Beyond Disciplinary Boundaries: Mapping Educational Science in the Discourse on Social Media

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Social media has attracted considerable scholarly interest. Previous research has demonstrated the need for a more comprehensive overview of social media research across diverse disciplines. However, there is a lack of research that identifies the scope of social media integration across educational settings and how it relates to research in other academic disciplines. Harnessing the search terms of previous literature reviews, this study collected data on 80,267 articles from the Web of Science Core Collection database using search terms that were based on previous literature reviews. The data were analyzed using a combination of co-citation and bibliometric analyses via a mixed-methods approach. Our results show that there has been a constant increase in the number of publications concerned with social media, both as a transversal topic and within the educational sector. We are also able to show a range of topical domains in which the vast majority of research on social media is conducted. Our findings have practical implications for scholars and practitioners alike. Scholars can benefit from these types of analyses to identify authors and topic clusters that might otherwise have been unrecognized. Similarly, practitioners can benefit from this overview of the current “state-of-the-art” on social media.

Defining social media is a challenge (Obar & Wildman, 2015). However, while the field is constantly evolving, and ever more (technological) affordances are provided to interact with others (human and machine), scholars have identified key aspects of social media. Obar and Wildman (2015)
have provided a valuable contribution to this discussion, noting Web 2.0 applications, user-generated content, site-specific user profiles, and connecting individuals via online social networks. Moreover, boyd and Ellison (2007) particularly focused on social network sites and provided a comprehensive overview of these sites, their main characteristics, and how they might have changed over time, starting in 1997 with SixDegrees.com and moving toward platforms such as Twitter and Facebook. Similarly, Hampton (2016) specifically looked at the newest communication technologies and highlighted how different disciplines have dealt with the underlying communication patterns and behavioral aspects of their users. In his work, Hampton showed that the topic of social media has always been a very multifaceted and interdisciplinary research domain.

While not conceived or designed for educational purposes, social media have become increasingly popular for formal and informal learning in many disciplinary areas. In this context, again, the applied definitions of social media are rather diverse, encompassing a wide range of Internet-based applications that allow the creation and exchange of user-generated content, such as social networking sites, blogs, and wikis (Kaplan & Haenlein, 2010; Tess, 2013). The benefits of integrating social media into learning and teaching within secondary and higher education have been extensively studied since early 2000. Despite changes in dominant platforms and brands (e.g., the demise of MySpace and the rise of Facebook), scholars argue in article titles such as “Now [That] the Dust Has Settled” that a critical balance of achievements and challenges is finally needed (Selwyn & Sterling, 2016). In the early days of social media studies in education, it seemed that social media were mostly investigated as a “killer app” capable of being leveraged for significant returns in education, with the majority of studies being on college students’ responses to social media adoption (Piotrowski, 2015). Today, a more critical stance is taken, and scholars have questioned the suitability of commercial social media for education (Frank & Torphy, 2019, this yearbook; Krutka et al., 2019, this yearbook), as well as their adequacy to support argumentation, discussion and knowledge construction (Friesen & Lowe, 2012; Greenhow, Menzer, & Gibbins, 2015; Kirschner, 2015).

Moreover, investigations of faculty attitudes toward social media have shown that, despite their positive outlook toward uses of social media for personal sharing and professional development, many faculty are reluctant to teach with social media because of cultural and pedagogical issues and lack of institutional support (see Manca & Ranieri, 2016a, 2016c). On the other hand, while educators’ resistance to instructional uses of social media continues to be documented (Willems, Adachi, Bussey, Doherty, & Huijser, 2018), investigation of research trends in
instructional design and technology journals shows that social media studies continue to attract scholarly interest worldwide (Bodily, Leary, & West, 2019).

