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Multiplatform ecosystems of professional learning: The case of the #CharlasEducativas

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Abstract

Self-directed educator professional learning is commonplace, and such activities increasingly span multiple digital spaces and formats, and blur boundaries between online and offline. In this exploratory research, we analyze the case of the #CharlasEducativas, a dynamic professional learning ecosystem that began in 2020 and is based in Spain. We describe the platforms, modalities, and activities that comprised the #CharlasEducativas from 2020–2023, and how these different elements combine to create a multiplatform learning ecosystem. Relying upon multiple data sources, we also analyze the topics and content associated with various components of this unique ecosystem, and share participant perceptions of the #CharlasEducativas. Although the ecosystem was first developed relying mostly on YouTube and X/Twitter, the #CharlasEducativas have evolved over time to include additional platforms, and even in-person events, with different spaces functioning in overlapping and distinct ways. These spaces have been employed in synchronous and asynchronous ways, using text, images, voice, and visuals to discuss and share information on a wide array of education topics. Many participants reported perceiving the #CharlasEducativas as a space of learning and community building, and credited this learning and community with sparking reflection upon and changes in their own teaching practices. We discuss how the #CharlasEducativas reflect opportunities and challenges of contemporary educator professional learning in the context of ubiquitous social media platforms. Finally, we define implications for research and practice, highlighting the need to advance understanding of educators' multiplatform professional learning activities.

Keywords: Professional learning, Social media, Multiplatform, Learning ecosystem, Teacher, Online community

1 Introduction

Among educators, social media platforms were once primarily the domain of technology enthusiasts. However, these platforms have now become a common part of many educators' professional lives. In particular, social media have played host to various self-directed professional learning activities (Carpenter & Staudt Willet, 2021; Greenhow et al., 2019; Lantz-Andersson et al., 2018). Over the years, a substantial body of research has described how and why educators use individual social media platforms, such as Facebook (e.g., Ito, 2023), Instagram (e.g., Shelton et al., 2022), TikTok (e.g., Carpenter, Morrison et al., 2024) and X, formerly known as Twitter (e.g., Marcelo-Martínez

& Marcelo, 2023). These individual-platform studies have contributed to understanding educator social media activities. And, for many years it was more typical for educators to engage primarily with a single online space or platform.

Individuals, however, increasingly have multiple social media accounts across various platforms (e.g., Global Web Index, 2023; Matassi et al., 2022; Zhao et al., 2016), and many educators do not limit themselves to employing a single social media platform, space, or approach (e.g., Aguilar et al., 2021; Staudt Willet, 2023). Nonetheless, very few studies have explored educator professional learning activities, initiatives, or programs that span multiple social media. Such activities are worthy of study because they may represent professional learning that is quite different in nature and possibilities from that which typically occurs in professional development (PD) programs. Formal PD has been the subject of much research, and various studies have demonstrated that well-designed PD can positively impact teachers' instruction (e.g., Garet et al., 2001; Van den Bergh et al., 2014). However, traditional PD approaches are frequently criticized (e.g., Hofman & Dijkstra, 2010; Kyndt et al., 2016), and some PD programs have resulted in null or even negative effects (e.g., Borman et al., 2008; Santagata et al., 2010). In this study, we investigate a non-traditional example of professional learning that is less prescriptive and less bounded by place and institutions, and potentially more fluid, just-in-time, and organic in character. Specifically, the purpose of this research is to explore the #CharlasEducativas, which offer a novel example of a professional learning ecosystem that utilizes several platforms and modalities.

The #CharlasEducativas can roughly be translated as "Educational Chats." Created in 2020 in Spain, the #CharlasEducativas began as a hashtag on what was then known as Twitter,¹ and was linked to education-related interviews. The second author of the current study initiated these interviews aiming to 1.) help give voice to and generate more of an audience for innovative teachers, and 2.) facilitate teachers being able to meet each other, and well-known colleagues who were otherwise inaccessible. For the interviews, the second author interviews an invited guest, with this conversation broadcast live on YouTube. Although interviews vary in length, most last between one-and-a-half and two hours. The majority of interviewees have been primary and secondary school teachers. However, interviews have been conducted with various other education workers and stakeholders, including early childhood educators, university faculty, staff from juvenile and adult centers, psychologists, families, and learners who speak in the first person about their diversity.

Educators and other education stakeholders have also used X/Twitter (and other platforms more recently) to respond to and discuss the interview content synchronously and asynchronously. From its inception, the #CharlasEducativas therefore used more than one platform and thus allowed for multiple approaches to interacting and learning. Gradually, the #CharlasEducativas have evolved to include additional platforms and modalities. As of June 2024, 239 chats had occurred, and the #CharlasEducativas have attracted substantial participation and recognition. For instance, the chat recordings have been viewed more than 280,000 times on YouTube at the time of writing. During its relatively

¹ Hereafter, we use the naming convention *X/Twitter* to reflect both the platform's current and long-standing historical names, except in quotes where we use participants' language.

short existence the #CharlasEducativas have received multiple prizes for Spanish-language education-related web content, such as the 2023 Espiral International Prize for Best Educational Dissemination Space. The #CharlasEducativas represent a unique case that illustrates some of the opportunities and challenges of the contemporary educator professional learning landscape. To date, there has been limited peer-reviewed research on the #CharlasEducativas (Mosquera-Gende et al., 2024), none of which focused on this learning ecosystem's multiplatform nature. By studying the #CharlasEducativas, we seek to broaden understanding of educator social media use as part of self-directed and informal professional learning activities that cross various traditional boundaries associated with time, location, cultures, hierarchies, and individual platforms.

2 Theoretical framework

Our study is framed by theory related to learning ecosystems. Such theory can help illuminate self-directed educator professional learning that takes place in multifaceted and unstable online settings. It also contributes towards thinking beyond distinct, clearly defined, and formal professional development (PD) programs, which often features predetermined content, is finite in duration, and may be either required or linked to teacher re-certification systems. *Professional learning*, by contrast, can include activities that are more self-directed, fluid, just-in-time, and organic (Webster-Wright, 2009). Theory related to learning ecosystems builds upon earlier theorization of human ecologies. Bronfenbrenner's (1979) social ecological model contributed to consideration of how individual humans do not exist in isolation and are influenced by environmental variables near and far. Later, Barron (2006) built upon Bronfenbrenner's work to offer a definition of a learning ecology as "the set of contexts found in physical or virtual spaces that provide opportunities for learning" (p. 195). The idea of a learning ecology highlights how self-initiated learning can occur in formal and informal ways, within and outside institutions.

While related to this idea of a learning ecology, a *learning ecosystem* is a slightly narrower concept in that it focuses on a particular system. A learning ecosystem includes elements such as people, places, activities, resources, and intangibles such as culture and history. Hecht and Crowley (2020) highlight the interactions between these elements, stating that a "learning ecosystem emerges as a constellation of intertwined and entangled elements, where learning happens through dynamic relational processes among the people, places, and stuff we find across/within/between school and out-of-school places" (p. 269). Sancho-Gil and Domingo-Coscollola (2022) similarly defined learning ecosystems in terms of "living organisms in combination with the non-living components of their environments, interacting as a system" and offered the following learning ecosystem characteristics:

- They are all interwoven.
- They are composed of elements of different kinds: people, nature, objects, symbols, and physical and virtual spaces.
- The intra-actions among all these elements have a certain stability and are governed by formal and informal rules.

- This stability can be more positive or more negative. Individuals may try to change or break free from these learning ecosystems. (Sancho-Gil & Domingo-Coscollola, 2022, p. 416)

Despite their “certain stability,” learning ecosystems are also understood to be dynamic, non-linear, and unpredictable, with mutable and permeable boundaries between different ecosystem parts (Hecht & Crowley, 2020; Zhao et al., 2016).

In the present study, a learning ecosystem framing draws attention to systems, as opposed to the focus on individuals that has been common in work framed in terms of learning ecologies (e.g., Barron, 2006; Van den Beemt & Diepstraten, 2016). The learning ecosystem concept also incorporates the interactions between a wide range of system elements, such as place, non-human nature, and objects (Akiva et al., 2023; Hecht & Crowley, 2020; Sancho-Gil & Domingo-Coscollola, 2022). Although individual learning experiences within the #CharlasEducativas are important and likely worth investigation in future research, our primary focus in this paper is on describing this learning ecosystem and exploring system-level factors. In other words, our interest is not in analyzing how the #CharlasEducativas may function as one component of an individual’s professional learning, but rather how the multifaceted elements of the #CharlasEducativas together comprise a learning ecosystem.

