

# Uses of the podcast for educational purposes. Systematic mapping of the literature in WoS and Scopus (2014-2019)

Usos del podcast para fines educativos. Mapeo sistemático de la literatura en WoS y Scopus (2014-2019)

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## ABSTRACT

**Introduction:** There is little research available on the educational use of the audio podcast. The published literature (2014-2019) was reviewed, classifying uses, contexts, and categories of the audio podcast for educational purposes, and identifying authors and reference journals in the field.

**Methodology:** The Systematic Mapping of Literature method was applied to a sample of open access articles indexed in the Web of Science and Scopus databases. The filtering of the sample was

carried out according to inclusion and exclusion criteria. **Results and conclusions:** 81 articles were found that highlight the main educational uses of the podcast and coincide in its usefulness to support learning in formal, non-formal, and informal educational institutions and settings. This work provides researchers, educators, and institutions with an updated baseline to further explore the educational strengths of the podcast.

**KEYWORDS:** podcast; e-learning; systematic mapping of literature; open educational resources; educommunication; education.

## RESUMEN

**Introducción:** la investigación disponible sobre el aprovechamiento educativo del podcast de audio es escasa. Se revisó la literatura publicada (2014-2019) clasificando usos, contextos y categorías del podcast de audio con fines educativos, e identificando autores y revistas de referencia en el ámbito. **Metodología:** se aplicó el método de Mapeo Sistemático de la Literatura a una muestra de artículos indexados de acceso abierto en las bases de datos Web of Science y Scopus. El filtrado de la muestra se llevó a cabo de acuerdo con unos criterios de inclusión y exclusión. **Resultados y conclusiones:** se hallaron 81 artículos que destacan los principales usos educativos del podcast y coinciden en su utilidad para apoyar el aprendizaje en instituciones y entornos educativos formales, no formales e informales. Este trabajo brinda a investigadores, educadores e instituciones una línea base actualizada para seguir explorando las virtudes educativas del podcast.

**PALABRAS CLAVE:** podcast; e-learning; mapeo sistemático de la literatura; recursos educativos abiertos; educomunicación; educación.

## CONTENTS

1. Introduction. 2. Method. 2.1. Research questions. 2.2. Boolean search strings. 2.3. Inclusion and exclusion criteria. 3. Results. 4. Discussion and conclusions. 5. References.

Translation by **Paula González** (Universidad Católica Andrés Bello, Venezuela)

## 1. Introduction

Educommunication studies phenomena that emanate from the synergies between communication and education. It not only tries to educate through the media, but also promotes education aimed at information management, internet-related technology, and the mass media (Aguaded, 2005; 2011; 2012). The emergence of the Web 2.0 of O'Reilly (2005) was a stimulus for citizen participation on the internet, a context that according to Naval and Arbués (2015) configures privileged spaces for participation. From this, what Jenkins, Purushotma, Werigel, Clinton, and Robinson (2009) have called participatory culture is consolidated. In this context, the ability to critically discern and value the vast amount of information available becomes essential. Gone are concepts such as computer literacy and information literacy (Gallado, 2013; Bundy, 2004), focused on managing the media in its most technical dimension. The paradigm of media education is more appropriate insofar as it considers aspects related to content and its consumption. As Naval, Serrano-Puche, Sádaba, and Arbués (2016) indicate, media education is already a priority, both in the educational system and in the main international organizations. Along these lines, Khan (2009) delves into the challenges of media education and establishes that collaboration between governments, companies, and civil society is crucial to advance on this path (p. 10).

The transformation of information into knowledge occurs through a directed human process, a coordination of cognitive skills that gives meaning to the data, to order it coherently, so that it is

useful and can solve problems (Díaz, 2012). This is how the information society construct evolves into the knowledge society construct (Castells, 2006; Phillips, Hameed, & El Akhdary, 2017). The people who make up society continually appropriate elements of the environment, process them as knowledge, and educate themselves, which is known as informal learning (Esclapez, 2008).

On the other hand, in the formal education system, the mentioned elements are crystallized through approaches derived from e-learning, m-learning (learning through mobile devices), and u-learning (ubiquitous learning), among others. Along these lines, Keegan (2005) highlights the latent learning opportunities on mobile platforms -tablets, telephones, and their complementary services linked to the internet- a field that has been called m-learning. For their part, Burbules (2012; 2014) and Zapata-Ros (2012) explain how u-learning takes advantage of the omnipresence of those media and sources with educational potential provided by the knowledge society, which overcome many of the limitations of traditional education systems.

The open education movement seeks to overcome the limitations of access and intellectual property that traditional analog resources present (Blessinger & Bliss, 2016). Unesco (2002) defends the proliferation of new Open Educational Resources (OER), supported by Information and Communication Technologies (ICT), with non-commercial uses. Those educational materials or activities that allow open access training practices are created and used. Consequently, D'Antoni (2009) points out that citizens, educators, and institutions have been the main benefited agents.

The most relevant advances of the open educational movement have been promoting quality open content, breaking down barriers to open educational content, and encouraging people around the world to use OER. These, according to a four-stage taxonomy, range from the production of activities and OER available on the internet to the selection and use of materials through repositories and connectors that act as catalog infomediaries; as well as the dissemination of open practices in academic, governmental, and institutional settings, NGOs, academies, companies, and other instances, and mobilization practices that allow them to be integrated into training actions (Ramírez-Montoya, 2018; Ramírez-Montoya and Burgos, 2012).