Despite educators’ concerns and critical arguments, social media have indeed attracted considerable scholarly interest, and hundreds of studies have been published on single platforms or on the combination of multiple social services. With an increasing number of studies concerned with social media, literature reviews have also flourished in the social sciences and in the field of education (Fox & Bird, 2017; Manca & Whitworth, 2018; Wilson, Gosling, & Graham, 2012; Zachos, Paraskevopoulou-Kollia, & Anagnostopoulos, 2018). Social network sites especially have gained a prominent position in the scholarly literature, and today they are the focal topic in thousands of articles in the major literature databases and in literature reviews (Aydin, 2012; Greenhow & Askari, 2017; Manca & Ranieri, 2013, 2016b). The educational value of social network sites has been deeply studied in specialized journals and in thematic conferences with a major focus on higher education (Zachos et al., 2018), and the topic has been increasingly taken up in K–12 education and related research as well (Daly, Liou, Del Fresno, Rehm, & Bjorklund, 2019, this yearbook; Daly, Supovitz, & Del Fresno, 2019, this yearbook; Greenhow, Cho, Dennen, & Fishman, 2019, this yearbook; Greenhow, Li, & Mai, in press; Greenhow & Robelia, 2009a, 2009b; Greenhow et al., 2015; Greenhow, Burton, & Robelia, 2011; Krutka et al., 2019, this yearbook). Relevant specific areas that have gained momentum in social media studies are teacher professional learning (Lantz-Andersson, Lundin, & Selwyn, 2018) and healthcare and medical/nursing education (Cummings & Mather, 2017; Fox & Bird, 2017; Hamm et al., 2013; Lewis et al., 2018). When investigating the educational benefit of single platforms, a number of literature reviews have analyzed educational benefits of Facebook and Twitter (Aydin, 2012; Barrot, 2018; Chugh & Ruhi, 2018; Gao, Luo, & Zhang, 2012; Hew, 2011; Manca & Ranieri, 2013, 2016b; Niu, 2019; Tang & Hew, 2017; Yang, Wang, Woo, & Quek, 2011; Voivonta & Avraamidou, 2018), while other social media platforms like WhatsApp, Instagram, and Pinterest have gained less attention in these types of studies (Manca, in press; Pimmer & Rambe, 2018).

Despite a number of literature reviews on global social media phenomena and on specific social media platforms, a comprehensive understanding of social media in education across disciplines is still lacking. This study aims to provide a preliminary analysis of the academic discourse on social media, spanning more than two decades of relevant articles to position educational science in this growing and interdisciplinary research context.
THEORETICAL BACKGROUND

Along with extensive reviews of the literature, other methodological approaches like meta-analytic reviews (Skoric, Zhu, Goh, & Pang, 2016), meta-synthesis (Mnkandla & Minnaar, 2018), and meta-analysis (Huang, 2018; Liu, Kirschner, & Karpinski, 2017) have been gaining impetus in assessing the educational benefits of social media studies and related sub-areas. While social network analysis and bibliometric and scientometric analysis are established fields of analysis in the communication and information sciences, they are relatively new methods of investigation in education and social media studies (Basak & Calisir, 2015; Gan & Wang, 2015; Gupta, Kumar, & Gupta, 2015; Lopes, Faria, Fidalgo-Neto, & Mota, 2017; Zyoud, Sweileh, Awang, & Al-Jabi, 2018).

To date, these analyses have been concerned with a specific focus on Facebook or on social media generally and have tended to focus on literature from a single database. Among the first studies, Basak and Calisir (2015) conducted a scientometric analysis of publication trends in Facebook-related articles retrieved from the Web of Science (WoS) database. The study showed that engineering, business and economics, and education were the top three most popular research areas in the 2005–2013 time span (Basak & Calisir, 2015). Other authors have analyzed publications on the topic of “Facebook and Libraries,” as covered in the Scopus database during 2006–2014, and reported that social sciences contributed the largest share of publications, followed by computer science, engineering, medicine, business, management and accounting, arts and humanities, and decision sciences (Gupta et al., 2015). A third study conducted in China mapped the intellectual structure of social media research published from 2006 to 2013 in the China Academic Journals Full-text Database. It revealed that the most common subject was (1) news and media, followed by (2) library, (3) information and digital library, and (4) computer software and applications (Gan & Wang, 2015). The study also identified 10 clusters of research on social media in the examined literature (i.e., change of media and its influence on news dissemination; socialization of social media; social media and public events; social media and user behavior; social media and communication; social media marketing and information sharing; social media and knowledge management; social media and government; empirical study on virtual community; and social media and library), which indicate the range of topics in social media research in China. The relatively dispersive distribution of research topics suggests the imbalanced development on social media research in the country: For instance, research topics in Cluster 1 (change of media and its influence on dissemination)
are found to be at the core of the social media field in China and tend to be mature, whereas topics in Clusters 2 (socialization of social media), 3 (opinion leader and emergency) and 6 (social media marketing and information sharing) are still developing and will become new research trends in the future. Another study employed mapping and bibliometric analysis to investigate the most used social media platforms in the field of psychology between 2004 and 2015 and assessed the growth in publications, citation analysis, international collaboration, author productivity, emerging topics, and mapped frequent terms in 959 publications (Zyoud et al., 2018). Results of the study show that personality psychology, experimental psychology, psychological risk factors, and developmental psychology were the main topics investigated in the examined studies related to social media.