Learning ecosystem terminology has been previously employed in research on teacher learning (e.g., Falkner et al., 2018; Sancho-Gil & Domingo-Coscollola, 2022), but the learning ecosystem concept has not been extensively used in relation to social media. Many individuals combine their use of various social media platforms, and as McKee and colleagues (2018) note, social media platforms “are interconnected in terms of both economics and user practices” (p. 4571). Our focus is not only on a “technological ecosystem” in which platforms are conceptualized as providing resources for learners in a one-directional manner, as we attend also to the potential “transformations and appropriations of technologies by learners” (Sancho-Gil & Domingo-Coscollola, 2022, p. 415) and how social media users and platforms mutually influence each other in entangled ways (Emke, 2019; Van Dijck & Poell, 2013).

3 Literature review

We situate the present research in relation to literature on three overlapping topics: social media use by educators for professional learning, self-directed learning in informally-developed educator communities and networks, and multiplatform social media use.

3.1 Social media use by educators for professional learning

This research can be contextualized within the broader literature on educator social media use. Educator social media activities have been studied in various countries including China (Xue et al., 2021), Germany (Richter et al. 2022), Spain (Pattier Bocos, 2021), and the United States (US; Aguilar et al., 2021), and researchers have investigated various social media platforms’ use in education, with Facebook (e.g., Nelimarkka et al., 2021), and X/Twitter (e.g., Carpenter, Rimmereide et al., 2024; Tur & Marin, 2015) among the most widely studied platforms (Barrot, 2021). Social media platforms have

been found to offer educators affordances related to personalization, flexibility, and just-in-time professional learning (Fischer et al., 2019; Greenhow et al., 2021). Multiple studies have included findings in which educators report various positive outcomes from their social media activities. For instance, social media can facilitate opportunities for educators to find, share, and discuss ideas, information, and resources (Carpenter & Staudt Willet, 2021; Marcelo-Martínez et al., 2024; Rosenberg et al., 2020; Schroeder et al., 2019).

Educators can use social media platforms to address social needs and wants related to community (Goodyear et al., 2019), social support (Richter et al., 2022), and professional identity (Robson, 2018). Many educators combat professional isolation by expanding their professional networks via social media (e.g., Trust et al., 2016). Instead of being limited to local interactions and opportunities, educators can use social media to access a larger professional sphere. For instance, X/Twitter hashtags have allowed teachers who otherwise might not interact to discuss various topics (e.g., Carpenter et al., 2022; Greenhalgh, 2021; Richter et al., 2024). For instance, French-speaking educators used an X/Twitter hashtag for just-in-time deliberations on how to discuss the 2015 Paris terrorist attacks with their students (Greenhalgh & Koehler, 2017).

The potential benefits of social media use for educators are, however, accompanied by complex practical, professional, and ethical challenges (e.g., Bergviken Rensfeldt et al., 2018; Fox & Bird, 2017). For instance, practically speaking, teachers may experience information overload given the copious content available via social media (Fyfield et al., 2021; Staudt Willet, 2019). Indeed, new technologies rarely come without costs, as digital tools may require users to develop new skills, fulfill new responsibilities, and be more available outside the school day (Meabon Bartow, 2014; Selwyn et al., 2017). Additionally, influencers and online teacherpreneurs engage in profit-oriented activities that can impact the cultures of educator social media spaces (e.g., Pittard, 2017). For example, if some teachers are trying to sell their wares from an online education resource marketplace in a social media space, other teachers may become less willing to share their resources freely in that space. Some teachers may also grapple with ethical concerns related to how their time and data contribute to platform profit margins (Krutka et al., 2019). When they use social media, educators also must accept some risk of experiencing different forms of cyberviolence such as bullying, misogyny, and racism (Nagle, 2018).

Educators' social media use for professional purposes in Spanish-speaking contexts has received some attention from researchers (e.g., Martín-Gutiérrez et al., 2024). For instance, Marcelo-Martínez and Marcelo (2023) analyzed the X/Twitter hashtag #claus-trovirtual and concluded that such hashtags can function as affinity spaces that facilitate teacher learning. Moreno-Fernández and Gómez-Camacho (2023) also found X/Twitter participation by teachers increased during and after the Covid-19 pandemic, and considered participation in certain hashtags as a means to obtain emotional support. Relatedly, Mosquera-Gende and colleagues (2024) explored the X/Twitter traffic associated with the #CharlasEducativas hashtag, and found that it featured the characteristics of an affinity space; i.e., a physical, virtual, or blended environment in which "people relate to each other primarily in terms of common interests, endeavors, goals, or practices" (Gee, 2004, p. 77) and where these people represent a wide range of skills, experience,

and interest levels related to the common topic (Gee, 2004, 2018). Recently, TikTok has also attracted research interest, as it is a platform where some Spanish-speaking teachers act as micro-celebrities and disseminate educational content (Vizcaíno-Verdú & Abidin, 2023). As seen in research on educator social media use broadly, however, most of the studies in Spanish-speaking contexts have investigated the use of a single social media platform or niches within that platform. Research that explores educator social media use that spans multiple platforms and online spaces can therefore advance the knowledge base.

3.2 Educator self-directed learning in informal communities and network

The #CharlasEducativas can also be understood in relation to research on educator self-directed learning in informally-developed communities and networks. For decades, research on professional learning tended to focus on formal PD programs, in which participation was often externally required or incentivized. While such research contributes to understanding educator development, much professional learning occurs outside of formal PD contexts and programs with defined beginning and end points (Sancho-Gil & Domingo-Coscollola, 2022). Many educators self-direct at least some elements of their professional learning, and choose to include informal components (Gairín Sallán et al., 2022; Kyndt et al., 2016; Louws et al., 2017). Self-directed informal learning can allow educators to learn in spontaneous, ongoing, and deliberate forms as individuals are able to address issues that are immediately relevant to them (Eraut, 2004). Educators can also continuously build their skills and update their practice without relying on formal PD that can too often be one-size-fits-all and untimely.

While informal teacher learning regularly happens in the workplace (Kyndt et al., 2016), online spaces, including social media platforms, have also hosted educator informal learning (e.g., Lantz-Andersson et al., 2018; Patahuddin & Logan, 2019). Additionally, although informal and formal learning often are considered in dichotomous ways, they are not entirely separate approaches (Sangrà & Wheeler, 2013; Scribner & Cole, 1973), and many professional learning activities include both formal and informal attributes (Greenhow & Lewin, 2016).

While some self-directed learning can and does occur independently, much educator self-directed learning has collaborative elements. Indeed, educators have used digital technologies to create online networks and communities since prior to widespread social media uptake (e.g., García Aretio, 2003; Hur & Brush, 2009; Murua Anzola et al., 2015). Informally-developed online educator communities and networks typically feature voluntary participation, cross institutional boundaries more than formal professional learning communities (PLCs), and have been linked to various purposes and benefits. Such communities and networks are often bottom-up initiatives involving educators who discuss, exchange information and ideas, mitigate isolation associated with their workplaces, and sometimes engage in collaborative work. These groups are distinct from formally-organized online PLCs, which are often top-down endeavors initiated by schools and government agencies (Lantz-Andersson et al., 2018). Instead, informal, unremunerated leaders or moderators often emerge from among the participants due to their contributions and initiative; these individuals often play facilitator roles and help monitor group norms, and may come and go over time (Hillman et al., 2021; Krutka,

2017). Research suggests that informally-developed online communities and networks can play host to various forms of self-directed educator learning. This can include the exchange of new ideas and practices, acquiring relevant and current information, and constructing knowledge (Carpenter & Staudt Willet, 2021; Eradze et al., 2023; Rosenberg et al., 2020). Educators' collective efforts in informally-developed online educator communities can serve to filter, curate, or cross-pollinate ideas, which is increasingly important given the sheer quantity of content available via the internet (Knake et al., 2021; Staudt Willet, 2019).

Although informally-developed communities and networks therefore offer some potential benefits that motivate educator participation (Hashim & Carpenter, 2019), they also feature limitations and challenges. Without formal sponsors or organizational support, informally-developed online communities and networks often rely heavily on the efforts of individuals who coordinate, moderate, or lead (e.g., Hillman et al., 2021). Such typically voluntary efforts can be rewarding or empowering, but also challenging for individuals to sustain over time (Bruckman & Jensen, 2002; Krutka, 2017). Informally-developed online communities and networks for educators have also been critiqued in terms of the depth of discussion and the quality of the online support available (Carpenter & Harvey, 2019). Based on their review of the literature, Lantz-Andersson and colleagues concluded that "the need for renewed scrutiny and questioning" regarding educator online communities "is more important than ever" (2018, p. 303), and our research responds to this call for further exploration of educator online activities.

