

Podcast: a research trajectory and emerging themes

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Submissão: 19/07/2021

Aceitação: 28/10/2021

Podcast: trajetória de pesquisa e temas emergentes¹

Resumo: 21 de outubro de 2004 é a data em que o primeiro podcast brasileiro, Digital Minds, foi para o ar. Em 17 anos, o podcast evoluiu e amadureceu como mídia. Paralelamente ao seu crescimento como meio, o podcast tem sido objeto de pesquisas e publicações científicas, e hoje é um campo específico de estudos. Assim, o objetivo desta pesquisa é compreender a configuração desse campo científico, a partir das publicações sobre podcasts. O artigo apresenta uma revisão da literatura sobre o termo podcast e tem como objetivo responder às seguintes questões: Qual a trajetória da pesquisa em podcast? Quais são os temas emergentes? A coleta de dados foi realizada no WoS e resultou em 669 artigos que continham o termo podcast entre os anos de 2005 e 2017, estabelecendo um período de 12 anos de pesquisa. Os resultados mostraram que os podcasts têm sido frequentemente estudados em associação com a Comunicação e outras áreas científicas, como Educação e Saúde, e que os temas encontrados na literatura mais recente têm sido as redes sociais e a participação política.

Palavras-chave: podcast; revisão sistemática; trajetória de pesquisa; temas emergentes.

Podcast: a research trajectory and emerging themes

Abstract: October 21st, 2004, is the date when the first Brazilian podcast, *Digital Minds*, was aired. In 17 years, the podcast has evolved and matured as media. Paralleled with its growth as a medium, the podcast has been the subject of research and scientific publications, and it is now a specific field of studies. Thus, the objective of this research is to understand the configuration of this scientific field from publications about podcasts. The article presents a review of the literature on the term podcast and aims to answer the questions: What is the trajectory of the podcast research? What are the emerging issues? Data collection was performed on the WoS and resulted in 669 papers that contained the term podcast between the years 2005 and 2017, establishing a period of 12 years of research. The results showed that podcasts have been often studied in association with Communication and other scientific areas, such as Education and Health, and that the topics found in the most recent literature have been social media and political participation.

Keywords: podcast; systematic review; research trajectory; emerging themes.

¹ Este artigo é a versão traduzida, revisada e ampliada de trabalho anterior, apresentado nos anais do 41º Congresso Brasileiro de Ciências da Comunicação, da Intercom – Sociedade Brasileira de Estudos Interdisciplinares da Comunicação.

Introduction

Podcast is a neologism created by the union of the words *pod* (of the MP3 player, iPod) and *cast*. In the same period of the birth of the P2P networks, automated distribution systems of digital audio files, starting from feeds like RSS and Atom, began to be used. Soon, aggregating programs such as iPodder and iTunes came into light, both aiming to organize the access to the contents signed by the netizens (Kischinhevsky, 2017). This is the scenario from which emerged the podcast, an audio transmission service that was first used in 2004 by the ex-VJ of the American MTV, Adam Curry, who being inspired by the practice of blogging, created the iPodder software. This software allows you to download recordings from the Internet and play them on portable devices, using them in the RSS format and/or as an aggregated element of content (Prata, 2009).

It is possible to point out two stages in the podcasting trajectory: according to Gallego (2010), in its first age, podcasting is considered an eminently sound production, built to be a mono platform. The second age of podcasting (Bonini, 2015) is marked by humanization, life stories and potentialization of storytelling, especially through non-fiction contents. These characteristics are among the most consolidated perspectives and *Serial* is the pioneering criminal podcast of the genre (McHugh, 2016). Authors like Luiz and Assis (2010) explain podcasting as “a way to transmit an audio or video via the Internet to play on an iPod or another device that plays or receives this file” (p. 2). The authors also understand that podcast “is both the audio file and the video transmitted via podcasting as well as the compilation of these files” (p. 2). Primo (2005) defines podcast as “a new way of producing and listening to information” (p. 6).

Podcast has gained uses in many fields, such as Education, Health, and Communication. It is noteworthy that the podcast is a new form of production and listening of sound information in the radiophony media, that its contours and reaches contributed even to the term’s own definition. Currently, there is a celebration of the Podcast Day, date celebrated on September 30. This day was created by the American podcaster Steve Lee, Netcast Studio, with the goal of publicizing this media and making it increasingly known. In Brazil, in December 2005, the Brazilian Podcast Conference (PodCon Brasil) was held in Curitiba, Paraná. It was the country's first event dedicated exclusively to the subject, which culminated in the creation of the Brazilian Association of Podcasters.

Stemming from the Martínez-Costa and Prata’s premise (2016) that “podcasts are clearly identified as one of the trends in the development of new digital radio content” (p. 123),

this research work seeks to reflect upon the theoretical basis on which the understanding of the podcast is based². The option chosen is a bibliometric study, in which is the application of statistical and mathematical techniques describes aspects of literature and other means of communication (quantitative information analysis); it has as a central point the use of quantitative methods in the search for an objective evaluation of the scientific production (Araújo, 2006). The data pointed out by the bibliometric studies provide important indicators of scientific production and indicate parameters for detecting the evolution of a field (Guedes & Borschiver, 2005; Lucatelli & Andrade, 2009).

Data collection was performed through the Web of Science research database and resulted in 669 papers that contained the term podcast between the years 2005 and 2017, establishing a 12-year research window. The chosen research period – 2005 to 2017 – is due to two factors. The first academic publication about podcast dates back to 2005 and, in 2017, Apple has turned an analytic feature that gives podcast creators the ability to see basic information about the way people listen - or don't listen - to shows on Apple's Podcast app, which is considered milestone in the history of this media, making it definitely professional. The data search was carried out through the use of two tools: the CitNetExplorer, for the network analysis of citations and the VOSviewer, for the construction of the bibliometric map.

