

Brokering the Research–Practice Gap: A typology

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Abstract Despite widespread recognition of a research–practice gap in multiple service sectors, less is known about how pre-existing communication channels facilitate the flow of information between researchers and practitioners. In the current study, we applied an existing typology of brokerage developed by Gould and Fernandez (Sociol Methodol 19:89–126, 1989) to examine what types of brokerage facilitate information spread between researchers and educational practitioners. Specifically, we conducted semi-structured interviews with 19 school administrators and staff in two public school districts regarding their experiences searching for information about instructional, health, and social skills programs. Using deductive content analysis, we found evidence of all five types of brokerage identified by Gould and Fernandez (1989). However, only three types of brokerage—gatekeepers, representatives, and liaisons—were involved in the flow of information between school administrators and researchers. Moreover, information transfer often occurred in longer chains that involved multiple, distinct types of brokerage. We conclude with the broad implications of our findings for narrowing the research–practice gap by improving researchers’ dissemination efforts and practitioners’ search for information.

Keywords Research–practice gap · Broker · Dissemination · Network · Education

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Introduction

There is widespread recognition of a research–practice gap in the education (e.g., Flaspohler et al. 2012; Hallfors and Godette 2002; Tseng 2012) and health (e.g., Chambers 2012; Glasgow and Emmons 2007; Green et al. 2009) service sectors.¹ This research–practice gap is characterized by a lack of reciprocal communication between the research and practice communities and limited implementation of evidence-based interventions in practice settings. Highlighting the significance of this gap, Wandersman (2003) called for a new interdisciplinary field of community science that focuses explicitly on improving communities’ access to and ability to implement evidence-based interventions. He and others (e.g., Kloos 2005) have argued that community psychology should play a central role in community science given its focus on context, systems, and participatory methods.

Community psychologists have answered the call for community science by focusing on issues of synthesis and translation (i.e., summarizing and packaging research evidence for practitioners), support (i.e., building capacity of practice settings), and intervention delivery (i.e., using capacity to implement interventions; Wandersman et al. 2008). The interactive systems framework focuses on each of these processes, and can be flexibly applied to bridge the research–practice gap in a range of service sectors and for a range of evidence-based interventions (see Flaspohler et al. 2012; Saul et al. 2008). However, despite these advances, community psychologists have not focused enough on the

¹ Although the phrase *research-to-practice gap* is commonly used in the literature, we use the phrase *research–practice gap* in this paper to more accurately reflect the possibility of bidirectional communication between researchers and practitioners (Wandersman 2003).

role of pre-existing communication channels in facilitating the flow of information between researchers and practitioners.

In his classic diffusion of innovations theory, Rogers (1995) highlighted the importance of communication channels in facilitating the spread of new ideas, programs, or practices. Specifically, individuals are most likely to adopt something new if they learn about it through interpersonal relationships. More generally, successful dissemination in a community depends on the structure of these interpersonal relationships. In the context of the research–practice gap, communication would ideally occur directly between researchers and practitioners. However, spatial and social distances between researchers and practitioners make direct communication rare (Green et al. 2009). Therefore, communication is often indirect, occurring through individual or organizational brokers (e.g., Cooper et al. 2009; Tseng 2012).

The current study aims to understand what brokerage looks like when practitioners seek information, including research evidence, and how brokerage can close the research–practice gap. We begin with a review of the research–practice gap literature, focusing on the distinction between bridging and brokering this gap. Next, we introduce a theoretical typology of brokerage initially described by Gould and Fernandez (1989), and discuss how this typology can be applied to the research–practice gap in the education service sector. Using qualitative analyses of semi-structured interviews in two Michigan school districts, we explore the presence of different types of brokerage among the sources that school administrators use when seeking information about instructional, health, and social skills programs (c.f. Domínguez and Maya-Jariego 2008). We conclude with the broad implications of our findings for narrowing the research–practice gap by improving researchers’ dissemination efforts and practitioners’ search for information.

Background

Bridging the Research–Practice Gap

Past models of intervention research, including the Institute of Medicine prevention research cycle, assumed a linear progression where interventions tested in efficacy and effectiveness trials by researchers would subsequently be adopted and implemented by practitioners (e.g., Flay et al. 2005; Mrazek and Haggerty 1994). However, researchers and funders alike now recognize that this assumption of linear progression is naïve: interventions tested by researchers do not transfer seamlessly to practice (e.g., Glasgow et al. 2003; Green et al. 2009; Wandersman et al. 2008). For example, in health, adult patients often do not

receive health care practices recommended in the medical literature (e.g., McGlynn et al. 2003). Similarly, in education, school district staff often adopt programs with little or questionable research evidence (e.g., Hallfors and Godette 2002; Ringwalt et al. 2009).