3.3 Multiplatform social media use

Studies of educator social media use have frequently focused on single platforms; in 2018, for example, Greenhow and colleagues' systematic literature review of educator social media use for professional learning did not identify any studies that explicitly had a multiplatform focus (Greenhow et al., 2018). However, many users have come to incorporate multiple platforms into their communication repertoires (Greenwood et al., 2016; Matassi et al., 2022). Through multiplatform social media use, individuals can exploit differences between platforms and access various people and networks (Madianou, 2014; Madianou & Miller, 2013). For example, an individual teacher might toggle between use of Reddit because the norm on the platform allows them to discuss sensitive topics, TikTok because of how its finely tuned algorithm serves them relevant content, and Facebook because it hosts a particularly active group of teachers focused on a niche professional topic of interest. In one report, internet users were already actively using 2.82 social platforms on average in 2015 (Global Web Index, 2015), and by 2023 a global sample of users had on average 6.4 social media accounts (Global Web Index, 2023). With more people using social media, and that use being spread across various evolving platforms, many individuals weigh various factors in evaluating which platforms to use for their communication needs. The existence of multiple platforms means that users are less likely to find everyone they want to engage with on a single platform (Zhao et al., 2016). Furthermore, using multiple platforms "allows social media users to navigate structural, social, and norm barriers" (Tandoc et al., 2019, p. 21). Individuals approach social media with different and multiple motivations, while platforms offer

distinct features and are characterized by different cultures, different networks, and social groups (e.g., Shane-Simpson et al., 2018; Waterloo et al., 2018). Such elements can contribute to users employing multiple platforms across their social media activities.

For individuals who maintain a presence across various platforms, each platform can serve as one part of an overall social media environment (Madianou & Miller, 2013). Users may employ *crossmedia strategies* that involve posting very similar content on multiple social media, in hopes of reaching different audiences on each platform. However, individuals may also use *transmedia strategies* in which they intentionally adapt the content they post to specific platforms or share almost entirely different content across different platforms (Tandoc et al., 2019). Zhao and colleagues (2016) suggested that many users simultaneously consider audience and content when deciding where to post social media content. Although platforms can have overlapping functions, many users associate certain social media with particular affordances (Tandoc et al., 2019). For instance, Instagram's visual nature—compared to more text-focused platforms like X/Twitter—has been credited with helping to build trust among users (Pittman & Reich, 2016).

Some educators who engage in professional activities via social media may limit those activities to one platform, but there is also evidence that multiplatform social media use for professional purposes is not uncommon (Aguilar et al., 2021; Fox & Bird, 2017; Staudt Willet, 2023; Trust et al., 2016). Given the breadth and complexity of the education profession, many educators may seek to access more than one professional group, network, or community (Wenger-Trayner & Wenger Trayner, 2014) online, and using multiple platforms may be required to do so. Just as individuals often use more than one social media platform, so too can educational projects, groups, communities, or spaces span multiple platforms. For example, the informally-developed network of educators that originally coalesced around the #sschat X/Twitter hashtag went on to also use a Ning site and Facebook groups to facilitate different kinds of interaction and communication (Krutka, 2017). However, we are not aware of research that has focused on the multiplatform nature of social media use by educators as a part of informally-developed communities or networks. Richer understanding of how educator professional learning occurs across social media platforms, and how platforms can function in concert, can help advance the field. Because the #CharlasEducativas span multiple platforms and have attracted substantial educator engagement in Spain, they offer an opportunity to explore multiplatform social media use as part of a learning ecosystem.

3.4 Research questions

In sum, research on educator social media use has identified various associated opportunities, challenges, and tradeoffs. Some educators, and educator networks or communities, may employ multiple platforms to try to leverage affordances and mitigate barriers associated with individual technologies. However, research that explores multiplatform social media use in the education realm is scant. Because such social media use by teachers offers potential advantages over traditional PD, its study is warranted. We therefore address a literature gap regarding how educator learning ecosystems can form and function in multiple platforms and spaces, and across multiple media and technologies, with the goal of advancing teacher professional learning. Given its novel

and innovative nature, the #CharlasEducativas warrant attention from researchers. By studying the #CharlasEducativas, we advance understanding of the multiple and varied roles that social media can play in education and in educator learning.

1. What are different components that comprise the #CharlasEducativas, and how do they work together?
2. What topics and content have been associated with the #CharlasEducativas?
3. How do participants in the #CharlasEducativas perceive this ecosystem as a means for continuous professional learning?

4 Methods

This study used multiple methods to describe and explore the case of the #CharlasEducativas. Case studies are “used to understand a real-life phenomenon in depth” (Yin, 2009, p. 18). The use of case studies is warranted when the case is unique, and as such can serve as an exemplar (Yin, 2009). The #CharlasEducativas were selected as a case because it features a novel combination of characteristics as a multiplatform learning ecosystem and it has attracted substantial participation and attention from educators in Spain, as well as some interest in other Spanish-speaking settings. The #CharlasEducativas can be divided into *seasons*, which roughly parallel the academic year in Spain; for context, Table 1 provides an overview of the five seasons that have transpired to date.

4.1 Researcher positionalities

The first author is not from Spain and has never been an active contributor to or participant in the #CharlasEducativas. He is a university-based teacher educator and researcher on educator social media use who previously taught in secondary schools for 10 years. He became aware of the #CharlasEducativas because of other studies he has conducted on educator social media use. He therefore offers an outsider perspective to the analysis of the #CharlasEducativas. Although not a native Spanish speaker, he is fluent in the language.

As previously noted, the second author initiated the #CharlasEducativas and continues to lead or facilitate many elements of the ecosystem. The #CharlasEducativas are strongly identified with her by many of the participants. She therefore offers the perspective of an influential insider to the analysis. She is a university teacher with more than 25 years of experience. Her research foci include informal learning and online education. She has extensive experience using social media for professional learning, especially X/Twitter. Prior research (Marcelo-Martínez & Marcelo, 2023) has demonstrated that she plays a key role in the Spanish teaching community on X/Twitter as a broker who facilitates the exchange of ideas, resources, and materials.

The third author is from Spain and has interacted on different occasions in the #CharlasEducativas, including as an observer in several of the live YouTube broadcasts. She is a university-based teacher educator and researcher on teacher development through social networks who has previously worked as an independent teacher trainer. Her position as a participant-observer offers a contextualized perspective, given that her level of engagement is similar to hundreds of participants in the #CharlasEducativas.

Table 1 Overview of the #CharlasEducativas seasons

Season	Description
First (January–July 2020)	January-June: 31 chats that included YouTube #summeredition: 7 chats that included YouTube Due to the COVID-19 pandemic and associated lockdowns in Spain, special chats and workshops were held from March 2020 onwards, with more frequent live sessions, to assist teachers who had to provide emergency teaching
Second (2020–2021)	September-June: 60 chats total; 55 chats that included YouTube, and 5 chats via X/ Twitter spaces There was no regularly scheduled #summeredition, but there were occasional special recordings on specific topics With the advent of X/Twitter's audio spaces, this summer also saw the first #CharlasEducativas use of #Spaces The #DebateDominguero (Sunday Debate) X/Twitter poll began in November
Third (2021–2022)	September-June: 59 chats total; 46 chats that included YouTube and 13 that were hosted on Spaces This season was the first in which one entire month (September) was dedicated to a focus on a single topic. This month was referred to as a "monograph" and in this case focused on assessment
Fourth (2022–2023)	September-June: 77 chats total; 37 chats that included YouTube, 39 chats that were hosted on Spaces, and one hosted on Telegram Two monographs: September/October (diversity), March (autism) The diversity monograph included the opportunity to certify this training for free through a professional development provider. More than 2500 teachers registered, and approximately 500 completed the certification April: First face-to-face meeting in Madrid that brought together more than 150 teachers from different parts of Spain. The event discussed topics which were selected based on the interests and profiles of the participants A #CharlasEducativas Telegram channel was created, which experimented with live broadcasts, and where news about #CharlasEducativas events is posted
Fifth (2023–2024)	October-May: 59 chats completed at the time of this writing (32 on YouTube and 27 on X/ Spaces) Three monographs: October (Mental health), January (Artificial intelligence), February (Diversity) December 2023 saw the launch of the website, charlaseducativas.com, in which the 2nd author has tried to provide a central hub for the ecosystem

