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Technical-Digital Teaching in Journalism Studies in Spain: Toward Hybrid Generic–Specialized Training in Languages and Formats

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Abstract:

Technological transformations and, especially, the accelerated process of digitalization have changed the profiles and production routines of the media. At the same time, universities have had to adapt their journalism curricula to new training needs. This paper analyzes the evolution of the technical-digital training of the journalism degree in Spain over the last two decades through a comparative study of three stages: before, during, and after the adaptation to the EHEA (2000–2010–2020). The research brings together, as valuable reference material, the curricular offerings of 112 programs and 242 subjects that show the educational evolution of the digital environment over the last 20 years, with a longitudinal and epistemological approach. The trends identified by this diagnostic work confirm, among other aspects, how the design of journalism curricula has evolved at a slow and asynchronous pace in digital training until the last decade and with disparate speeds between universities. On top of that, this is the conformation of a highly varied epistemological heritage that, beyond the specific names of the subjects, denotes a progressive commitment to digital and multimedia teaching, combining generic hybrid knowledge with more specialized training in terms of languages and formats.

Keywords:

Journalism; Technology education; Digital; Multimedia; Technical-digital teaching; Journalism studies; Languages; Professional profiles; Study plans; Training needs; Curricula offer; Formation programs; Journalism curricula; Journalism education; Topics

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1. Introduction

Technological transformations and, especially, the accelerated process of digitalization, have changed the profiles and production routines of the media. At the same time, universities have had to adapt their journalism curricula to the new training needs. This process has

generated a great deal of research over time on the characteristics and evolution of the university training of future journalism professionals. In the 1990s, training focused on technological aspects. Subsequently, changes in the professional sector demanded a curricular rethink in journalism studies in an open and timely debate coinciding with the celebration of the 50th anniversary of this degree in Spanish universities [1].

Reflection on the needs of journalists generated numerous controversies that have been maintained, for the most part, in the academic works of the last two decades. Twenty years ago, Vassallo-de-Lopes *et al.* (2000) warned of the lack of a framework for in-depth reflection, both at the teaching and research level, regarding the institutionalization of Communication Studies [2]. The debates between digital competencies and non-technological knowledge have been recurrent at a global level and, specifically, in the Spanish context. Fidalgo (2001) went so far as to propose training levels that combine more traditional knowledge with new platforms and technical tools through processes of experimentation [3]. Within the framework of this debate, Palomo warned, from the beginning of the digital transformation of the media, of the risk of generating 'two-speed' journalists [4].

The National Agency for Quality Assessment and Accreditation (ANECA) established in the White Paper on Bachelor's Degrees in Communication that the main training requirements of Journalism degrees should focus on analytical-critical skills, good technical and professional preparation, reflection on journalistic work, innovation, the ability to adapt to changes and experimentation derived from professional practice and in laboratories [5]. In the same year, UNESCO commissioned a group of education experts to define guidelines for a journalism curriculum. The study concluded that such a curriculum design should be organized around three axes [6]:

(1) Journalism standards, values, tools, quality criteria and practices;
(2) Social, cultural, political, economic, legal and ethical aspects of journalism practice;
(3) Knowledge of the world and the intellectual challenges linked to journalism.

UNESCO's reflection did not have a direct impact on the technological aspect because, despite the existence of cybermedia, the digital emergence was still incipient in the journalistic scene. However, during the first decade of the 21st century, several academic studies appeared that, in the Spanish context, already highlighted the transformations in professional profiles due to the accelerated process of digitalization [7,8]. In 2010, research on the training of journalists in Brazil, Portugal, Puerto Rico and Spain concluded that university communication studies had been widely incorporated into universities in the Ibero-American scenario [9]. However, it alluded to the existence of a disparity of programs and curricular designs.

The debate on the connection between academia and industry has been recurrent. Among others, Acosta *et al.* (2016) pointed out the reduced connection between Journalism studies and the professional scenario due to the speed of transformations in the industry and the slowness of universities to update their curricula [10]. For its part, the most demanded professional profiles in the field of digital content in Spain 2012–2017 pointed out that training in Spain focused on technical aspects to the detriment of creative skills [11]. In 2017, Harvard University's NiemanLab and the Reuters Institute's report on journalism, media and technology trends and predictions pointed out that the main challenges facing journalism had a strong technological component: 3D reality in mobile phones for news purposes, virtual intelligence, data journalism, the fight against fake news and new business models [12,13].

Since 2000, the curricular transformation of journalism curricula has undergone a continuous process of redefinition around four specific areas [14], including E-journalism, Writing, Information technology, and Development of multimedia projects. At the same time, academic work on the teaching of journalism in Spain is receiving a boost with the proximity of the Bologna Plan (2008–2010), generating a wide range of general references and those on specific areas:

(1) Evolution of journalistic tasks and routines [7,15–18];
(2) Competences and specialization in the new digital environment [19,20];
(3) New profiles [21–23];
(4) More specific aspects such as organic search engine positioning or other technological developments [24].

The advances made in recent decades in the training of communicators go hand in hand with the exponential increase in consolidated Communication research in Spain [25–27] whose findings affect the very teaching of Communication theories, revisited in the digital environment [28,29], and which are gradually being transferred to the classroom in parallel to the expansion of the digital environment in the last 25 years [30], with similar scenarios in Spain and in the European environment [31].

These studies have focused in recent decades on answering a question: How to design the digital training of future journalists in the Journalism curricula of Spanish universities? This research attempts to answer this question based on previous studies that have identified a slow but progressive incorporation of new skills and competencies [14,32] and on work based on comparative studies with other countries [9,33,34]. Based on these previous studies, the main objective of this paper is to analyze the evolution of the technical-digital training of the Journalism degree in Spain over the last two decades. Three specific objectives are developed from this main aim:

(1) To analyze the longitudinal evolution of the curricular insertion of the technical-digital training of journalists in three comparative stages: before, during and after the adaptation to the European Higher Education Area (EHEA) (2000–2010–2020).
(2) To quantify the increase in the number of compulsory subjects in digital training.
(3) To point out the epistemological changes in the definition of both general and specialized training processes.