It is really interesting to observe how currently the majority of media with educational potential based on ICT escape purely educational or communicative categorizations and acquire a dual nature. This is what happens with blogs, vlogs, wikis, or podcasts, among others: they are *educommunicative* objects. Among them, the podcast format, in particular, is a digital media of the 2.0 era. According to Sellas (2011), it began to be defined in the early 2000s, as a result of the exchange of audio files between technophile users, but it officially took shape in 2004, when technology journalist Ben Hammersley (2004) described the consolidation of these practices in an article called *Audible revolution*. While it has been popularly called «internet radio», Gallego (2010) links the identity of the podcast to automatic syndication via RSS protocol, which allows its free and gratuitous distribution over the internet, as well as its deferred consumption on user demand.

The podcast format can contain only audio or associated video as well, in which case it is called a video podcast or vodcast, which is similar to the videoblog format. Podcasting is experiencing a significant boom as a means of communication in recent years, where audio predominates. It is analogous to the YouTube phenomenon in the field of audio since it collects *amateur* initiatives while serving as an extension to traditional media, and platforms such as Spotify or Apple Podcasts serve as showcases. The United States is the country where most podcasts are listened to. Edison Research (2019) concludes that 90 million Americans, 32% of the population, would have listened to podcasts in the past month. The data in Spain is more modest, 350,000 listeners, 1.2% of Internet users, according to EGM (2017). However, it is a format that shows an upward consumption trend.

The educational community has experimented from very early on with the podcast format. Research on its educational use has been promoted in its beginnings by university projects such as the Duke Digital Initiative, which in its edition from 2005 to 2006 explored the potential of the production and consumption of academic content in audio and video podcast formats. (Earp, Belanger, & O'Brien, 2006). Borges (2009) pointed out cognitive advantages due to its use in the classroom and greater involvement, self-management, availability of the material, continuity in the study, understanding, and reduction of anxiety (pp. 35-36); he also emphasized that recorded classes or *lecturecasting* is only one of its possible applications (p. 43). The EDUCAUSE organization, which promotes innovation in higher education through ICT, uses the podcast as a means of broadcasting interviews on innovation, good educational practices, and teacher training. Also in this line, but in the informal sphere, the podcast has been studied as a container and diffuser for scientific disclosure (de-Lara-González & del-Campo-Cañizares, 2018), while authors such as Forbes & Khoo (2015) have focused on its usefulness to deliver education in a non-classroom mode.

Regarding meta-studies on podcasting, the review that Hew (2009) presented a decade ago stands out, in addition to more recent works focused on the areas of radio communication (Arribas, Gutiérrez, Frago, & Arcos, 2018), training in emergency medicine (Paterson, Thoma, Milne, Lin, & Chan, 2015), language learning (Hasan & Hoon, 2013; Lomicka & Lord, 2011), and higher education (McGarr, 2009). These works are very specific and do not address the educational uses of the podcast in an aggregated and multidisciplinary way. Consequently, we consider novel an updated review that explores the literature regarding the podcast for educational purposes in all disciplines, to obtain information on the current state of the object of study.

This work presents the results obtained from a systematic mapping of the literature, which was carried out in early 2019, to know the educational uses that have been given to the audio podcast. For this, the literature between January 2014 and February 2019 was located in the main databases (Scopus and Web of Science), spanning a five-year period. The method applied in the study and the obtained results are detailed, as well as the analysis of the data, which updates the state of the art on the educational podcast. The conclusions point to both the educational and academic communities, delving into the educational virtuality of podcasting, and also illuminating new lines of research that may be useful to develop future research on the subject.

## 2. Method

The Systematic Mapping of Literature is a research method that allows tracing the evidence in a domain with a high level of granularity. This helps to identify evidence groups and evidence gaps to develop future literature reviews and primary studies (Kitchenham & Charters, 2007; Kitchenham, Pretorius, Budgen, Brereton, Turner, Niazi, & Linkman, 2010). It is common to use mapping as a preliminary (descriptive) phase to a systematic (analytical) review, which gives more context and structure to the object of study (CASCADE, 2012).

### 2.1. Research questions

First of all, as suggested by the collaborations of Kroll, Richardson, Prikladnicki, and Audy (2018) and Petersen, Vakkalanka, and Kuzniarz (2015), a series of research questions (RQ) were established, to focus the search strategy.

- RQ1: How many open-access studies on the educational treatment of the audio podcast are there in the Scopus and Web of Science (WoS) databases between January 2014 and February 2019?
  - RQ1.1: What research methods were applied in the studies?

- RQ1.2: What is the geographical distribution of the authors who published the most in the area?
- RQ1.3: Which are the most cited articles?
- RQ1.4: Which are the journals that published the most on the subject?
- RQ2: In what contexts did the studies take place?
- RQ3: What are the thematic categories in which the educational use of the audio podcast was structured?