The research is of quantitative and qualitative nature (Flick, 2009; Codina et al., 2011), presenting as results some possibilities of research agendas and contributing, in some aspects, to the literature on podcast. The first contribution is the methodology itself. According to an extensive search conducted by the authors, until this moment, this is the first study to analyze the publication citation network in order to examine the podcast literature. Secondly, the results found can help researchers to better understand the genesis and current state of research on the subject. Thirdly, this work identifies, through objective criteria, the most highlighted themes within this field's diffusion of knowledge, as well as the emerging themes in podcast research. In addition, based on the results found, insights are a research agenda in this field.

² As there have been divergence among the authors' understanding of the terms podcast and podcasting, this research has chosen to investigate the podcast term in the Web of Science database.

1. Brief podcast scenario in Brazil

The first Brazilian podcasts were clearly inspired by the American model, but today it can be said that there is a culture and a way of producing this medium in the country. The first Brazilian podcast, *Digital Minds*, was broadcast on October 21, 2004 and it was created by Danilo Medeiros on his blog known by the same name. Although it was not the first blog to have audio files available for download, it was the first one to do so through podcasting. A few days later, on November 15, *Podcast* was born and the first edition was well didactic, with explanations about the intention of trying out this technology. On the following month, the podcasts *Perhappiness* and *Código Livre* appeared. Since then, the country has hosted the emergence of new programs (Brazilian Association of Podcasters, 2019).

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Starting in 2012, the podcasting scenario begins as a second epoch according to Bonini (2015): “Since its creation podcasting has evolved in two directions: amateur, non-profit use and commercial, for-profit use (a profit which, as we will see, is almost always non-existent, at least until 2012) (p. 21). The amateur production and distribution processes gave way to a professional solution with the adoption of new business models: “With this mix of new technologies for distribution (podcasting) and for listening (smartphones) combined with sound-based social networks (Soundcloud, Mixcloud, Spreaker and the Deezer-belonging Stitcher) and new crowdfunding platforms (Kickstarter, Indie Go Go), the foundations have been laid to create an independent market for podcasting (p. 21). In Brazil, the number of projects to finance the production and distribution of podcasts on crowdfunding platforms is increasing.

It is currently possible to draw a profile of the podcast audience in Brazil. A study carried out by the Brazilian Association of Podcasters points out that the majority of podcast listeners in the country, 84.1%, are males. Eighty percent of listeners are between the ages of 20 and 39; 56% are single; 54% have a college degree. The preferred device for listening to podcasts is the cellphone / smartphone, which is accounted for by 92.1% of listeners. When asked about the reasons why they listen to podcasts, the interviewees answered: quality and diversity of content (75.3%) and freedom to listen when, where

and how they want (74.6%). The most listened Brazilian podcasts are: *Nerdcast* (57%), *Não Ouvo* (21,2%), *Mamilos* (13,3%), *Anticast* (13,1%), *Gugacast* (12,9%) *Xadrez Verbal* (11,3%), *Braincast* (10,4%), *Matando Robôs Gigantes* (9,2%), *99 Vidas* (9,2%), and *Café Brasil* (9,1%).

2. Trajectory of the podcast research

In these 17 years of production and transmission of podcasts in Brazil and, consequently, of a certain field of research, we intend to get to know the scientific scenario from a bibliometric study of the publications on the subject. Araujo (2006) points out that bibliometry aims to analyze the scientific production of certain themes and Quevedo-Silva et al. (2016) explain that the application of this methodology "helps the understanding of new themes and can collaborate in the identification of trends for future research "(p .1). In this work, we start from the description of what was published about the podcast and, from the results found, researchers and students can guide their studies and conduct new research.

On the other hand, the bibliometric study also has limitations and one of them is that the method does not allow to gauge the quality of the publications. Thus, an indication for future articles would be a careful analysis of the works mentioned here in light of the theories and the research carried out. Furthermore, Lima (1986) shows that quantity is not an indicator of quality and that the most cited article / book is not necessarily the best, it may just be the most accessible. It is important to point out that the number of citations is not the main measure of the value and influence of a study, since it is only a mathematical datum. For this assessment, it is needed a more detailed analysis on the impact factor of an article that takes into account the geographic specificities, the diversity of languages, the different normalizations of the references and the circulation of the journals (Bruno, 2008).

In order to study the research trajectory covered by the term podcast, two procedures were adopted: (i) data collection from the scientific base Web of Science (WoS) and (ii) use of the free software CitNetExplorer to view and to analyze networks of citations in scientific publications. Subsequently, the publications were grouped by similarity forming clusters. This method of network analysis of citations in publications was adopted because, according to the software developers, Van Eck and Waltman (2014), the program, by generating a network of citations, interconnects the authors by means of the cited

references, presented the work in chronological order, which facilitates the construction of a theoretical framework with methodological accuracy (Van Eck and Waltman, 2014). Researchers such as He, Lei and Wang (2018) corroborate the authors' idea by affirming that, through mutual citations, a network of citations is formed, which demonstrate the trajectory, transformation and accumulation of scientific knowledge.

As alerts Close (2017), the approach has restrictions because WoS neglects studies published as monographs and edited volumes, slightly distorting the analysis. In attempt to reduce the distortion, the CitNetExplorer's "include mismatched references" option was used. The network still includes books (or chapters) cited in the Web of Science articles that were not previously included in the database. A second restriction, still according to the author, involves the citations of recent publications (as they were recently published, they did not have the chance of being cited) and they do not appear in the graphics, which can make it difficult to identify clusters that contain works of issues that are still being researched. Another restriction is that the data used only those publications whose records were available on WoS. There are likely to be other important publications on podcast and that is one of the reasons why contemporary authors tend to not appear in the map of citation.