The study is based on a double hypothesis about the evolution of the technical-digital training of the Journalism degree in Spain. On the one hand, it is predicted that this training process has evolved more decisively in the post-EEES stage (2010–2020) than in previous ones. Secondly, it is established that the process of curricular insertion is slow and uneven among the group of Spanish universities with different commitments to the renewal of curricula, specialization and hybrid-type content.

2. Methodology

The research is descriptive, explanatory and exploratory. The methodological proposal is based on a prescriptive documentary review and a content analysis based on several documentary sources. Firstly, a literature review is carried out [35], based on previous studies that describe and analyze the training changes that have taken place in Journalism programs in Spain, especially in the last three decades analyzed (2000–2010–2020), before, during and after the Bologna Plan and reviewed in terms of technological training changes and training innovation approaches [36].

This review allows us to delimit the theoretical framework on which the empirical analysis is based. The preceding studies outlined above reflect a shift in university journalism programs towards more technical and specialized training. There is a slow but progressive increase in journalism and digital communication-related teaching to the detriment of interdisciplinary theoretical content. To check this trend in more detail and in an updated way, this research proposes a longitudinal content analysis that allows us to observe the evolution of technical and digital teaching during different stages that reflect the changes introduced in the training programs of the Spanish universities that offer Journalism studies. The list has been compiled from the ANECA database (2021) [37] and the Ministry of Science, Innovation and Universities website (2021) [38]. The study focuses on three specific stages of the last two decades using a diachronic longitudinal analysis that addresses different samples both in terms of the number of universities and the number of subjects in each of them [39]. The stages of the study respond to the following curricular changes (**Table 1**).

Content analysis is used as a research technique that helps to achieve objective, systematic and quantitative description of content based on systematic textual observation [40–42]. In addition, this analysis has made it possible to establish and analyze trends in a final, more qualitative discussion centered on the epistemological debate on the teaching of the digital environment to answer the questions of what to teach about the changing digital environment, how to delimit the formative variety and what knowledge is considered essential, as compulsory teaching, in recent decades.

Table 1. Stages of the study

Study stage	Characteristics
Stage 01	Last Bachelor's program (late 1990s and early 2000s) The last Bachelor's plan allows us to analyze the initial training aimed at incipient technological innovation in 35 universities.
Stage 02	First Degree Plan (2008–2010) First Bachelor's Degree in Journalism syllabuses adapted to the European Higher Education Area (EHEA) in which universities cut back to four years and introduced new features more specific to the digital environment. The offer increases to 38 universities.
Stage 03	Updating the Bachelor's Degrees (2010–2020) Analysis of the most specialized digital and multimedia training a decade after the first Journalism Degree plans (post-EEES) and in the face of an expanding digital and automated environment. The analysis covers 40 universities.

Table 2. Categories of the study: explanation and scope

Study category	Explanation and scope
C1. Presence of compulsory subjects	It makes it possible to know and quantify which subjects are considered central to a journalist's curriculum and which are offered as essential for professional practice, regardless of the wide and varied optional subjects, which depend on the choice of each student.
C2. Comparative time evolution	Undergraduate / EHEA / post-EHEA, which makes it possible to check the training evolution with respect to the offer and the university regulatory changes adapted to the Bologna Plan and the expansive digital environment.
C3. Epistemological Question	The naming of the subjects reflects an evolution from an epistemological point of view with respect to the training approach, indicating a greater degree of specialisation in terms of knowledge of advances in the technological ecosystem.
C4. Ownership of Universities	The naming of the subjects reflects an evolution from an epistemological point of view with respect to the training approach, indicating a greater degree of specialisation in terms of knowledge of the advances in the technological ecosystem. It makes it possible to differentiate between public and private provision in terms of their more synchronous or asynchronous adaptation to the digital environment.

Source: Based on Tejedor (2008), Acosta *et al.* (2016) and Sánchez-García (2016; 2017).

The reference population, selected from the website of the Ministry of Science, Innovation and Universities (2021) [38], covers Spanish universities that offer a Bachelor's Degree in Journalism. The purposive sample of the delimited curricula (n = 112) includes the analysis of three university programs for each of the stages. In the case of universities that inaugurate their Journalism studies at later stages, 1 or 2 programs have been analyzed, as appropriate. The list compiled over the last two decades has made it possible to draw up a sample of subjects (n = 242) from two main sources:

(1) The syllabuses published in the Official State Gazette (BOE), corresponding to the Bachelor's degree programs, in the case of the first stage;

(2) The first Bachelor's degree programs approved under the Bologna Plan complete the second stage [43].

In the case of the third stage, the information has been compiled from the official websites of each university, including their offer for the 2020–2021 academic year. Each stage and each program offers a differentiated number of subjects: in the 1st stage (last Bachelor's degree program) 35 universities with Journalism studies add up to 51 subjects; in the 2nd stage (new Bachelor's degree in 2010), 38 degrees and 86 subjects; and in the 3rd stage (post-EHEA, 2020–2021) 40 universities add up to 109 compulsory subjects under study. Four categories have been studied which allow for a comparative quantitative analysis (**Table 2**).

The selection of compulsory subjects in all courses

was completed through a manual search of the programs, using a register of 10 keywords derived from the methodological proposals of Tejedor (2008); Acosta *et al.* (2016) and Sánchez-García (2016; 2017): 'technology,' 'cyberjournalism,' 'digital,' 'multimedia,' 'innovation,' 'big data,' 'data,' 'network,' 'networks' and 'internet' [10,22,33,43]. From a first search, a second review was carried out based on a complete check of the offer of more specialized subjects by analyzing minority keywords, not contemplated a priori (such as 'transmedia,' 'storytelling' or 'app') that referred to digital training from perspectives other than those included in the keywords. In cases of doubt, the analysis of teaching guides published by each university was used.