Several barriers contribute to the research–practice gap identified in the health and education service sectors. These barriers can be attributed to characteristics of the intervention, practice setting, and/or research design (Glasgow and Emmons 2007). For example, interventions developed by researchers often do not consider the importance of financial and time costs or the resources and technical support available in the practice setting (Miller and Shinn 2005; Wandersman et al. 2008). Moreover, research designs often fail to include aspects important to widespread dissemination of interventions including generalizable samples, information about variation in implementation, and information about intervention sustainability (Glasgow et al. 2003). Beyond these barriers, practitioners often have trouble acquiring information about evidence-based interventions (Green et al. 2009; Wandersman et al. 2008). As Green et al. (2009) describes, there are several leaks in the communication pipeline between researchers and practitioners. Some research is never submitted for publication or published. If it is published, it often remains in academic journals, and thus is not translated and communicated effectively to the practitioners who might use it.

Attempts to bridge the research–practice gap have often focused on building new communication links between researchers and practitioners. For example, the interactive systems framework highlights how researchers can synthesize and translate research findings in ways that are more accessible to practitioners (Thigpen et al. 2012; Wandersman et al. 2008). Similarly, there have been several calls for more participatory approaches that explicitly link researchers and practitioners in the process of intervention design and testing (e.g., Glasgow and Emmons 2007; Green et al. 2009; Miller and Shinn 2005; Wandersman 2003). Although critical, these intentional efforts to build new connections are likely insufficient to fully bridge the research–practice gap. Specifically, even when research findings are synthesized and translated into user-friendly forms, practitioners may still struggle to acquire this information (Tseng 2012). Moreover, participatory approaches that build new connections between researchers and practitioners may be hindered by spatial distance, differences in professional identities, and differences in organizational structure and norms (Green et al. 2009).

Brokering the Research–Practice Gap

One alternative or supplement to current efforts to bridge the research–practice gap is to focus on pre-existing connections that indirectly link researchers and practitioners

through brokers. Diffusion of innovations theory suggests that new interventions typically spread from researchers to practitioners through existing communication networks (Dearing 2008; Rogers 1995). Thus, there are key individuals or organizations that obtain information from researchers and transmit it to practitioners (as well as vice versa). These individuals or organizations are interchangeably called brokers (e.g., Daly et al. 2014; Knight and Lyall 2013; Leadbeater 2010; Meyer 2010; Ward et al. 2009), intermediaries (e.g., Cooper et al. 2009; Debray et al. 2014; Honig 2004; Scott and Jabbar 2014), or boundary spanners (e.g., Glisson and Schoenwald 2005; Honig and Ikemoto 2008) in the research–practice gap literature. However, for consistency in terminology, we use the term *broker* throughout this paper.

In the research–practice gap literature, brokers are typically defined by their role. For example, Meyer (2010) refers to brokers as “persons or organizations that facilitate the creation, sharing, and use of knowledge” (p. 119) while Ward et al. (2009) note that brokers “act as go-betweens, serving the needs of both” researchers and practitioners (p. 268). In addition to these role-based definitions, brokers have also been defined based on their position in social networks. Specifically, Burt (2005) noted that brokers fill structural holes or gaps between tightly knit clusters of individuals, who are not in direct contact with one another. In the research–practice context, a set of researchers in a particular field might form one tightly knit cluster because they are more likely to communicate their study results among themselves in the form of presentations and publications. Likewise, a set of practitioners in a particular region might form another tightly knit cluster, because they are more likely to communicate information and discuss their experiences among themselves in the form of professional development workshops and administrative meetings. Brokers form linkages with individuals in both of these clusters, serving as a conduit by which information can flow from one cluster to the other (see Fig. 1). In this paper, we adopt a network definition because it allows for a more precise identification of brokers based on the structure of relationships in a setting.