4.2 Data sources and analysis

We addressed our research questions via multiple methods, including using multiple kinds of digital trace data (Hakimi et al., 2021) from multiple social media platforms, and qualitative analysis of survey responses. For our first research question, "What are the different parts/structures/components that comprise the #CharlasEducativas, and how do they work together?" we relied in part upon the second author's familiarity with the #CharlasEducativas. We analyzed data first through iterative drafting and discussions of a graphic representation of the elements of the #CharlasEducativas. The representation was meant to include all elements of the #CharlasEducativas and also organize these various elements into related groups. The second author, based on her experience leading the #CharlasEducativas, drafted an initial graphic representation that was then discussed among the research team. Based on that initial discussion, a second draft was created and discussed, with the discussion leading to a third draft. This cyclical process was continued for four more rounds until the finalization of the graphic representation which is presented in the findings section (Fig. 1). We also collected digital trace data associated with many of the parts/structures/components of the #CharlasEducativas in

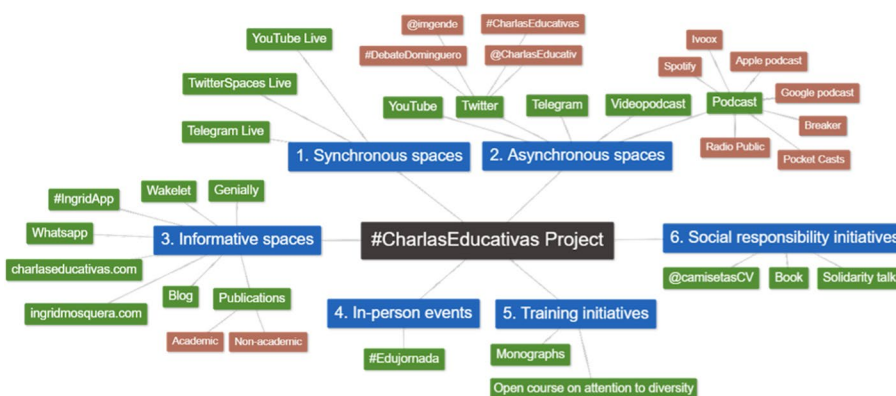


Fig. 1 Graphic representation of the #CharlasEducativas

order to provide a sense of the scope of these different elements. To collect information from the #CharlasEducativas, the “Tweet Binder” analytical tool (Niburski & Niburski, 2020) has been used, a software for data analysis on social networks. The digital trace data is reported descriptively (see Table 4 in the Findings).

For our second research question, “What topics and content have been associated with the #CharlasEducativas?” we relied upon a previously developed categorization of chat topics (Mosquera-Gende, 2023). For our third research question, “How do participants in the #CharlasEducativas perceive this ecosystem as a means for continuous professional learning?”, we collected data from three sources. The first source was a purposeful selection of publicly available tweets ($n = 86$) from the #CharlasEducativas that commented directly on perceptions of the #CharlasEducativas. For the second source, we used the public YouTube video of an approximately two-hour-long virtual event which was held to mark the three-year anniversary of the #CharlasEducativas, with 19 special guests who shared about their participation. Third, we analyzed open-ended responses ($n = 83$) to one item from a questionnaire that asked teachers what they had gained from the #CharlasEducativas. The questionnaire was distributed after an in-person #CharlasEducativas event. Therefore, the sources were selected by considering the ecosystem’s main platforms, X/Twitter and YouTube, as well as a significant event in the history of the #CharlasEducativas, its first associated in-person event.

To analyze the data from the three sources, the category system carried out by Mosquera-Gende et al. (2024) was used as a starting point. This system was previously developed to analyze the tweets that were listed under the hashtag #CharlasEducativas and addressed four dimensions: educational topics, community building, information, and hashtags. Given that in the current study the analysis refers to the entire #CharlasEducativas learning ecosystem and other sources of information are also analyzed, the category system has been adapted. The instrument resulting from the adaptation of the first category system includes three dimensions: educational topics, community building, and format.

The categorization and data coding were carried out independently by two research-team members through manual coding. Through a random selection of a sample of

Table 2 Interrater reliability

		Value	Asympt. Std. Error	Approx. T	Approx. Sig
Measure of Agreement	Kappa	.78	.21	4.39	.000
N of Valid Cases		30			

30 codes, the reliability of the instrument was calculated. The reliability of the original instrument was previously verified by applying Cohen's Kappa Coefficient using the SPSS program (Mosquera-Gende et al., 2024). For this new analysis, the interrater reliability with the instrument reached an index of 0.783 which, according to Landis and Koch's (1977) classification, is considered a substantial concordance rate (Table 2). The assignment of codes generated 252 data units (i.e., 86 tweets, 83 questionnaire responses, and 83 fragments from the video) that were then the focus of the subsequent analysis. Regarding the video fragments specifically, individual fragments were taken by performing an automatic voice-to-text transcription, using Transkriptor software. With the raw text database, phrases of between 40–50 words were selected that came from the individual contributions of the speakers. The format of this video consists of a total of 19 participants speaking for a few minutes each to explain what for them is most significant and notable about the #CharlasEducativas. From the verbal presentations they made, the most relevant ones for the study were selected.

Table 3 shows the system of categories created, as well as examples of these categories. The examples include abbreviations corresponding to the videos (V), the tweets (T) and the questionnaire responses (Q) and are accompanied by a number assigned to each unit of data. Data were analyzed in their original Spanish form, and subsequently those data that appear in the findings sections were translated into English by a professional translator. The first author reviewed these translations and made some minor changes for the sake of clarity.

4.3 Ethics

Ethical guidelines for online research recommend attention to the contexts within which information is shared (Franzke et al., 2020), and so we note that participation in the #CharlasEducativas is voluntary and generally has a focus on professional matters. The #CharlasEducativas were not begun as a research endeavor, and their multiplatform nature and evolution generates some unique ethical considerations, in particular in relation to RQ3. The questionnaire was anonymous, and participants provided informed consent. For the purposeful selection of tweets and the video that were analyzed for RQ3, we considered these to be data for which there would not be an expectation of privacy from the users, given the venue and context in which information was being shared (Markham et al., 2012). Regarding the tweets, we did not analyze or present tweets from accounts that were set to private. Furthermore, the translation of the tweets to English, light editing of tweet language, and the use of excerpts from tweets helped de-identify this data (Mason & Singh, 2022). Apart from the tweets analyzed for RQ3, below we share screenshots of two actual tweets, one of which is from the second author (Fig. 2), and the other for which the creator explicitly provided permission to share (Fig. 3). For the video, the 19 interviewees had all previously participated in #CharlasEducativas activities and were thus aware that the video would be livestreamed and archived on the public YouTube

Table 3 Codebook for research question 3

Dimension	Categories & Definition	Example
Educational topics	Learning: References to the learning obtained through the #CharlasEducativas	"Quality learning" (Q2)
	Reflection: References to the reflection that the #CharlasEducativas have encouraged in relation to one's own teaching work or to a way of knowing other perspectives different from one's own	"A wider, richer, more diverse and more optimistic view of education. It also inspires you and motivates you to work harder and better. One of the main things that I take away from these educational chats is that all the problems and barriers we create for ourselves (lack of resources, administration, teachers who don't collaborate, doubts, etc...) are nothing in comparison to our initiative and predisposition. The phrase that sums it up I think is [redacted], "we are the main resource" (Q45)
	Profile of Guests: References to the quality of the invited guests for the #CharlasEducativas	"Tomorrow is the start of the second season of #CharlasEducativas with luxury guests, another great opportunity to continue learning from fellow colleagues" (T32)
	Variety: References to the variety of chats, topics, or guests	"In other words, you can see all kinds of topics and with all kinds of teachers and parents too, which is an extremely important part" (V76)
Community building	Resources: References to resources associated with the #CharlasEducativas	"Here is the presentation if you want to take a look. As you know, a lot of things were said and they're not all included here [hyperlink, redacted] (T41)
	Acknowledgement: Gratitude is shown to the creator of the #CharlasEducativas, to the invited guests, to the participants, or for the project in general	"#CharlasEducativas THANKS FOR EVERYTHING. You're amazing" (T61)
Format	Metaphors: Metaphors are used to refer to the #CharlasEducativas community, participants, creator, etc	"It's what we are, a family, a team" (V26)
	Recorded: Mention of the relevance of the chats being recorded so that they can be seen or listened to after they are broadcast live	"Even if we can't watch it live, we always have the opportunity to watch it on YouTube and be more flexible with our time" (Q22)
Format	Multiplatform: Mention of some of the platforms on which the #CharlasEducativas are present	"#CharlasEducativas is now available in podcast format!! Every day I'm more IN LOVE with this format. It makes me want to listen to them all at once!!!❤️❤️❤️" (T22)
	Repository: Mention of the value of #CharlasEducativas as a repository for learning and consultation	"A library of knowledge and educational experiences" (Q78)

account associated with the #CharlasEducativas. Additionally, we quote in the findings section only statements from individual participant's tweets or video commentary, and not a series of interactions or replies among users, as such interactions can create more ethical complexity (Franzke et al., 2020).