3. Results

The compilation of all the technical-digital subjects in three different stages has allowed the construction of a first table (**Table 3**), which can be considered as one of the contributions of this research, as it synthesizes key aspects in the study of the evolution of journalism education in Spain. Furthermore, it is considered a contribution to the current debate on the curricular design of the curricula for Journalism degrees. This is a descriptive work, non-existent to date, which, from a longitudinal comparative approach, offers a diagnostic approach to the curricular offer of subjects related to technological education and the digital environment in Spanish universities with a Bachelor's Degree in Journalism. Based on this table, the results are analyzed according to the study categories described.

3.1. Full offer of compulsory subjects in the technical-digital environment

The analysis in **Table 3** of the sample of 112 programs and 242 subjects reflects the evolution of technical-digital teaching over the last two decades and allows us to compare the change from the Bachelor's degree programs, which are accounted for in 34 universities, and their transition to the first Bachelor's degree programs (2008–2010), with a total of 38 universities now offering Journalism studies. This work makes it possible to verify whether there has been a training update in the digital environment 10 years after the adaptation to the EHEA in the 2020–2021 academic year, which amounts to a total of 40 universities with a Bachelor's Degree in Journalism in Spain. To facilitate and organize the longitudinal analysis by categories, the table is divided into three sections that include information on each university: the ownership (private or public) of the institution, the compulsory subjects for each stage, and the express incorporation of new subjects offered on the official websites. The list includes compulsory subjects related to training in technology and the digital environment. However, the optional subjects have been excluded to highlight those that each university considers essential in journalism education, without depending on the student's choice. On the other hand, the study has identified three types of subjects: Compulsory (OB); Basic Training (FB), and Core (T).

3.2. Three-stage longitudinal analysis

The results of the longitudinal analysis of the last two decades studied are presented below, listing the main categories in each period that mark their evolution and trends.

3.2.1. From the 'technological' degree to the 'digital' degree (2000–2010)

The relationship between the offer of compulsory subjects (C1) and its comparative study by stages (C2) describes interestingly the educational change from the last Bachelor's Degree to the debut of the Bachelor's Degree and the current post-EHEA stage. The offer compiled shows that the training of journalists linked to technologies is present in the old Bachelor's degree programs of the late 1990s and the beginning of the 21st century in the majority of universities. In the first decade analyzed, 34 universities offer Bachelor's degrees in Journalism, and one type of subject is predominant, offering training in 'technologies.' This subject is present in 19 curricula (56%) with two predominant denominations: 'information technology' or 'journalism technology' and, to a lesser extent, 'communication technology.' The next most common subject in the Bachelor programs is the term 'digital,' which appears in 4 curricula, as does the term 'electronic' in 4 programs. The term 'multimedia' appears in three programs, while 'internet' appears in three others.

Table 3. Programmatic offer of technological-digital teaching in the curricula of universities with a Bachelor's Degree in Journalism in three stages (2000–2010–2020)

University	Compulsory subjects related to technology education and the digital environment in Spanish universities with a Bachelor's Degree in Journalism		
	Last Bachelor's Degree (1995/2000)	First Degree Plan (2008/2010)	Updating of the Degree post-EHEA (2020/2021)
Abat Oliba University Oliba (UAO) Private	Information Technology I (5cr., 3rd, T); Information Technology II (5cr., 3rd, T)	Innovaciones tecnológicas en periodismo (6cr., 3º, OB); Periodismo multimedia (6cr., 4º, OB)	Periodismo Lab. Redacciones integrales (6cr., 1, OB) (Nueva); Innovaciones tecnológicas en periodismo (6cr., 3º, OB); Periodismo multimedia (6cr., 3º, OB); Storytelling multimedia (6cr., 4º, OB) (Nueva)
University Antonio de Nebrija (UAN) Public		New Technologies and the Information Society (6 cr., 1st, FB, bilingual); Writing and Editing in Digital Media (6 cr., 3rd, OB); Management of Virtual Communities (6 cr., 4th, OB)	New Technologies and the Information Society (6cr., 2nd, OB); Writing and editing in digital media; Management of virtual communities (6cr., 4th, OB); Digital Journalism and Data Analysis (6cr., 4th, OB) (New)
University Autonomous Barcelona (UAB) Public		Journalistic Writing in Interactive Multimedia (6cr., 2º, OB); Information and Communication Technologies (6cr., 2nd, FB); Journalistic Production and Expression in Multimedia and Interactive (6cr., 2nd, OB)	Information and Communication Technologies (6cr., 2nd, OB); Data Journalism (6cr., 3rd, OB) (New); Management of Multimedia and Interactive Contents (6cr., 3rd, OB)
University Camilo José Cela (UCJC) Private		New Technologies (6cr., 2nd, OB); Cyberjournalism (6cr., 4th, OB)	(Extinction of the Bachelor's Degree in Journalism for the new Bachelor's Degree in Communication); Creation of transmedia stories (3cr., 2nd, OB); Cybercommunication and social transformation (6cr., 3rd, OB); Digital skills for the 21st century (II) (6cr., 3rd, OB); Digital media production (6cr., 3rd, OB); New marketing trends (6cr., 3º, OB); Big data and open data in communication (6cr., 3rd, OB); Apps and communication (6cr., 3rd, OB); Mention in new media (with electives)
University Cardenal Herrera (UCH) Private	Information Technology (12cr., 4th, T)	Digital Communication and Information Architecture (6cr., 4th, OB); Journalistic production applied to the Internet (6cr., 4th, OB)	Digital Communication and Information Architecture (6cr., 4th, OB); Journalistic production applied to the Internet (6cr., 4th, OB)
University Carlos III Madrid (UC3M) Public	Technology Applied to Journalism (6cr., 1st, OB); Journalism on the Net (6cr., 2nd, OB); Treatment of Information on the Net (6cr. 4th, OB)	Communication and Citizen Participation on the Net (6cr., 1º, FB); Journalism on the Net (6cr. 2º, OB)	Communication and Citizen Participation on the Net (6cr., 1º, FB); Journalism on the Web (6cr. 2nd, OB); Data Journalism (6cr. 4th, OB)
University of Castilla la Mancha (UCLM) Public	No Bachelor's degree offered	Technology of written media (6cr., 1st, OB); Press and Internet message techniques (6cr., 1º, OB); Digital journalistic design and editing (6cr., 3rd, OB); Cyberjournalism (6cr., 3rd, OB)	Technology of the written media (6cr., 1º, OB); Press and Internet message techniques (6cr., 1st, OB); Digital Journalistic Design and Editing (6cr., 3rd, OB); Cyberjournalism (6cr., 3rd, OB)
University Catholic Antonio (UCAM) Private	Information Technology (10cr., 3rd, T)	Technology I: Print Media (6cr., 1st, OB); Technologies II (6cr., 2nd, OB); Technology III: Interactive Multimedia (6cr., 3rd, OB); Multimedia Journalism Workshop (6cr., 4th, OB)	Technology I: Print Media (6cr., 1st, OB); Technology II (6cr., 2nd, OB); Technology III: Interactive Multimedia (6cr., 3rd, OB); Multimedia Journalism Workshop (6cr.4th, OB)
University Complutense Madrid (UCM) Public	Journalistic production in New Technologies (4.5 cr., 3rd year, OB); Information Technology (12 cr., 4th year, T)	Multimedia (6cr., 3rd, OB); Journalistic Digital Information Management Technologies (6cr., 4th, OB)	Multimedia (6cr., 3rd, OB); Journalistic Digital Information Management Technologies (6cr., 4th, OB)
European University of Madrid (UEM) Private	Computer Graphics and Multimedia (8 cr., 3rd year, OB); Information Technology (12 cr. 3rd year, OB)	Multimedia Journalism Platforms (6cr., 3rd, OB); Multimedia design and programming (6cr. 3º, OB)	Immersive Journalism (6cr., 3rd, OB) (New); Digital Marketing (6cr., 3rd, OB) (New)