The mentioned studies, published in information management and health sciences publications, demonstrate an interest in providing a comprehensive overview of social media across diverse disciplines by means of quantitative methods (i.e., bibliometrics and scientometrics) applied to large numbers of publications. However, to our knowledge, there is a lack of similar analyses of the educational use of social media as an extensive phenomenon in the diverse disciplinary sectors. The aim in this chapter is to position educational science in this growing and interdisciplinary research context and to explore possible interconnections between research disciplines.

RATIONALE OF THE STUDY

This study builds on the work laid out in the previous section and investigates the academic discourse on social media. More specifically, we employ a mixed-methods approach, combining co-citation and bibliometric analysis to analyze more than two decades of publications in social media research identified in the WoS. These methods have been increasingly suggested to deal with large corpora of text (e.g., Deerwester, Dumais, Furnas, Landauer, & Harshman, 1990). They provide a methodological framework to unveil underlying structures (co-citation analysis) that can be used as a point of departure for further investigations of common terminology, content topics, and interrelations between research areas.

Consequently, in the context of this exploratory study, our research questions are formulated as:

1. **What does the general academic landscape look like on the overarching research topic of social media?**

2. **To what extent can we identify interconnections between research disciplines?**
3. How does the domain of educational science, in particular, compare to the other academic disciplines?

Next, we provide an overview of our data collection procedures and two types of analyses to orient the reader.

METHODS

DATA COLLECTION

We collected data from the WoS Core Collection, which includes fully indexed cited references, authors, and author affiliations with sources dating back to 1900 (Web of Science, 2018). Our search terms were based on those used in the most recent literature reviews of social media in education (Greenhow & Askari, 2017) and were deliberately broad to cast a wide net in the search. Search terms included a mix of descriptive social media terms (i.e., “social media” or “social network” or “blog”) and specific names of major social media platforms (i.e., “Facebook” or “Twitter” or “Pinterest”). The search was limited by document type (journal articles) and language (English) so that only journal articles in English were included. There were no publication year limits on the search. The 84,755 results were downloaded in batches of 500 articles at a time and included abstracts, cited references, and article citation. The batch files were then imported into the statistical software package R. The files were then merged and analyzed using the R libraries bibliometrix, tm, topicmodels, and wordcloud.

While the “casting a wide net” approach has potential drawbacks, we believe that this technique considers the difficulty in providing a unique definition of “social media” and thus results in a mixed approach of defining and dealing with the matter (Hampton, 2016; Obar & Wildman, 2015). Moreover, we purposefully wanted to be very wide in our search and definition to possibly discover commonalities between disciplines.

Furthermore, to identify prominent journals from the domain of educational science, we used the Incite Journal Citation Reports, Social Science Citation Index edition, in WoS. Consequently, we used the list of 239 journals ranked in Education & Educational Research to filter the out the applicable publications from the entire data set, which resulted in 1,474 publications (1.74% of the total data corpus).

CITATION NETWORK ANALYSIS

As mentioned, we combined co-citation and bibliometric analysis to analyze more than two decades of publications in social media research. Citations are formalized, explicit (content) connections between different
scientific works (Garfield, 1979). Figure 1 provides a schematic example of this. Author A writes an article and cites the work of Authors B and C. This constitutes a co-citation. Moreover, the observation that A has cited B and C suggests that A has established a certain commonality or discussion with the work of B and C. Hence, the work of the latter two authors can be said to have a certain basis for discussion and possibly also acceptance in the research community. On the basis of this information, the recorded co-citation networks can be used as a first step to possibly identify authors who cover a certain content area and to map the resulting (content-related) discussion (see de Solla Price, 1963; Griffith, Small, Stonehill, & Dey, 1974). In comparison to other bibliometric methods, in (co-)citation networks, the main topics are represented by researchers (clusters) who are connected with each other and point out possible (content-related) proximity and connections (see Garfield, 2006). These clusters were determined using the Louvain method (Blondel, Guillaume, Lambiotte, & Lefebvre, 2008). For the purpose of this study, we did not look into the directionality of the underlying citation network and used binary, unweighted network data. Consequently, we are not able to distinguish between topical antecedents and successor, either by topic or by author. Only articles that show similarities in covering the predefined, wide domain of “social media” were identified.

