Educators on the Front Page of the Internet:
Education-Related Subreddits as Learning Spaces

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Abstract: Accessing and contributing to online spaces have become regular parts of many educators' professional activities. However, the popular discussion forum website Reddit has received little attention from educational researchers despite the presence of multiple education-related *subreddits* that have tens of thousands of subscribers and feature thousands of threaded conversations per year. To address this gap in the literature, we gathered data related to one year of activity on four education-related subreddits. Comparative analysis revealed substantial differences among the four subreddits in terms of levels of engagement, sentiment, and network characteristics. Reddit appears to host multiple online spaces that are diverse in nature and might meet or respond to different educator needs. We discuss these findings in relation to the extant literature and consider implications for future research and teacher education practice.

Introduction

A robust body of research has described educators' professional use of social media—including Facebook (e.g., Kelly & Antonio, 2016) and Twitter (e.g., Rehm & Notten, 2016), but also numerous other platforms—for a variety of professional purposes such as collaborating, experimenting, idea exchange, learning in interaction, combating isolation, professional improvement, reading, and reflecting. Against this backdrop, the platform Reddit has been under-researched—in fact, almost entirely unstudied by educational researchers. Reddit, which bills itself as "the front page of the Internet," is a significant presence among social media platforms, with more than 330 million average monthly active users contributing 14 billion average screen views per month, and supporting more than 138,000 active communities, as of November 2017 (Reddit, n.d.).

This study seeks to explore a single research question: What kind of learning spaces can be found on the social media platform Reddit? More specifically, we investigate several education-related *subreddits*—which the company describes as communities gathered around a topic, but practically are distinct discussion forums hosted on the platform. We build upon and follow recommendations made in earlier research conducted by Carpenter, McDade and Childers (2018) on a single education-related subreddit: we expanding the scope of study to compare and contrast different education-related subreddits—there are numerous ones that have tens of thousands of subscribers and feature thousands of threaded conversations per year—and include additional methods of analysis. More specifically, Carpenter and colleagues' earlier research used Reddit data spanning 20 days, from which the top 25 posts and top responses to each were analyzed with human-coded content analysis. Here, we seek to establish a broader foundation of educational research on Reddit, so we extend the scope of inquiry to a full year of Reddit data and analyze all *contributions* (i.e., both posts and responses) to four different education-related subreddits.

Background

Understanding Educators' Professional Learning in Social Media

Research on educators' professional growth has often focused on learning that occurs as a result of participation in formal professional development (PD) activities such as district-provided workshops and university-based coursework (Macià & García, 2016). However, professional learning has many forms and purposes

(Lieberman & Pointer Mace, 2010), and informal learning activities have long been a part of educator professional growth, even if these have received relatively less attention in the literature. More recently, the rise of social media has created new opportunities for educators to personalize their learning beyond PD encouraged or required by their schools, districts, and licensure regulations (e.g., Carpenter & Krutka, 2014, 2015). A variety of popular social media are used by educators to reach outside their individual schools and districts to share resources, connect, and collaborate with a wider set of colleagues (Carpenter & Green, 2017; Hu, Torphy, Opperman, Jansen, & Lo, 2018; Robson, 2018). In contrast to offline modes of educator informal learning which can prove challenging for researchers to explore, many professional activities that occur via social media also leave *digital traces* that researchers can study.

Exploring Educators' Uses of Reddit

Despite the existence of many education-related subreddits, Reddit has received scant attention from researchers in comparison to the literature on educators' professional uses of other social media such as Facebook and Twitter. Reddit has a number of features that would seem to create unique affordances and constraints for users and influence the nature of discourse in subreddits. For example, Reddit's infrastructure is that of an online discussion forum, hosting a number of separate, stable, ongoing conversations through the various subreddits. This contrasts Twitter's more fluid and informal hashtag conversations. In addition, the content within subreddits is ordered by *popularity*, as measured by a scoring system where other users can vote with a +1 (i.e., upvoting) or -1 (i.e., downvoting), based on their evaluation of the contribution. Finally, Reddit offers anonymity to any user who desires it, and the norm of the platform is for usernames to not be readily identifiable with real people. Potts and Harrison (2013) described the interface of Reddit as a kind of "rhetorical construction" where its features "all work towards building a distinct culture of sharing information" (p. 144). Because of these unique features and the resulting culture of the platform, it seems likely that educators' activities on Reddit may differ in important ways from their uses of other social media.