Starting the procedures, the data collection was performed from WoS. Such choice finds justification in the longevity of the platform, which was created in 1960 and is the oldest scientific database currently available. The research base not only includes publications, but it also searches for citations dating back to the 1900s and allows access to abstracts and references of articles, conference documents, reviews, and books belonging to the areas of Social Science, Arts and Humanities, covering approximately 20 thousand journals. Therefore, it was considered that such database is adequate to fulfill the purposes of the research.

The first search carried out on WoS adopted the following procedures: (i) it used the term podcast, in the field of research time, in the period of 1945 - date of the first publications available in the base, until 2017; (ii) it used the field topic, which identifies the occurrence of the term podcast in the summary, title and keywords of the publications associated with the filter. The results indicated 669 primary publications involving the syntagma. Subsequently, a test search was performed, using the same procedures of the previous research, changing only the time period, this time from 1945 to 2004. In this new search, no records were found. Since the first publication on podcast dates to 2005, it was considered the period from 2005 to 2017, forming a 12-year research window.

The 669 primary publications found on WoS include 332 articles, 175 congress papers, 110 editorial materials, 16 new articles, 14 expanded abstracts, 14 reviews, and 8 letters. The three scientific areas that published more on podcast are Education (34%), Computer Science (12%), and Engineering (7.7%). Communication represents 4.9% of publications, appearing in seventh place, tied with Occupational Health.

In order to analyze the data downloaded from the WoS search database (primary and secondary publications, those cited by the primary ones) and to determine the trajectory of the podcast, we used the CitNetExplorer which, according to Massimo and Cuccurullo (2017), allows the researcher to perform three procedures: i) analyze the development of a research field over time; (ii) identify the central literature on a research topic, and (iii) explore the work of a particular researcher and understand the influence of these publications on the future work developed by other scientists. According to Van Eck and Waltman (2017), in order to operate the software, it is essential to fulfil four stages: (i) establish a database in which the research will be carried out; (ii) collect complete records of the publications and references cited; (iii) establish the type of connection between publications, and (iv) form clusters that group together similar citations that are directly related.

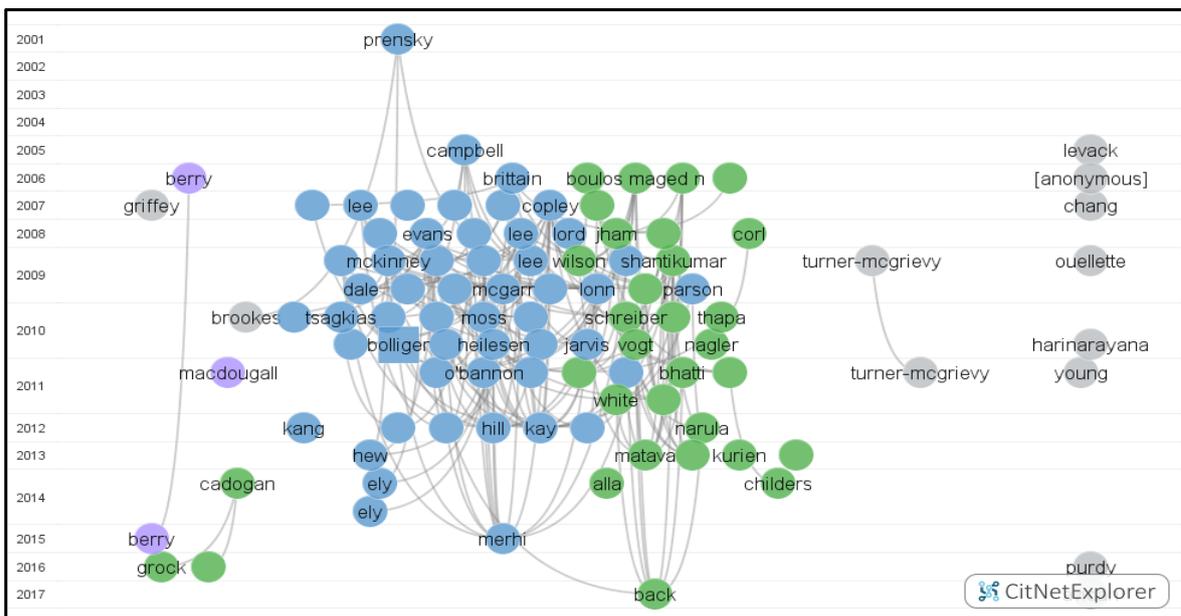
The first two steps have been fulfilled while researching and exporting the WoS primary and secondary publications into the software. In the next step, the connection between publications was established, aiming to form a network that would relate direct citations, established by the original publication and its citations. This parameter was determined because, according to Klavans and Bayack (2017), direct citation relations offer more accurate publication relations, being adequate to detect what was important in a research area. Therefore, 18 secondary publications were identified as relevant. These, at the authors' discretion, were non-primary publications that had been cited at least 10 times by primary publications. Thus, a network composed of 687 works, published between 2001 and 2017, was formed, being connected by 683 citation relations, and reaching, this way, a network of the 100 most cited podcast publications.

After determining the connections between publications, the next step was to create clusters, grouping the publications by similarity. Each publication is assigned to only one cluster, without overlaps.

The default resolution parameter (1.00) of the CitNetExplorer software was established, which determines the level of detail through which the clusters will be identified. The

number of clusters and the resolution pattern are directly proportional, so the larger the parameter value, the greater the number of clusters. It was determined, in addition to the resolution standard 1.00, that the minimum number of citations belonging to the clusters was of 10 publications. Even making a strict choice, 461 works were not included in any clusters, as they did not contain at least 10 similar publications. This limitation was pointed out previously and can be attributed to the difficulty of identifying clusters containing works of emerging themes that are being researched. In attempt to remedy the problem and identify emerging issues, the VosViewer software will be used in the emerging themes' session. The other works were attributed to two clusters: the blue one, containing 148 publications and 401 quote relations; the green one, with 63 publications and 163 quote relations, and the purple one, with 15 publications and 16 quote relations. Figure 1 shows the network of the most cited podcast publications and the formation of clusters.

