

Podcasting in Higher Education: Learning Experiences in Face-to-Face and Blended Modalities

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∞ This article presents the results of an interdisciplinary innovation project entitled Podcasting in Higher Education Teaching and Learning. The project was implemented across different subjects and degree programmes at the University of Vic – Central University of Catalonia during the 2021–2022 academic year, using both face-to-face and blended learning modalities in three faculties. The project's objectives are two-fold: firstly, to integrate podcasting as a teaching and learning tool in university environments, and secondly, to conduct a pilot test of its interdisciplinary application for future use in various subjects and university programmes. The study explores podcasting as a learning tool to enhance communication skills across various scientific disciplines at the university level. The results indicate high participant satisfaction, affirming the effectiveness of podcasting in higher education, driven by factors such as innovation, autonomy, creativity and new educational paradigms. However, challenges in implementation and significant variations across degree programmes are noted. The project also highlights the importance of raising awareness within the university community about the role of communication in the dissemination of scientific knowledge.

Keywords: innovation, podcasting, higher education, blended learning, face-to-face learning

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Uporaba podkastov v visokošolskem izobraževanju: učne izkušnje, pridobljene prek učenja z neposrednim stikom in kombiniranih oblik učenja

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≈ Članek predstavlja izsledke interdisciplinarnega inovacijskega projekta z naslovom Uporaba podkastov pri visokošolskem poučevanju in učenju (Podcasting in Higher Education Teaching and Learning). Projekt se je izvajal pri različnih predmetih in študijskih programih na Univerzi Vic – Centralni katalonski univerzi v študijskem letu 2021–2022 z uporabo učenja z neposrednim stikom in kombiniranih načinov učenja na treh fakultetah. Cilja projekta sta bila vključiti uporabo podkastov kot orodje za poučevanje in učenje v univerzitetnem okolju ter izvesti pilotni preizkus interdisciplinarne uporabe podkastov za prihodnjo rabo pri različnih predmetih in univerzitetnih programih. Študija raziskuje uporabo podkastov kot učno orodje za izboljšanje sporazumevalnih spremnosti v različnih znanstvenih disciplinah na univerzitetni ravni. Izsledki kažejo na veliko zadovoljstvo udeležencev, kar potrjuje učinkovitost uporabe podkastov v visokošolskem izobraževanju, ki jo spodbujajo dejavniki, kot so: inovativnost, avtonomija, ustvarjalnost in nove izobraževalne paradigm. Zaznani pa so bili tudi izzivi pri izvajanjju in velike razlike med študijskimi programi. Projekt poudarja tudi pomen ozaveščanja univerzitetne skupnosti o vlogi sporazumevanja pri širjenju znanstvenega znanja.

Ključne besede: inovacije, uporaba podkastov, visokošolsko izobraževanje, kombinirano učenje, učenje z neposrednim stikom

Introduction

The study presents the results of the research and teaching innovation project Podcasts in the University Teaching and Learning Process, funded by a competitive call of the CIFE – Centre d’Innovació i Formació en Educació (Centre for Education and Innovation Training) at the University of Vic – Central University of Catalonia (UVic-UCC). The present article details the implementation of this didactic resource in both face-to-face and blended degree programmes across various faculties of the university. The focus is to explore how podcasting can be a learning tool to improve communication skills in various scientific disciplines at university level. Specifically, the questions guiding the research are: How can podcasts contribute pedagogically as a tool for the development of interdisciplinary and transversal competences in university subjects of different degrees? What competences are developed through podcasting and what do students think about it?

The research has several general objectives. Firstly, it aims to incorporate podcasting as a teaching and learning tool in face-to-face university studies and to explore its application in blended learning modalities. Secondly, it seeks to develop a pilot test with a transversal approach to evaluate its implementation in different subjects across various degrees. Specific objectives include measuring the educational competencies that podcasting promotes during its production and highlighting the benefits of podcasting in scientific communication.

We believe that the study aligns with the proposals of specialised literature in education. Technology brings new learning strategies and “technological innovation can precede pedagogical creativity” (Uka et al., 2024, p. 5). Moreover, digitalisation transforms the learning space and “requires pedagogical adjustments with the collaboration of experts from various domains” (Vivitsou, 2019, p. 123). Thus, the collaborative and interdisciplinary work of faculty from different academic fields can be interpreted in this way.

According to Bosco et al. (2019), technology in education is not just about knowing how to use it; its goal is to enhance the learning of content and competencies. In this context, creating podcasts represents an educational innovation and a powerful learning resource that fosters skill development in the training of students and educators across all university disciplines. Podcast creation also develops essential skills, such as writing and public speaking, which are crucial for effectively disseminating scientific research.

