, and usually with an output of less than 3,000 programme editions (except for *UJI* and *León*). Most of the radio stations are in this group, which is marked in the figure with a light grey colour.
- 2. The second group has a higher production (usually more than 3,000 editions, except for *UAL* and *UA*), and is more capable of accumulating plays (with more than 150,000). This group includes *Inforadio, Europea, UniRadio Jaén, UAL, UA*, and *Navarra*. In the figure, they appear in a darker shade of grey.
- 3. The last group of radio stations is located between the two groups in terms of production, yet they accumulate 500,000 plays, which is much higher than the other two. This group includes *RUAH*, *UNED* and *Ondacampus*.

It is interesting to note that *Ondacampus* is the station with the highest number of plays, yet it does not have the largest percentage of high-impact productions, with a ranking of fourth. The data suggest that in addition to producing a high volume of content, this station also accumulates a massive number of plays from many of its programmes, with an average of 818 per programme and a median of 48 plays. The radio station with the largest percentage of high-impact productions is *UOC* (60%, from a short production of 56 programme editions), followed by *UNED* (44%), *UNE* (31%), *Ondacampus* (27%) and *RUAH* (21%).



Figure 12. Impact and number of productions based on the top 27 categories

Source: iVoox, created by the authors

According to the categorization of their programmes by the university radio managers themselves, two fairly generic categories⁴, *Magazine y Variedades* [magazine and variety], and *Mundo y Sociedad*) [world and society], are at the top of the university radio production, followed by two more specialised subjects, which are *Polideportivo* [sports] and *Cine, TV, y espectáculos* [film, TV and shows]. Curiously, despite reports from other studies regarding the number of programmes produced, music does not appear until the fifth position with *Músicas del Mundo y Otras* [world music and others]. This could be due to the fact that although radio stations broadcast a lot of music, often as fillers between spaces, these musical interludes are not considered to be properly packaged spaces to be uploaded to *iVoox*.

This production data based on category contrasts with the impact obtained. If one looks at the categories of programmes with the highest impact in terms of plays, we see that most of them have a more specialised topic, such as *Historia y Humanidades*, [history and humanities], *Misterio y Otras Realidades*, [mysteries and other realities], *Ciencia y Naturaleza*, [science and nature], *Pop Rock* [pop and rock music], and *Arte y Literatura* [art and literature]. The largest percentage of high-impact programme editions can be found in the following themes: *Misterio y otras realidades* [mysteries and other realities] (55%);

⁴ These categories are mandatory for any iVoox programme and are chosen by the user who uploads a given podcast (with all its editions) to *iVoox.* The analysis of the two impact groups by topic show similar patterns in both groups and the separate conclusions are very similar to the joint analysis.

Historia y humanidades [history and humanities] (42%); *Experimental y New Age* (35% from very few programmes); *BSO y Clásica* [BSO and classic] (30%); *Internet y Tecnología* [the Internet and technology] (27%); and *Ciencia y naturaleza*a [science and nature] (22%).

With regard to the way programmes are included on $iVoox^5$, specific descriptions have a direct beneficial effect on impact: in other words, the average impact is higher in programmes with specific descriptions (162 plays on average) than those with generic descriptions (102), with a p-value<0.001. In terms of tagging, the spaces that had at least one tag received more than twice as many plays as those that had none (74 listens versus 163, p-value<0.001), but, however, there does not seem to be a linear relationship between the two: the more tags, the more plays (R2=0.008).

4. Conclusions

Following the analysis of the data collected and the comparison with the existing literature, it is possible to answer the research questions posed.

Firstly, with regard to the embracement and use of *iVoox* by Spanish university radio, it has been confirmed that a majority of broadcasters (85%) have taken advantage of the opportunity offered by the platform for the dissemination of audio content.

Most university stations use *iVoox* as a repository for their files and for playing audios, both in the tool itself and on their own websites as well (27%). Although the broadcasters continue to experiment with other digital tools, which are still in the minority, the platformisation outlined by Martín Pena et al. (2023) has been fully achieved. University radio stations have found *iVoox* to be a great ally for broadcasting their content at zero cost, yet they have surrendered the freedom that their own podcast instruments would give them. This general embracement of *iVoox* has also led to a commitment by university broadcasters: most of them have taken care of their presence on *iVoox* by carefully following rules established by this community, whether implicitly or explicitly, thereby enhancing their impact. Consequently, these radio stations separate the content into different programmes (92.5%), rather than offering them indiscriminately combined in a generic podcast. They also add specific descriptions to the published editions (70%) and include tags to describe the content (79%).

Regarding the second research question related to the *iVoox* spaces of Spanish university radio stations, a large amount of programming has been uploaded to the tool over the years, with more than 64,000 programmes and growing. Furthermore, the analysis of this programming shows that there is a group of nine radio stations that have been present on *iVoox* for many years longer and not only have they produced more editions of programmes, but they have had a stronger impact as well. These include *UNED*, *Ondacampus*, *RUAH*, *Europea Radio*, *Radio Universidad de Navarra*, *Uniradio Jaén*, *UAL*, *Radio de la UA* and *Inforadio*. The relevant analysis of the reasons with regard to budgets, student mobilisation, facilities and communication strategies that have ensured the continuity, greater production and impact of this group, is outside the scope of this research. Nevertheless, this should be noted as a possible topic for future research.