At face value, this type of analysis cannot provide any more detailed information on the actual content that is being published and underlying discourse about the content matter. However, based on these networks, preliminary topic domains, as represented by citation links, can be extracted from the collected publications. This can then be used as a basis for further, more detailed bibliometric analyses, which will be described next.

BIBLIOMETRIC ANALYSES

Based on the results of the co-citation networks, we used bibliometric analyses to further analyze the collected data. This type of analysis enabled us to deal with the large amounts of text data. More specifically, we employed latent semantic analysis (LSA; Deerwester et al., 1990). LSA is a technique in natural language processing, particularly distributional semantics, for analyzing relationships between words. LSA assumes that words that are close in meaning will occur in similar pieces of text. The more often terms appear together or are used in the vicinity of other terms in a document, the more likely it is that they contextually belong together, providing preliminary evidence for a shared common understanding and terminology. Additionally, and focusing on journals from the domain of educational science, we used latent Dirichlet allocation (Blei & Lafferty,
2009). This method is also referred to as topic modeling (Alsumait, Wang, Domeniconi, & Barbará, 2010) and has increasingly been used to analyze the underlying topical structure of these big data sets (Chaney & Blei, 2012). Again, the underlying notion is to analyze larger corpora of text and identify words that often occur in the vicinity of each other. The more often certain words occur in combination, the stronger the suggested relation between them. This in turn can be used to unveil concepts, terminological connections, and topics within the text. To conduct these types of analyses, we had to determine the number of anticipated topics we expected to find in the text corpora. Because this can be a challenging task, previous research has suggested to use the so-called Gibbs sampling algorithm to identify this structure, which is the most commonly used method (Blei, 2012). In the context of this method, the anticipated number of topics is assigned ex ante, before the actual topic structure is apparent. For the purpose of this study, we ran the applicable analyses for five, seven, and 10 ex ante topics. Then, to determine the best fit for the underlying data, we qualitatively analyzed the results. As a result, we determined which option best describes the underlying content patterns.

![Figure 1. Schematic representation of a co-citation network](image)

To summarize, we used the co-citation analysis as a first step to map the academic landscape of social media research from articles identified from the WoS. From the links that were established between authors, who cited each other’s work, we could stipulate whether different distinguishable clusters cover social media in their work. Moreover, we could identify, at the author level, whether any co-citations across academic disciplines occurred, which would suggest a discourse on common terminology. As a second step,
and to then draw more detailed conclusions about the connections we were seeing, we specifically looked at the content that was being published. This allowed us to zoom in on the specific words and phrases that were used in the individual content clusters. The methods described earlier provided us with a toolkit to assign content topics and terminology to the content clusters that were previously determined on the author level.

RESULTS

DEMOGRAPHICS

Overall, the data set contained 84,755 articles from a total of 170,179 authors. The average number of coauthors was 4.18. These articles cover the time span in the WoS database from 1908 until 2018 and exhibited an annual percentage growth of 4.2%. For the purpose of this particular set of analyses, we decided to focus on articles starting from 1992 onward for two reasons: First, about 99% of all articles were published after 1992, which makes sense given that social media approached mainstream adoption in early 2000; second, the WoS search only started to include abstracts, which we needed for bibliometric analyses, as of 1992. The final data set is described in detail next.

Figure 2 shows how the number of publications has changed over the years. Moreover, Figure 2 also contrasts the publications from the entire data set (solid line, left axis; N = 80,267) with the publications from the identified educational journals in the WoS Core Collection (dotted line, right axis; N = 1,474). For example, in 2018, there were 10,646 publications in the entire data set, and 172 of these articles were published in the identified educational journals.

Figure 2. Publications per year
As can be seen in Figure 2, both lines (denoting all publications and publications in education journals) follow a similar upward trend. Yet, while the topic domain of educational science is growing, the volume of publications in the identified educational journals ($N = 1,474$) remains low compared with the volume of publications overall analyzed in our WoS search.

CITATION NETWORK ANALYSIS

As previously mentioned, citations are formalized, explicit (content) connections, and co-citation networks can contribute to mapping (content-related) discussion among authors (see de Solla Price, 1963; Griffith et al., 1974). Figure 3 shows an example of a subset of 350 nodes of the co-citation network. In this context, the nodes represent authors, and the edges visualize whether one author has cited another author in his or her publication. We chose this particular visual representation, which is representative of the entire data set, because a depiction of the entire network would not have yielded visually clear sociograms given their large size.

