Who Bridges the Gaps? Examining the Background, Content, and Role of Knowledge Brokers in Informal Social Networks

Martin Rehm, Department of Design, Media and Educational Science, University of Southern Denmark, Denmark, mareh@sdu.dk
Anita Caduff, Marsal Family School of Education, University of Michigan, United States of America, acaduff@umich.edu
Marie Lockton, Department of Education Studies, University of California, San Diego, United States of America, mlockton@ucsd.edu
Alan J. Daly, Department of Education Studies, University of California, San Diego, United States of America, ajdaly@ucsd.edu

Abstract
Knowledge mobilization can be understood as a dynamic, iterative, and social process through which knowledge is gathered, contextualized, and applied in ways that improve educational systems and professional practices. Rather than being a simple top-down transfer, it involves constant movement between different contexts and purposes, with knowledge taking on new meaning as it is interpreted and used by diverse groups. Increasingly, such processes unfold in informal spaces, particularly on social media platforms where educators, researchers, and other stakeholders exchange resources, address pressing challenges, and attempt to reduce structural inequities. Within these informal spaces, knowledge brokers play an especially important role. They contribute by facilitating access to information, helping groups establish shared goals and mutual understanding, and creating new links across domains where connections might otherwise not exist. Knowledge brokers are therefore not only carriers of information but also translators, connectors, and catalysts for collective learning. Their importance is recognized in practice, as many policy initiatives now deliberately include brokers to strengthen equity-oriented reforms and ensure that information flows more effectively across educational systems. Building on this conceptual understanding, our study introduces an analytical framework designed to examine how knowledge brokers operate in informal social networks. The framework makes it possible to assess how roles, behavioral patterns, and topical foci interact to shape the circulation of knowledge. Applying this framework, we analyzed online education networks, using both structural and content-based methods to capture the connections among brokers and the kinds of knowledge they share. The findings suggest that knowledge brokers indeed serve essential connective functions, exchanging information widely while also exhibiting a tendency to cluster with similar peers, which can limit the reach of their knowledge. Different types of brokers were found to specialize in particular functions, with educators emphasizing classroom practices, researchers highlighting scholarly outputs, and NGOs focusing on resources related to change processes and opportunities. These differentiated roles illustrate how knowledge is translated into usable forms for different audiences. By foregrounding both the potential and the limitations of informal online networks, the framework provides insights that can inform policymakers and partnerships seeking to create more equitable, collaborative, and sustainable systems of knowledge exchange.

Keywords
Knowledge mobilization, knowledge brokers, informal social networks, educational data science, social network analysis, natural language processing

Knowledge Brokers in Social Opportunity Spaces

Increased collaboration and sharing of high-quality information and resources among educators has become more important as schools continue to face new challenges (OECD, 2022). To embrace educational innovation and change, schools and educators need to constantly create, access, and share new and relevant information and resources (Ariyani & Zuhaery, 2021) to address existing structural inequities (Noguera, 2016), that continue pervasive patterns of marginalization and lack of opportunity (OECD, 2018). However, getting useful and focused

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information into the hands of educators at the right time remains challenging (Wilcox & Lawson, 2018). As a result, there has been a call for more informal social networks to support the important work of schools in preparing students for the challenges of today and the future (Azorín, 2020). More specifically, Putnam and Nicotera (2009) stipulate that social interaction and informal communication are key building blocks in fostering a process whereby organizations, such as schools, can create and support change and renewal.