Although Chang-Kredl and Colannino (2017) studied how teachers were portrayed on Reddit, only limited investigation of the use of Reddit by educators has been published. Carpenter and colleagues (2018) conducted a qualitative analysis of the top posts and responses to the r/Teachers subreddit, which at the time was the education-related subreddit with the second largest number of subscribers. Analysis suggested that individuals who posted to r/Teachers most frequently engaged in seeking and giving advice related to both technical and emotional aspects of teaching, while top-rated responses sometimes provided advice in line with the nature of the original advice-seeking post, and at other times provided emotional support or advice that reframed the original post. Of note for teacher educators was the presence of pre-service teachers (PSTs) on r/Teachers seeking and receiving various kinds of advice related to teaching and the teaching profession. The limitations of this single study of one education-related subreddit mean that much remains to be understood about what use educators make of the platform and the nature of the learning spaces Reddit supports.

Affinity Spaces as a Framework for Educators' Uses of Reddit

Researchers have conceptualized educator professional learning via social media in various ways, including the frames of *communities of practice* (e.g., Wesely, 2013) and *professional learning networks* (e.g., Trust, 2012). However, because of the particular features of Reddit described in the previous section (e.g., the anonymity offered to users), Carpenter and colleagues (2018) preferred an *affinity spaces* framework to other lenses. Reddit (n.d.) has described itself as a place where, "every day, millions of people around the world post, vote, and comment in communities organized around their interests;" this would seem to match Gee's (2004) conception of an affinity space as defined primarily by a common goal, endeavor, or interest. The shared affinity is expressed through the content of the space, and of interest are how users interact directly with that content as well as with each other around the content (Staudt Willet, Koehler, & Greenhalgh, 2017). Thus we are interested in how educators interact with the content of different education-related subreddits and with each other within these subreddits.

Method

Following the precedent of the scant earlier educational research studies on Reddit (e.g., Carpenter et al., 2018; Chang-Kredl & Colannino, 2017), we used *digital traces*—that is, those durable and machine-readable records of social life resulting from electronic transactions with social media (Welser, Smith, Fisher, & Gleave, 2008)—to examine educators' uses of Reddit. We collected these digital trace data using the BigQuery web service (Google Cloud, 2018). In total, we collected 351,301 contributions—114,524 posts and 236,777 responses to those posts—to four different education-related subreddits—r/education, r/Teachers, r/teaching, and r/teachingresources— between July 1, 2017 and June 30, 2018. For this initial exploratory study, we want to examine education-related subreddits that included substantial activity levels and potentially demonstrated different approaches to conversations about education. We chose r/education and r/Teachers because at the time of data collection, they were the education-related subreddits with the most subscribers; r/teaching and r/teachingresources also appeared on Internet lists of top education-related subreddits, although they had significantly fewer subscribers.

Digital traces are a form of observational data and, as a result, are limited in terms of the depth of interpretation they offer. We used R, a "free software environment for statistical computing and graphics" (R Core Team, 2018), to analyze the collected data with a variety of methods to vary our perspective on what we were able to see and thus "thicken" our descriptions of the data (Latzko-Toth, Bonneau, & Millette, 2017). First, we calculated descriptive statistics for contributions and contributors. Second, we used the *sentimentr* R package (Rinker, 2018), with the Jockers-Rinker dictionary of positive and negative words, to calculate a text-polarity sentiment score for each contribution. Third, we created word clouds of the 100 most common words in each of the four subreddits, after removing numbers and English *stop words* (i.e., the most common words in a language, such as "the" and "of"). Fourth, we used the *igraph* R package (Csárdi, 2018) to conduct social network analysis of how contributors responded to each other within a subreddit.