The present research focuses on two key aspects. First, it addresses the demand for skills development in education. Šipuš et al. (2022, p. 105) highlight the importance of research, problem-solving, critical thinking, reasoning

and creativity as fundamental competencies in education. Second, it aligns with Agud and Ion (2019, p. 103) in emphasising the evolving role of teachers, shifting from knowledge users to active knowledge creators.

Podcasting in the teaching and learning process

Podcasting is a disruptive technology that emerged in the early 2000s. Initially developed in the amateur field, it was progressively adopted by the radio industry. Podcasting is a technology and cultural practice characterised by significant flexibility in listening, production and distribution. Podcasts enable listeners to choose how, when and where they listen, with listening autonomy being a key factor in podcast consumption. Other distinctive characteristics of podcast consumption include mobility or portability, ubiquity, multitasking, entertainment and personalisation (McLung & Johnson, 2010).

Since its inception, initiatives have integrated podcasts into the university context as a means of communication or institutional dissemination, as well as a tool in teaching and learning processes. Academic literature confirms that, beyond the perceived impact on students, there is sufficient evidence and experience to support the notion that podcasting enhances edu-communication, blending digital and communicative literacy (Caldeiro-Pedreira & Aguaded-Gómez, 2015; Celaya et al., 2020). Therefore, it is an intriguing resource for university students, as knowledge dissemination and scientific communication are key competencies for their professional development.

In the university context, Mehri (2015) identifies key factors influencing student receptivity and satisfaction with podcasting. It is considered a useful learning tool, suitable for understanding and disseminating content, and enjoyable to listen to. Students report increased motivation and find that potential technical difficulties do not significantly hinder the successful integration of podcasts into their academic routines. McCarthy et al. (2021) also discuss challenges related to planning, technology and communication skills, but emphasise positive aspects, such as the oral nature of the product and the benefits of collaborative work on podcasting projects.

In higher education, podcasting has been utilised across various scientific and academic disciplines (Cea & De Vicente, 2020; Celaya et al., 2020; Piñeiro-Otero, 2011). McGarr (2009) identifies three types of podcast implementation: the substitute podcast (students can access a recording of a lecture); the complementary podcast (summary or supplementary material created by teachers to assist learning); and the creative podcast (created by students based on specific content). Borges (2009) offers a more detailed classification of

teaching podcasts: 1) expository; 2) instructions for field work; 3) instructions for laboratory or simulation activities; 4) reinforcement of specific content; 5) presentation of basic or preparatory content; 6) personalised feedback; and 7) extension with current information. This diversity highlights the inherent versatility of the podcast format.

According to academic literature on podcasting in higher education, its integration into learning activities promotes the acquisition of transversal and general competencies related to personal development and communication. These competencies include research and information management, critical thinking, creativity, effective communication, time management and teamwork (Besser et al., 2021; Croft & Scopes, 2011; Donnelly & Lawlor, 2010). Examining the podcast creation process reveals various phases that activate these competencies and skills:

- Conceptualising the idea and product, and researching and/or verifying information sources (research).
- Selecting materials and prioritising content (critical analysis and reflection).
- Designing the podcast (structuring the text, writing, sound design).
- Producing the podcast (narration, editing).

Blended learning in higher education

The progressive digitalisation of educational environments and the consolidation of Information and Communication Technologies (ICT) and Learning and Communication Technologies (LCT) encourage the development and combination of various teaching and learning systems. In higher education, blended learning merges traditional face-to-face and distance education models, resulting from a convergence of both (Pinto-Llorente et al., 2017). Blended learning optimises the advantages of in-person interaction and participation of teachers and students in the same place and time, while benefiting from the flexibility characteristic of online learning.

Blended learning, understood as a hybrid model, combines face-to-face methods and resources with online instruction and interaction mediated by technology, either synchronously or asynchronously (Bartolomé, 2008; Graham, 2006). This approach offers the opportunity to design unique and innovative teaching and learning experiences. The learning models can be rotational, whereby students alternate between different learning modalities, or flexible, whereby online learning is central to the educational process. This combined learning approach can positively impact factors such as space-time flexibility, digital

competence (Graham, 2006), access to resources, modalities of lecturer-student interaction, autonomy and personal responsibility (Salinas Ibáñez et al., 2018).

Some experiences even suggest that incorporating blended learning can lead to greater student participation and improved outcomes in teaching practices that were previously entirely face-to-face (López-Pérez et al., 2011). It is also a relevant alternative in complex or unexpected situations (Area-Moreira et al., 2021; Martín-García et al., 2023), or in contexts of structural diversity among students (Okaz, 2015).