Table 3. (Continued)

University	Compulsory subjects related to technology education and the digital environment in Spanish universities with a Bachelor's Degree in Journalism		
	Last Bachelor's Degree (1995/2000)	**First Degree Plan (2008/2010)**	**Updating of the Degree post-EHEA (2020/2021)**
European University Miguel de Cervantes (UEMC) Private	Fundamentals of Information Technology (6 cr., 4th, T)	Information and Communication Technologies (6cr., 2nd, OB)	Information and Communication Technologies-ICT (6cr., 1st, OB); Multimedia Supports in News Production (6cr., 2nd, Basic); Production in Press and Cybermedia (6cr., 3rd, OB)
University (UFP-C) Private	No Bachelor's degree offered	Written Information Technology (6cr., 3rd, OB); Digital Journalism (6cr., 4th, OB)	New information technologies and multimedia production (6cr., 3rd, OB); Digital journalism, blogs and social networks (6cr., 3rd, OB).
University Francisco de Vitoria (UFV) Private	Written Information Technology (4.5cr., 2nd, OB); Applied Technology (6cr., 3rd, OB); Information Technology I: Written and Electronic (6cr., 4th, T)	Media Technology (6cr., 1º, OB); Cyberjournalism and Digital Products (6cr., 3rd, OB)	Multimedia Information (6cr., 1st, OB); Multimedia Journalism and New Formats (6cr., 3rd, OB); Information Processing and Social Network Management (6cr., 4th, OB) (New); Multimedia Design (6cr., 4th year, OB) (New)
International University of Catalonia (UIC) Private	Infotechnology 1 (5cr. 1st cuso, T); Infotechnology 2 (5cr., 1st cuso, T); Infotechnology 3 (5cr., 1st course, OB)	Networked Journalism Projects (6cr., 3rd, OB)	Online Journalistic Projects (6cr., 3º, OB); Online Community Management (6cr., 3rd, OB) (New)
University Jaume I (UJI) Public	No Bachelor's degree offered	Communication Technology (6cr., 2nd, OB); Cyberjournalism (6cr., 3rd, OB)	Online Journalistic Projects (6cr., 3º, OB); Online Community Management (6cr., 3rd, OB) (New)
University Jaume I (UJI) Public	No Bachelor's degree offered	Communication Technology (6cr., 2nd, OB); Cyberjournalism (6cr., 3rd, OB)	Communication Technology (6cr., 2nd, OB); Cyberjournalism (6cr., 3rd, OB)
University of La Laguna (ULL) Public	Print Journalism Technology (8 cr., 4th, OB)	Technology in Journalism (6cr., 3rd, OBs); Cyberjournalism (6cr., 3rd, OB)	Technology in Journalism (6cr., 3rd, OB); Cyberjournalism (6cr., 3rd, OB)
University of Málaga (UMA) Public		Written Media Technology (6cr., 1st, OB)	Digital Journalistic Design and Editing (6cr., 3rd, OB)
Miguel Hernández University (UMH) Public	Communication and Internet (4.5 cr., 2nd , T); Information Technology (12 cr., 4th, T)	Digital Communication and the Internet (6cr., 2nd, OB)	Database Management (6 cr., 1st, FB,); Digital Communication and Internet (6 cr., 2nd, OB)
University of Murcia (UMU) Public	Information Technology (12cr., 4th, T)	Information Production Technologies (12cr., 3rd, OB); Construction of Digital Information Services (12cr., 4th, OB)	Information Production Technologies (12cr., 3rd, OB); Construction of Digital Information Services (12cr., 4th, OB)
University of Navarra (UNAV) Private	Information Technology (5cr., 3rd, T)	Multimedia Communication (6cr., 1st, OB); Cyberjournalism (6cr., 3rd, OB); Digital Media Editing (3cr., 4th, OB)	Comunicación multimedia (6cr., 1er, OB); Ciberperiodismo (6cr., 3º, OB); Edición de medios digitales (3cr., 4º, OB)
University of Basque Country (UPV) Public	Print Media Technology (6cr., 1st, T)	Cyberjournalism Writing (6cr., 2nd, OB); Journalism Technology (6cr., 2nd, OB); Multimedia Editing and Production (6cr., 3rd, OB)	New Curriculum, in transition; Writing and Web Content Creation (6cr., 2nd, OB); Technology of Journalism (6cr., 2nd, OB); Multimedia and Transmedia Narratives (6cr., 2nd, OB) (New)
University Pompeu Fabra (UPF) Public	Internet Journalism (4.5cr, 4th, OB); Internet Workshop and Writing (6.5cr, 4th, OB)	Journalism on the Internet (4cr., 2nd, OB); Integrated Journalism Workshop I, II and III (24cr, 3rd, OB)	Formats Digitals i Documentació (6cr., 2nd, Basic); Journalism on the Internet (4cr., 2nd, OB); Integrated Journalism Workshop I, II and III (24cr., 3rd, OBs)
University Pontifical Salamanca (UPSA) Private	Information Technology (10cr., 4th, T)	Information Technology I (6cr., 1st, OB); Information Technology II (6cr., 3rd, OB); Digital Journalism (6cr., 4th, OB)	Information and Communication Technologies I (6cr., 1st, OB); Information and Communication Technologies (6cr., 3rd, OB); Digital Journalism (6cr., 4th, OB)