Secondly, to answer the proposed RQs, a search strategy was designed that was limited to journal articles indexed in the Scopus and WoS databases (SCI-E; SSCI; A&HCI; ESCI), which were chosen based on their vast collection and extensive reputation in the scientific field. The axes of the article selection strategy were the establishment of inclusion, duplication, and exclusion criteria, applied to Boolean search strings.

## 2.2. Boolean search strings

Search strings made up of Boolean expressions based on the keywords *podcast*, *online radio*, *profcast*, *lecturecasting*, *education*, and *train* were used. With these parameters, 2,447 initial results were obtained: 1,659 in Scopus and 788 in WoS. The raw results were obtained from the search strings reflected in table 1.

**Table 1.** Search strings.

<b>Scopus</b>	TITLE-ABS-KEY (“online radio” OR podcast* OR profcast OR lecturecasting) AND (educ* OR train*) Limitado a: (LIMIT-TO (PUBSTAGE, "final")) AND (LIMIT-TO (ACCESSTYPE (Open Access))) AND LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2018) OR LIMIT-TO (PUBYEAR, 2017) OR LIMIT-TO (PUBYEAR, 2016) OR LIMIT-TO (PUBYEAR, 2015) OR LIMIT-TO (PUBYEAR, 2014)) AND (LIMIT-TO (DOCTYPE, "article" )) AND (LIMIT-TO (SRCTYPE, "journal"))
<b>WoS</b>	TS=(("online radio" OR podcast* OR profcast OR lecturecasting) AND (educ* OR train*)) Refined by: PUBLICATION YEARS: (2019 OR 2017 OR 2015 OR 2014 OR 2018 OR 2016) AND Open Access: (OPEN ACCESS) AND DOCUMENT TYPES: (ARTICLE) Indexes=SCI-EXPANDED, SSCI, A&HCI, ESCI Timespan=2014-2019

**Source:** own elaboration.

## 2.3. Inclusion and exclusion criteria

The proposed inclusion and exclusion criteria for filtering the original sample were decided based on pragmatism, seeking a reasonable balance between quantity and quality. According to Table 2, those articles from closed journals were excluded due to the difficulty of accessing the full text. According to Melero and Hernández-San-Miguel (2014) and García-Peñalvo (2017), open science facilitates the circulation of research data among researchers and guarantees the reproducibility of studies. Furthermore, studies such as that of Breugelmans, Roberge, Tippett, Durning, Struck, and Makanga (2018), McKiernan *et al.*, (2016), Piwowar *et al.*, (2018), and Wang, Liu, Mao, and Fang (2015) suggest that open access articles tend to have a greater scientific impact measured in bibliographic citations. On the other hand, it was decided not to filter by discipline, since the podcast has been used for educational purposes in areas other than education. The language variable was not limited.



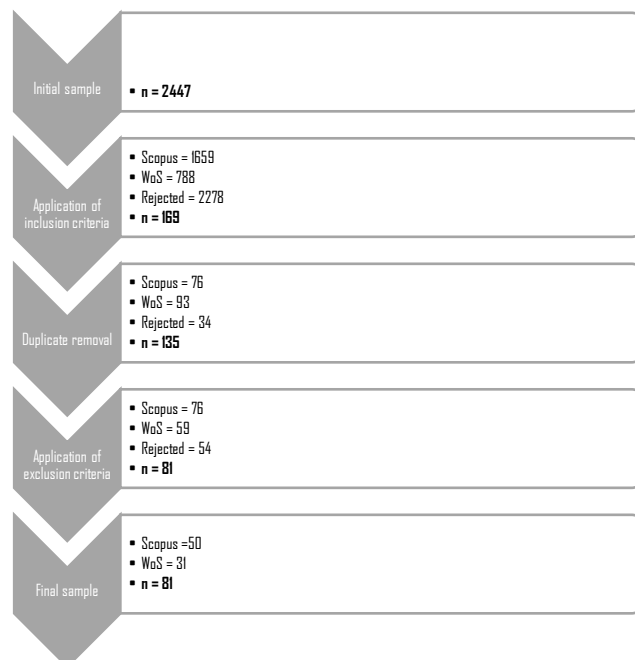
Studies using video podcasts were discarded. The vodcast appears in multiple educational research works where, many times, audio and video are included under the same podcast concept, without distinction. This conceptual disparity can lead to confusion since these are different resources, as Brabazon (2016) points out, who also indicates that the added value of video in content assimilation is debatable (p. 135). These differences and the fact that video in education has been in fashion in recent years leads us to focus our attention this time on the audio podcast.

**Table 2.** *Inclusion and exclusion criterio.*

Inclusion criteria	Exclusion criteria
Articles with the keywords "podcast *", "profcast", "lecturecasting", "educ *", "train *".	Articles without educational connection.
They are in the Scopus and WoS databases (SCIE; SSCI; A&HCI; ESCI).	Works that focus on video podcasts ( <i>vodcasts</i> ).
Articles between January 2014 and February 2019.	References that are podcasts themselves (audio-articles) and not journal articles.
All disciplines and languages.	Closed access articles.
Open access articles.	