According to Torrisi-Steele and Drew (2013), the progressive accumulation of blended learning experiences and the resulting academic literature on current practices are essential for understanding the keys to this modality in higher education. However, implementing blended learning requires understanding the barriers, difficulties and systemic factors that influence its adoption, as well as the specific impact of methodologies and tools on its application (Castro, 2018; Castaño et al., 2017). In this context, podcasting emerges as a valuable medium in teaching and learning processes, whether in face-to-face, blended or distance education (Laaser et al., 2010; Grau Ibarra, 2019), as analysed in the present article.

Podcasts and the relevance of dissemination and scientific communication

The dissemination of scientific knowledge is crucial for several reasons. It makes research activities visible, helps society understand and value scientific production, and justifies the economic investment and financing of new projects (Gertrudix et al., 2020). Scientists typically communicate with their peers through conferences, professional meetings or academic publications. However, “throughout their careers, they are not taught how to speak to the public or interact with the media” (De Semir & Revuelta, 2010, p. 2). The first step to effective communication is recognising its necessity within the scientific community, which often struggles with limited curricular recognition of dissemination efforts (Fernández Bayo et al., 2018).

Determining what content to communicate and how to do it is a primary concern. The scientific community must play a crucial role in the dissemination of science, as scientists possess the knowledge, credibility and authority in their fields. However, public dissemination has not always been a priority. Recently, many scientists have found dissemination to be an interesting and enjoyable activity, considering it part of their job and practising it regularly. In trying to be understandable, however, they sometimes oversimplify the content. More

frequently, they do not simplify enough, failing to facilitate understanding (Fernández Bayo et al., 2018, p. 8).

The specialised literature highlights the importance of scientific dissemination in all academic areas. Communicating complex scientific knowledge in a simple and direct way is crucial for reaching broad audiences: “Dissemination is not a substitute but an attractive complement to awakening curiosity about certain topics, which can then be explored further through formal education” (Buitrago & Torres-Ortíz, 2022, p. 130). Online dissemination tools such as podcasts or videos published on various platforms offer “an informal medium of emerging and engaging scientific literacy that links the latest trends and brings knowledge to a younger audience” (Vizcaíno-Verdú et al., 2020, p. 301).

After producing a radio piece, the process continues with the essential dissemination of knowledge through various online platforms and social networks. De Semir and Revuelta (2010) highlight this need, noting that “Nature magazine has opened a debate about the importance of the scientific world embracing public communication as a strategic line of their work [...] Today, we must go far beyond the traditional ways of sharing and socializing knowledge; for this reason, network communication has become an essential strategy” (p. 7). Building these communication skills at the undergraduate level is a crucial step towards fulfilling this commitment. The present project focuses specifically on enhancing students’ abilities to effectively communicate and share knowledge.

Finally, we must consider that training in communication and scientific dissemination involves overcoming fears and discomfort in front of cameras and microphones: “Recording! And the scientist loses half of their ability. Scientists, who are often very passionate individuals, suddenly become fearful. As a result, they begin to lose the passion that makes them so captivating” (De Semir & Revuelta, 2010, p. 4). This dissemination must be engaging, attractive and emotional, aiming to capture and maintain the audience’s attention and interest (Buitrago & Torres-Ortíz, 2022). One must consider “its artistic, playful, and entertaining dimension; that is, we must present knowledge to the public as a pleasure for human beings and the joy of learning” (Calvo-Hernando, 2002, p. 18). Podcast productions should creatively use radio language. Although students may view working with music and sound effects as activities outside their academic discipline, it should be seen as a transversal value in all scientific communication and an essential method to make dissemination more effective.

Following on from the research questions stated above and the problem at hand, the methodological decisions that have been taken to carry out the present research are explained below.

Method

Participants

A total of 152 UVic-UCC students from degree programmes in Journalism (PER), Audiovisual Communication (CAV), and Human Nutrition and Dietetics (NHD) participated in the study. Out of these, 97 students completed the educational innovation project evaluation questionnaire. The respondents comprised 13 students from CAV, 27 from PER and 57 from NHD, with ages ranging from 18 to 59 years. Among them, 55.7% were women, 41.2% were men and 3% identified as non-binary. Regarding their study mode, 71.1% were studying full-time ($M = 20$ years) and 28.9% were studying part-time ($M = 34.1$ years).