Table 3. (Continued)

University	Compulsory subjects related to technology education and the digital environment in Spanish universities with a Bachelor's Degree in Journalism		
	Last Bachelor's Degree (1995/2000)	First Degree Plan (2008/2010)	Updating of the Degree post-EHEA (2020/2021)
University Ramón Llull (URL) Private		Digital Journalism (6cr., 4th, OB)	(The Double Degree in Journalism and Corporate Communication is analyzed); Digital Content Management (3cr., 3rd OB) A new Digital Media Degree and other double degrees are launched.
King Juan Carlos University (UJC) Private	Written Information Technology (6cr., 1st, T); Multimedia Technologies (9cr., 3rd, OB); Digital Technologies I: Editing and Production in printed and electronic media (6cr., 4th, T); Digital Technologies II: Editing and Production in Audiovisual Media (6cr., 5th, T); Electronic Journalism (6cr. 5th, T)	New Technologies and the Information Society (6cr., 1st, FB); Planning and Development of Web Projects (6cr., 3rd, OB); Multimedia Journalism (6cr., 3rd, OB)	New Technologies and the Information Society (6cr., 1st, FB); Planning and Development of Web Projects (6cr., 3rd, OB); Multimedia Journalism (6cr., 3rd, OB)
University Rovira i Virgili (URV) Public	Journalism specializing in Multimedia Environments (9cr., 5th, T)	Audiovisual and Internet Technology (9cr., 1st, FB); Graphic Design and Multimedia (9cr., 2nd, OB); Internet Journalism (6cr., 3rd, OB)	Audiovisual and Internet Technology (9cr., 1st, FB); Graphic Design and Multimedia (9cr., 2nd, OB); Internet Journalism (6cr., 3rd, OB)
Universidad San Jorge (USJ) Private	Electronic Journalism (6cr., 3rd, T)	Cyberjournalism (6cr. 3rd OB); Multimedia Graphic Design (6cr. 3rd OB); Journalistic writing in digital media (6cr. 4th OB)	Ciberperiodismo (6cr. 3º, OB); Diseño gráfico multimedia (6cr. 3º, OB); Redacción periodística en medios digitales (6cr. 4º, OB)
San Pablo University (USP) Private	Information Technology: Fundamentals (4cr, 4th, T); Publishing and Production Technology (6cr, 5th, T)	Technology and New Media (6cr., 3rd, OB)	Social networks (6 cr., 1º, FB) (New); Production in digital environments (6 cr. 2º, OB) (New)
University Santiago de Compostela (USC) Public		Media Techniques and Technologies (6cr., 1st, OB); Multimedia: Theory, Technique and Applications (6cr., 3rd, OB); New Media and Information Architecture (6cr., 4th, OB)	Media Techniques and Technologies (6cr., 1st, OB); Multimedia: Theory, Technique and Applications (6cr., 3rd, OB); New Media and Information Architecture (6cr., 4th, OB)
University of Seville (USE) Public	Written Information Technology (6cr., 1st, T); Information Technology; Journalistic Cybernetics (6cr., 4th, T); Technological Configuration of Journalistic Processes (4,5cr., 4th, T)	Written Information Technology and Design (6cr., 2nd, OB); Cyberculture (6cr., 4th, OB)	Written Information Technology and Design (6cr., 2nd, OB); Cyberculture (6cr., 4th, OB)
Universidad a Distancia de Madrid (UDIMA) Private	No Bachelor's degree offered	Learning and Information and Communication Technologies (6cr., 1st, FB); Research in Digital Media (6cr., 2nd, OB); Digital Journalism (6cr., 4th, OB)	Information and Knowledge Technology and Management (6cr., 1º, T); Research in Digital Media (6cr., 1st, OB)
University of Valencia (UV) Public	Theory and Technology of Written Communication (9cr., 1st, T); Social Impact of Communicative Technologies; Technologies (4,5cr., 2nd, OB); Internet for Communicators (4,5cr., 3rd, T); Theory and Practice of Hypertext (4,5cr., 3rd, OB); Organization, Design and Production of Newspapers and Magazines (Paper and Electronic) (9cr., 4th, T); Digital Journalism (4,5cr., 5th, T)	Communication Technologies I (6cr., 1st, OB); Digital Journalism (6cr., 2nd, OB)	Communication Technologies I (6cr., 1st, OB); Digital Journalism (6cr., 2nd, OB); Communication Technologies II (6cr., 2nd, OB)