![Figure 3. Subnetwork ($N = 350$) co-citation network](image)

As can be seen in Figure 3, there are numerous communities, as highlighted by the shades of the nodes, covering the topics of our WoS search. Furthermore, these clusters appear to be interconnected, as highlighted
by nodes from different clusters showing a connection. This suggests that (individual) authors have collaborated on the topic of social media. The interpretation of this can be twofold. On the one hand, this could suggest that different authors from different strains of the same discipline have jointly written an article on social media. On the other hand, this could also reflect the collaboration of representatives from two (or more) disciplines, who conducted multidisciplinary research on a specific topic from the wide domain of social media. We have also been able to identify some nodes on the periphery in Figure 3. A possible explanation for their outlier status in the overall network is, among others, that they might have been published in English in an otherwise non-English journal (e.g., Zeitschrift für Erziehungswissenschaft: German Journal for Educational Science, Zdravstveno Varstvo: Slovenia Journal for Health Care).

To identify content domains in which the communities published, we then investigated the titles of the 11,732 journals included in the data set. As described in the methods section, using topic modeling, we ran the analysis for an anticipated number of five, seven, and 10 ex ante topics based on the largest sets of clusters. This resulted in seven topics (see Table 1), which we assigned to the topic domains of (1) medicine, (2) applied science, (3) healthcare, (4) management, (5) information sciences, (6) psychology, and (7) social sciences (as a broad category). However, this was merely a preliminary analysis of the content being published. At this level of granularity, it was possible to identify the indicated topic domains. A more detailed analysis—for example, by increasing the number of ex ante topics—would allow us to provide a more differentiated picture of, for example, “information science” and whether this example would also include the subdomain of “computer science.”

BIBLIOMETRIC ANALYSIS

Figure 4 provides wordclouds for the entire data set and for the subset of articles from the educational journals. The wordclouds are constructed based on the most commonly used words from all applicable abstracts. Here we can see traces of terminology being used within the identified topical communities, as described earlier. For instance, in Figure 4a, next to terminology like “social” and “network, words such as “patients” and “brain” appear dominant in the abstracts, which corresponds to the appearance of related terms like “medicine” and “medical” listed in Topic 1 (in Table 1).
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Next, we were interested in the content of the identified educational journals. As expected, and as illustrated in Figure 4b, the focus is now considerably more on “students,” “learning,” “school,” and “teachers”—all terms that appear dominant in the wordcloud. However, words like “network” were also again present. Although in the context of this study, we cannot make a clear judgment of whether this constitutes a topical overlap or genuine interdisciplinarity, it certainly provides preliminary evidence for the use of a common terminology (e.g., method or approach) to deal with the topics of our WoS search across the different content domains.

![Wordclouds](image)

**Figure 4. Wordclouds**

To attain a more refined picture of the content being published in educational science, we then conducted topic modeling within the education journal articles subset of our data. As indicated earlier, we ran the analyses for five, seven, and 10 ex ante topics. Based on a qualitative interpretation of the results, we decided that seven topics provided the best fit for the underlying data. More specifically, while five topics appeared to summarize the underlying topical structure too much, seemingly combining distinctive nuances with each other (e.g., online learning among students and teachers), 10 topics did not add any new dimensions. Instead, the additional topics merely subdivided already identified topics into smaller subsets. As can be seen from Table 2, the seven topics cover different aspects.

Topic 1 deals with social support mechanisms and interventions around the general topic of health. Topic 2 takes a social network perspective and investigates applicable social network patterns related to
schools. Topic 3 specifically deals with Facebook and how its use possibly related to communication patterns in an educational context. Topic 4 looks at digital media, how it can be (critically) used in practice, and its potential for literacy. Topic 5 is concerned with collaborative online environments and apparently focuses on activities such as writing (in wikis). Topic 6 appears to focus on teachers’ professional development. Finally, Topic 7 deals with students, academic groups, and peers in higher education courses and universities.

DISCUSSION

This study builds on the work laid out in the previous sections and investigates the academic discourse on social media by providing a preliminary analysis of social media across diverse disciplines and how the field of educational research is interconnected with these disciplines. Specific research questions for this project were:

1. What does the general academic landscape look like on the overarching research topic of social media?
2. To what extent can we identify interconnections between research disciplines?
3. How does the domain of educational science, in particular, compare to the other academic disciplines?