Figure 1: The 100 most-cited podcast publications grouped into clusters



Source: Research Data (CitNetExplorer)

Each circle shown in Figure 1 represents a publication, which is identified by the first author's surname. The vertical axis indicates the year of publication and, the curved lines indicate the citation connection between the publications. Van Eck and Waltman (2017) explain that the closer the circles are, the more the work is related. Therefore, the

publications that compose the clusters blue (148 works) and green (63 works) have more similarities than those in the purple cluster (15 works).

In the map analysis, it is possible to see that the publications of the blue cluster are dominant and go back to the year 2001, with the publication of Marc Prensky's "Digital natives, digital immigrants", that reflects on the challenges of education in face of new digital technologies. The blue and green clusters only begin to interact with purple from 2006, with the publication of the article "Wikis, blogs and podcasts: a new generation of virtual collaborative clinical practice and education" by Maged et al. (2006), on the risks and possibilities of using collaborative tools in the context of medical education. In turn, the purple cluster practically does not create a dialogue with the publications of the other two clusters. A single interaction is noted in Brooks' (2010) paper, "An evaluation of the impact of formative feedback on student learning experience" quoting Prensky's (2001) publication above and Evans' (2008), "The effectiveness of m-learning in the form of podcast revision lectures in higher education", both concerning the potential of the podcast in the teaching-learning process. The clusters will be qualitatively analyzed in the next session.

3. Qualitative analysis

In this section, in order to qualitatively analyze the works, the pioneer articles that gave rise to the discussions, the most cited publications and the most recently published ones were chosen. The main idea is to understand how the articles connect to each other and explain the way podcast research has been developed since 2001. The clusters were named according to the subjects referred to in each of the works.

a) Blue Cluster: Technology and Education

Chart 1 shows some of the blue cluster's highlights. When exploring the texts, although the oldest work cited by this cluster is Prensky's (2001), the author does not refer to the term podcast, but rather to the challenges to be overcome in the teaching-learning process in the face of new emerging technological devices. In this research, the term podcast is used for the first time in the text by Campbell (2005), who believes in the potential of podcast content as an educational tool capable of promoting learning.

Prensky has written an important article aiming to foster a discussion in the educational sphere, evincing the emergence of a new generation of individuals associated with Information and Communication Technologies (ICTs). The article emphasizes that today students process information in a fundamentally different way than their predecessors did, once they are surrounded by new technologies. Prensky draws attention to the teaching learning process between digital natives and Digital Immigrant instructors. For the author, on the one hand, the digital immigrants receive information really fast; they like parallel processes and multi-tasking activities. On the other hand, Digital Immigrants do not believe their students can learn successfully while watching TV or listening to music and they have very little appreciation for these skills. The Immigrants choose to teach as they have learned — slowly, step-by-step, one thing at a time, individually, and above all, seriously. So, to deal with this issue, it is necessary to think of different ways to learn.

It is important to know that Prensky's (2001) proposal provides an overview of the perceptual differences between natives and digital immigrants. However, one cannot dichotomize these two groups, understanding that one is opposite to the other. The author's contribution lies in pointing out that there are different generational groups living at the same time-space, in order to improve the teaching-learning process, it is necessary to rethink the methodological forms and the way of approaching the content.

The most cited work is the one by Evans (2008) and it discusses the effectiveness of mobile learning (m-learning) in the form of podcasting, for the teaching of undergraduate students in Higher Education. Evans (2008) was particularly interested in the learner's perceptions of technology and adopted a learner-centered design in which students were asked to comment on the learning characteristics of conventional materials (revising lectures, notes, textbooks) and also on podcasts so that a contrast could be made.

The study was based on the process of using podcasts “as a revising tool used by learners after their traditional lecture course has finished, but before their final examination” (p. 493). The author, after some observations, made four specific predictions for the benefits of podcasting over traditional revising mechanisms: H1: Learners believe that it is quicker to revise from podcasts than from notes; H2: Learners believe that revising from podcasts is more effective than from notes or from a textbook; H3: Learners feel more receptive to revising materials delivered as a podcast than from a traditional revising lecture or a textbook, and H4: Learners feel they can relate more to the lecturer in a podcast than in a traditional revising lecture.

The results provide support for three out of the four hypotheses suggesting that the podcasts are a quicker way to revise than using notes. The students also believe that podcasts are more effective revising tools than textbooks, but not more than their own notes. Other hypotheses confirm the greater acceptance of podcasting material rather than the material delivered as a revising lecture or from a textbook. The last hypothesis was not supported, and it could not prove that it is easier to relate to the lecturer in a podcast than it is in a revising lecture. “This suggests that lectures are just as effective at personalizing the material as podcasts” (p. 496).

The most recent article found in this research, “Podcasts in Biochemistry and Molecular Biology,” written by Hözer and Matté (2017), discusses how the podcast can be used as an instrument for teaching the most complex subjects in Biochemistry and Molecular Biology. The main pedagogical goal is to improve the students’ understanding of topics in Biochemistry and Molecular Biology by developing scripts, records, and making available podcasts on some of the more complex contents of Biochemistry and Molecular Biology. The authors conclude that the development and dissemination of alternative materials for the teaching of Biochemistry and Molecular Biology will contribute to improve the performance of the undergraduate students attending these subjects. However, they disagree on the results presented by Evans (2008) and defend that podcasts do not replace the use of textbooks filled with complex maps of metabolic diseases. For the authors, “Biochemistry is a visual discipline, and requires the interpretation of different cell types and metabolic understanding” (p. 111). Chart 1 compiles the results found in the blue cluster.