Table 3. (Continued)

University	Compulsory subjects related to technology education and the digital environment in Spanish universities with a Bachelor's Degree in Journalism		
	Last Bachelor's Degree (1995/2000)	**First Degree Plan (2008/2010)**	**Updating of the Degree post-EHEA (2020/2021)**
University of Valladolid (UVA) Public	Journalistic Production in New Technologies (6cr., 3rd, OB); Information Technology (12cr., 4th, T)	New Technologies applied to Journalism (6cr., 1st, OB); Cyberjournalism (6cr., 3rd, OB)	New Technologies Applied to Journalism (6cr., 1st, OB); Cyberjournalism (6cr., 3rd, OB)
University of VIC (UVIC) Private	Digital Journalism (6cr., 3rd, T); Fundamentals of Digital Communication (4,5cr., 3rd, OB); Interactive Communication Workshop (6cr., 4th, T)	Interactive Digital Communication (3cr., 3rd, OB); Online Journalism (3cr., 3rd, OB); Interactive Communication Workshop (3cr., 3rd, OB)	Fundamentals of Digital Journalism (3cr., 1st, OB) (New); Interactive Digital Communication (3cr., 3rd, OB) (New); Digital Journalism Workshop (3cr., 2nd, OB) (New); Interactive Communication Workshop (3cr., 3rd, OB) (New)
University of Zaragoza (UNIZAR) Public	No Bachelor's degree offered	Digital Communication and Information (6cr., 4th, OB); Digital Communication Project (9cr., 4th, OB)	Digital Communication and Information (6cr., 4th, OB); Digital Communication Project (9cr., 4th, OB)
CESAG Private (Attached to U. Pontificia de Comillas; formerly U. Baleares)		Information Technology (10 cr., 3rd year, T); Internet Journalism (6 cr., 4th, T)	Information Technology (10 cr., 1º, Basic); Digital Journalism (6cr., 4º, OB)
CESINE Private (Attached to London Metropolitan University)			Technology and organization of social media (6cr., 2nd, OB); Creation and maintenance of virtual communities (6cr., 3rd year, OB); Management and development of virtual content (6cr., 3rd, OB); Digital journalism (6cr., 4th, OB)
EUSA Private (Attached U. Seville)		Written Information Technology and Design (6cr., 2nd, OB); Cyberculture (6cr., 4th, OB)	Written Information Technology and Design (6cr., 2nd, OB); Cyberculture (6cr., 4th, OB)
University Villanueva CUV Private (Affiliated Complutense)		Multimedia (6cr., 3rd, OB); Journalistic Digital Information Management Technologies (6cr., 4th, OB)	Multimedia (6cr., 3rd, OB); Journalistic Digital Information Management Technologies (6cr., 4th, OB)

Source: Based on Sánchez García (2014), Sánchez-García and Campos-Domínguez (2016); Sánchez-García and Marinho (2016). Contrasted with BOE corresponding to each degree and updated with the offer of the programs disseminated on the websites of the universities with Bachelor's Degrees in Journalism in the 2020–2021 academic year.

In the adaptation of the curricula to the EHEA (2008–2010), with the incorporation of four more centers, there are 38 universities with new Bachelor‘s Degree in Journalism. At this stage, the offer of compulsory disciplines related to digital education was extended with a more specific approach and terminology linked to the new media, reflecting an initial trend towards specialization, while at the same time promoting hybrid, generic training in formats, languages and channels of communication.

The change from the Bachelor‘s Degree to the first Bachelor‘s Degree plan (the second stage in 2010) confirms that the reference to the subject of ‘technology’ remains predominant in 31 programs (81%), increasing its presence with respect to the previous stage, but with an appellation that was not present in the Bachelor‘s Degree. In this sense, the study identifies the irruption in this phase of the term ‘innovation’ and the denomination of ‘new technologies.’ Technology linked to communication and not only to information is on the rise. The new digital and networked environment of communication already appears in an expansive way at this stage in different subjects that reflect a formative change. For the first time, the meaning of “cyberjournalism” appears, which makes its debut in 9 programs with subjects that expressly present this denomination. The predominant subjects are “digital” in 19 programs (50%); “multimedia” in 15 programs (39.4%); and the concept of “internet” appears in 7 programs (18.4%). To a more limited extent, other new subjects appear (with their corresponding names) such as “network” in 4 programs; “new media” or “new supports” in 2 programs; and, finally, the expressions “interactive,” “online,” “new media,” “new supports” or “virtual communities” appear in 1 program, respectively. The term “electronic” disappears, and even at this stage there are no compulsory subjects referring to “social networks.”

The overall analysis of the change from the Bachelor‘s degree to the first Bachelor‘s degree plan in terms of digital or multimedia teaching represents a renewal of 55% of the Bachelor‘s degree programs adapted to the EHEA. In all the universities studied the number of such subjects increased from 51 subjects in 35-degree programs to 86 subjects in the 38 plans for the first Bachelor‘s degree. This increase was reflected in a majority offer of 2 to 3 compulsory subjects related to new technologies or the digital environment in 80% of the faculties.