Results

Through calculating descriptive statistics for overall contributions to the four subreddits, we found an *active percentage* which represented the number of contributors to a subreddit in the past year divided by the number of subscribers to that subreddit, as of September 2018. We also found an *engagement score* which represented the number of responses to questions in a subreddit in the past year divided by the number of threads, or clustered conversations, in that subreddit during the same span of time (Table 1). The data suggest that a large number of subscribers is not necessarily associated with the most active contributors; for example, r/education and r/Teachers had nearly identical number of subscribers, but r/Teachers had more than three times as many contributors in the past year. Similarly, r/teaching had less than half as many subscribers as r/education but almost the same number of contributors. Engagement scores tell a similar story; for instance, the threads of conversation in r/Teachers had on average three and a half times as many responses as those in r/education and r/teachingresources. These findings suggest that those users subscribed to r/Teachers and r/teaching were much more actively involved (i.e., not just watching the subreddit but willing to contribute) than those subscribed to r/education and r/teachingresources.

Subreddit	Contributors	Subscribers	Active	Contributions	Threads	Engagement
r/education	6,129	70,900	8.64%	23,299	6,258	3.72
r/Teachers	19,366	71,600	27.05%	190,335	13,739	13.85
r/teaching	5,436	30,800	17.65%	22,309	2,330	9.57
r/teachingresources	549	11,500	4.77%	834	294	2.84

Table 1. Activity and Engagement in Education-Related Subreddits

Because we wanted to describe what would be considered normal or typical behavior within these different subreddits, we also calculated descriptive statistics related to contributions-per-contributor (Table 2). Examination of these statistics reinforces our observations from Table 1—the typical user in r/Teachers does indeed contribute more than an average user in the other subreddits, as measured both by mean and median.

Subreddit	Mean	SD	Median	Min	Max
r/education	4.21	13.95	1	1	520
r/Teachers	10.80	49.65	2	1	3,628
r/teaching	4.50	8.22	2	1	160