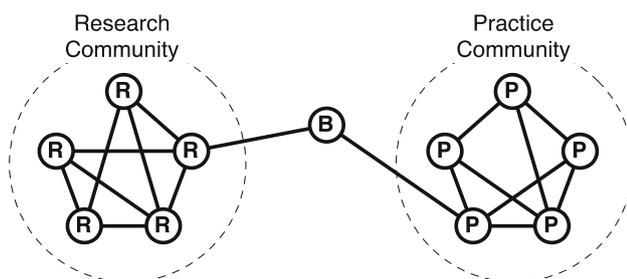


Fig. 1 Network definition of brokerage of the research–practice gap

A Typology of Brokerage and its Application in Education

A network definition of broker has another key advantage. Namely, this definition can provide insight into variations in the type of brokerage. Gould and Fernandez (1989) distinguished five different types of brokerage: coordinator, itinerant, gatekeeper, representative, and liaison (see Table 1). Here, we provide a conceptual description of each of these types of brokerage, and illustrate more concretely what each type of brokerage might look like in the context of an education service sector research–practice gap. We focus on the education service sector because there is a growing body of literature to suggest the importance of individual and organizational brokers in transferring evidence from researchers to educators (e.g., Cooper et al. 2009; Debray et al. 2014; Tseng 2012; Scott and Jabbar 2014), and a call to explore network definitions of brokerage (Daly et al. 2014). However, less is known about the types of brokerage that exist in the education service sector (Cooper et al. 2009).

The five types of brokerage identified by Gould and Fernandez (1989) have the same relational structure (i.e., a broker that links otherwise unconnected clusters of individuals). In Table 1, this relational structure is represented in a simple three-actor case: actor 1 shares information with actor 2, who acts as a broker by sharing this information with actor 3. That is, actor 2 brokers the otherwise impossible flow of information between actors 1 and 3. Although the five types of brokerage have the same relational structure, they differ in terms of their configuration of subgroups. In Table 1, the shading of each of the three actors represents subgroup membership. Subgroups are sets of individuals that “are differentiated with regard to activities or interests” (Gould and Fernandez 1989, p. 91). More specifically, membership in a subgroup is defined by what individuals do. In the educational research–practice context (see Fig. 1), the research community can be considered one subgroup whose participants (i.e., educational researchers) generally engage in the same types of activities (e.g., conducting studies, presenting at academic conferences, publishing in academic journals). In contrast, the school staff practice community might be considered a separate subgroup whose participants (e.g., front-line educators and district administrators) generally engage in the same types of activities (e.g., teaching students, choosing curricula). It is important to note that unconnected clusters of individuals can exist in a single subgroup. For example, within the school staff practice community, practitioners who work in different districts may form distinct clusters.

In Gould and Fernandez’ (1989) typology, two types of brokerage—*coordinator* and *itinerant*—link unconnected clusters that belong to the same subgroup (see Table 1).

Table 1 Gould and Fernandez's (1989) brokerage types, with their incidence in school staff information seeking

Brokerage type	Structure	Example in education	Instances in all chains (rank)	Instances in chains with a researcher (rank)
Coordinator		A high school principal shares results from the high school's implementation of a bullying intervention with a middle school principal, who later tells an elementary school principal. The middle school principal brokers information between the high school and elementary school	20 (3)	0 (4.5)
Itinerant		A researcher shares results from one school district's implementation of a bullying intervention with staff in another school district. The researcher brokers information between two school districts	5 (5)	0 (4.5)
Gatekeeper		A district superintendent recruits a local researcher with expertise in bullying interventions to provide professional development to district staff and teachers. The superintendent brokers information between the researcher and school staff	39 (1)	7 (2.5)
Representative		An employee of a university outreach office compiles and presents recent bullying intervention research conducted in the university's College of Education at a local school district's teacher professional development meeting. The outreach office brokers information between the university and a school district	10 (4)	6 (1)
Liaison		A staff member at an anti-bullying foundation works with researchers to synthesize recent work on bullying interventions and to distribute it to school district administrators. The foundation brokers information between researchers and school administrators	22 (2)	7 (2.5)

These two brokerage types might help clarify how research and information spreads within the school staff practice community. Specifically, a *coordinator* broker and the clusters of individuals that he or she connects are all part of the same subgroup. For example, a high school principal might share results from the high school's implementation of a bullying intervention with a middle school principal, who later tells an elementary school principal. The middle school principal (i.e., *coordinator*) brokers information between the high school and elementary school. Like a *coordinator* broker, the clusters of individuals that an *itinerant* broker connects are part of the same subgroup. However, in contrast to a *coordinator* broker, the *itinerant* broker is part of a different subgroup than the clusters that he or she connects. In this case, a researcher might share results from one school district's implementation of a bullying intervention with staff in another school district. The researcher (i.e., *itinerant*; a member of the research subgroup) brokers information between two school districts (i.e., members of the school staff practice subgroup).