Research design and data collection instruments

The research project is based on a socio-critical paradigm with the main objective of integrating podcasting as a teaching resource across various subjects and degree programmes at UVic-UCC, in both face-to-face and blended formats. The project aims to enhance the communicative and digital literacy of students and teachers through the production and creation of podcasts. The methodology employed was action research, whereby the project researchers served dual roles as both researchers and participants. The data collection instruments included field diaries, document analysis (work plans and rubrics) and questionnaires.

The research was conducted during the 2021–2022 academic year across different faculties of the university. The research team consists of six individuals from various faculties at UVic-UCC: three lecturers from degree programmes in Journalism, Audiovisual Communication, and Advertising and Public Relations (FEC Faculty); one lecturer from degree programmes in Early Childhood Education and the Double Degree in Early Childhood and Primary Education (FETEP Faculty); and two lecturers from the degree programme in Human Nutrition and Dietetics (FCSB Faculty). Considering the diverse academic backgrounds within the team, specific courses were carefully selected for the podcasting activities. The selection of these courses and their respective groups was guided by the transversal competencies detailed in the degree verification reports.

The selected courses were: Workshop on Writing and Broadcasting in Audiovisual Media (1st year – face-to-face), which is offered in both the Journalism (PER) and Audiovisual Communication (CAV) degrees; Bromatology (BRM) (1st year), which is available in two formats – face-to-face (BRM) and

blended learning (BRM-S) – as part of the Human Nutrition and Dietetics (NHD) degree; and Dietotherapy I (3rd year), which is also offered in two formats – face-to-face (DT) and blended learning (DT-S) – within the Human Nutrition and Dietetics (NHD) degree. The project initially aimed to work on a subject within the degree in Early Childhood Education (FETEP); however, this could not proceed as planned due to the researcher's maternity leave.

During the project's development, various types of podcasts were designed. Faculty-created podcasts provided a theoretical approach. In the FCSB subjects, the focus was on content related to alternative proteins to animal protein, with podcasts summarising key theoretical content. For the communication degrees, podcasts were produced on the concept and structure of news and radio chronicles.

Additionally, expert podcasts offered professional perspectives, such as a well-known journalist explaining radio news production with personal examples and another journalist sharing real cases from her professional experience in radio chronicles. Two renowned dietitian-nutritionists contributed podcasts on diabetes and sports, and plant-based foods for the Degree in Human Nutrition and Dietetics.

The project also included the production of two student-created podcasts. The first, an individual podcast lasting five minutes, allowed for the creative exploration of specific concepts or theoretical content discussed in class. The second, a fifteen-minute group podcast, aimed to present a topic or practical case from the course syllabus.

Data analysis

A specific rubric was designed to evaluate the individual and group podcasts created by students from all of the subjects. It was structured into four dimensions, defining evaluation criteria based on the achievement of various competencies. The first dimension evaluated the sources of information (research and documentation on the topic); the second evaluated the content (selection of information sources, content hierarchy and alignment with the purpose of the podcast); the third dimension focused on design (structure, writing, content narration and sound language); and the last dimension focused on the technical aspects of the product (technical production and editing).

Each evaluation criterion was graded from failing to excellent. The weighting of the rubric dimensions varied depending on the course. For Journalism and Audiovisual Communication students, the evaluation focused primarily on the second and third dimensions, while for students of the bachelor's degree in Human Nutrition and Dietetics, the rubric prioritised the first

dimension related to documentation and content management. The rubric was designed to guide students in both their learning process and their results.

In order to facilitate podcast production, a Podcasting Guide was created and included as a teaching resource in the virtual classrooms of the subjects involved. The content of the guide was structured according to the podcast creation sequence: initial design and content ideas; script research and development; writing and storytelling strategies; and a review of technical material, editing applications, and content publication and distribution channels. The guide also provided advice on creating and accessing sound resources for recording and editing. This teaching material initially targeted teachers and students involved in the project, but was designed to facilitate project replication across various scientific fields. Finally, professional recording facilities within the university and radio technicians for podcast production were made available to all participants.

At the end of the course, the students completed a self-administered survey via Google Forms. The survey included informed consent and evaluated various aspects. Firstly, it collected sociodemographic data of the participants (age, sex, university degree, subject and type of study). Secondly, it assessed the students' prior knowledge and habitual consumption of podcasts. Finally, the survey responses evaluated the satisfaction and usefulness of both the podcasts produced by the students during their learning process and those created by teachers and professionals. This evaluation included a Likert scale (from 1 = strongly disagree, to 5 = strongly agree) for different indicators and a free-form section for students to reflect on their experiences with the project and its impact on their learning. Additionally, throughout the fieldwork, the participating teachers maintained a field diary, documenting observations on the project implementation process and reflecting on its feasibility and organisation.