Moreover, the rise of social media has led to a panoply of online communication spaces or sites, such as LinkedIn and X (formerly Twitter), wherein individuals can engage in social interaction and informal communication. These platforms are also referred to as social networking sites (SNS). In this context, there has been a growing amount of research that investigated the potential of SNS for informal communication, learning, and knowledge mobilization. For example, Owen and colleagues (2016) postulate that social media provides educational professionals with a means to "scale-up their professional learning" (p. 2). Furthermore, Ito and colleagues (2013) refer to connected learning, which is fostered in a (online) space and "[…] seeks to build communities and collective capacities for learning and opportunity" (p. 8). Consequently, learning spaces can be described as being embedded in the immediate environments of individuals and enable them to explicate their own ideas and experiences, which in turn contributes to a growing pool of resources and information that everyone can benefit from (A. Y. Kolb & Kolb, 2005). However, when you enter such spaces, neither learning nor knowledge creation are guaranteed. Instead, they provide an opportunity for informal, professional development by enabling individuals to engage into discussions with a wide variety of other individuals (Tynjälä, 2012) and by stimulating them to critically reflect on their actions (D. A. Kolb, 1983, p. 198). We therefore argue that social networking sites constitute 'social opportunity spaces', which provide the meta-context wherein knowledge creation is fostered and learning processes are stimulated by the complex interplay of various underlying relations and factors (Rehm et al., 2020, 2021; Rehm & Notten, 2016).
Similarly, educational professionals' opportunities to learn and make sense of new information are shaped by their informal networks (e.g., the people they are connected with), in particular regarding the individuals they perceive as having expertise on a topic (Farley-Ripple & Buttram, 2015), or whom they perceive to hold similar beliefs and worldviews to their own (Trust, 2017). In this context, a growing body of work has reconsidered how knowledge gets mobilized. Generally, the process of knowledge mobilization is multidirectional, fluid, and can be collaborative and co-productive with a continued shaping and re-shaping of knowledge between parties (Ward, 2017). In a review of studies on knowledge mobilization, Ward (2017) even found it challenging to identify knowledge receivers in some of the studies as the various stakeholders worked collaboratively. The framework of knowledge mobilization recognizes that knowledge does not flow top-down, and the contexts in and purposes for which knowledge is assembled, synthesized, translated, and applied all matter (Moss, 2016).

Additionally, knowledge brokers (KB) have been suggested to take on pivotal roles in connecting otherwise disconnected people (Weber & Yanovitzky, 2021). Similarly, Meyer (2010) defined knowledge brokers as entities that "facilitate the creation, sharing, and use of knowledge" (p 110). In the context of this study, we define KB as individuals or organizations, who connect otherwise unconnected others within a network, effectively translating knowledge into usable resources for target audiences, e.g. educators and policy makers (Farley-Ripple et al., 2018). In doing so, KBs facilitate and foster relationships between research, policy, and practice, make knowledge accessible and usable, and support evidence-informed change (Cooper, 2014). KBs differ in features such as scope (e.g., regional, provincial, national), target audience (e.g., practitioners, policy makers, parents), size, operating expenditures, and revenue. Moreover, they follow different brokering strategies, including capacity building, and networking events (Cooper, 2014; Rehm et al., 2023). Practical examples of KBs include, among others, foundations, researchers, policy institutes, curriculum developers, and university departments (Ward, 2017).
Particularly, it has been argued that more research is required to better understand the core characteristics of KBs (e.g., background characteristics, behavior, motivation), in order to better understand how they mobilize information and resources (Rycroft-Smith, 2022), and what type of KBs might be more effective in doing so (Cvitanovic et al., 2017). Consequently, this research formulates three main research questions:

RQ1. What roles do KBs have in informal social networks?
RQ2. With what other KBs do they communicate in informal social networks?
RQ3. What type of information do these KBs mobilize across informal social networks?

Perspective(s)

Knowledge mobilization is the process of moving knowledge to where it will be most useful (Ward, 2017). Similarly, Cooper (2014) described knowledge mobilization as an iterative and social process involving interactions among different groups or contexts to improve the broader education system. Moreover, knowledge mobilization does not strictly refer to top-down processes, but rather depends on the contexts and purposes for which knowledge is gathered, contextualized, and applied (Moss, 2016). It has also been suggested that knowledge mobilization processes increasingly take place on social media platforms, such as X (formerly Twitter)(Rehm et al., 2020, 2021, 2022; Supovitz et al., 2015). Even more so, there have been unprecedented efforts among educators to use social media to possibly cope with the new challenges (Azorín, 2020; Doucet et al., 2020) and address structural inequities.

Among the growing body of research in this field, KBs have been suggested to be instrumental in disseminating information and resources within informal social networks (Rycroft-Smith, 2022). These brokers have also been suggested to have a wide variety of different qualities that underline their importance for informal social networks (Dobbins et al., 2009). Among others, KBs can contribute to the development of a mutual understanding of goals and cultures (Kitson et al., 1998), facilitate the identification, access, and translation of new information into local contexts and practice (van Kammen et al., 2006), have valuable insights into the communities that they are connecting (Monod-Ansaldi et al., 2019), and forge the creation of new connections across domains between otherwise disconnected users (Kwon et al., 2020). As a result, a wide range of educational initiatives has already been launched that actively incorporate KBs in policy processes (Wollscheid et al., 2019).