Results show that there is a constant growing trend in the number of publications concerned with social media both as a transversal topic and in the educational sector, which demonstrates that social media research continues to attract scholarly interest (Bodily et al., 2019).

Investigation of topics through citation network analysis revealed that a number of topical communities map a varied research agenda from a (wide) range of different disciplines. We have shown that the vast majority of research on the indicated topics, at the moment, is conducted in the topical domains of (1) medicine, (2) applied science, (3) health care, (4) management, (5) information sciences, (6) psychology, and (7) social sciences. It seems that medicine and health sciences are the prominent sectors in our investigation of social media, unlike previous studies conducted to map social media studies or a specific social media platform in a domain (Basak & Calisir, 2015; Gan & Wang, 2015; Gupta, Kumar, & Gupta, 2015; Lopes et al., 2017; Zyoud et al., 2018). For instance, other analyses of Facebook-related literature in WoS or Scopus databases have identified engineering, computer science, and business as the most prominent topical domains (Basak & Calisir, 2015; Gupta et al., 2015).

Despite these differences, synthesis across studies provides an image of the growing interdisciplinary and transversal nature of educational
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science concerned with social media. This observation is further supported by a bibliometric analysis of the scientific literature conducted on Facebook that was indexed at the WoS Core Collection, from Thomson Reuters, and linked to the research areas of Education/Educational Research (Lopes et al., 2017). Results indicated that the educational domain shows links with other academic disciplines such as health sciences, computer science, and linguistics. Our findings also align with studies published in the educational technology sector that demonstrated a specific interest in social media in health care and medical/nursing education (Cummings & Mather, 2017; Fox & Bird, 2017; Hamm et al., 2013; Lewis et al., 2018). Yet, future studies need to investigate the range of social media subtopics in order to understand the nature of social media studies in these disciplines and how they connect to and help shape disciplinary-related educational research.

Another result of this study concerns the impact of social media research in educational science. Articles in educational journals represented a very limited percentage of the overall research output (1.74%). Nonetheless, further research is needed to determine whether this percentage is consistent with the total number of articles published in the global database of journals concerning other topics. It is also important to situate social media in education research in the landscape of educational technology research broadly (Bodily et al., 2019; Bond, Zawacki-Richter, & Nichols, 2019; Zawacki-Richter & Latchem, 2018) to assess to what extent it is attracting scholarly interest and for what reasons (e.g., learning benefits for new generations of students who are regular users of these platforms, challenges posed by commercial social media for educational use). For instance, five out of the top 20 cited papers across all journals on instructional design and technology scholarship between 2007 and 2017 were on social media, which indicates the growing interest in this topic within the educational technology sector (Bodily et al., 2019). In a review of four decades of educational technology research published in the British Journal of Educational Technology (Bond et al., 2019), for the years 2010–2018, the leading research topics were learning analytics, online collaboration in higher education, and mobile learning and social media. The latter were investigated as tools to enhance student learning and students’ engagement, as well as to expand professional learning, but the psychological challenges of adopting Web 2.0 were also noted. A similar study conducted on four decades of research in Computers & Education (Zawacki-Richter & Latchem, 2018) showed that the educational potential of social media for learning started to emerge during 1997–2006 (identified as networked computers as tools for collaborative learning) and continued to increase in 2007–2016.
(e.g., in research concerning online learning in a digital age) as a steady and more mature scholarly interest. By more closely examining studies outside the field of education, educational scientists can benefit from the methodologies and findings provided by other fields. The limited presence of educational science in the results of this study suggests that other fields have been, at the very least, more prolific in their studies of social media and, at most, have theoretical frameworks, methodologies, and findings that could inform work in educational science through the cross-pollination of ideas.

Furthermore, the co-citation analyses revealed topic clusters and communities, as represented by co-citation links between authors. This constituted the first step in our analysis and provided a first indication of whether we could identify different distinguishable clusters that cover social media in their work. Furthermore, this analysis also showed that these clusters were, to varying degrees, interconnected, which supports the findings of previous work in this area (Gan & Wang, 2015). Bibliometric analysis and topic modeling further supported this claim. More specifically, while we were able to zoom in on specific details, particularly for the domain of educational science, we also identified a “common ground” among disciplines, at least with respect to terminology. Interestingly, this common terminology may indicate common methodological approaches, namely social network analysis, or social media platform as the focus of study, namely social network sites.