**Source:** own elaboration.

Once the initial search was filtered according to the inclusion criteria, 169 items remained: 76 in Scopus and 93 in WoS. Duplicate items were then removed. For this, priority was given to the Scopus database, and, consequently, 34 duplicate WoS items were discarded. Subsequently, the titles and abstracts of each of the remaining articles were read. An additional 54 articles were rejected after applying the exclusion criteria. Figure 1 shows a diagram with the filtering process carried out until obtaining the final sample.



**Figure 1:** diagram with the sample filtering steps.

**Source:** own elaboration.

### 3. Results

RQ1 - How many open-access studies on the educational treatment of the audio podcast are there in the Scopus and WoS databases between January 2014 and February 2019? After completely filtering the sample, a total of 81 articles related to the educational use of the podcast were obtained, which are included in table 3.

**Table 3.** *The final sample of articles on the educational use of the podcast.*

Ref.	Autor, título y revista
1	Abdoli-Sejzi, A., Aris, B., Ahmad, M. H., & Rosli, M. S. (2015). The relationship between web 2.0 technologies and students achievement in virtual university. <i>International Education Studies</i> , 8(13), 67–72. Retrieved from doi: 10.5539/ies.v8n13p67
2	Álvarez-Moreno, M. A., & Vásquez-Carvajal, S. C. (2015). Radio y cultura: Una propuesta de radio ciudadana en Internet. <i>Palabra Clave</i> , 18(2), 475–498. Retrieved from doi:10.5294/pacla.2015.18.2.7
3	Ausín, V., Abella, V., Delgado, V., & Hortigüela, D. (2016). Project-based learning through ICT. An experience of teaching innovation from university classrooms [Aprendizaje basado en proyectos a través de las TIC. Una experiencia de innovación docente desde las aulas universitarias]. <i>Formación Universitaria</i> , 9(3), 31–38. Retrieved from doi: 10.4067/S0718-50062016000300005
4	Barber, J. F. (2016). Digital storytelling: New opportunities for humanities scholarship and pedagogy. <i>Cogent Arts &amp; Humanities</i> , 3(1). Retrieved from doi: 10.1080/23311983.2016.1181037
5	Bednarczyk, J., Pauls, M., Fridfinnson, J., & Weldon, E. (2014). Characteristics of evidence-based medicine training in Royal College of Physicians and Surgeons of Canada emergency medicine residencies - a national survey of program directors. <i>BMC Medical Education</i> , 14(1). Retrieved from doi: 10.1186/1472-6920-14-57
6	Blomgren, C. (2018). OER Awareness and Use: The Affinity Between Higher Education and K-12. <i>International Review of Research in Open and Distributed Learning</i> , 19(2), 55–70. Retrieved from doi: 10.19173/irrodl.v19i2.3431
7	Bounds, R., & Boone, S. (2018). The Flipped Journal Club. <i>Western Journal of Emergency Medicine</i> , 19(1), 23–27. Retrieved from doi: 10.5811/westjem.2017.11.34465
8	Brites, M. J., Santos, S. C., Jorge, A., & Catalão, D. (2017). Ferramentas jornalísticas na educação: Uma rádio online para jovens. <i>Sociologia, Problemas e Práticas</i> , (84), 81–100. Retrieved from doi: 10.7458/SPP2017846102
9	Bucher, J., Donovan, C., & McCoy, J. (2018). EMS providers do not use FOAM for education. <i>International Journal of Emergency Medicine</i> , 11(1). Retrieved from doi: 10.1186/s12245-018-0189-4
10	Chan, T. M., Thoma, B., Krishnan, K., Lin, M., Carpenter, C. R., Astin, M., & Kulasegaram, K. (2016). Derivation of Two Critical Appraisal Scores for Trainees to Evaluate Online Educational Resources: A METRIQ Study. <i>Western Journal of Emergency Medicine</i> , 17(5), 574–584. Retrieved from doi: 10.5811/westjem.2016.6.30825
11	Chin, A., Helman, A., & Chan, T. M. (2017). Podcast use in undergraduate medical education. <i>Cureus</i> , 9(12). Retrieved from https://dx.doi.org/10.7759/cureus.1930
12	Cortés-Fuentes, J. -A., & Correyero-Ruiz, B. (2017). Radio and social empowerment. Uses and the rewards gained of radio workshops for individuals with intellectual or developmental disabilities [Radio y empoderamiento social. Usos y gratificaciones del taller de radio para las personas con discapacidad intelectual o del desarrollo]. <i>Profesional de la Información</i> , 26(1), 55–65. Retrieved from doi: 10.3145/epi.2017.ene.06
13	Da Costa Miranda De Carvalho, F. B., De Lima, C. P., Dutra, A., Da Rosa, V. F., & De Oliveira, J. (2018). Use of podcast and webquest resources in the study of assessment in early childhood education [Uso de recursos podcast e webquest no estudo do tema avaliação na educação infantil]. <i>Texto Livre</i> , 11(2), 192–205. Retrieved from doi: 10.17851/1983-3652.11.2.192-205