5 Findings

In the three sections that follow, we will share the findings associated with each of the three research questions.



Fig. 2 #DebateDominguero tweet that asks teachers if their students and/or families know their personal phone number.

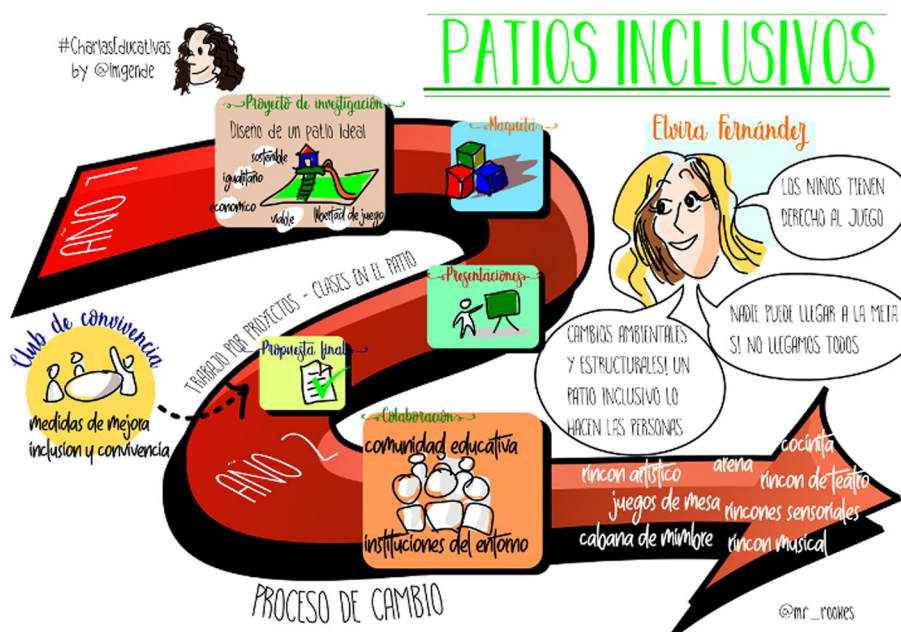


Fig. 3 Sketchnote example (shared with the permission of the creator)

5.1 RQ1. What are different components that comprise the #CharlasEducativas and how do they work together?

The first #CharlasEducativas event was a January 2020 live broadcast on YouTube. To

Table 4 Platform activity data

Platform	Data on users through the first four seasons (as of September 2023)
YouTube	18.5 K subscribers Number of videos #CharlasEducativas: 237 282,258 views (1191 views per video on average)
X/Twitter	8,401 #CharlasEducativas original tweets sent by 1,233 unique users #CharlasEducativas creator’s account: 42.2 K followers
Telegram	1,719 subscribers
Podcast	63,206 downloads 143 streams per episode (on average) 85% Spanish-speaking audience 62% Apple Podcast 72.9% female 43.3% aged between 35–44 Most listened to episode: Gifted and talented students (1,175 streams)

date, five seasons have been completed (Table 1). More than 650 invited guests were interviewed in the first four seasons, and Table 4 provides data related to the number of followers or users of the multiple spaces or platforms associated with the #CharlasEducativas. Figure 1 depicts the components which comprise the #CharlasEducativas, and these components will be described in text in the subsections that follow.

5.1.1 Synchronous spaces

Several important components to the #CharlasEducativas learning ecosystem are primarily synchronous in nature. From its genesis, an important synchronous #CharlasEducativas component has been the YouTube live interview broadcasts. Additionally, X/Twitter Spaces livestreams are social audio spaces, without a video component. Lastly, a few live streams have been held on Telegram. During synchronous events, participants can interact directly with the invited guests, and establish parallel dialogues amongst themselves. Participants are often very active in the chat, greeting each other, answering questions and comments from each other, and debating and posing questions. The host asks the invited guests questions and monitors interactions, comments, and questions from participants.

5.1.2 Asynchronous spaces

The #CharlasEducativas asynchronous spaces include platforms on which recordings of chats remain available to be watched, listened to, and/or interacted with. This is the case for the YouTube channel, and the main podcasting platforms. Additionally, Telegram and X/Twitter are spaces that facilitate both synchronous and asynchronous interaction. For example, the Telegram channel is used to announce chats, to leave links after the live event, to share information about invited guests, to ask questions of the channel followers, and to debate different topics asynchronously.

X/Twitter deserves special mention as the platform that has served as the cradle and the nerve center of the #CharlasEducativas. From January 13, 2021 to June 30, 2023, 8,401 original tweets were collected that were sent by a total of 1,233 users who included the hashtag #CharlasEducativas in their posts. These tweets generated 175,844 likes and the average number of posts per contributor was 7.32 tweets. In the early days of the #CharlasEducativas, chats were primarily publicized and commented on via X/Twitter,

and the name of the #CharlasEducativas itself includes a hashtag, in reference to X/Twitter. The second author has been highlighted in previous academic literature (Marcelo & Marcelo, 2021; Marcelo-Martínez & Marcelo, 2023; Moreno Fernández & Gómez Camacho, 2023) as an important X/Twitter profile in the Spanish education context.

Within the #CharlasEducativas, the #DebateDominguero is a distinct facet of the learning ecosystem. It involves a X/Twitter poll held every Sunday about different educational topics (Fig. 2). The polls often refer to education issues that have attracted substantial social media attention during the preceding week. In holiday periods, the questions commonly include personal matters, as a way for participants to get to know each other better. In addition to the poll results, comments are often left in response to the poll tweet, with some users explaining their response or discussing the poll topic.

5.1.3 Informative spaces

Informative spaces provide information about the #CharlasEducativas, such as archives of past chats and a chat calendar. These spaces have not included interactive components to date. Some spaces that have only been used for informative purposes could eventually host interactions. Three further informative spaces that are not solely associated with the #CharlasEducativas are the second author's personal website, blog, and an Android mobile app she developed. These spaces are not exclusively focused on the #CharlasEducativas, as they also include content related to the second author's other personal and professional endeavors. More recently, the second author created a website charlaseducativas.com as a central informative space for all #CharlasEducativas information and to lessen dependence on external platforms.

Over the years, the second author, invited guests, and participants have also written various non-academic publications in Spanish-language newspapers, magazines, and educational blogs that have described or commented on the #CharlasEducativas. The #CharlasEducativas have also been discussed in various videos, podcasts, and interviews. Likewise, academic articles have been published in which the #CharlasEducativas stood out for its relevance in online networks (Marcelo & Marcelo, 2021; Marcelo-Martínez & Marcelo, 2023; Mosquera-Gende et al., 2024). Its presence was also addressed in an academic book which included analysis of the X/Twitter elements of the #CharlasEducativas as a part of a broader look at informal learning in social networks (Mosquera-Gende, 2023).

Participants have drawn sketchnotes for many of the individual #CharlasEducativas chats. These illustrations are graphic summaries of each chat which include key concepts and quotes, and which are subsequently shared on social media. One X/Twitter user, @mr_rookes, started making these sketchnotes after each chat during the #CharlasEducativas's first season, and began including an avatar of the second author in each of these as a symbol of the #CharlasEducativas. Figure 3 is an example of one of these sketchnotes that summarized a chat related to inclusive school playgrounds. By including drawings of the host and invited guests, the sketchnotes may help make participants feel more like the chats involve interactions with real humans.



Fig. 4 Examples of #CharlasEducativas merchandise sold to raise funds for children's organizations

5.1.4 In-person events

In 2023, the first in-person event associated with the #CharlasEducativas took place, organized by the second author and colleagues from the #claustrvirtual. The #claustrvirtual, or “Virtual Teachers’ Lounge” is the name of a broader educational community formed on X/Twitter that is composed of educators based primarily in Spain (Marcelo-Martínez & Marcelo, 2023). The in-person event brought together more than 150 teachers from all over Spain for a Saturday of learning and meeting in-person many colleagues with whom they had been interacting via online networks for years. In April 2024, the second in-person event took place, with an attendance of more than 270 teachers.

5.1.5 Training initiatives

Monographs, which are various consecutive chats referring to one topic, began in the third season (see Table 3). In 2022, a monograph on Attention to Diversity extended the duration of previous monographs, and also included an option for formal professional certification. Participants could complement the viewing of the monograph chats with participation in an open online course. This was carried out through a collaboration with a private education company and with volunteer participants of the #CharlasEducativas who acted as informal tutors and trainers. In this way, learning acquired informally was formalized, and given additional value via certification.