Chart 1: Technology and Education

Type of Work	Author	Title	Journal	Citation CitNetExplorer
Pioneer	Prensky (2001)	Digital natives, digital immigrants	On the Horizon	13
Most cited	Evans (2008)	The effectiveness of m-learning in the form of podcast revision lectures in higher education	Computers & Education	61
Latest	Hözer e Matté (2017)	Podcasts in Biochemistry and Molecular Biology	Journal of Biochemistry Education	0
Main discussion: The podcast as an education tool in the teaching-learning process				

Source: Research Data

b) Green Cluster: Podcast and Health

The article written by Boulos et al. (2006) is the pioneer and most cited paper found in this research. The discussion proposed refers to the collaborative tools available in the cybernetic environment and its use for learning in the health area. The authors discuss how podcasts, blogs, and wikis formulated with health-related topics have been increasingly adopted by professionals as a way of sharing experiences and learning. The conclusion points out “research agenda and an invitation to medical and health educationalists/researchers to formally debate, investigate, and report on the use and effectiveness of these tools in clinical education” (p. 2).

The work of Grock et al. (2017) seeks to identify how high quality medical educational content available in open access blogs and podcasts can help the development of orthopedic emergency residence programs. For the research, the authors chose to analyze the WestJEM Blog and Podcast Watch, high quality open-access educational blogs and podcasts in emergency medicine (EM) based on the ongoing ALiEM Approved Instructional Resources (AIR) and AIR-Professional series. This installment of the Blog and Podcast Watch highlights the topic of orthopedic emergencies from the AIR series. The results show that The *WestJEM* Blog and Podcast Watch series are based on the AIR and AIR-Pro series, “which attempt to identify high quality educational content on open-access blogs and podcasts. This series provides an expert-based, post-publication curation of educational social media content for EM clinicians with this installment focusing on orthopedic emergencies” (p. 531).

Available works in this cluster analyze learning through the podcast within the areas of Pharmacy, Dentistry, Nursing, Neurology, Surgery, Dermatology, Anatomy and Radiology. Although this cluster hosts health publications, it is closely linked to the potential of the podcast as an effective tool in the teaching-learning process. The articles that compose this cluster emphasize the results brought about by the use of the podcast having as purpose the educational character. Chart 2 compiles the results found.

Chart 2: Podcast and Health

Type of Work	Author	Title	Journal	Citation CitNetExplorer
Pioneer and most cited	Boulos et al. (2006)	Wikis, blogs and podcasts: a new generation of Web-based tools for virtual collaborative clinical practice and education	BMC Medical Education	19
Latest	Grock et al. (2017)	Blog and Podcast Watch: Orthopedic Emergencies	Western Journal of Emergency Medicine	0
Main discussion: Podcast as a tool in promoting and teaching of health				

Source: Research Data

c) Purple Cluster: Podcast and Radio

"Will the iPod kill the radio star? Profiling podcasting as radio", by Berry (2006), is the pioneer in the subject and the most cited author's study. It opens the discussion about the nature of the new media called podcast, how it has changed the way we listen to music and interact with the platform that we hear it on, also claiming that Podcasting is a new boom in amateur radio. The author assumes an optimistic position when he states that podcasting "not only removes global barriers to reception but, at a stroke, removes key factors impeding the growth of internet radio: its portability, its intimacy, and its accessibility" (p. 143). Berry (2006) believes that while podcasts continue to grow, the radio also grows, and a revamp is essential.

Berry (2006) presents radio characteristics, compares them to the podcast ones, and concludes that the concepts are distinct, since the podcast offers much more possibilities than the radio. "Podcasting is a medium that can do so much more, so organizations and individuals are finding ways to exploit the characteristics and the benefits of the new medium for corporate gain, for self-help and for education" (Berry, 2006, p. 153). The author also emphasizes the empowerment of the audience in the face of the new technologies, by arguing that the opportunities brought by the technological development provide experiences that go beyond consumption, allowing the listener to produce content and make it available to millions of people who can access it, when and where they wish. "What Podcasting offers is a classic 'horizontal' media form: producers are consumers

and consumers become producers and engage in conversations with each other” (Berry, 2006, p. 146).

Palomar and Borrajo’s most recent article “Serial, The Radio Program that Brought Podcasting Back to Life” (2017) discusses the investments made in podcasting from its inception to the arrival of the *Serial* podcast. According to the authors, in its early years, the podcast had practically no advertising investment, being treated by the industry in two ways - simple distribution channel that replicated the radio programming and space to advertise amateur work without great economic aspirations. The authors argue that it is in the year of 2013, in the United States, that the interest in the product gains strength. For them, this is directly linked to the connectivity of cars, the growing use of cell phones and the use of podcast in platforms such as Spotify, Deezer, Netflix, and Hulu. The authors regard the *Serial* podcast as the turning point in the podcasting business model, when advertising investments increased significantly, and brands saw in podcasting a direct way to advertise their products to an audience emotionally involved with the stories being told.

Palomar and Borrajo (2017) further claim that the podcast faces challenges to consolidate itself as a profitable business model, such as deep concentration around aggregators (Apple or Ivoox) and indexing, since audio is not yet linked to Google or other search engines. Finally, the authors warn that there is no pattern in the sector about the metrics, nor agreement with entities that regulate these standards. In addition, the data offered refer to the number of downloads, which does not necessarily represent a real listening. In summary, the cluster hosts publications about the nature of the podcast, its potentialities, and its paths to be consolidated as a profitable product in the development of a business model. Chart 3 compiles the publications discussed in this cluster.