Data & Method

As a point of departure, we chose X (formerly Twitter) as an exemplary social media platform where informal social networks have been identified and analyzed by numerous scholars (Bernhard & Dohle, 2018; Park & Kaye, 2017; Phua et al., 2017; Tang & Hew, 2017). Accessing the Twitter API, we used a combination of hashtags (e.g. #education, #teachertwitter, #edutwitter, #edchat, and #edtech) for an initial Twitter data collection. We collected data from January 21, 2023 to March 23, 2023, resulting in a total of 379,678 tweets from 2,167 unique users. Here, we would like to acknowledge collecting data from social media has raised some ethical concerns (Koene et al., 2015). We follow the work by Moreno and colleagues (2013), who stipulate that collecting data on users that publicly disseminated thoughts, ideas and experiences, which requires no password to obtain, qualifies as an exemption from strict ethical guidelines and considerations.

First, we conducted social network analysis (SNA), which has been increasingly used to investigate complex social behaviors (Singh et al., 2022). Generally speaking, social network theory describes patterns of social relationships that exist between people in a social network (Scott, 2017). In order to determine the potential existence of communities within the observed communication patterns, we used the Louvain community detection algorithm (De Meo et al., 2011). Then, to determine knowledge brokers, we used the betweenness centrality metric (Abbasi et al., 2012), which identifies whether and to what extent an individual account lies on the shortest path between two otherwise unconnected parts of the network, thereby effectively bridging between accounts and communities within the network. Although not all of these users fully meet the definition of a KB as outlined above—particularly with regard to the explicit aim of bridging research, policy, and practice—there is an overlap between the groups. Importantly, social media serves as a valuable tool for knowledge brokering, enabling the dissemination and exchange of knowledge and, therefore, expanding the reach and impact of knowledge brokering activities.

Second, we then employed natural language processing (NLP) to gain insights into the type of information that was being shared by knowledge brokers (Manning & Schutze, 1999). NLP is commonly used to map what is being contributed and shared by actors within online networks (Berger & Packard, 2022). More specifically, we employed a Continuous Bag of Words (CBOW) model, which is a particular approach in the context of word2vec (Church, 2017), and determines the meaning of a particular word. It does so by considering other words that are used in the vicinity of that word, assuming that the closer the word pair is to each other (e.g. in a sentence), the more similar they are in meaning. Additionally, to further investigate whether the mobilized information exhibits an underlying topical structure, we employed k-means clustering. This constitutes an unsupervised machine

learning application (Arora et al., 2018; Melit Devassy et al., 2020), and we used it to identify topics within the overall network, as well as for the individual types of KBs.

Finally, based on the identified knowledge brokers from the applicable SNA analyses, we used inductive qualitative coding to classify profiles into 14 categories. Users we suspected were bots that were automatically spreading information and resources were included in the "other" category. We co-developed and refined the codebook based on the data and our understanding of the education knowledge brokering space (Caduff et al., 2023; Lockton et al., 2022). Six independent researchers completed the coding. The Krippendorff's Alpha was 0.708 (Marzi et al., 2024), indicating satisfactory agreement. All users with inconsistent coding were discussed among the coders until a consensus was reached (Merriam & Tisdell, 2016). Lastly, these 14 categories were summarized into 7 overarching categories (see Table 1 below) that build the basis for the results presented in this paper.