Three types of brokerage in Gould and Fernandez' (1989) typology—*gatekeeper*, *representative*, and *liaison*—link unconnected clusters that belong to the different subgroups (see Table 1). These three brokerage types might be particularly useful for clarifying how research and information spreads between the research and school staff practice communities. A *gatekeeper* broker is part of the same subgroup as a cluster of individuals receiving information. He/she can

grant or deny access to this cluster of individuals to a cluster of individuals in a different subgroup that is sending information. In the research–practice context, *gatekeeper* brokerage can be linked to a pull mechanism of dissemination where end-users of an intervention seek out evidence and ties to brokers who can communicate this evidence (Leadbeater 2010). For example, a district superintendent in need of a new bullying intervention might recruit a local researcher with expertise in bullying interventions to provide professional development to district staff and teachers. The superintendent (i.e., *gatekeeper*; member of the school staff practice subgroup) brokers information between the researcher (i.e., member of the research subgroup) and school staff (i.e., also members of the school staff practice subgroup).

Like a *gatekeeper* broker, a *representative* broker is part of the same subgroup as one cluster of individuals. However, unlike a *gatekeeper* broker, a *representative* broker sends information to another cluster of individuals in a different subgroup that is receiving information. In the research–practice context, *representatives* can be linked to a push mechanism of dissemination where individuals seek to communicate research evidence to end-users (Leadbeater 2010). To illustrate, an employee of a university outreach office might serve as a representative broker by compiling and presenting recent bullying intervention research conducted in the university's College of Education at a local school district's teacher professional development meeting. The outreach office (i.e., *representative*; part of the research

subgroup) brokers information between the university (i.e., part of the research subgroup) and a school district (i.e., part of the school staff practice subgroup).

Liaison brokers—included in the last type of brokerage in Gould and Fernandez' (1989) typology—are unique in that they are part of their own distinct subgroup, and also link unconnected clusters that belong to the different subgroups. Recent research in education suggests that foundations and intermediary organizations such as think tanks or advocacy groups may serve in the role of *liaison* brokers (e.g., Scott and Jabbar 2014). For instance, a staff member at an anti-bullying foundation might work with researchers to synthesize recent studies on bullying interventions and distribute it to school district administrators. The foundation (i.e., *liaison*; a member of a non-profit organization subgroup) brokers information between researchers (i.e., members of the research subgroup) and school administrators (i.e., members of the school staff practice subgroup).

The Current Study

Although Gould and Fernandez' (1989) typology is not new, there is limited empirical application of this typology to the individuals and organizations that broker the research–practice gap. The current study examines what types of brokerage can be identified in the context of the dissemination of information and research evidence in the education service sector. Using semi-structured interviews from nineteen administrators and staff in two public school districts, we explore how Gould and Fernandez' (1989) typology maps onto the individuals and organizations identified as key sources of information about school-based instructional, health, and social skills programs. Identifying key types of brokerage that exist between research and practice communities may improve efforts to strengthen the communication pipeline and patch up existing leaks (e.g., Green et al. 2009). In particular, this information can be used to develop future dissemination efforts that capitalize on pre-existing brokers that link research and practice communities.

Method

Setting and Sample

Two school districts from the same county in Michigan were included as sites in this study. Given their shared location, these school districts were subject to the same state and county-level policies. Moreover, both districts were situated within 30 miles of a major research university. Despite these constants, the districts were purposively selected by our research team to maximize variation in

enrollment size, student demographics, and academic performance. Village District located in a rural community and serves a small primarily White student body (i.e., student enrollment <3000). This district is also one of the highest performing districts in the county with respect to state testing in reading and math. Village District has a small central office and therefore tasks for locating and selecting school programs are typically assigned to principals and teaching staff. City District is located in a mid-size city and serves a larger, more diverse student body that includes African American, White, and Latino(a) students (i.e., student enrollment >10,000). This district is one of the lowest performing districts in the county with respect to state testing in reading and math. City District has a larger central office, and tasks for locating and selecting school programs are often assigned to central office administrators.² The research team recruited both school districts for participation by contacting and describing the study to the superintendent. Each district received a \$500 donation to be used at their discretion as a token of appreciation for their participation in the study.

Within each participating school district, we followed sampling procedures initially outlined by Coburn and Talbert (2006) in their qualitative study of evidence use in school districts. Namely, we began with a seed sample of administrators in each district's central office and used a snowball sampling design to expand our interview sample based on information and referrals we received from these seed sample participants. We continued to expand our interview sample using this snowball procedure until we reached saturation (i.e., participants were providing common themes and were referring named individuals who were already in our sample). This led to a total sample of 19 school administrators and staff [11 in Village (57.8 %) and 8 in City (42.1 %)]. Of the sample, 7 were administrators in district central offices, 5 were principals, and 7 were teachers or staff in school buildings. On average, school administrators and staff in our sample had worked in their current district for 20.42 years ($SD = 11.75$) and had worked in their current position for 4.5 years ($SD = 5.12$). The sample was mostly female (70.59 %), White (88.24 %), and most participants held at least a master's degree (94.4 %).