r/teachingresources	1.82	2.21	1	1	64

Table 2. Descriptive Statistics of Contributions per Contributor

We calculated a text-polarity sentiment score for every contribution to each of the four subreddits. This allowed us to create scatterplots (Figure 1) of the voting score (i.e., the sum of all upvotes and downvotes) of each contribution (the *y*-axis) by the sentiment score (the *x*-axis). Although each subreddit had a range of sentiment scores, r/Teachers had the greatest diversity of voting scores and r/teachingresources had very little; these findings reinforce the theme that r/Teachers had the most active and engaged participants, and r/teachingresources had the least.
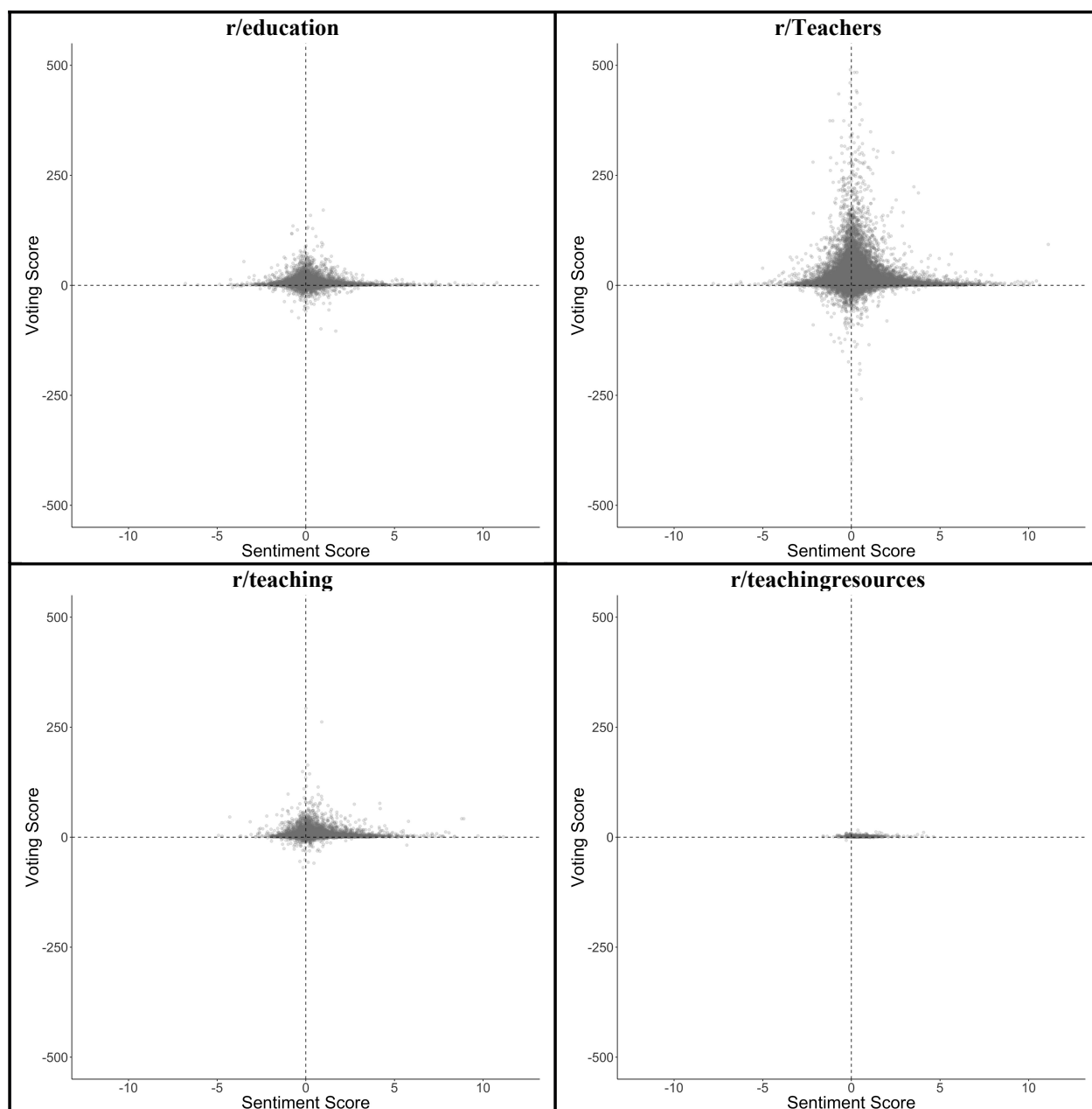

Figure 1. Scatterplot of Voting Score vs. Sentiment Score of Each Subreddit Contribution

We calculated the means and standard deviations of the sentiment scores and voting scores for each subreddit (Table 3). With these statistics, we notice that the average text-polarity sentiment score of contributions in all four subreddits are positive and similar to each other, although r/teaching and r/teachingresources are slightly

more positive. We also notice that the average voting score of contributions in each subreddit was positive; contributions in r/Teachers had the highest average voting score, r/teaching and r/education were fairly similar, and r/teachingresources were lowest on average. In addition, the large standard deviation for voting scores in r/Teachers suggests that some threads in that subreddit garnered quite a bit of attention in terms of responses.