3.2.2. A decade of the EHEA: An expansive multimedia environment in a changing Bachelor‘s Degree (2010–2020)

The academic year 2020 represents the ephemeris of ten years after the adaptation to the EHEA. The technological advances lead to a second phase of educational adaptation in the Spanish university, known here as post-EHEA. This stage is characterized by a progressive process of synchronization with a changing communicative reality with a training offer that is more specialized in digital transformations, new audiences and the irruption of social networks. In this third period analyzed, the study identifies 40 universities that offer a Bachelor‘s Degree in Journalism in Spain, i.e. 2 more than in the previous stage and 5 more than in the last Bachelor‘s Degree plan.

In terms of the name of subjects that refer to hybrid or transversal knowledge, the result of the analysis points to a change in trend to the previous ones, with a greater presence of the concept of “digital,” which appears in 30 syllabuses (75%) in a clear increase to the previous decade. The term “technology,” on the other hand, has dropped slightly to 29 subjects (72.5%). The term “multimedia” also appears as a predominant and growing term in 18 programs (45%). The use of the term “cyberjournalism” is reduced as an autonomous subject and appears in 6 of the 40 programs analyzed at this stage (15%), which confirms that it is not a term in expansion. Other previous references are still present, although their prominence is reduced or not increased, such as “internet” in 6 plans, in a slight decrease, and the expression “network” is maintained in the same 4 programs. The terms “new media” or “formats” are maintained in the same 2 plans.

The trend towards training specialization can be detected in new compulsory subjects in the digital environment with more specific knowledge in specific formats, channels or languages. These are subjects such as “social networks,” which appear for the first time as compulsory in 3 programs, and “online” or “virtual” communities, which emerge in 3 other programs. For the first time, the study detects “data journalism” as a

compulsory subject, and with different names: “database management” or “data analysis,” making a total of 4 subjects. In a more limited way, but marking a trend towards more specialized knowledge, “transmedia” training is included in 2 syllabuses, and expressions such as “online” or “web” appear linked to specific subjects in the area of editorial staff in 2 programs respectively; as do the subjects of narratives, storytelling or apps, which are offered in 1 program each.

Overall, the level of renewal in the last decade post-EHEA in terms of compulsory subjects related to the digital environment continues to increase, rising from 86 compulsory subjects in the previous stage to 109 subjects in 40 universities. Thus, the study identifies an increase of 3 and 4 compulsory disciplines in 52% of universities compared to the previous stage.

3.2.3. Epistemological delimitation: Hybrid generic training and tendency towards specialization

The above results provide elements for an epistemological debate on how subject designations reflect the change in educational content, the predominant offer and the trends in the need for delimitation of the changing digital education. In this sense, beyond the exhaustive quantification of the data, the study detects in a comparison of the predominant and minority keywords by stages, how the variation in the educational offer is being marked towards the compulsory content and, therefore, considered essential, which is offered as inherent to the teaching of the digital environment. On the one hand, it is confirmed that in the first stage, before the Bologna Plan, there is a predominance of generic training in technology. On the other hand, in the second stage, technological innovation and the express incorporation of the digital aspect in the first degrees, although the training considered to be hybrid and generic in nature still prevails.

During the so-called post-EHEA stage, corresponding to the last decade of the study, there is a change in trend: the more generic hybrid training is maintained, but a more specialized training in the digital environment begins to emerge, more focused on Communication in general and with more specific and differentiated training in multimedia formats, channels or languages. This quantification actually reflects how the terms of the subjects respond to the epistemological question of which compulsory education is considered basic at each stage so that journalists are sufficiently trained in constantly changing communicative environments by combining generic and specialized knowledge.

3.2.4. Two trends in e-learning: Stasis or renewal

When comparing the degree programs that were launched in the first phase in 2010 and those that were renewed a decade later, in 2020, two main trends can be seen that define university programs: those universities that opt for immobility in the face of dizzying changes in communication, with no or moderate innovation of programs; those that are already offering renewed curricula in the face of a changing communications sector.

In the first case, when analyzing the last decade, the study detects that 25 curricula maintain the same subjects, i.e. 62% of the programs have not renewed their compulsory offer between 2010 and 2020. On the other hand, new subjects appear in 14 programs, representing 35% of the offer of the 40 universities studied. Among the renewed programs, the majority incorporate 1 new compulsory subject; in the case of one program, 3 subjects are renewed; and in 4 programs, 2 new subjects are included.

The universities that have opted for a profound renovation in the last decade are three (**Table 3**), have opted to extinguish their 2010 plans and approve new Degrees, as is the case of two private universities: Camilo José Cela University (which is launching the Degree in Communication) and Ramon Llull University (which is launching the Degree in Digital Media). For its part, there is a public university, the University of the Basque Country, which is offering a new Bachelor‘s Degree in Journalism in transition.

Although this list of subjects does not take into account optional subjects, it has been noted as a trend that some universities offer differentiated itineraries and mentions in the Journalism degree itself, depending on the optional subjects, which, within the framework of the study, is of interest because it confirms the existence of a trend towards specialization in the digital environment. This is the case of Camilo José Cela University which offers a “Mention in new media”; University of Castilla-

Table 4. Variations of compulsory subject terms in the digital-technological training environment as hybrid or specialized training (2000–2010–2020)

	1st stage subjects (Undergraduate - 2000) 35 degrees / 51 subjects	2nd stage subjects (First Degree - 2010) 38 degrees - 86 subjects	3rd stage subjects (Post-EHEA - 2020) 40 degrees - 109 subjects
Hybrid training (generic to the digital environment)	Technology: 31 subjects (Information; Journalism; Communication)	Technology: 31 Subjects (New Technologies or Innovation)	Digital: 30 subjects
	Digital: 6 subjects	Digital: 19 subjects	Technology: 29 subjects
	Electronics: 5 subjects	Multimedia: 15 subjects	Multimedia: 18 subjects
	Internet: 4 subjects	Cyberjournalism: 9 subjects	Cyberjournalism: 6 subjects
	Multimedia: 3 subjects	Internet: 7 subjects	Internet: 6 subjects
	Network: 2 subjects	Network: 4 subjects	Network: 4 subjects
		New Media/Support: 2 subjects	New media/formats: 2 subjects
Specialized training (in formats, languages and channels)		Virtual Communities: 1 subject	Data: 4 subjects
			Online/Virtual Communities: 3 subjects
			Social networks: 3 subjects
			Transmedia: 2 subjects
			Interactive: 1 subject
			Online: 1 subject
			Web: 1 subject
			Narrative: 1 subject
			App: 1 subject

La Mancha with a "Mention in digital journalism"; San Jorge University of Zaragoza, which includes a new "Diploma of Specialisation in Digital Competences for Communication."