Results

The survey revealed that 88.6% of the respondents were familiar with podcasts before the activity. However, significant differences were observed between disciplines ($p < 0.05$). Communication students (CAV and PER) showed higher levels of familiarity with podcasts, whereas Human Nutrition and Dietetics (NHD) students demonstrated lower levels of awareness. All of the students who were unfamiliar with podcasts were from the NHD field, with no differences observed based on the study mode (face-to-face or blended learning).

Among those surveyed, 63.9% reported listening to podcasts regularly, primarily at home (33.3%) or while traveling by car or public transportation

(33.3%). No differences were observed according to the mode of study, but significant variations were found between disciplines ($p < 0.05$). Specifically, Journalism students (PER) listened to podcasts more frequently (46.5%) than NHD (32.5%) and CAV (21%) students.

With regard to the consumption of the aforementioned podcasts made by experts, significant differences were found between degrees ($p < 0.05$) and study modes ($p < 0.05$). Some 63% percent of PER students and 61.5% of CAV students listened to all or at least half of these podcasts, compared to 52% of NHD students. Blended learning students listened to the complete audios (75%) more often than face-to-face students (49%). Overall, 78% of the students surveyed listened to the podcasts one to two times, with no significant differences depending on degree or study mode. However, differences were observed in the comprehensive consumption of the podcasts depending on the study mode ($p < 0.05$), with blended learning students more likely to listen to the podcasts uninterrupted (43%).

The average satisfaction ratings for the expert-produced podcasts indicated high approval. Students found them beneficial for their learning ($M = 3.69$) and highly valued the content ($M = 3.72$) and its relevance to the subject ($M = 3.52$).

The students' satisfaction results regarding the impact of the podcasts on their learning are shown in Table 1. In all five indicators evaluated through the questionnaire, satisfaction levels are high ($M > 3$). Satisfaction levels did not differ significantly by study mode, but did vary by degree programme ($p < 0.05$). Communication-related programmes consistently reported higher satisfaction scores.

Table 1

Mean satisfaction level of the students regarding the impact of the podcasts on their learning

	The podcast has helped me to learn/improve:				
	Search for info	Content management (analysis, organisation, etc.)	Written communication	Oral communication	Sound editing
Face-to-face	3.58±1.15	3.55±1.17	3.36±1.13	3.93±1.17	3.61±1.20
Blended	3.5±1.21	3.36±1.26	3.25±1.23	3.82±1.29	3.82±1.27
Study programme					
CAV	3.69±1.01	3.62±1.06	3.54±0.48	4.31±0.95	4.08±1.5
PER	3.67±0.96	3.67±0.87	3.44±1.05	4.04±0.93	3.67±1.52
NHD	3.47±1.24	3.39±1.29	3.23±1.23	3.74±1.3	3.58±1.23

The podcast has helped me to learn/improve:					
	Search for info	Content management (analysis, organisation, etc.)	Written communication	Oral communication	Sound editing
Globally	3.56±1.15	3.49±1.17	3.33±1.17	3.90±1.13	3.67±1.20

Note. Satisfaction level: Likert scale (1 = *strongly disagree* to 5 = *strongly agree*); Results expressed as $M \pm SD$ (Mean values±Standard Deviation); Study programmes: CAV (Audiovisual Communication)/PER (Journalism)/NHD (Human Nutrition and Dietetics)

The most highly rated dimensions were improvements in oral communication and sound production editing, which received scores of 3.90 and 3.67, respectively. While no significant differences were observed based on study mode, notable variations were evident across degrees ($p < 0.05$). Students in PER and CAV consistently rated all of the evaluated dimensions significantly higher than those in the NHD field.

As shown in Table 2, the students exhibited high satisfaction in producing and creating their own individual podcasts ($M = 3.84$) and group podcasts ($M = 3.68$). Significant differences were noted when evaluating comfort, support materials and workload involved in podcast creation. Blended learning students rated all of these aspects lower than face-to-face students ($p < 0.05$). However, the mode of study did not result in significant differences in satisfaction with either individual or group productions. Once again, NHD students consistently rated all dimensions lower than CAV and PER students. Nonetheless, there is a clear indication of high satisfaction with the individual podcasts created by the students across all disciplines, garnering very high and nearly identical scores.