Chart 3: Podcast and Radio

Type of Work	Author	Title	Journal	Citation CitNetExplorer
Pioneer and most cited	Berry (2006)	Will the iPod kill the radio star? Profiling podcasting as radio	Convergence	11
Latest	Palomar and Borrajo (2017)	Serial, The Radio Programme that Brought Podcasting Back to Life	Area Abierta	0
Main discussion: Podcast Nature Discussions and Business Model				

In the next topic, this research will present the emerging issues regarding the podcast.

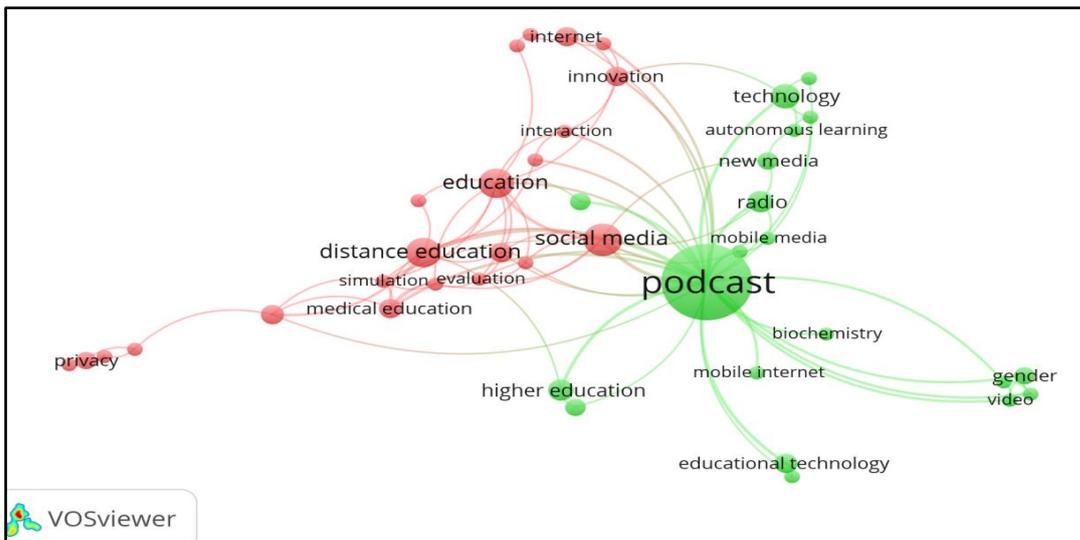
4. Emerging themes involving podcast research

The use of direct citation to identify the trajectory of a research field, as demonstrated in the previous topic, is inappropriate to find the emerging themes, as explained by the website's own developers, Van Eck and Waltman (2014, 2017). For this, it is necessary to work with the most recent publications, so a sub-sample was determined, containing only the works published between the years 2015 (65 publications), 2016 (78 publications), and 2017 (98 publications), totalizing 241, 36% of the original sample (669 publications). To analyze the sub-sample, the VosViewer software was used in two moments to both visualize and analyze the networks formed by keywords and coupled publications (Van Eck and Waltman, 2011).

Authors such as Zupic and Čater (2015) explain that clustering can detail issues approached in recent studies. Following the authors' guidelines, keywords were attributed to the clusters obeying the following parameters: (1) terms that occurred at least twice in the 613 keywords determined by the authors of the papers, belonging to the 241 papers published in the years 2015, 2016, and 2017 dealing with the podcast subject, should be used to form a network; (2) each cluster should contain at least 10 keywords.

However, according to Van Eck and Waltman (2011), the occurrence of synonymous keywords must be grouped in order not to modify the network. The authors therefore recommend that a dictionary should be created to gather words with the same meaning. Such procedure was adopted by this research, grouping words like "podcast" and "podcasts", for example. After the procedure, 51 keywords were found, but only 42 were consistently connected, according to the software. The final set of keywords was used to create a network, as explained in Figure 2 below.

Figure 2: Keyword network of the latest podcast publications



Source: Research Data (VosViewer)

The diameter of the circles represents the 42 keywords in the network, being directly proportional to the number of times they were cited by the authors of the articles. The curved lines indicate the 132 co-occurrence relations, the proximity between the circles shows the relationship between the keywords and the colors of the circles, the clusters containing at least 10 similar keywords.

The map suggests that there are two main emerging themes in the podcast research - social media and political participation, represented respectively by the red and green clusters. The red cluster indicates that podcasts are closely linked to social media and new forms of education and communication. The green cluster shows the proximity between political participation, mobile media, and radio. The green and red clusters are connected directly when discussing podcast, education, radio, and new media. The results create a dialogue with the reality presented by the “second age” of podcasting, when audio connects to others technological resources in a process of media convergence, weaving a cybernetic environment consisting of complex elements that establish a dialogue by creating new forms of relation with the diversified audiences. The results can be interpreted as insights for a research agenda about the podcast.

Conclusion

This article aims to review the literature on the term podcast, seeking answers to the following questions: What is the trajectory of podcast research? What are the emerging

issues? In order to reach this goal, it carried out a qualitative-quantitative research (Flick, 2009; Codina et al., 2011). Data was collected from the Web of Science research database and resulted in 669 papers that contained the term podcast between the years 2005 and 2017, establishing a 12-year research window. The chosen research period – 2005 to 2017 – is due to two factors. The first academic publication about podcast dates back to 2005 and, in 2017, Apple has turned an analytic feature that gives podcast creators the ability to see basic information about the way people listen - or don't listen - to shows on Apple's Podcast app, which is considered a milestone in the history of this media, making it definitely professional. Data search was carried out through the using the CitNetExplorer software, the analysis of the citations network, and the VOSviewer, in the construction of the bibliometric map. After the data collection, the articles highlighted by the research were analyzed, in order to bring light to the understanding of the theoretical basis on which the study of the podcast is based.