Table 1: Codebook for Knowledge Broker Roles (7 categories and 14 subcategories)

Category	Sub-Categories
Education	Educational institutions (e.g., schools, school districts) Educators (e.g., teachers, counselors, museum educators) Educational leaders (e.g., principals, informal leaders)
For Profit	Companies
Media/ News	Media persons (e.g., podcast hosts, celebrities, journalists) News outlets, and organizations that provide entertainment
Research	Researchers Organizations that advance research (e.g., universities, research and policy institutes)
Politics	Politicians (e.g., governors, state delegates, mayors) Governmental agencies Activists and advocates who fight for a cause (e.g., for equal rights)
NGO	Professional associations Foundations, museums, and charities
Other	Any user that doesn't fit any of the categories above

Results

Interaction across the board – with some caveats

As can be seen from Figure 1 below, there has been considerable interaction between the different KB roles that were identified via the qualitative coding. Moreover, as to be expected from the topical orientation of the data collection process, the majority of users were identified as having an "Education" background. Additionally, while interaction was visible across types of KBs, there also seemed to be some degree of homophily, in the sense that the sociogram suggests that KBs from "Education" seemingly tended to stick together in their conversations.
This perception was consolidated by considering the composition of the top 10 communities in terms of the assigned KB roles. Figure 2 below summarizes the applicable metrics. Here, we see that the largest communities were largely composed of two to four types of KBs. More specifically, communities with "NGO" and "Other" appeared to have formed quite often. Interestingly, KBs from "Education" were seemingly not well connected with KBs from "Research". Furthermore, KBs with "NGO" backgrounds were among the most common members of the identified communities.

Topical Similarities and Nuanced Differences

Turning our attention to the type of information being shared by different KBs, we generally found that 7 topic clusters could be identified (Figure 3 below). The applicable information and exchanges covered a wide variety of aspects, including "development plans", "health care", "opportunities for girls to experience science", "discovering practical insights for practice". Next, we ran the same analyses for subsets of the data, where we filtered out all content of KBs that were coded as either "Education", "NGO", "Research", or "Other". This allowed us to identify nuanced differences in the type of information being mobilized by different KB types. More specifically, KBs from "Education" shared information on "math projects", "parent-staff meetings", and "tools for educators". In the case of "NGO" we found traces on information being mobilized on "Research", "Funding Opportunities", and "Conferences". KBs that were coded as "Research" shared information on "research reports", "mathematics", and

"news". Finally, in the context of the study, the content of "Other" centered largely around "staff development", "strategy and impact", and "school resource".

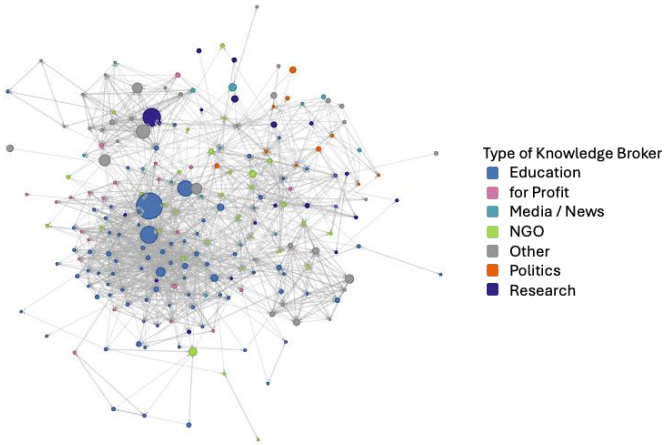

Figure 1: Sociogram of the most active (determined by overall degree), coded KBs
(Note: Size of Nodes: Overall Degree; Color of Nodes: Type of KB; Layout: Force-directed)

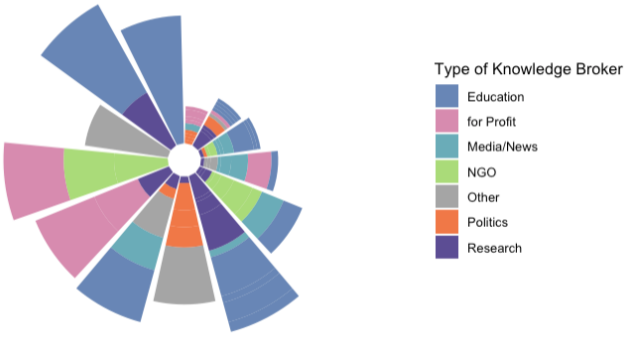

Figure 2: Distribution of Types of KBs across the Top 10 Communities (determined by number of members)