The Research Team

The research team for the current study included two assistant professors (the first and second authors) and three community psychology graduate students (the third through fifth authors). Interviews were conducted by the

² We use the pseudonyms Village and City to protect the confidentiality of our participating districts.

first, second, and third authors, activities related to coding and analysis were conducted by first and second authors, and activities related to the write-up of the paper were conducted by all authors.

Our team was comprised of four females (three White and one African American) and one White male. All members of the research team attended public primary and secondary schools growing up and value the US public school system. However, our experiences in the public school system differed substantially. The first author attended school in both suburban and mid-size urban districts serving diverse populations of students in California and Arizona. The second author attended school in one of the largest urban districts serving a diverse population of students in Arizona. The third author attended school in a mid-size urban district serving diverse population for students in California. The fourth author attended school in a large, urban district serving predominantly Black or African American students in Michigan. Finally, the fifth author attended school in well-resourced, mid-size suburban district in Illinois. This diversity in experiences was beneficial, and allowed for fruitful team discussions and distinct reflections during data collection, preliminary analysis, coding, and synthesis.

As researchers, the team views educational research as useful and of potential value to improving the US public school system. Therefore, we took extra steps to make sure our pro-research perspective did not influence the data collection, coding, or analysis. During data collection, we carefully crafted questions in our interview protocol to avoid potential social desirability among participants related to their search for and use of research evidence (see Procedures below). During coding and analysis, we identified and challenged our personal perspectives (Patton 2002). For example, our perspectives were often challenged when instances of brokerage did not include members of the research subgroup.

Measures and Procedures

The research team developed a semi-structured interview protocol for use in the current study that focused on school district administrators' experiences searching for information about instructional, health, and social skills programs. To avoid potential social desirability effects related to the use of research evidence in these processes, we employed two general strategies in the development of our semi-structured interview protocol. First, we avoided using language that explicitly refers to "research evidence," and did not explicitly identify our study as seeking to explore research evidence acquisition or use. Instead, we described the study as broadly focused around understanding how school districts and their administrators think about and

select school-based programming. Second, we used "grand tour" questions to allow the respondent to lead the discussion, albeit in a focused direction (e.g., *Can you tell me about a program you or your school district recently considered?*) (Bernard 2011; Patton 2002). Focusing on a recent and concrete example allowed the respondent to recall specific details, and to describe an actual deliberation process as it unfolded, rather than merely speculating on what might/could happen. The respondent was then encouraged to "tell the story" of the process, during which additional probes were used to elicit information including details about sources of information about programs (e.g., *What sources of information did your district use to deciding whether or not to use this program?*).

Interviews were conducted in-person by the first through third authors and one additional trained interviewer. All interviews took place in a private space or office at the participant's place of employment, and were tape recorded with participants' consent. Most interviews were conducted individually, however two school staff members requested to be interviewed as a pair. Interviews ranged in length from 31 to 83 min ($M = 55.8$), and were transcribed verbatim by a team of trained undergraduate students.

Data Analysis Plan

We used directed content analysis to analyze our data. Directed content analysis is an appropriate qualitative analysis strategy when research aims to apply an existing theory (Hsieh and Shannon 2005). Unlike conventional content analysis where codes are derived in vivo from textual data, directed content analysis involves a deductive approach where coding categories and operational definitions are developed a priori based on existing theory or empirical studies. In the current study, our aim was to determine what types of brokerage occur when schools seek information, including research evidence. Directed content analysis was well suited for this purpose because we focus on kinds of brokerage specified in Gould and Fernandez' (1989) pre-existing typology, rather than inductively inferring brokerage types from our data.