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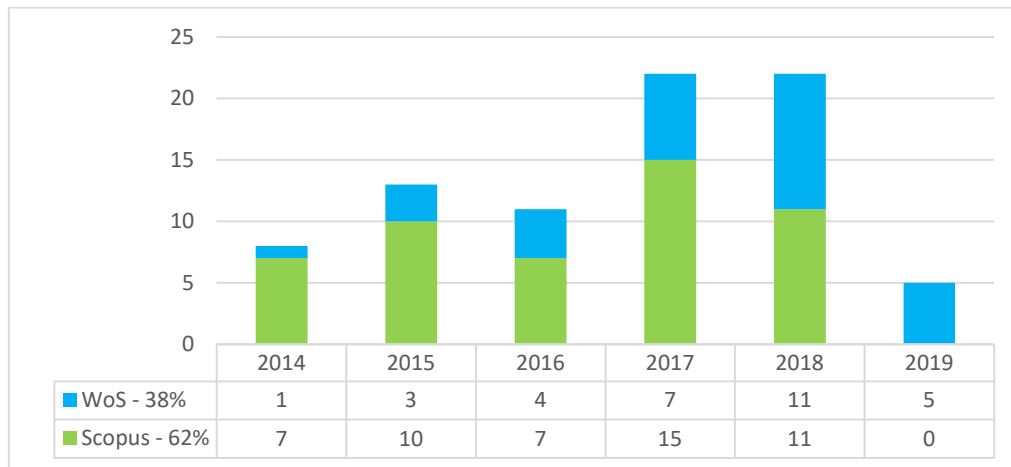
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Source: own elaboration.

The publicly accessible database with the 81 articles included in the final sample is available at (<https://bit.ly/2yLSaoF>).



**Figure 2:** open access articles based on the year of publication in the Scopus and WoS databases.  
**Source:** own elaboration.

The relationship of publications based on the year of publication (figure 2) follows a stable trend over time, slightly upward. The years with the most publications were 2017 and 2018 (both with 22 articles) while 2014 and 2016 were the years in which the least was published (8 and 11 articles respectively). The 2019 data (5 articles) is conditioned by the search dates, February of that year, so they should not be taken into account in the bibliometric analysis.

Based on the databases, Scopus has 50 articles (62%) and WoS has 31 (38%). It is striking how the total number of final items decreases when adding the filter of open access articles only. The reason is that there are fewer open access journals available.

Subsequently, the titles and abstracts of the articles were analyzed to obtain the answer to the remaining RQs. In some cases, when the abstract did not offer enough information, the full text was consulted.

RQ1.1 – What research methods were applied in the studies?

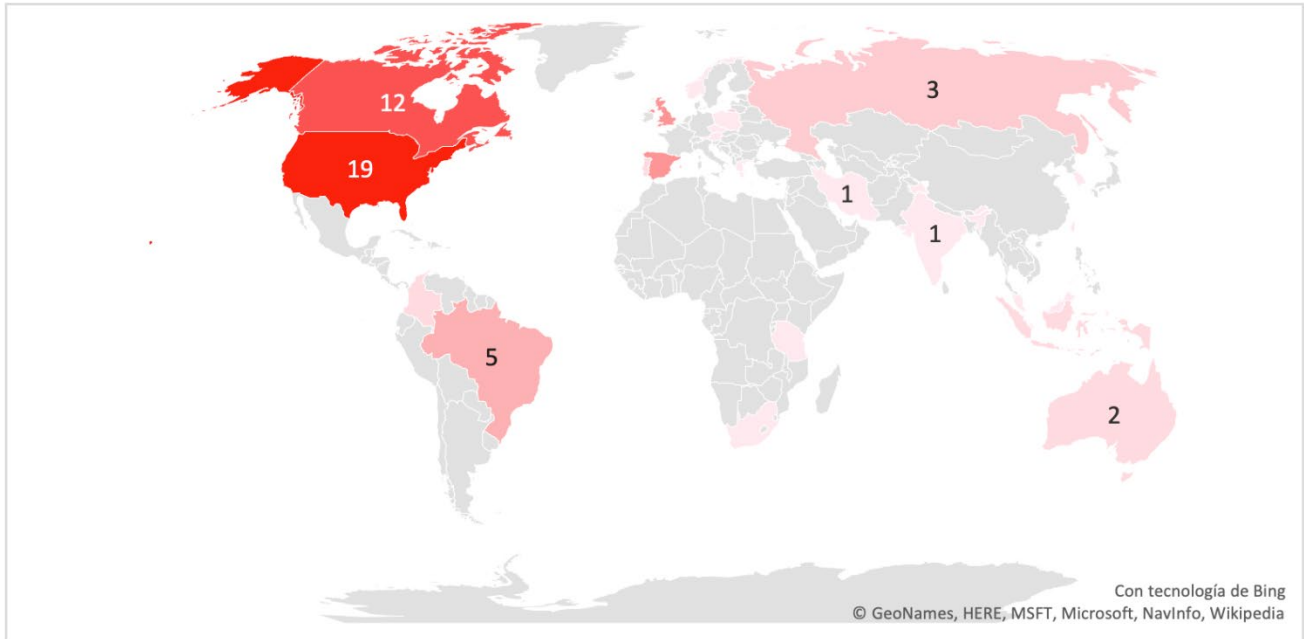
The results show that the majority of the analyzed studies applied empirical methods, 43 in their quantitative aspect and another 24 mixed. Also, 14 theoretical articles were registered. Table 4 includes the articles classified according to the research method used and their percentage of the total sample.