5.1.6 Social responsibility initiatives

The #CharlasEducativas have contributed to various social responsibility initiatives. For example, a chat was held as part of a charity audio-a-thon on X/Twitter Spaces to raise funds for various causes. The #CharlasEducativas has also participated in a project organized by several teachers in Spain, @camisetasCV, that consists of designing t-shirts, bags, mugs or sweatshirts (Fig. 4) that are sold through an online shop and the profits of which go entirely to different organizations that help children.

5.2 RQ2. What topics and content have been associated with the #CharlasEducativas?

Over the course of more than four seasons, the #CharlasEducativas learning ecosystem has played host to discussion of a broad range of education topics. Specifically, the live chats associated with the #CharlasEducativas can be linked to seven different categories, as seen in Table 5. This table also indicates how many chats fall within each category. Attention to diversity and inclusion has been the most frequently featured topic in chats, although the large number of chats included in the *other* category also indicates the wide variety of topics that have been addressed in the #CharlasEducativas. Chat topics have also addressed content pertinent to a broad range of educational stages, including early-childhood, primary, secondary, tertiary, vocational, and adult education. Different

Table 5 Categorization of #CharlasEducativas chat topics

Topic	Explanation	Frequency
1. Classroom experiences in different educational stages	Includes chats about the stages of Pre-School, Primary, Secondary, Vocational Training, Adult Education, Language Teaching, University	55
2. Attention to diversity and inclusion	Includes first-hand participation of experts, family members and people with different disabilities. With special attention given to autism, giftedness, and mental health	71
3. Teaching methodologies and approaches	Project based learning, flipped learning, etc. With special attention to gamification, with its own sub-section	42
4. Digital competency, digital tools and educational technology	Chats about artificial intelligence, explanation of specific digital tools and about their application in the classroom. It also includes chats about teachers' digital competency	33
5. Specific curricular areas	With special attention to mathematics and languages	26
6. Education policy and curriculum	With special attention to assessment and educational legislation, recently amended in Spain. Lesson plans, etc.	20
7. Other chats	With three sub-sections: - Debates; chats with three or four interlocutors, or totally open participation, about various topics - Chats that aren't held live and which form part of specific initiatives within the #CharlasEducativas project, such as open chats, where a topic is proposed and anyone who wishes to can send an audio to be included in the recording - Other topics. Some chats are difficult to classify in the previous categories, such as a chat about chess, and another about innovation centers	88

Some individual chats were categorized as being relevant to two categories

Table 6 Dimension 1. The #CharlasEducativas as a source of learning

Categories	Examples
Learning	<p>"Well, I think that now a new reform of the teaching profession is starting, it's not a bad idea to make it a requirement for future teachers to attend 70% of @imgende's educational chats. (T1)</p> <p>"These chats are essential for any current or future teacher. Make a note in your diaries 📝" (T24)</p> <p>"It's priceless. A type of learning that they don't even teach you in university, in master's degrees nor in professional courses" (Q44)</p> <p>"Knowledge of an informal nature that makes me want to know more about subjects that I would not otherwise be able to access" (Q82)</p> <p>"It's a different way of learning" (Q47)</p>
Reflection	<p>"They provide you with so much information that I need to process and incorporate into my life and my work. I think they make me a better professional" (Q29)</p> <p>"The #CharlasEducativas are a space that allows teachers to reflect on a multitude of educational aspects" (Q22)</p> <p>"It opens my mind to other possibilities, methodologies" (Q51)</p> <p>"CharlasEducativas, thanks for the chat. You have opened my eyes to some inconsistencies of mine. I learn something from all the #CharlasEducativas" (T79)</p> <p>"You have changed the outlook of many teachers, which is no small feat 🙌" (T64)</p> <p>"It's very exciting, to think that those things that have been said in a YouTube chat have reached a teacher who needed to help a student and that student has found that help and that support from the teacher, which is why we are here, right?" (V72)</p>
Profile of guests	<p>"First-hand experiences, which gives you much richer and more complete points of view" (Q32)</p> <p>"It helps me to get to know mentors or guides who I can turn to or ask about research work/projects/resources. It helps me to learn about other teachers' doubts that I also had or that hadn't occurred to me, or I didn't know could exist. It helps me to meet other professionals who I maybe didn't know" (Q80)</p> <p>"Wednesdays are a luxury. It's like being enrolled in an exclusive conference with top-notch speakers and an excellent organizer" (T18)</p> <p>"Oh my god! There's no other conference with as many star speakers as the #CharlasEducativas. Thank you!" (T19)</p> <p>"There are so many amazing people" (V79)</p>
Variety	<p>"I mean, you can see topics of every type" (V76)</p> <p>"There is so much variety in the topics they cover that they always offer me the chance to learn things I didn't know before or to broaden my understanding of things I already know" (Q30)</p> <p>"They cover topics from different points of view. They are really enriching" (Q11)</p> <p>"They provide me with lots of information about topics which I know almost nothing about in the majority of cases" (Q80)</p>
Resources	<p>👉 Here's the @genially_es with the #CharlasEducativas presentation that I used last night 😊 Thanks for organizing these chats; it was a pleasure to share the chat on #educacioninfantil with Ingrid" (T36)</p> <p>"#CharlasEducativas You can now enjoy yesterday's chat! A big thank you to @imgende for giving us this space to talk about the situation of the LGBTI + Community in Education. Thanks to all the participants for their great interest and support!" (T75)</p>

teaching methodologies and approaches, such as gamification and project-based learning, have also been the focus of many chats.

5.3 RQ. 3 How do the participants of the #CharlasEducativas perceive this learning ecosystem as a means for their continuous learning and training?

In this section, we describe comments made by participants in the #CharlasEducativas. One dimension refers to the participants' valuation of the #CharlasEducativas as a source of learning (Table 6). It includes references to their usefulness as a means of in-service training for teachers and the importance of these activities in the training of student teachers. Participants appreciate that it is a different way of learning, an opportunity to get to know new points of view, and to improve teaching practice. The

Table 7 Dimension 2. The #CharlasEducativas as a space of community building

Categories	Examples
Acknowledgement	<p>"I never get tired of thanking you for this safe, relaxed place where we can really debate, because in education, if we want to move forward, if we want to learn and if we want to improve, we need to debate about education" (V19)</p> <p>"Say thank you to @ManoliFM and to @imgende for inviting her, it was great, well planned, well explained and above all very real, they're getting longer each time and they're still too short for me, I could watch for hours, thank you so much!" (T40)</p> <p>"For anyone who says 2020 didn't bring anything good, they clearly don't know about #CharlasEducativas. I think I speak for everyone when I say: "Thank you, Ingrid!!!" (T6)</p> <p>"Eternally grateful for everything you do, because it is something that benefits us all, you say that the chats are thanks to everyone, but in the end, if there's not that one person who coordinates it, who directs all of this, well, no, we wouldn't have gone anywhere" (V17)</p>
Metaphors	<p>"Very often we lack that support in the centers, with certain colleagues and when we lack support, we know that we have it online with people that many of us don't know in person, we simply know each other virtually and in the end we're a family" (V4)</p> <p>"The conclusion I've come to is that we are all family" (V14)</p> <p>"The family that we form and everything that we can do together, we have each other, we know that if we need to, well, we can give each other a hand and that's what's great. And these guys, they've only just started" (V48)</p> <p>"The nicest thing about the chats is that we're like that ideal team that we'd all like to have, that maybe in real life some of us have and others don't. For me it was like a lifeboat" (V49)</p> <p>"Well, that's priceless, you make a community. Like what I told you the other day, you are an anchor, you have made us unite around YOU, so I can only thank you. A million and one times" (V22)</p> <p>"We all contribute, but Ingrid is great, the matriarch, the boss, however you want to call her, the person that makes us all come together, and the little screen doesn't matter because we're all here" (V26)</p>

participants highlighted the value of the #CharlasEducativas as a context in which to reflect on their own teaching practice, even highlighting the fact that they have modified elements of their practice thanks to the chats. The variety of the topics and the quality of the guests were also highlighted.

The second dimension refers to the community building that has been generated in the #CharlasEducativas ecosystem (Table 7). Participants mentioned acknowledgements and gratitude towards the #CharlasEducativas creator, to the space itself, to the guests, and even for the participants standing together and complimenting each other on numerous occasions. Acknowledgement directed towards the second author referred to her work as a source of community unity. This was also reflected in the category of metaphors, with some of these referring to the function of the creator and others referring to the created community itself. The term “family” was repeated on numerous occasions, as various participants indicated the #CharlasEducativas provided a network of support that they sometimes did not find in their physical workplaces.