We coded our data for the current study using a three-stage process. In the first stage, the first and second authors independently conducted an in-depth review of the verbatim transcripts. We identified any instances in the transcripts where participants described brokerage or the transfer of information about a program or practice across at least three parties: a recipient, a source, and the source's source. Here, information was broadly defined to include research evidence or other aspects of an educational program or practice such as its name or details regarding its content. During this first stage, the first and second authors met regularly to discuss consistencies and discrepancies in their independent

Table 2 Codebook definitions for stage 3 of qualitative coding

Code	Definition
School staff	Front-line providers (teachers, building staff, principals), central office staff (superintendent, curriculum director), and school board members
Intermediate school district (ISD)	Staff employed by an intermediate school district (a county-level educational entity that provides services to individual school districts)
Federal & state education agencies	State-wide and nation-wide governmental educational agencies, including MiBLISI (Michigan Integrated Behavior and Learning Support Initiative), state and federal departments of education, etc.
Company	For-profit companies including textbook vendors and publishers
Parents and friends	Parents, friends, and other acquaintances that could not be coded into another category
Foundations	Foundations and non-profit corporations
Research	Universities, academic faculty and staff, books and articles written by academic staff
Consultant	Private consultants (current academic faculty/staff who also consult are coded as “Research”)
Other	All other sources of information

identification of brokerage instances. When discrepancies occurred, these authors came to a consensus and tracked all decisions using an audit trail. In total, we identified 167 mentions of brokerage across our 19 participants.

In the second stage of coding, the first author aggregated instances of brokerage in two ways. First, to eliminate redundancies, multiple mentions of the same brokerage instance were combined. Second, to accommodate information transfer chains that exceed two sources, overlapping brokerage instances were combined (e.g. a brokerage $A \rightarrow B \rightarrow C$ and a brokerage $B \rightarrow C \rightarrow D$ were combined into the longer $A \rightarrow B \rightarrow C \rightarrow D$ chain). The second author verified each aggregation, and again, we maintained an audit trail to track decisions. This aggregation process resulted in 73 distinct information transfer chains (47 in Village and 26 in City) involving 96 unique instances of brokerage (62 in Village and 34 in City).

In the third stage, we followed Hsieh and Shannon's (2005) outlined procedures for directed content analysis. We developed and applied subgroup codes for each party in the 73 information transfer chains we identified in stage 2. These subgroup codes were developed using both deductive and inductive approaches, and are shown in Table 2. Using a deductive approach, we initially derived subgroups (e.g., research, federal and state education agencies) in our codebook from existing research on school administrators' search for information and decision-making processes (e.g., Bickel and Cooley 1985; Corcoran and Rouk 1985; Honig and Coburn 2008). Next, based on our review of the transcripts, we expanded and refined our initial subgroup codes to include additional sources (e.g., companies, foundations, and consultants) not derived from the literature. This inductive approach was used to guard against potential coding biases inherent in relying solely on existing research. Finally, using these subgroup codes, each

unique instance of brokerage was coded as one of Gould and Fernandez's (1989) five brokerage types based on the configuration of subgroups. Because the five brokerage types defined by Gould and Fernandez (1989) are exhaustive and mutually exclusive, each of the 96 unique instances could be coded as one and only one of the types.

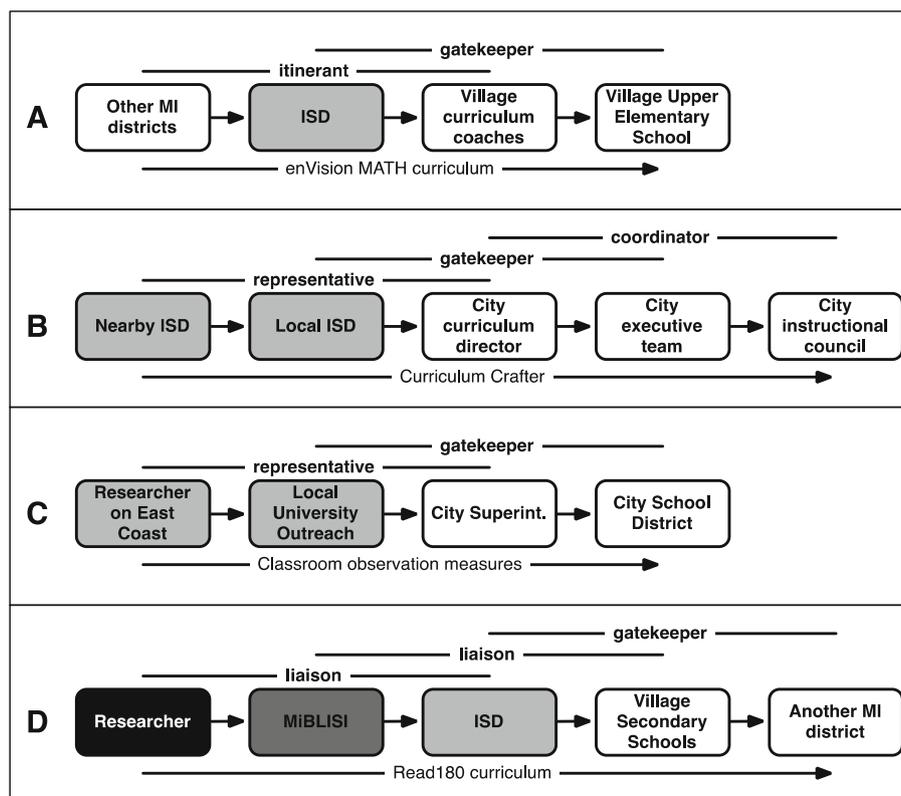
After the completion of coding, we used two techniques for analysis. First, we applied a rank order comparison technique to explore the incidence of each of Gould and Fernandez' (1989) brokerage types in our data and the incidence of brokerage types that included a source coded as research (Curtis et al. 2001; Humble 2009). Rank order comparison is recommended as a technique for analyzing data when utilizing directed content analysis given its ability to highlight the fit of theoretical categories to the data (Hsieh and Shannon 2005). Second, we utilized four example information transfer chains from our data (see Fig. 2) to highlight how information transfer is complex and often includes multiple brokerage types.