These findings can have practical implications for scholars and practitioners alike. Scholars can benefit from these types of analyses to identify authors and topic clusters that might have otherwise been invisible because of the ever-increasing number of publications on social media. On the one hand, this can provide valuable input to both theoretical and empirical considerations in a research domain that is inherently interdisciplinary. On the other hand, it can help to position different disciplines and methodological approaches in a wider context, adding another dimension to our understanding of how research on social media evolves and how it is shaped by which disciplines. Similarly, practitioners can benefit from these analyses because they provide them with an overview of the current “state-of-the-art” on social media. What are scholars currently discussing? What are the latest findings on how to use certain aspects of social media in class (e.g., using Facebook in schools, collaborative writing using wikis)? Are there commonalities among disciplines that might suggest an “agreed-on” methodology or setting? Being able to provide possible answers for these types of questions can be useful for practitioners without requiring them to delve into the specific details of academic research.
CONCLUSION AND LIMITATIONS

While our study provides valuable insights on how social media research is discussed across diverse disciplines and in the field of educational science, five limitations should be considered when interpreting the results and designing future studies on the topic.

First, building on previous research (e.g., boyd & Ellison, 2007; Ellison & boyd, 2013; Hampton, 2016; Kaplan & Haenlein, 2010; Obar & Wildman, 2015; Tess, 2013), we have included a wide variety of definitions of “social media” over a long time period. To acquire a preliminary overview of possible underlying connections between disciplines, this has shown to be a valuable methodological approach. However, for the purpose of identifying more detailed and nuanced relations between, for example, information and educational science, future research should also consider differences in definitions and apply a denser time frame.

Second, the focus of our work was on article abstracts and not on full papers. Similarly, we focused on journal articles. While this is a good point of departure, it concentrates on a limited amount of text that highlights the key issues of a publication. More specifically, different disciplines use different primary publications for the discourse. Whereas computer and information science mainly publish in conference proceedings, media studies predominantly use book publications as an output channel for their work. Hence, being interested in commonalities and trying to show a multidisciplinary picture of the underlying research, those conducting future research should strive to also allow for multidisciplinarity in references. Similarly, we only analyzed 239 educational journals that were included in the Social Science Citation Index edition. This means that educational journals in the Emerging Sources Citation Index (a citation index produced since 2015 by Thomson Reuters, and now by Clarivate Analytics, which includes publications of regional importance and in emerging scientific fields) were not considered for analysis. Casting a wider net would provide a more nuanced view of how scholars from the domain of educational science study and investigate the realm of social media.

Third, WoS was the only database used in our search. The information required to run the analyses (abstracts, references, etc.) was only available through WoS, thus ignoring research that appears in other quality databases. As more databases offer the same data access, this study could be repeated with expanded access to journals that are not currently accessible in this manner.

Fourth, in this study we took a holistic view of the subject matter. Future studies should consider in more detail (1) possible thematic changes over time; (2) prominent scholars from the co-citation network and how they
might influence the focus and direction of research and the impact of educational technology research in other areas of social media research; (3) how educational benefits of using social media are investigated in the diverse disciplinary areas and not only in educational science (e.g., medical education, computer science education, business and marketing education); and (4) relevance of the social media topic with regard to the most prominent topics identified in the educational technology sector.

Finally, although our quantitative approach is very well suited to analyzing large corpora of text (e.g., Deerwester et al., 1990), it can be criticized for only “scratching the surface” of the underlying academic discourse. Using this mixed-methods approach as a filtering mechanism to get a comparatively quick overview of how a certain topic is discussed across different, interrelated disciplines is very valuable. However, to further zoom in on terminological differences and nuances, it should be combined with more thorough and qualitative literature reviews (e.g., Manca & Ranieri, 2013).

NOTES

1. The final topic search terms were: ((((((((((((“social media” OR “social network”) OR “social networking”) OR “blog”) OR “weblog”) OR “Facebook”) OR “Twitter”) OR “Pinterest”) OR “Instagram”) OR “Snapchat”) OR “wiki”) OR “Reddit”) OR “social network site”) OR “YouTube”) OR “Vine”) OR “WhatsApp”) OR “Voxel”) OR “Tumblr”) OR “LinkedIn”) OR “microblogging”).

2. Please note that our search was conducted on November 7, 2018. We therefore do not cover any publications that were published after that date.

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