Table 2
Mean satisfaction level of the students regarding podcasts

	Satisfaction level according to:					
	Individual podcast	Group podcast	Ease of the activity	Materials for independent work	Workload has been adequate	Would repeat the experience
Study modality						
Face-to-face	3.87±0.99	3.71±1.1	3.9±1.32	3.55±1.16	3.3±1.24	3.55±1.33
Blended	3.75±1.08	3.61±1.20	3.04±1.44	3.00±1.17	2.32±1.33	2.68±1.41
Study programme						
CAV	3.38±0.95	3.85±0.95	4.23±1.01	4±0.89	3.77±0.97	3.85±0.78
PER	4.00±0.78	3.96±0.93	4.26±0.90	3.81±1.01	3.37±1.01	3.89±0.97
NHD	3.97±1.07	3.41±1.22	3.41±1.41	3.1±1.20	3.03±1.32	3.1±1.42

	Satisfaction level according to:					
	Individual podcast	Group podcast	Ease of the activity	Materials for independent work	Workload has been adequate	Would repeat the experience
Globally	3.84±0.99	3.68±1.11	3.65±1.32	3.39±1.16	3.02±1.24	3.3±1.33

Note. Satisfaction level: Likert scale (1 = *strongly disagree* to 5 = *strongly agree*); Results expressed as $M \pm SD$ (Mean values±Standard Deviation); Study programmes: CAV (Audiovisual Communication)/PER (Journalism)/NHD (Human Nutrition and Dietetics)

Discussion

Based on the results gathered from the data collection instruments (open-ended questionnaire items, field journal entries and document analysis), three main themes emerged, which are elaborated upon below: a) podcasts as an educational and science communication resource; b) challenges encountered in podcast production and implementation; and c) effective communication and the use of radio language.

Podcast as an educational and science communication resource

The present project underscores the significance of integrating public and media communication as a pivotal strategy for scientific production (De Semir & Revuelta, 2010; Gertrudix et al., 2020). Podcasting is recognised for its role in enhancing digital and communicative literacy as a progressive educational experience (Caldeiro-Pedreira & Aguaded-Gómez, 2015; Celaya et al., 2020). As discussed earlier, producing a podcast involves multiple phases that help develop a wide range of competencies and skills. These phases include tasks such as sourcing and verifying information, conducting critical analysis and reflection on content selection and prioritisation, and refining writing and voice-over techniques for the final audio production.

Overall, the analysis of questionnaires across various disciplines highlights a positive and interdisciplinary view of podcasts in university education. Podcasts demonstrate significant potential for enhancing research skills and effectively disseminating findings across diverse fields of knowledge to wider audiences. For instance:

- “Using podcasts is a practical way to communicate acquired knowledge.” (DT)
- “Podcasts reach a wider audience and are an effective method.” (BRM)
- “It’s a more dynamic way of learning and encourages creating your own podcast.” (CAV)

- “A valuable activity that could evolve into a standard learning model.” (DT-S)
- “It’s a refreshing and enjoyable way to learn.” (BRM)
- “Indeed, it’s a resource that enhances skill development.” (DT)
- “Initially daunting, but ultimately enjoyable.” (DT-S)

Responses highlight tasks such as researching, selecting and prioritising content:

- “Podcasts provide a method to synthesise content.” (PER)
- “It encourages thorough research on the topic.” (DT-S)
- “It’s about retrieving and synthesising information effectively.” (DT-S)
- “Yes, it helps in learning how to explain concepts.” (CAV)
- “It’s a current resource that develops essential skills.” (PER)

For communication students, podcasting is particularly seen as pertinent to their degree:

- “It’s very beneficial; we should incorporate it more.” (CAV)
- “It covers multiple lessons that are beneficial across all disciplines.” (CAV)
- “It’s necessary and likely to become standard in future courses.” (PER)
- “One of the best activities I’ve encountered this year.” (PER)

Radio language or how to communicate effectively

The present research highlights the critical importance of effective scientific communication and content dissemination. Particular emphasis is placed on the “how” of communication, underscoring the relevance of radio language in both general and scientific contexts. Engaging, participatory and emotionally resonant approaches are essential for capturing and sustaining audience interest (Buitrago & Torres-Ortiz, 2022). Achieving this requires incorporating artistic, playful and entertaining elements into the communication process (Calvo-Hernando, 2002). In this regard, radio language – which integrates verbal expression, music, sound effects and silence – plays a key role in effectively conveying scientific content across diverse fields.

However, this premise is not always accepted among students. For instance, a section of the questionnaire asked about their experiences producing personal podcasts, with a focus on incorporating music and sound effects. Training students to produce and create podcasts as part of the learning process

aims to make them aware that communication is a fundamental transversal competency. It is necessary to address and counter comments that undervalue the role of radio language, such as: “The inclusion of music during the podcast was appreciated, but there are many famous and widely recognised podcasts that do not use background music” (BRM-S); and “I don’t think finding music is the most important aspect of the task” (BRM-S).