Results

Rank Order Comparison of Brokerage Types

Table 1 provides the incidence in our data of each of the Gould and Fernandez' (1989) five brokerage types. Across all the information transfer chains we observed, the gatekeeper was the most common type of brokerage ($N = 39$). In all of these cases, a gatekeeper broker in the school staff subgroup pulled information into the district from a member of another subgroup, and transferred it to others within the school staff subgroup. For example, one participant described how his school obtained information about remedial math programs:

Fig. 2 Example information transfer chains, with subgroups and brokerage types highlighted



So, we looked at my math department chair I'd give him the task of researching some different programs and bringing that information in and a speaker and vendors and so we had a vendor look at some, present to us information and then the math teachers asked a lot of very deep questions. (Principal in Village district)

Here, the math department chair served as a gatekeeper, brokering the flow of information about a math program from vendors to other teachers in his school. The frequency of school staff who served as gatekeeper brokers in our data suggest that school staff are active rather than passive participants in the information transfer process.

Liaison (N = 22) and coordinator (N = 20) were the next most common types of brokerage in the data. In liaison brokerage, each of the three parties belongs to a different subgroup, and this represents a case of information transferring across multiple boundaries. For example, one participant discussed how the intermediate school district (ISD)³ brought consultants into train staff in his

district on the most up to date practices in curriculum and instruction:

The ISD here is really uh quite, (sighs) I don't know, phenomenal might be too exaggerated, but they are highly um intelligent (...) They are current in their best practices, they bring consultants in, we do a training once a month with them. (...) So all the different county schools come together once a month for these professional trainings on curriculum and instruction and they're quite good. (Principal in Village district)

Here, the ISD served as a liaison, brokering the flow of information about curriculum from consultants to school staff. Coordinator brokerage is distinct from liaison brokerage because all three parties are members of the same subgroup. In our data, instances of coordinator brokerage always involved the transfer of information between three parties who were all part of the school staff subgroup. Thus, instances of this type of brokerage reflected the internal transfer within and among school districts:

Um teachers hear about a program uh I mean I guess it's mostly word of mouth because the other programs that we've implemented here, it's like teachers, if their kids go to another school or district, they're like

³ In Michigan, intermediate school districts are county-level administrative bodies that provide a range of support services for school districts within their county. Because they (generally) do not provide instruction to students, we coded them as belonging to a different subgroup than school staff.

'Oh yeah, my daughter uses the Scholastic um Reading Counts and it's great and you know my daughter loves it.' (Principal in City district)

Here, teachers served as coordinator brokers, brokering the flow of information between their own school and another school or district where their child is enrolled.

Participants were least likely to mention representative ($N = 10$) or itinerant ($N = 5$) brokerage. Although these two types of brokerage were rare in our data, we still observed some instances, which suggests that all types of brokerage described by Gould and Fernandez (1989) may be useful for identifying brokers in the context of information transfer in education. However, information transfer may not always result in brokering the research–practice gap. To understand whether Gould and Fernandez' (1989) typology describes key types of brokerage that exist between educational research and practice, we now turn to exploring brokerage instances in information transfer chains that involved parties from both the research and school staff subgroups.

Rank Order Comparison of Brokerage Types Involving the Research Subgroup

Of the 73 information transfer chains in our data, only 13 (17.8 %) involved parties from both the research and school staff subgroups, and thus represent instances of successful brokering of the research–practice gap. This is consistent with the existence of a research–practice gap and suggests that school staff rely on sources other than those in the research subgroup for information about school programs and practices.