Subreddit	Sentiment Scores		Voting Scores	
	Mean	SD	Mean	SD
r/education	0.28	0.83	3.11	7.28
r/Teachers	0.31	0.75	5.06	14.46
r/teaching	0.43	0.83	3.76	7.37
r/teachingresources	0.45	0.65	1.80	1.60

Table 3. Descriptive Statistics of Sentiment Scores and Voting Scores

Comparing the word clouds (Figure 2) of the most common words in each of the subreddits (not including numbers or stop words), we notice that many of these words are obviously relevant to conversations about education —for example, "students" and "teachers." The word "education" appeared frequently in r/education contributions, but surprisingly did not feature prominently in any of the other subreddits. On the other hand, all the subreddits had a high occurrence of "school," except for r/teachingresources. These differences could suggest that r/education does include more broad conversations about the field of education and that r/teachingresources has more attention paid to the resources themselves rather than what takes place in schools.
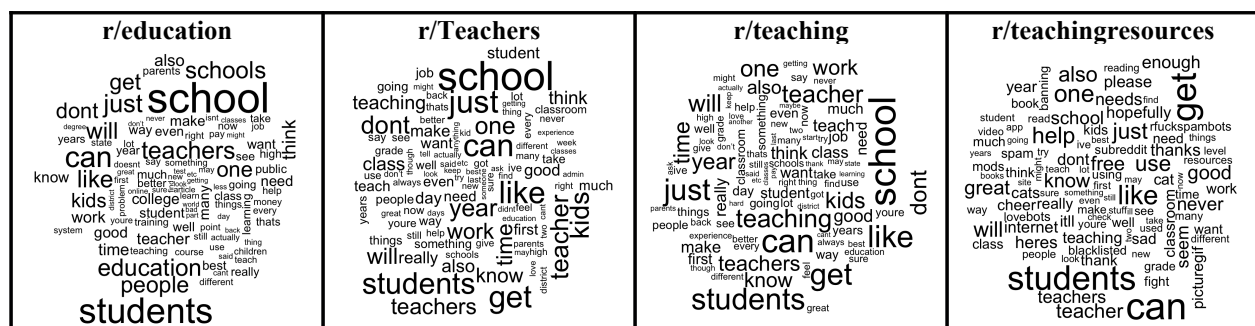

Figure 2. Word Clouds of the 100 Most Common Words in Each Subreddit

Finally, we conducted network analysis of how contributors responded to each other within a subreddit, and we created the network graphs shown in Figure 3 below. We depicted each subreddit contributor with a *node* (i.e., a dot) and each interaction between two contributors with an *edge* (i.e., a line). Following Csárdi, Nepusz, and Airoldi's (2016) recommendation for determining the layout of very large (i.e., more than 1,000 nodes) and disconnected networks, we used the *distributed recursive (graph) layout* (DrL) algorithm to create the network visualization. We only included contributors who had connected with other contributors in these visualizations, so even nodes that appeared to be isolated dots were in fact connected with an edge. In these cases, what appears to be a dot is two nodes plotted very close together. The *centrality* of nodes on the plot represents the number of other users interacted with, which means the nodes around the periphery were minimally connected.