Podcasts by experts: The relevance of formal quality and content

The results obtained from the questionnaires show a general acceptance of podcasts created by experts and lecturers. In all subjects across all grades, these podcasts are seen as dynamic and attractive complements to theoretical content, enhancing understanding and providing an enjoyable learning format:

- “I think listening to experts discuss the topic helps you understand better.” (CAV)
- “The content is useful and helps you to understand more complete content.” (DT)
- “A very good tool to better understand the concepts of the curriculum.” (DT)
- “A more dynamic way to learn and guide you to create your own podcast.” (CAV)

Podcasts are also appreciated as a creative learning activity. They adapt to current trends, and examples from teachers and experts provide models for learning how to create them:

- “It teaches a new and creative way to convey information and gives you public speaking skills.” (CAV)
- “It can be a dynamic way to learn knowledge.” (DT)

In blended learning programmes, some comments favour video formats, considering them more useful because they provide a visual reference of the person explaining:

- “It is very hard for me to listen to someone who is not in front of you.” (TMO)
- “Personally, I don’t think it’s helpful since there’s no visual reinforcement!” (DT)

Finally, it is worth noting some critical comments from the subject of Bromatology. These critiques address the insufficiently substantiated content

and lack of scientific references: “It could be useful as long as the content is relevant and not a simple copy of what we already receive in PDF” (BRM); “The content (most of it) lacks scientific references.” (BRM). Additionally, there is criticism of the quality of the sound production: “The teachers who recorded the podcast also made several mistakes during the recording when they were clearly reading a script.” (BRM).

These comments highlight the need to improve and enhance the communication skills of all parties involved in the communication and educational process at university.

Challenges in podcast production

Beyond the positive view of podcasting as a learning tool, the present research also acknowledges and addresses critical comments on the challenges and systemic factors involved in podcast production (Castaño et al., 2017; Castro, 2018). These difficulties are related to planning, technology and the communication skills required by students to produce podcasts (McCarthy et al., 2021). Moreover, teachers unfamiliar with communication techniques also face significant challenges.

In some cases, the effort and workload involved in producing podcasts are highlighted. The argument is that podcasting activities are perceived as being distant from the scientific interests of the students’ academic fields: “No, it takes up hours of work and it is not our field.” (BRM); “Boring, has nothing to do with the topic.” (BRM-S).

While acknowledging the adequacy of the guidance provided, some comments emphasise the time required for production: “I think the guidance provided for recording podcasts is adequate; however, having to use unfamiliar programs adds much more burden than estimated to the podcast production.” (BRM-S). A second recurring difficulty lies in inadequate technical knowledge for production, while a third problem reveals a preference for the video format among students in face-to-face teaching, particularly in blended programmes, with students criticising podcasts as an additional burden to their workload:

- “They were a waste of time that gave us nothing but a headache.” (BRM-S)
- “Complicated and tedious.” (BRM)
- “No. I think it’s a waste of time for people who aren’t interested in podcasts either.” (BRM)
- “I suggest not doing it again. Just editing takes too much time.” (BRM-S)
- “With so much workload, it ends up being like dead weight until it is

finished, but once you see the work done I would repeat it.” (DT)

In degrees linked to the communicative field, the needs are generally well covered, with only two individuals highlighting the need for more tutoring sessions:

- “No, but I would like more tutoring.” (CAV)
- “Maybe a tutorial to learn how to use different editing applications.” (PER)

Another significant result of the project highlights the difficulties faced by both students and teachers due to a lack of technical knowledge or difficulty in accessing appropriate software, particularly in blended learning programmes:

- “I lack a technical base and I am incapable of making a montage with music and many decorations without spending my life on it.” (BRM-S)
- “Be more flexible with the audiovisual part in terms of music, intro... we are not professionals, and everything was homemade.” (BRM-S)

In the face-to-face modality, the complexity of radio production is discussed and the need for more detailed instruction is emphasised:

- “More knowledge and perhaps more explanation is needed to develop it.” (BRM)
- “The explanation in class was short and insufficient, and I had to end up doing it with my cell phone because I was lost.” (BRM)

Given this situation, the Diet-Therapy lecturer reported that the production of the podcast “has involved many hours of work dedicated to review and correction, and the fact of having little experience and technical knowledge makes it difficult to evaluate the technical aspects of the final products” (Field Diary, DT lecturer). Another lecturer participating in the project agreed with this sentiment and proposed including co-assessment and self-assessment strategies by the students themselves (Field Diary, BRM lecturer).