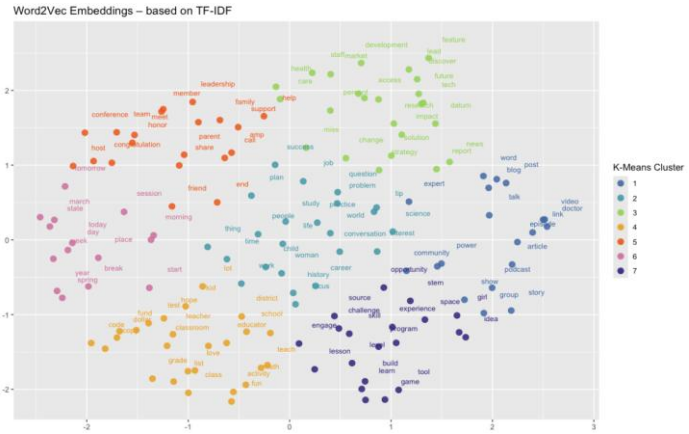

Figure 3: Visualization of Word2Vec for the overall Network (Color of Dots: K-Means Cluster)

Educational Importance for Practice and Theory

KBs are one pivotal factor for mobilizing knowledge (Weber & Yanovitzky, 2021). We introduced a novel analytical framework and examined how the interplay between KBs' roles and behavioral patterns potentially affects their topical foci in informal social networks. Our preliminary results can be summarized into three key insights. First, we found considerable interaction and information exchange among diverse types of KBs, confirming their role in connecting otherwise disconnected individuals (Weber & Yanovitzky, 2021). However, network analysis revealed a significant tendency toward homophily (McPherson et al., 2001), particularly among those KBs identified as having an "Education" background, who primarily interacted amongst themselves. This suggests that while KBs facilitate connection, the flow of information might be subject to preferential attachment among users (Fuhse & Gondal, 2024; Piva et al., 2021). Second, our analyses of community compositions indicated that while "Education" KBs were numerous, "NGO" and "Other" KBs frequently acted as key brokers, appearing most commonly across the largest identified communities. More strikingly, a notable disconnect was observed between "Education" and "Research", suggesting a critical structural gap in the network where practitioner and scholarly knowledge may not effectively be exchanged. This further supports the notion put forth by numerous researchers that Research-Practice Partnerships (RPP) can often be challenging to foster and achieve (Farrell et al., 2022; McGeown & Sjolund, 2025). Finally, the overall network addressed a broad range of topics, from "development plans" to "practical insights for practice." However, focused analysis revealed that different KB types specialized in distinct informational domains. "Education" KBs focused on immediate instructional needs (e.g. "math projects," "tools for educators"), while "Research" KBs focused on scholarly output (e.g. "research reports," "mathematics"). In contrast, "NGO" KBs served a connective function by mobilizing information related to the *process* of change and knowledge assembly (e.g. "Funding Opportunities," "Conferences"). This specialization provides a granular understanding of how various KBs translate knowledge into usable resources for target audiences (Farley-Ripple et al., 2018).

Moreover, these insights in turn provide valuable insights for e.g. policy makers who have already started actively incorporating KB in a wide range of educational initiatives (Wollscheid et al., 2019). Being better able to understand which KB can help with what type of behavior and content can be instrumental for the success of policy makers' efforts to address existing structural inequities (Noguera, 2016). Additionally, by incorporating these findings into RPP considerations and initiatives can potentially contribute to a more effective exchange of information and expertise among the participating stakeholders (Alonzo et al., 2022; Farrell et al., 2021). In summary, by employing our novel analytical approach, we are better able to understand the state of knowledge mobilization in informal social networks, including the education space, the role of KB, and how these settings can best be used to open up the future, re-imagine traditional systems, and effectively use the power and agency of informal social networks to create a more equitable system for all.

Despite the new insights and findings, we would like to acknowledge two limitations. First, our work focused on X as an example of social networking sites. While X has been recognized as an important platform for knowledge mobilization, it constitutes one of many social networking sites actively used in this context. Moreover, given more recent developments that go beyond the scope of this study, its relevance and general perception may have had an impact on the type of knowledge being mobilized by various KBs and other users. Future studies should therefore expand on this study and incorporate platforms like Reddit or BlueSky. Second, the current study focused on CBOW and word2vec, in order to reveal content related aspects of KBs. Future studies should employ more supervised machine learning techniques (Hasan et al., 2018), in order to more easily expand beyond the qualitatively coded users and include also the actual posts that the KBs have posted. This could provide even more interesting insights into the workings of KBs in these types of online spaces.

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