The r/Teachers network had a very dense core: more than three times as many nodes as r/teaching and r/education were plotted close together, with several thick spokes coming out to additional node clusters, and very few nodes around the periphery. This could indicate that there were several notable conversation clusters occurring in r/Teachers, where contributors tended to respond to each other with higher frequency within that cluster than with those in other clusters. Because of the lower rate of contributors connected to others in r/education, r/teaching had more nodes depicted in Figure 2 in a denser network core with fewer nodes around the periphery. Finally, the r/teachingresources network had a sparse core, with many nodes around the periphery—users who did not connect to the core and only rarely connected to each other. Thus the visualizations in Figure 3 align with findings reported above indicating that the interaction level was highest in r/Teachers, then r/teaching, then r/education, and lowest in r/teachingresources.
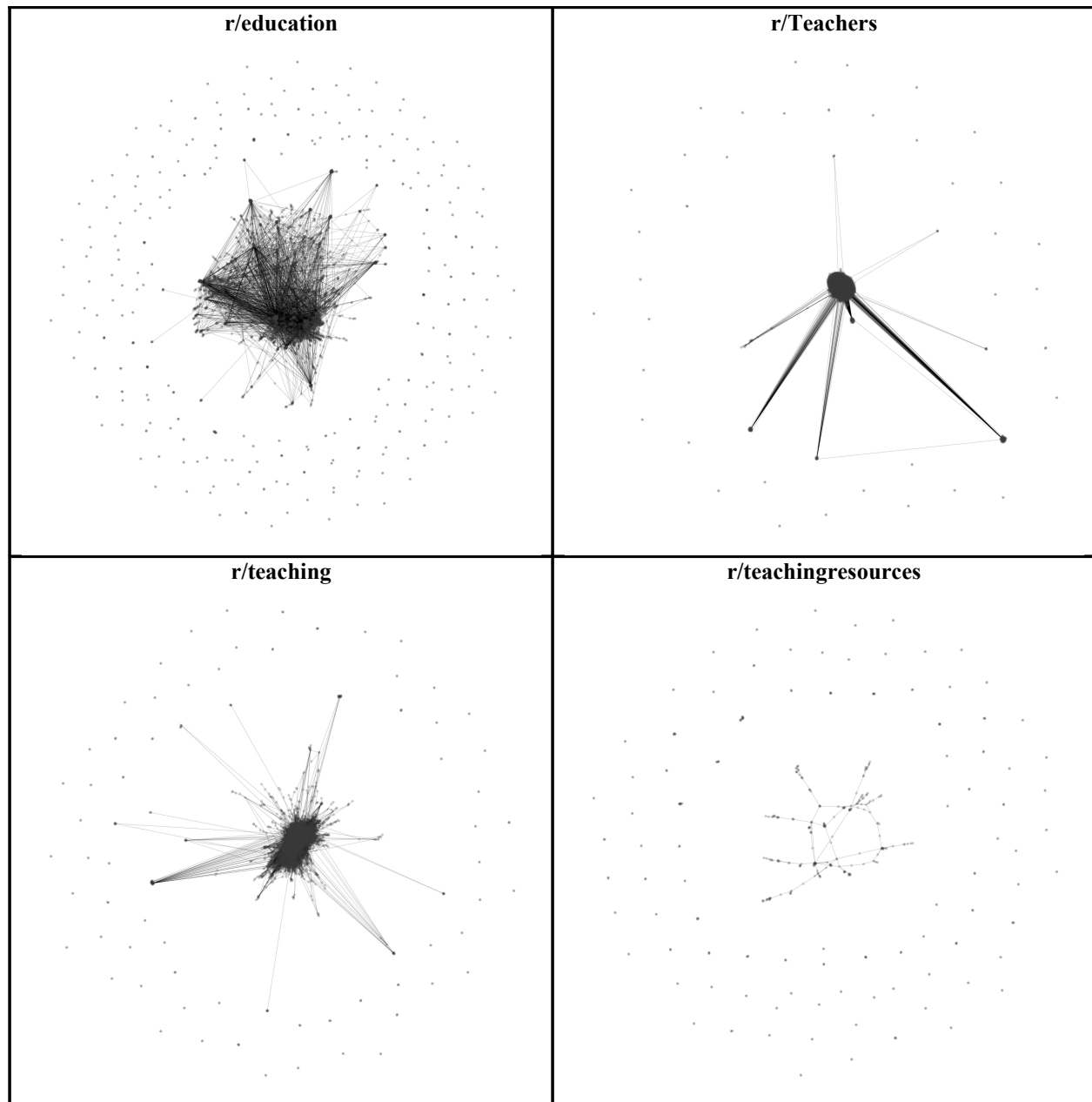
Figure 3. Network Visualizations of the Four Subreddits

Discussion

Our analysis of four education-related subreddits suggests that Reddit hosts a variety of learning spaces. These subreddits demonstrated characteristics—to varying degrees—of both *networks* and *communities*, consistent with Macià and García's (2016) review of educational research on how educators pursue PD in informal online spaces. Networks provide access to a wide range of useful information, but participation in networks can be spontaneous and unpredictable (Macià & García, 2016). On the other hand, communities are more stable, but access to content can be complicated by interpersonal relations. For example, the r/teachingresources subreddit was characterized by more network qualities, showing lower levels of engagement by a number of different measures, meaning this subreddit may be more focused on the sharing of teaching and learning materials than on discussion of those resources. In contrast, the r/Teachers subreddit seemed to have more community qualities, featuring a high

level of interaction in terms of responses, vote scores, and peripheral users' connections to central conversations—suggesting more active discussion threads. By signaling collective values, Reddit's voting mechanism may contribute to the development of community because of how it helps build a shared identity around a topic (Wenger, 1998). However, we temper any application of a "community" framework to these subreddits, because while communities are characterized by the commitment of members to each other, Reddit's anonymity may undermine that commitment in some cases.