In the third dimension, regarding the format, those attending the chats referred to their preferred platforms, above all emphasizing the importance of being able to watch chat recordings and highlighting the podcast format. They also underlined the relevance of the chats as a possibility to access a repository of knowledge and experiences, even speaking of them as a library. Table 8 offers examples of the subcategories in this dimension.

One aspect that stands out from the analysis of the sources of information is the close, informal tone, full of humor and jokes: “I remember those Wednesdays like today. Who did we have dinner with? And it was Ingrid with the guest. I mean, we all sat down for dinner, and we put the tablet there and we were, well ... we were talking” (V23). This

Table 8 Dimension 3. The formats of the #CharlasEducativas

Categories	Examples
Recordings	<p>“For those I can’t attend live, I’ll watch the recorded version, so I’ll try not to miss any of them” (T34)</p> <p>“If by any chance you didn’t see that chat live, don’t worry. Click on the link and enjoy” (T45)</p> <p>“I don’t always have time to watch all of them and I feel bad because I know that I’m missing a lot of things. The good thing is that they are always there on YouTube” (Q79)</p> <p>“What’s cool about the chat is that if you can’t watch it live, it’s recorded” (V76)</p>
Multiplatform	<p>“Those that I’ve listened to on the podcast have given me loads of information” (Q29)</p> <p>“We have the opportunity to watch it on YouTube” (Q22)</p> <p>“There is nothing nicer than to keep sharing via Twitter” (V3)</p> <p>“I love listening or participating in the Twitter spaces” (V28)</p> <p>“Looking forward to that face-to-face event where we can meet each other” (V42)</p> <p>“I’ve been trying for a while to write the exact words to describe what we have experienced today in the first #CharlasEducativas ... but you know what? There are no words for it. No words. I’ll just say THANK YOU, from the heart, for letting me be there. Let’s keep going!” (T85)</p>
Repository	<p>“It’s like a library (or video library, rather) ... so everything I was talking about before is collected and organized in these videos & podcasts” (Q41)</p> <p>“They are an incredible storehouse of topics, stages and professionals that can serve as a starting point to learn about any aspect of education” (Q46)</p> <p>“An endless supply of resources and knowledge” (Q77)</p> <p>“The YouTube channel is a kind of repository with a lot of information, there’s a lot of knowledge condensed there that you can access continuously” (V66)</p> <p>“You are a people person because you are able to generate community, to get us all excited and to encourage us all to put into action all those ideas that YOU come up with AND there is that camaraderie and that desire to work together” (V70)</p>

reflects the confidence and familiarity that exists among many participants, who consider the environment of the #CharlasEducativas as a safe space for exchange, support, and learning. Another participant commented, "In terms of the tone ... I think the #CharlasEducativas have achieved something very important, both in the chats and on X/Twitter, because we all know that on social networks there is room for hatred, bad manners and badly managed controversy" (V68).

The previous descriptive analysis shows the dimensions with the highest frequencies. Educational and Community Building topics are the broadest and most abundant categories among the codes. The most important categories are exemplified in the following tweets, which summarize what the #CharlasEducativas are:

The #CharlasEducativas are a space that allows teachers to reflect on a multitude of educational aspects and continue learning from the experiences of top professionals. Even if you can't watch it live, we always have the opportunity to watch it on YouTube and we can be more flexible. (Q22)

A meeting point for quality and rigor among teachers. They are an incredible storehouse of topics, stages and professionals that can serve as a starting point to learn about any aspect of education ... They give me a tremendous sense of camaraderie and horizontality. (Q46).

6 Discussion

In what follows, we highlight key findings, point out similarities and differences in what we found in comparison to prior work, and then discuss how the #CharlasEducativas reflects the four previously-mentioned learning ecosystem characteristics from Sancho-Gil and Domingo-Coscollola (2022). In this research, we sought to describe how the #CharlasEducativas learning ecosystem spans multiple platforms and presents various opportunities for self-directed and collaborative professional learning. Our findings capture how, in a short period of time, the #CharlasEducativas have grown to include a substantial presence across various social media platforms, with different professional activities spanning multiple digital (and even physical) spaces. Additionally, our findings demonstrate how different platforms can function in both overlapping and distinct ways (Tandoc et al., 2019). For instance, several spaces within the #CharlasEducativas allow for asynchronous interaction, synchronous interaction, or both. Educators with diverse social media preferences and patterns of use can thus access and participate in #CharlasEducativas discussions and knowledge sharing. Users can also potentially attempt to navigate the relative strengths and weaknesses of different platforms in terms of their affordances.

This diversity of avenues for participation may increase participants' sense of autonomy, and that they have volition to choose to participate in ways that they find convenient or motivational; such opportunities for teachers to express autonomy and volition may be less present in many formal PD programs (Kennedy, 2016). In addition to the blending of modalities in #CharlasEducativas activities, there is the blending of personal and professional elements, and cognitive and social pursuits. While traditional professional development frequently focuses on knowledge and skills, we see in the #CharlasEducativas how social and affective elements matter in a professional learning

ecosystem to which teachers can have varied interests and affinities (Noonan, 2019) and may choose to bring their whole selves (Trust et al., 2016).

The #CharlasEducativas have provided opportunities for discussion of and learning about a broad range of education-related topics over an extended period of time. This can be considered in contrast to online spaces for teachers that have a particular focus, such as a content area, grade level, or pedagogical approach (e.g., Larsen & Parrish, 2019; Nelimarkka et al., 2021; Rosell-Aguilar, 2018; van Bommel et al., 2020). Although most of the invited guests who have been interviewees in the #CharlasEducativas are based in Spain, the ecosystem is not meant to be exclusively about education in Spain and has included some invited guests from other countries. Additionally, the digital trace data on podcast downloads (see Table 4) suggests that the #CharlasEducativas attract some attention and participation from other Spanish-speaking contexts. Learning ecosystems that address a broader set of education-related topics may be attractive for some educators who have multiple professional interests or needs. The wide range of topics addressed in the #CharlasEducativas may also mean that at different times participants can be both givers and receivers of knowledge (van Bommel et al., 2020), as individuals bring their expertise to the fore at different times. However, some educators may find more narrowly focused online spaces offer certain benefits in terms of depth.

Our findings underscore the challenges of determining how research on formal PD approaches relate to self-directed and informal educator professional learning that uses multiple social media spaces. For example, past research has tended to emphasize the value of PD with carefully planned models and clearly defined learning objectives (e.g., Desimone, 2009; Garet et al., 2001), but the self-directed professional learning that occurs via social media platforms often is more organic and even chaotic. Rather than representing an intervention that can be meticulously designed in advance, teachers' social media activities in spaces such as the #CharlasEducativas can be understood as an on-going engagement with people and ideas that contributes to unpredictable interactions and learning outcomes. On the other hand, the literature suggests teacher agency, collaboration, and active participation in PD can contribute to enduring changes in practice (e.g., Desimone & Garet, 2015; Noonan, 2019); our findings suggest such agency, collaboration, and active participation is common in teacher professional activities in the #CharlasEducativas.

To consider how the #CharlasEducativas function as a learning ecosystem, we revisit here the four previously-mentioned learning ecosystem characteristics from Sancho-Gil and Domingo-Coscollola (2022). First, the #CharlasEducativas's components are indeed *interwoven*, with the different social media platforms that are part of the ecosystem interconnected and working in concert. For example, YouTube events are advertised and commented on via X/Twitter, and Telegram content similarly responds to and builds upon content from the other platforms. Second, the #CharlasEducativas are *composed of elements of different kinds*, including people, objects, symbols, physical and virtual spaces, and formal and informal components. For instance, visual objects associated with the #CharlasEducativas included the interview videos and the summary visual notes. Also, the #CharlasEducativas map (Fig. 1) reflects the many spaces that comprise the learning ecosystem.

Third, it is apparent that the elements of the #CharlasEducativas are characterized by *a certain stability* and that the chats are *governed by formal and informal rules*. The live YouTube chats and #DebateDomingueros have followed a relatively set schedule, with a consistent frequency and format. A degree of stability is also evident in that changes to one of the platforms that has played an important role in the ecosystem's development (X/Twitter) did not entirely disrupt the chats, as additional platforms have come more to the fore. Despite this degree of stability, learning ecosystems are also understood to be dynamic, non-linear, and unpredictable, with boundaries between different ecosystem parts often mutable and permeable (Hecht & Crowley, 2020; Zhao et al., 2016). In some #CharlasEducativas activities, there are formal rules around participation, such as how to contribute during live X/Twitter Spaces events. Informal and unwritten norms for #CharlasEducativas participation also appear to exist. These norms or rules may to some degree be influenced by practices, cultures, and vernaculars related to social media platforms more broadly (Vicari & Ditchfield, 2024), such as linguistic conventions and memes associated with X/Twitter. However, the participants' perceptions suggest the #CharlasEducativas has developed some of its own norms and vernacular as well, as multiple participants described the chats in terms of "family" and mentioned humor, closeness, and supportiveness as common features.