The trajectory of podcast research can be understood from three points, mainly: the podcast as an educational instrument in the teaching-learning process; the podcast as a tool for promoting and teaching health; discussions about the nature of the podcast and the business model.

This work points out the theoretical framework in which the understanding of the podcast is based, with concepts and reflections in different fields of knowledge. If the podcast, at first, is associated with a theme exclusively relevant to Communication, this research concludes the there are three scientific areas with more published works on the podcast are: Education (34%), Computer Science (12%) and Engineering (7.7 %). Communication represents only 4.9% of publications, appearing in seventh place, tied with Occupational Health. In fact, the term podcast is used for the first time in a text about education, by Campbell (2005), which defends the potential of the content conveyed by the podcast as an educational tool capable of promoting learning. On the radio media, specifically, the research found out that there are publications about the nature of the podcast, its potentialities, and its paths to be consolidated as a profitable product in the development of a business model. The research points out that the article “Will the iPod kill the radio star? Profiling podcasting as radio”, by Berry (2006), opens the discussion about the nature of the podcast, being the pioneer in the subject and the most cited authors’ work.

In the three areas studied by this research, we point out that the precursor paper “Digital natives, digital immigrants on the horizon”, by Prensky (2001), is anchored in education, and does not specifically refer to the term podcast, but to the challenges to be surpassed in the teaching-learning process in the face of new emerging technological devices. In the areas of health and radio, the pioneering works - and also the most cited - are both from 2006.

The research also produced a map with the main emerging topics on podcasting and reached the terms ‘social media’ and ‘political participation’, respectively represented by the red and green clusters. The red cluster indicates that podcasts are closely linked to social networks and new forms of education and communication. The green cluster shows the proximity between political participation, mobile media, and radio. The green and red clusters are connected directly to the discussion of podcast, education, radio, and new media. These themes can be understood as a conceptual map about the podcast today, with the six main problems emerging from the scientific field around this media: social media, political participation, education, mobile media, radio and new media.

The research carried out by this work can be understood as an initial study on the conceptual foundations of the podcast, since it is a medium that is still under construction, and it is not possible, at this time, to carry out any predominantly conclusive study. A 12-year research window does not point to a definitive scenario, but shows some movements, such as the growth of scientific interest in the subject; the wide coverage of podcast studies, with presence in various areas of knowledge; and the emerging problems that are guiding the researchers' reflections.

REFERENCES

- Araújo, C. A. (2006). Bibliometria: evolução, história e questões atuais. *Em Questão* 12(1), 11-32.
- Avelar, K., Prata, N. & Martins, H. (2018). *Podcast: trajetória, temas emergentes e agenda*. 41º Congresso Brasileiro de Ciências da Comunicação, Joinville, Santa Catarina.
- Berry, R. (2006). Will the iPod kill the radio star? Profiling podcasting as radio, *Convergence*, 12(2), 143-162.
- Bonini, T. (2015). The ‘Second Age’ of Podcasting: reframing Podcasting as a New Digital Mass Medium. *Quaderns del CAC*, 41(38), 21-30
- Boulos, M.; Maramba, I.; Wheeler, S. (2006). Wikis, blogs and podcasts: a new generation of Web-based tools for virtual collaborative clinical practice and education. *BMC Medical Education*, 6(41). <https://doi.org/10.1186/1472-6920-6-41>.
- Brazilian Association of Podcasters. <http://abpod.com.br/wp-content/uploads/2018/10/PodPesquisa2018.pdf>

- Brookes, M. (2010). An evaluation of the impact of formative feedback podcasts on the student learning experience. *Journal of Hospitality, Leisure, Sport and Tourism Education*, 9 (1), 53-64.
- Bruno, I. (2008). *Fator de impacto – O índice h*. <https://pt.slideshare.net/esalq/fator-de-impacto-e-ndice-h-presentation>.
- Campbell, G. (2005). There's Something in the Air: Podcasting in Education. *Educause Review*, 40(6), 32-47.
- Cid, M. (Host) (2015-present) *Não Ouvo Podcast* [Audio podcast]. <https://open.spotify.com/show/7w2wmS5tdwLBMtEN3puAxx>
- Close, C. (2017). *Rethinking intra-party cohesion*. In: Australian Political Studies Association Annual Conference, Sydney.
- Codina, L., et al. (2011) Ferramenta para análise geral de qualidade em cibermeios. In M. Palácios (ed.), *Ferramentas para Análise de Qualidade no Ciberjornalismo*. Labcom.
- Evans, C. (2008). The effectiveness of m-learning in the form of podcast revision lectures in higher education. *Computers & Education*, 50(2), 491-498.
- Figueiredo, F., & Pinto, M. (Hosts) (2015-present) *Xadrez Verbal Podcast* [Audio podcast]. <https://xadrezverbal.com/category/audio/podcast-do-xadrez-verbal>
- Filho, J., Mesquita, F., Freitas, E., & Carvalho, B. (Hosts) (2010-present) *99 Vidas* [Audio podcast]. <http://99vidas.com.br>
- Flick, U. (2009). *Uma introdução à pesquisa qualitativa*. Artmed.
- Gallego Pérez, J. I. (2010). *Podcasting: distribución de contenidos sonoro y nuevas formas de negocio en la empresa radiofónica española*. [Tesis de Doctorado no publicada]. Universidad Complutense de Madrid.
- Grock, A.; Rezaie, S.; Swaminathan, A.; Min, A.; Shah, K. & Lin, M. (2017). Blog and Podcast Watch: Orthopedic Emergencies. *Western Journal of Emergency Medicine*, 18(3), 531-538.
- Guedes, V. L. S. & Borschiver, S. (2005) *Bibliometria: uma ferramenta estatística para a gestão da informação e do conhecimento, em sistemas de informação, de comunicação e de avaliação científica e tecnológica*. In: Proceedings CINFORM - Encontro Nacional de Ciência da Informação, 6, Salvador. <http://dici.ibict.br/archive/00000508/01/VaniaLSGuedes.pdf>.
- Hözer, R. Matté, C. (2017) Podcasts in Biochemistry and Molecular Biology. *Journal of Biochemistry Education*, 15(1), 107-125.
- Klavans, R & Boyack, W. (2017). Which type of citation analysis generates the most accurate tax on my scientific and technical knowledge? *Journal of the Association for Information Science and Technology*, 68(4), 984-998.
- Lima, R. (1986). Bibliometria: análise quantitativa da literatura como instrumento de administração em sistemas de informação. *Ciência da Informação* 15(2): 127-33.
- Lucatelli, F. & Andrade, M. (2009). *A Comunicação na Esfera Pública: o que se publicou entre 1998 e 2008 no Congresso Brasileiro de Ciências da comunicação*. XXXII Congresso Brasileiro de Ciências da Comunicação, Curitiba-PR.
- Luiz, L. & Assis, P. de. (2010). *O Podcast no Brasil e no Mundo: um caminho para a distribuição de mídias digitais*. XXXIII Congresso Brasileiro de Ciências da Comunicação, Caxias do Sul-RS.
- Kischinhevsky, M. (2017). *Podcasting como suporte para experiências imersivas de radiojornalismo narrativo*. 15º Encontro Nacional de Pesquisadores em Jornalismo. ECA/USP – São Paulo.
- Martínez-Costa, M. & Prata, N. (2017). The radio in search of its audience: towards a diversified and multiplatform listening. *Revista Brasileira de Ciências da Comunicação*, 40(3), 109-128. <http://portcom.intercom.org.br/revistas/index.php/revistaintercom/article/view/2803/2108>.
- Massimo, A. & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science. Mapping analysis. *Journal of Informetrics*, 11(4), 959–975.