Still, it may be the case that some educators derive social and emotional benefits from their Reddit activities despite their anonymity. Many educators who opt to invest time in education-focused subreddits could feel they can receive useful support from these online spaces, or that they can offer meaningful contributions to their profession. Furthermore, Reddit's anonymity might also encourage educators to make aspects of their practice public in ways that benefit other educators (Lieberman & Pointer Mace, 2010).

For educators' professional learning, these subreddits offer both active and passive forms of engagement in online spaces (Robson, 2018). Educators might find r/Teachers and r/teaching a better fit for connecting with other educators and participating in longer threads of conversation that could offer greater nuance and depth. However, educators who are more focused on finding resources or prefer more passive modes of participation in online spaces could find r/education or r/teachingresources to be compelling despite their different activity patterns. Collaborative processes of knowledge sharing via Reddit may be quite useful to educators, even if they attract fewer responses or votes. Educators bring diverse purposes and motivations to their online professional activities (e.g., Carpenter & Krutka, 2014, 2015), and it may be that different education subreddits can accommodate these varied needs and interests. The varied nature of the subreddits we studied does raise the question of how educators are to find the online spaces best suited to them. While some educators may be persistent in searching out and testing various online spaces to identify those which are most helpful to them, others might give up on professional social media activities if they do not quickly find the spaces that meet their needs.

The topics that educators chose to address in online spaces may indicate that content that is lacking from their formal PD opportunities or initial teacher preparation. Teacher educators might benefit from learning the kinds of questions PSTs ask in subreddits. However, the power dynamics present between teachers and administrators in charge of PD, PSTs, and teacher educators may mean that there are certain kinds of discussions and content that educators prefer to address in more anonymous contexts. For example, teachers may find Reddit to be a helpful place to get outside perspectives on internal school politics (Carpenter et al., 2018). Even if the PD and initial preparation available to them were in many ways effective, there may be value and safety in interacting with colleagues from outside one's immediate professional environment when discussing certain topics.

Limitations and Future Research

With the methods we use in this study, we are unable to fully discuss the content of the contributions to these subreddits. Ranking the top word frequencies and creating word clouds is imprecise and limiting, although a worthwhile inclusion for this introductory study. As a next step, we suggest that future research could implement a structural topic modeling or supervised machine learning approach (see Xing & Gao, 2018); establishing these more robust computational methods would also allow researchers to examine and compare a greater number of additional education-related subreddits. Future research could also combine such content analyses with surveys or interviews that allow educators to explain their purposes for participating in particular subreddits and how Reddit use relates to their other professional learning activities.

Conclusion

Reddit is a potentially rich source of informal learning and professional development for both pre-service and in-service teachers that should be of interest to teacher educators. Many PSTs could benefit from guidance regarding how to take advantage of the opportunities and limit the challenges associated with professional use of social media platforms such as Reddit. Teacher education coursework could include activities that help PSTs analyze how different social media might best be used professionally (e.g., Carpenter, 2015; Damico & Krutka, 2017). In the specific case of Reddit, certain subreddits may be more or less hospitable spaces for novice teachers. The challenges that early-career educators face are well documented, and potential additional sources of online mentoring that could support persistence should be of interest to teacher educators. This exploratory study has built

off the existing literature on education-related uses of Reddit, provides teacher educators with considerations for directing PSTs to different subreddits, and offers clear on-ramps to potentially fruitful next waves of research.

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