Fourth, we can see evidence of how the #CharlasEducativas's stability *can be more positive or more negative*. To date, the maintenance of the live chats has depended largely on the second author, consistent with prior research that has shown that informally-developed online communities and networks often rely heavily on the efforts of key individuals who coordinate, moderate, or lead (e.g., Hillman et al., 2021, Krutka, 2017). This individual's steady presence has been important to the development of the chats and their character and norms, and some participants describe her as a "matriarch" or "chief." However, given the #CharlasEducativas's scope and nature, this leadership role has come to involve a significant and consistent investment of time and energy which could eventually become challenging to maintain. Stability can thus come with high costs for some actors in the learning ecosystem, and this may create some fragility should these actors become unable to continue their contributions or move on to other projects (Bruckman & Jensen, 2002).

Invited guests for the chats also volunteer their time to be interviewed, while others dedicate substantial time contributing to the #CharlasEducativas through actions such as creating sketch notes to share with others or serving as peer tutors for the aforementioned monograph that led to a professional certification. Many individuals may maintain such activities because of non-financial benefits they receive from their participation and/or a sense of responsibility to their colleagues. However, prior research has found that changes over time in educator social media use are quite common (Staudt Willet & Carpenter, 2021; Aguilar et al., 2021). These changes can be precipitated by technological factors, but also individual, relational, cultural, and political factors (Veletsianos et al., 2019), as well as the contexts in which teachers work (Lantz-Andersson et al., 2018). For instance, one of the participants who created sketchnotes for almost every chat during the first two seasons of the #CharlasEducativas found it hard to continue to dedicate so much time to this task, and no longer regularly creates such notes. Learning ecosystems that rely heavily upon social media and voluntary, self-directed learning may

therefore achieve a degree of stability that is always in tension with the precarity of social media (Duffy, 2020; Koutropoulos et al., 2024) and the absence of institutional sponsorship. It may be that the #CharlasEducativas learning ecosystem has reached scope where it has to some extent developed a life of its own, but it remains to be seen how it and other similar educator learning ecosystems can sustain themselves over time.

6.1 Limitations and implications for research

Our research features various limitations that readers should consider as they interpret the relevance of our results for their contexts and concerns. First, this was a descriptive study that relied primarily on digital trace data. Second, we relied upon participants' self-reports regarding their perceptions their #CharlasEducativas experiences, which may have been affected by social desirability biases given the public nature of some of the self-reports (i.e., the tweets and video data sources). Third, the complexity of ecosystems means that it is important to note that no two cases are ever the same (Hecht & Crowley, 2020); much of what we found is likely specific to the case, and readers must be thoughtful in considering how our findings may or may not be relevant or informative to other contexts. Fourth, the organic and ever-evolving nature of a multiplatform learning ecosystem may be seen as complicating notions of consent and awareness. For instance, this research project was initiated during the fourth year of the #CharlasEducativas's existence, and this limited some of the data collection methods available to us and the opportunities to create awareness of the research among all teachers who have participated in the #CharlasEducativas over time. Despite these limitations, our results offer a rich description of a novel professional learning initiative that is illustrative of various important dynamics relevant to understanding the present and future of educator professional learning.

Furthermore, the limitations of this research point towards several fertile areas for future research. Study of additional instances of multiplatform educator learning ecosystems would benefit the field. Given the complex, multifaceted nature of learning ecosystems, studies that use interviews to comprehensively probe how teachers experience and perceive different ecosystem components would help advance the knowledge base. Research could explore the positive and negative implications of the stability for participants who play various roles within the ecosystem (Sancho-Gil & Domingo-Coscollola, 2022). Regarding social media in particular, given that different platforms have different affordances and vernaculars (Vicari & Ditchfield, 2024), research could examine how learning ecosystems may reflect this, with ideas, discussion, and social capital developing differently on different platforms within the larger ecosystem. Such studies could help identify "continuities and tensions between learning and participation in various settings" (Greenhow et al., 2023, p. 666). Finally, scholars can also begin to try to tease out some of the influences or impacts that learning ecosystem experiences such as those in the #CharlasEducativas have on teaching beliefs and practices, as well as student outcomes.

6.2 Implications for practice

Although some educators may find that a single social media platform meets their professional needs and interests, many educators may benefit from considering how learning ecosystems can span multiple platforms. Changes in particular social media platform

ownership and practices, as well as threatened (and real) bans of individual platforms can potentially disrupt educators' use of those platforms (Koutropoulos et al., 2024). Such platform instability could dissuade some teachers from investing as much in professional learning via social media, but educators who still wish to pursue such professional learning may be wise to diversify their platform use and seek out learning ecosystems that are resilient in the face of inevitable disruptions. Given that learning ecosystems are dynamic, teachers who participate in spaces such as the #CharlasEducativas must expect and accept constant change, and prepare for "natural" disturbances (Hecht & Crowley, 2020) and the emergence of new practices, tools, and colleagues (Zhao et al., 2016).

Educators can potentially learn "everywhere, in every space, at every moment of their lives, with different people and the surrounding resources" (Sancho-Gil & Domingo-Coscollola, 2022, p. 414), and school administrators and policy makers should consider if there are ways to encourage, validate, incentivize, and/or productively harness the educator learning that occurs outside of traditional school and PD spaces. However, because much participation in learning ecosystems such as the #CharlasEducativas is self-directed and informal, it could also be counterproductive for administrators or policymakers to try to formalize or require participation in such endeavors, or focus on scaling up or replication. This is particularly the case given past instances of well-intentioned administrators creating "bureaucratic, managerial knots that squeeze out autonomy" (Kennedy, 2014, p. 691). Teachers' motivation to learn can be essential to the outcomes of professional learning activities (Kennedy, 2016; Noonan, 2019), and common top-down approaches to institutionalizing professional learning run the risk of reducing the voice and choice that often draws teachers to self-directed learning opportunities. Greater understanding of how educator learning takes place across the settings and components in a learning ecosystem can help those involved in teacher education, school leadership, and educator development to understand educators' needs and interests, and what kinds of learning experiences may work in concert to support their growth.

7 Conclusion

Online professional activities have come to comprise "routine elements of many teachers' working lives" (Lantz-Andersson et al., 2018, p. 303), and yet research remains limited on cases in which such activities occur in more self-directed and informally-organized ways, particularly across multiple social media platforms. Digital spaces or communities for educators are multi-faceted, be it in terms of media (text, audio, video) platforms (Facebook, Instagram, Reddit, etc.) or modalities (synchronous, asynchronous, blending online w/ physical, private, public). However, it has been common for research to focus on particular elements or facets of educator online activities, such as their use of a single platform (e.g., Carpenter, Morrison et al., 2024), the activity or community associated with an individual space on a platform (e.g., Greenhalgh et al., 2020; Staudt Willet, 2019), or one modality of platform use (e.g., Kerr & Schmeichel, 2018). Such studies of individual social media platforms in isolation can contribute useful knowledge to the field regarding certain aspects of teacher professional learning. But these studies may not lead to a more holistic understanding of teachers' professional activities in a digital age. In this study, we have described the unique and instructive case of the #CharlasEducativas learning ecosystem, and how that learning ecosystem spans

multiple social media platforms. While the #CharlasEducativas learning ecosystem undeniably features some idiosyncrasies that may not be relevant to other contexts, it offers a glimpse into elements of what educator professional learning may look like in a future likely to be characterized by multiplatform social media activities.

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Authors' contributions

Conceptualization, JPC, IMG, PMM; methodology, JPC, IMG, PMM; validation, JPC, IMG, PMM; formal analysis, JPC, IMG, PMM; investigation, JPC, IMG, PMM; resources, JPC, IMG, PMM; data curation, JPC, IMG, PMM; writing—original draft preparation, JPC, IMG, PMM; writing—review and editing, JPC, IMG, PMM; visualization, JPC, IMG, PMM.

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Data availability

Anonymized data will be made available by the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The procedures used in this investigation were approved by the Instituto Interuniversitario Andaluz de Investigación Educativa. In the case of non-publicly available data, informed consent was obtained from participants.

Consent for publication

The authors declare their consent to the publication of this study. All authors have read and agreed to the published version of the manuscript.

Competing interests

The authors confirm that this work is original and has not been published elsewhere, nor is it currently under consideration for publication elsewhere. The first and third authors state that they have no interests to declare. The second author has been a key leader in the development of the #CharlasEducativas, however she does not directly profit from the #CharlasEducativas in any way.

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