**Table 4.** Research methods applied by the studies.

Method	Ref.	Total	Percentage (N = 81)
Theoretical	4, 6, 19, 22, 23, 46, 57, 58, 60, 63, 66, 67, 74, 81	14	17%
Quantitative	1, 5, 7, 9, 10, 11, 20, 27, 28, 29, 30, 31, 32, 33, 35, 36, 37, 38, 40, 41, 43, 44, 45, 47, 49, 50, 51, 52, 53, 54, 55, 59, 61, 64, 65, 68, 69, 70, 71, 75, 77, 78, 79	43	53%
Mixed	2, 3, 8, 12, 13, 14, 15, 16, 17, 18, 21, 24, 25, 26, 34, 39, 42, 48, 56, 62, 72, 73, 76, 80	24	30%

**Source:** own elaboration.

RQ1.2 – What is the geographical distribution of the authors who published the most in the area?  
 Of the 81 analyzed articles, the countries with the most publications are the United States (19), Canada (12), the United Kingdom (7), Spain (7), and Brazil (5) respectively. It can be seen in Figure 3 that North America concentrates much of the total published. The criteria used to establish geographic origin was the provenance of the university to which the first author of each article was affiliated.



**Figure 3:** the number of publications by country.  
**Source:** own elaboration.

RQ1.3 – Which are the most cited articles?

The articles totaled 345 citations. Considering the quartiles according to the impact index of the journals, the sample of articles is distributed as follows: 18 articles in Q1, 20 in Q2, 13 in Q3, and 4 in Q4. A further 26 articles were registered from the WoS Emerging Sources Citation Index (ESCI) database. As table 5 indicates, 47% of all studies were published in the first two quartiles.

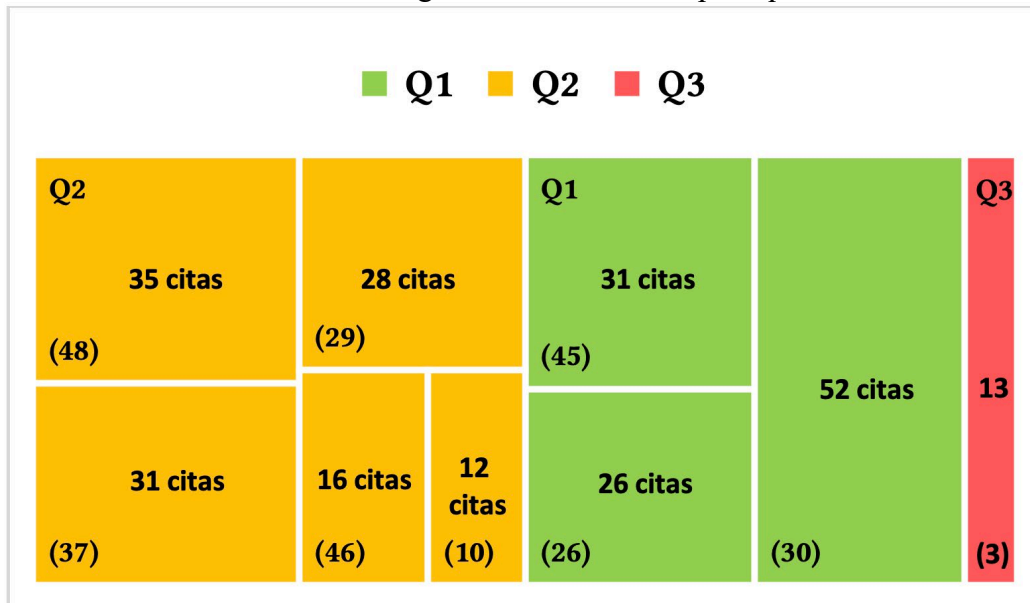
**Table 5.** Classification of articles according to the quartile of their journal.

Quartile	Ref.	Total	Percentage (N = 81)
Q1	5, 6, 14, 27, 28, 32, 38, 39, 41, 43, 44, 46, 47, 55, 61, 68, 69, 77	18	22%
Q2	2, 7, 9, 10, 12, 16, 18, 29, 31, 33, 35, 42, 48, 49, 53, 67, 70, 72, 73, 78	20	25%
Q3	1, 3, 4, 8, 19, 21, 45, 56, 59, 64, 76, 79, 81	13	16%
Q4	13, 36, 58, 65	4	5%
ESCI	11, 15, 17, 20, 22, 23, 24, 25, 26, 30, 34, 37, 40, 50, 51, 52, 54, 57, 60, 62, 63, 66, 71, 74, 75, 80	26	32%

**Source:** own elaboration.



To answer more concisely to RQ1.3, those articles with 10 or more citations were identified, which were considered high impact. They were represented hierarchically in Figure 4, according to criteria of the number of citations and relative weight in the different impact quartiles.



**Figure 4:** articles with more than 10 citations ordered according to their quartile.  
**Source:** own elaboration.

Most articles with more citations were located in Q2, with a total of 5 articles and 122 citations in total. Q1 is the second most important, with 3 high impact articles that added 109 citations. In Q3 only 1 high-impact article was found, with 13 citations in total. No article with more than 10 citations was found belonging to the Q4 or ESCI.