- Mafra, G. (Host) (2017-present) *Gugacast Podcast* [Audio podcast]. <https://gugacast.com>
- McHugh, S. (2016). How podcasting is changing the audio storytelling genre. *The Radio Journal – International Studies in Broadcast & Audio Media*, 14(1), 65-82.
- Medeiros, D. (Host) (2004-present) *Digital Minds Podcast* [Audio podcast]. <https://www.digitalminds.com.br/blog>
- Merigo, C., Wallauer, J., & Bartis, C. (Hosts) (2012-present) *Braincast Podcast* [Audio podcast]. <https://www.b9.com.br/podcasts/braincast>
- Merigo, C., Wallauer, J., & Bartis, C. (Hosts) (2014-present) *Mamilos Podcast* [Audio podcast]. <https://www.b9.com.br/podcasts/mamilos>
- Mizanzuk, I., Beccari, M. & Ancara, R. (Hosts) (2011-present). *Anticast* [Audio Podcast]. <http://anticast.com.br>
- Otoni, A., & Pazos, D. (Hosts) (2015-present) *Nerdcast Podcast* [Audio podcast]. <https://jovemnerd.com.br/nerdcast>
- Palomar, R. & Borrajo, E. (2017). Serial, The Radio Programme that Brought Podcasting Back to Life. *Area Abierta*, 17(1), 73-82.
- Perfil da audiência do podcast no Brasil. <http://abpod.com.br/wp-content/uploads/2018/10/PodPesquisa2018.pdf>
- Pires, L. (Host) (2014-present) *Café Brasil Podcast* [Audio podcast]. <http://www.portalcafebrasil.com.br/todos/podcasts>
- Prata, N. (2009). *Webradio - novos gêneros, novas formas de interação*. Insular.
- Prensky, M. (2001). Natives, digital immigrants. *On the Horizon.*, 9(5), 1-6.
- Primo, A. (2005). Para além da emissão sonora: As interações no podcasting. *Intexto*, 2(13), 1-23.
- Quevedo-Silva, F.; Biagi, E.; Brandão, M.; Vils, L. (2016). Estudo Bibliométrico: Orientações sobre sua Aplicação. *Revista Brasileira de Marketing* 15(2). <http://www.revistabrasileirmarketing.org/ojs-2.4/index.php/remark/article/viewarticle/3274>.
- Scolari, C. (2013). Media Evolution: Emergence, Dominance, Survival, and Extinction in the Media Ecology. *International Journal of Communication*, 7, 1418-1441.
- Solano, A., Braga, D., & Estrada, R. (Hosts) (2010-present) *Matando Robôs Gigantes Podcast* [Audio podcast]. <https://www.matandorobosgigantes.com/>
- Van Eck, N. J. & Waltman (2010). L. Software survey: VOSviewer, a computer program tion in the Media Ecology. *International Journal of Communication*, 7, 1418-1441. for bibliometric mapping. *Scientometrics*, 84(2), 523-538.
- Van Eck, N. J. & Waltman, L. (2011). Text mining and visualization using VOSviewer. *ISSI Newsletter*, 7(3), 50–54.
- Van Eck, N. J. & Waltman, L. (2017). Citation-based clustering of publications using CitNetExplorer and VOSviewer. *Scientometrics*, 111(22), 1053-1070.
- Van, Eck, N. J. & Waltman, L. (2014). CitNetExplorer: A new software tool for analyzing and visualizing citation networks. *Journal of Informetrics*, 8(4), 802 -823.
- Web of Science. <https://clarivate.com/products/web-of-science/web-science-form/web-science-core-collection/>
- Yardley, E.; Wilson, D. & Kennedy, M. (2017). “To me its [sic] real life”: Secondary Victims of Homicide in Newer Media. *Victims & Offenders*, 12, 467-496.