4. Discussion and conclusions

The longitudinal comparative study of the technological-digital educational offer of Journalism studies in Spain (2000–2010–2020) allows, on the one hand, to analyze the characteristics and evolution of the Spanish curricular offer linked to the training of students in technical-digital issues and, on the other hand, contributes to delimit the epistemological debate on what hybrid or specialized content to offer journalists as compulsory. First, the stage-by-stage analysis confirms the initial hypothesis that journalism programs have evolved more strongly in digital training in the post-EHEA phase (2010–2020) than in previous phases. This aspect at least partially challenges the criticisms of Acosta *et al.* (2016) regarding the reduced connection between Journalism studies and the professional scenario [10]. However, the diversity of proposals and the lack of a clear terminological consensus in the curricular offer of Spanish universities warn of some weaknesses in this process and of trends towards the educational change described in three stages:

(1) 2000–2010. The change from the Bachelor's Degree with technological training to the Bachelor's Degree with a digital focus.
(2) 2010–2020. The multimedia expansion of the first degrees under permanent review.
(3) 2020–2021. The trend towards hybrid training

together with the specialization of languages and formats.

The analysis of the compulsory subjects shows that in the last old Bachelor's Degree plans in force in 35 universities (first stage: from 1995 to 2000), subjects related to "technologies" appear as a generic technical training in more than half of the programs, being the predominant references; while, to a limited extent, the denominations "digital" or "multimedia" appeared. From the new EHEA-adapted Bachelor's Degrees, in the second stage of 2010, is when training in the digital environment appears in expansion. In this stage, 38 universities have the new Bachelor's Degree in Journalism and the offer of compulsory disciplines is extended with a more specific focus and terminology of the new media, which reflects an initial trend towards specialization of content, although they are still hybrid (generic in that they do not yet differentiate the changing trends in formats, languages and communication channels). In the first Degrees, training in "technology" continues to predominate, but the digital focus increases with subjects that incorporate this meaning together with "multimedia." In addition, the term "cyberjournalism" appeared for the first time, the use of the concept of "internet" increased in the subjects and "new media" was added. In all cases, these subjects are included in the general hybrid curriculum. In this period, they cannot yet be considered as part of a more specialized compulsory education.

The most notable change has taken place in subsequent years, especially progressively in the last stage, ten years after the implementation of the EHEA (2010–2020), with 40 universities whose programs set new trends. The study concludes that the presence of compulsory subjects offering general training in the technological-digital environment has been maintained, while a more hybrid curriculum has been consolidated in terms of training approaches. The main change concerning previous stages can be seen in the greater presence of the "digital" denomination, which has increased in three-quarters of the programs, overcoming the presence of the "technology" approach, characteristic of previous stages and which maintains a leading presence. The research notes a growing focus on the multimedia perspective, while the explicit term "cyberjournalism" is progressively reduced, confirming that it is not a growing term. The study's findings also identify a loss of the presence of generic concepts such as "internet," just as there is no growth of the term "network" or "new media."

The study concludes that there is a trend towards the incorporation in the compulsory curriculum of a set of subjects differentiated by channels, audiences, social networks or types of narrative, which is beginning to be considered essential in some programs that offer specific knowledge in specific environments such as social networks. In this sense, the irruption of subjects, non-existent in the first stages, which are structured around concepts such as "online" or "virtual communities," has been detected. For their part, "data journalism," although still tokenistic, or the teaching of transmedia storytelling or apps are becoming increasingly important. However, the analysis does not allow us to affirm that the curricula offered by Spanish universities respond to the challenges and trends identified in 2017 by Harvard University's NiemanLab and by the Reuters Institute's report Journalism, Media and Technology Trends and Predictions, which indicated, among other aspects, 3D reality through mobile telephony and virtual intelligence as the areas of greatest projection [12]. The analysis does not lead to the conclusion that these topics are given a leading role. Data journalism, on the other hand, has a progressively clearer presence.

The descriptive results of the longitudinal analysis carried out in the research conclude that there is an epistemological heritage that, beyond the specific names of the subjects, reflects the advances of the digital journalism environment itself, which are being incorporated into the classroom as an essential training. The comparison between the three stages shows a continuous process of change that points towards specialization. However, it would be necessary to study the degree of speed of these changes and their correspondence with the transformations of a digital communication environment shaken by technological impact. This aspect invites the development of a permanent line of research into the curricular design and training dynamics of journalism curricula based on key issues such as content, methodologies and professional profiles. The evolution of journalism profiles, which has been the subject of numerous studies in the Spanish context [7,15–22] could absorb a prominent presence,

especially from the reflective aspect, in the curricular design of Journalism studies.

In this sense, apart from the name of the programs and subjects, the commitment to transversal training emerges as a progressive trend that is difficult to quantify, if all journalism is now digital and that it is inevitably taught in all subjects. For this reason, this line of research can and should continue to be updated in various ways, aspiring to cover the offer of electives, also addressing postgraduate degrees, and updating the study through an international comparison in order to contribute new data and reflections to the open epistemological academic debate regarding the names and specific content most appropriate for the training of journalists in a changing communicative environment with both hybrid and specialized training profiles.

Disclosure statement

The authors declare no conflict of interest.

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