RQ4 – Which are the journals that published the most on the subject?

Eight journals with more than one published article were identified (Table 6), which bring together 35% of the entire studied sample. As for the topic area, they can be divided between medical education journals (19 articles) and educational technology journals (6 articles). The Western Journal of Emergency Medicine (10) and the Canadian Journal of Emergency Medicine (4) stand out by the number of publications, both belonging to the medical field.

**Table 6.** Journals with more than two publications.

Journal	Quartile	Ref.	Total	Percentage (N = 81)
Western Journal of Emergency Medicine	Q2	7, 10, 18, 19, 20, 22, 38, 48, 52, 53	10	12%
Canadian Journal of Emergency Medicine	Q1	28, 37, 46, 47	4	5%
CUREUS	ESCI	11, 37, 40	3	4%
Information Technologies and Learning Tools	ESCI	34, 63, 66	3	4%
Australian Journal of Teacher Education	Q2	14, 50	2	2,5%
Educational Technology & Society	Q2	23, 35	2	2,5%
International Review of Research in Open and Distributed Learning	Q1	6, 21	2	2,5%
Journal of Medical Internet Research	Q1	26, 31	2	2,5%

**Source:** own elaboration.

RQ2 - In what contexts did the studies take place?

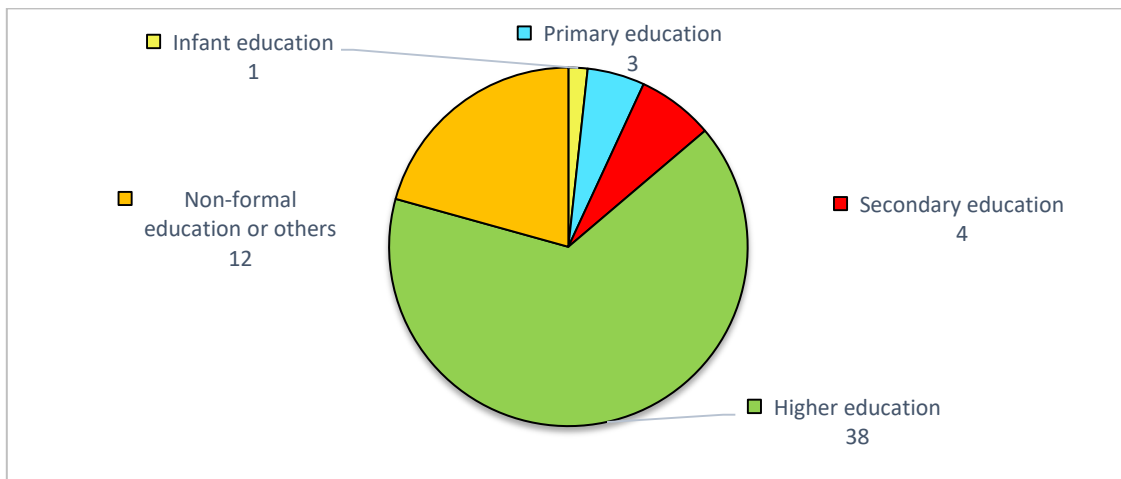
To answer RQ2, the Ramírez-Montoya and García-Peñalvo (2018) classification was used, which classifies the contexts of educational performance in academic, social, business, and cultural. Thus, the articles were analyzed according to the context in which the research had been carried out.

Specifically, 35 articles were found in the academic context, 10 in the social context, 9 in the business context, and 1 related to the cultural context. Table 7 shows the relationship of the articles according to each of the contexts, while figure 5 classifies the studies in an academic context according to the specific educational stage in which they are included.

**Table 7.** Contexts of the studies.

Context	Ref.	Total	Percentage (N = 81)
Academic	1, 3, 5, 6, 7, 10, 11, 13, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 30, 31, 33, 34, 35, 36, 37, 39, 40, 41, 42, 45, 47, 48, 50, 52, 54, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 69, 70, 71, 72, 73, 75, 76, 77, 78, 79, 80, 81	58	72%
Social	4, 8, 12, 14, 38, 46, 49, 51, 56, 68, 74	11	13%
Business	9, 27, 28, 29, 32, 43, 44, 53, 55, 57	10	12%
Cultural	2, 15	2	2%

**Source:** own elaboration.



**Figure 5:** Distribution of articles in academic context according to their educational stage.

**Source:** own elaboration.

RQ3 - What are the thematic categories in which the educational use of the audio podcast was structured?

Finally, RQ3 identified the emerging categories according to the most specific approaches of the studies, grouping them according to the educational function they confer to the podcast (production, selection/use, dissemination, and mobilization).

Table 8 shows how studies conceive podcasting according to the taxonomy of open educational practices and the percentage weight of each category. According to the above, and considering the podcast format as OER, 23 articles on production (28%), 30 articles on selection/use (37%), 3 articles on dissemination (4%), and 25 articles focused on mobilization (31%) were found.