⁵ No influence on impact was found in the grouping of content (broadcasters that publish everything on a generic podcast) or on continuity (programmes that have been on air longer and are broadcast with some regularity).

University radio stations have taken advantage of the freedom offered by the digital environment to abandon the traditional time space duration, which started and, moreover, from the beginning of the period analysed. On *iVoox*, there is no need to adjust programmes with the hourly news bulletins, nor to put together a puzzle to compose a morning or afternoon grid. Nevertheless, the duration of the spaces depends on other criteria. This research sheds light on previous studies regarding the types of programmes on university radio: despite supporting the importance of micro spaces (De Lorenzo, 2012 or Marta Lazo and Martín Pena, 2014), or the preference of these stations for one-hour spaces, -if we consider the minimagazines outlined by Perona (2012:44) as programmes of such length-, the data indicate that there is great diversity in terms of duration. Although one-hour programmes are the most common, they never exceed 40% of the total number of spaces, and in recent years they have been overtaken by half-hour spaces in the annual distribution. In any case, neither the micro spaces nor the one-hour programmes have the strongest impact. The lower average impact of micro spaces confirms what some professionals in the sector have suspected in recent years (Ubate, 2019): outside social media, listeners prefer to consume products that are less fleeting and longer lasting, which enables longer stories to be told. This also explains the increase in half-hour spaces mentioned above.

Regarding the third question posed related to the impact of university radio stations, some conclusions have already been offered in the previous points. This study has confirmed the presence of a group of high-impact programmes: in fact, while these comprise approximately 10% of all programming, they account for 86% of all plays. Although this programming does not belong exclusively to the stations with the longest history and strongest impact, this specific group of stations produces 90% of all such programmes. Two hypotheses can now be posed that will have to be resolved by future studies outside the limits of this research: firstly, whether the distribution into two high-impact groups occurs in other sectors such as commercial radio or free podcasts; and secondly, whether the plays figures obtained are similar to those of comparable broadcasters, such as community or local radio. It would also be beneficial to analyse the factors that make these spaces so attractive to audiences.

As mentioned above, the alternative nature of university radio programmes should be clarified. However, it is necessary to reexamine the assertion that university programming is alternative in the sense of being "specialised". Spanish university radio stations have classified their programmes on *iVoox* as generalist from a topic point of view, such as *Magazine y Variedades* [magazines and miscellaneous], *Mundo y Sociedad* [the world and society], and *Noticias y Sucesos* [news and events], which concurs with the assertions of Perona (2012:43), and Marta and Segura (2012), as to what comprises the thematic heart of university radio programming. Despite the reality reflected in *iVoox*, the relevance of these radio stations' commitment to being alternative in their programmes with regard to topics is supported by this research, due to the greater impact obtained in the most thematically-focused programmes, such as *Historia y Humanidades* [history and humanities], *Misterio y Otras Realidades* [mysteries and other realities], *Ciencia y Naturaleza* [science and nature], *Pop Rock* [pop and rock], and *Arte y Literatura* [art and literature]). The success of these issues is in line with the aim of cultural dissemination that has traditionally been assigned to university radio stations. As argued by Gallardo Camacho and Pulido Núñez (2022), this also indicates that listeners search for podcasting content that is generally more entertaining, rather than just pure and direct information, while continuing to increase the production of educational and training content, as pointed out by Pérez Alaejos, Martín Valiente and Hernández Prieto (2016), and Espino Narváez (2014: 29). As outlined above, this research paves the way for multiple analysis options, an example of which would be to study transversal aspects attributed to university radio stations with the type of impact measured in the exploration herein. Thus, with regard to the social value of university radio, as pointed out by Martín Pena and Piñeiro (2020), it would be beneficial to discover whether these programmes with social themes, in addition to dealing with civic issues, are played more or less than others, such as programmes that are pure entertainment. The same can be said of programmes that are educational, cultural, or educommunicative in nature, which have also been described by these same authors. Thus, by associating purpose and impact, it would be possible to overcome a certain introspection in the analyses of university radio programming, which focus more on what the broadcasters do to fulfil their public service mandate than on the real and quantifiable impact they achieve through their programming. Incorporating true impact into this area of university radio research would undoubtedly offer multiple benefits.

5. Acknowledgements

This work has been translated into English by Charles Arthur, to whom we are grateful for his meticulous work.

	Name and surname
Conception and work design	Eva Lus Garate and Ignacio de Lorenzo Rodríguez
Methodology	Ignacio de Lorenzo Rodríguez
Data collection and analysis	Eva Lus Garate and Ignacio de Lorenzo Rodríguez
Discussion and conclusions	Eva Lus Garate and Ignacio de Lorenzo Rodríguez
Writing, formatting, review, version approval	Eva Lus Garate and Ignacio de Lorenzo Rodríguez

6. Specific contributions by each author

7. Conflict of interest

The authors declare that there is no conflict of interest contained in this article.

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