In health-related degrees, both in-person and blended, sound creation in the professional radio studio made the experience very positive:

- “It has been spectacular to be able to record the podcast in the radio studio.” (DT-S)
- “Working in the studio has been very enriching and a very cool experience.” (DT)
- “I liked the experience, but I need more time to understand and assimilate the technical knowledge of making and editing the podcast.” (DT-S)

These responses highlight the importance of intensive and extensive initial training and information to facilitate the activity's initial stages and development. They also underscore the importance of monitoring and support throughout the activity.

It is crucial to recognise the need to understand scientific communication as an essential skill in the professional development of any scientific field. Activities such as the "Present Your Thesis in 4 Minutes" contest should be considered as a reasoned response to comments that deem the creation of a five-minute podcast absurd and unrealistic. Organised by 12 Catalan universities, this contest challenges doctoral students from any scientific discipline to explain their research in four minutes using simple and understandable language for the public. These initiatives aim to bring research closer to society while simultaneously improving the skills and techniques of the scientific community to transmit and disseminate knowledge in a simple and easily understandable way. Scientists must also consider the need for public communication, such as in the media. In these contexts, simple, clear and direct language with precise and high-quality content delivered in a very limited time is essential.

In conclusion, this approach recognises the need for scientists to communicate scientific content (Fernández Bayo et al., 2018) and "assume public communication as a strategic line of their work" (De Semir & Revuelta, 2010, p. 7). In the next phase, it is crucial to decide what content to include and how to communicate complex scientific knowledge in a simple and direct manner (Buitrago & Torres-Ortiz, 2022). At the same time, the pedagogical implications of the entire process must be considered.

Conclusions

The conclusion of the project confirms that podcasts are an appropriate tool for developing interdisciplinary and transversal skills. Creating podcasts promotes autonomy in significant learning processes that can be replicated across various university degrees. These competencies are connected to the different stages of radio production – idea generation, documentation and content selection – which involve research, reflection and critical analysis; podcast design and writing processes; application of sound language; and oral expression in the production phase.

In line with the project's objectives, podcasts have been incorporated and positively evaluated by participating lecturers and students as an interdisciplinary learning tool in different university degrees. A podcast production and delivery guide has been developed, receiving positive feedback in evaluation

surveys. This guide facilitates the replication of the project by lecturers interested in this learning strategy. The project contributes to the communicative and digital literacy of university students and underscores the importance of disseminating scientific content in an attractive and understandable manner to broad, not necessarily specialised, audiences. The positive evaluations from participants confirm that podcasts develop soft skills such as information searching and management, teamwork, personal autonomy, and oral and written communication.

However, it is important to acknowledge some limitations of the research related to project implementation and sustainability proposals. Critical comments on podcasting practices highlight coordination problems and the need for a proper understanding of production standards and sufficient time for development. There is also a need to explain the creation process, set clear expectations and provide evaluation guidelines. It is necessary to address these issues, especially those that impacted the beginning of the investigation.

During the initial phase, the simultaneous demands of material production, teacher training and the creation of initial podcasts led to understandable criticisms about time constraints. Nevertheless, the current application of the project takes these factors into account, providing access to the necessary activities, guides and rubrics from the outset for optimal development. However, future research should consider the need for an initial training period in the ideation, production and execution processes for both teachers and students. This research project has yielded quantitative results that lay the groundwork for future studies. Moving forward, we aim to further investigate correlations between variables related to student satisfaction and those assessing the challenges encountered during the process. Additionally, we understand that future studies on the implementation of podcasts in the teaching and learning process should consider factors arising from the diversity of student profiles. In fact, the present study has already shown significant differences depending on the university programme in which the participants are enrolled. We deem it appropriate to extend the research to other faculties and degree programmes in order to observe these divergences.

A significant conclusion highlights the necessity for teacher training in knowledge, strategies and communication tools in order to effectively convey information to students. Raising awareness within the scientific community about the importance of science dissemination through adequate communication is crucial. Since this research is framed as an Educational Research and Innovation Project at UVic-UCC, and in view of the project's conclusions, a seminar has been created for the university's teaching staff during the 2024–2025

period. The objective is to develop tools for communication and scientific dissemination among teachers, with the aim of enhancing their capacities and replicating the training among students from different faculties of the university.

Ethical statement

This research study was approved by the UVic-UCC Ethical Research Committee.

Disclosure statement

The authors have no conflict of interest to declare.

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