**Table 8.** *Studies according to their educational function*

Category	Ref.	Total	Percentage (N = 81)
Production	1, 5, 11, 16, 17, 21, 25, 33, 34, 36, 37, 38, 42, 44, 46, 49, 50, 54, 58, 62, 68, 70, 81	23	28%
Selection/Use	6, 9, 10, 13, 18, 19, 20, 22, 24, 27, 28, 29, 30, 32, 35, 40, 43, 52, 53, 55, 57, 60, 63, 65, 66, 67, 72, 75, 77, 78	30	37%
Dissemination	41, 51, 69	3	4%
Mobilization	2, 3, 4, 7, 8, 12, 14, 15, 23, 26, 31, 39, 45, 47, 48, 56, 59, 61, 64, 71, 73, 74, 76, 79, 80	25	31%

**Source:** own elaboration.

#### 4. Discussion and conclusions

The sample of articles studied draws a constant publication trend from 2014 to the present as shown in Figure 2. Half of the articles are in the upper quartiles of impact, Q1 and Q2 (table 5), even more so the most cited (figure 4). The studies present a practical approach to the subject: they apply mostly empirical methods, both quantitative and mixed (table 4). The trend towards empirical research is similar to that of Hew's study (2009). The survey and interview were the most widely used methods in empirical studies, along with others such as the case study. Regarding regions, the United States, Canada, United Kingdom, Spain, and Brazil were the countries that published the most articles on the subject (figure 3). It is not surprising that the United States and Canada appear in the first place, given that media studies such as Edison Research (2019) already showed that North America is the region with the largest presence of podcasting worldwide.

On the other hand, it should be noted that most of the scientific production focuses on academic contexts, specifically formal education centers, although also to a lesser extent on social and business contexts (table 7). However, as Figure 5 shows, it is in the higher education stage where the bulk of the research has been concentrated. McGarr (2009) distinguishes between three categories regarding the implementation of podcasts in higher education: substitute and complementary to the lessons, or creative, which would imply that students create content from what they have learned. For their part, Forbes and Khoo (2015) found that student-generated podcasts had the potential for distance formative evaluation, as well as to share ideas between students and teachers. However, considering the increasing complexity of the aforementioned categories, the most common literature focuses on the substitute and complementary categories, with creative production being more expensive and, therefore, scarce.

Regarding the specific uses of the podcast format, or categories that emerge from the studies, it was found that the literature affects the production, selection, and use of podcast resources and their mobilization for educational purposes (table 8). The spectrum of educational uses has oscillated in the past between the use of podcast content for dissemination in universities and educational centers (McGarr, 2009; Lomicka & Lord, 2011; de-Lara-González & del-Campo-Cañizares, 2018, p. 351), and an application of the format itself as a vehicle to deliver training in a non-face-to-face mode (Hasan & Hoon, 2013; Forbes & Khoo, 2015). The accomplished mapping uncovers a varied list of proposals around the podcast that the researchers carried out in the last 5 years: they study podcasting in formal education settings in its various educational stages; but also, in the institutional sphere, concerning personnel training. The uses are very varied, the main ones being language teaching, training of medical personnel, digital literacy, and social and health education in informal contexts. The role of the podcast as a means of disseminating scientific production is also documented, to a lesser extent, which refers to its role as an instrument for broadcasting (Ramírez-Montoya and Burgos, 2012). In light of the above, it can be seen that the interest in the educational podcast not only continues but that, judging by the results, its uses evolve over time.

This systematic mapping finds its main limitation in the selection of the object of study. On the one hand, it was resolved to limit the concept of the podcast to that format consisting of syndicated digital files in audio format, since as explained in the introductory part, this work considers that podcasts and vodcasts are concepts with differentiable characteristics. Consequently, all those studies that refer to video podcasts were discarded. On the other hand, the search was limited to studies published in open access based on accessibility and opportunity criteria (table 2), consciously renouncing to many other quality articles that might have been interesting for the review. Furthermore, the nature of a systematic mapping *per se* implies a limitation of depth in the analysis. The aim is to present the topic in a more descriptive than analytical way. Also, limiting the search to the last 5 years leaves out previously published works. However, this is a deliberate decision in the design of this research, considering that this previous stage is covered by the third-party reviews cited in the introduction.

To overcome the aforementioned limitations, it is considered valuable for future research to continue delving into the podcast for educational purposes through a systematic review, which would describe the depth of the localized studies and compare them with each other. Additionally, the present mapping detected a deficit of studies oriented towards the infant, primary, and secondary educational stages in scientific production with more impact (Figure 5). As a hypothesis, this lack could be explained as a consequence of the eminently practical and not so much investigative profile of many teachers of these educational stages, who would go to conferences and congresses rather than to journals. However, higher education professionals would be more familiar with the scientific publishing system. Thus, we encourage researchers to study what is published in the so-called "gray literature" that could shed light on the uses of podcasting in these mentioned educational stages.

Based on the analyzed studies, we conclude that the podcast is a multipurpose medium that continues to be used in various ways in education: in its facet of *educommunicative* object, it has been used to disseminate scientific and social knowledge, instruct in institutional settings, as well as to promote critical and reflective attitudes. As OER, it has been applied in all educational stages, at a distance or in classroom settings, in formal, non-formal, and informal education contexts. Besides, referring to its ease of production, it has been used to work with learning communities and in the development of repositories with training content. Podcasting is one more technological tool at the service of education.

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