Within these 13 chains, we observed only three of Gould and Fernandez's (1989) brokerage types—representative, gatekeeper, and liaison—which appeared in roughly equal proportions. Gatekeeper brokerage appeared 7 times, and as the following exchange suggests, specialized members of the school staff (in this case, nurses) often served as gatekeeper brokers between researchers and the rest of the district:

P: It's an education, an asthma health education program. I: So these were researchers that were working in collaboration with your school district? P: Yes, and now they have the lessons ready. And so we're going to start next year with the lessons. Ya know, they use the right language, inhaler and all the correct information. I: Great. And how did you partner up with these researchers? P: I think it was <State University> contacted maybe our nurses and then we listened to it at a principal meeting. (City district administrator)

Here, the nurse served as a gatekeeper, brokering the flow of information about an asthma program from researchers to teachers in her district.

Liaison brokerage also appeared 7 times, and as these two quotes illustrate, liaison brokers can come from many different subgroups.

Project Lead the Way, which is out of <Regional University>, but they are um <Local Foundation> is the major um one of the major corporations supporting this Project Lead the Way. (...) We'd had a relationship with them before through our math/science academy. (...) And, but I saw their name attached to this one. I talked to <Name>, the lady there and said you know, what, tell me more about this from your point of view and, whoa, she just waxed eloquent about it, so the idea was ok, and when you look at it, it's it is this, the this curriculum teaches them all of this, moves them up in here and then splashes them right down with a project. (Village district administrator)

We went to a training series that was put on through our ISD where they brought <National Consultant> in.... And so his um, his talk was largely about engagement and um explicit vocabulary instruction. But layered in there was this research from John Hattie...and so we really started to identify John Hattie's work as like gee this could be really important. (Behavior coach at Village district)

In the first case, a local foundation serves as a liaison, brokering the flow of information about a STEM education program from a regional university to an administrator in the Village district. In the second case, there are two distinct instances of liaison brokers. A national consultant served as a liaison, brokering the flow of information about program effect sizes reported in the book *Visible Learning* from the book's author, John Hattie, to the local ISD. Later, the ISD serves as a liaison, brokering the flow of this information from the national consultant to the Village district. Thus, these cases offer examples of parties from the foundation, consultant, and ISD subgroups all functioning as liaison brokers in the transfer of information from researchers to practitioners.

We also observed representative brokerage 6 times in chains linking researchers and practitioners. This is notable as representative brokers were relatively rare in chains not linking researchers and practitioners. As the following quote illustrates, representative brokerage often occurred when a member of the research subgroup pointed a school administrator toward another researcher, article, study, or university.

I went out to dinner the other day with <Name>, who's at the College of Ed. K-12 outreach. So she's like, Well so what's going on? (...) and I'm like, Oh yeah, well we're gonna do this, and that, and the other thing, and, and I said and you know our MEAP scores came back and we're pretty low in math and I'm, I'm just you know really worried about that so we're gonna put our summer school program together to be focused on math, and she says to me, Have you talked to Dr. <Name>? (...) He's doing a project where, you know, he takes a survey of the enacted curriculum, teachers respond to this survey and then he does a locator on the kids, and then he triangulates that, and then he'll tell you where your math gaps are. And I'm like, (dramatic pause, chuckles) Okay, we're doing that. You know, the light bulbs went off. (City district administrator)

Here, a researcher in the local university's outreach department acted as a representative of the university's larger college of education, and during a casual dinner brokered the flow of information from a researcher at the college to an administrator in the City district.

Example Information Transfer Chains

The brokerage types identified by Gould and Fernandez (1989) are relevant to information transfer and the research–practice gap in the educational service sector. However, our analysis suggested that information transfer often occurred in longer chains that involved multiple, distinct types of brokerage. Here, we use four examples of information transfer chains from our data (illustrated in Fig. 2) to illustrate how multiple brokers of distinct types can overlap to facilitate information transfer across longer chains.

Complex information transfer chains that include multiple types of brokerage were common in our data even when none of the sources mentioned were from the research subgroup. For example, Chain A in Fig. 2 illustrates how the upper elementary school in Village district learned about the enVisionMATH curriculum, a Pearson developed math program linked to the United States Common Core State Standards.

We actually have curriculum coaches and so the coaches had gone um through some of the work they had done with the county and branching out to some of the other districts they kinda found this. (Principal at Village upper elementary school)

This quote reveals two types of brokerage. First, the county ISD served as an itinerant, brokering the flow of information from other Michigan school districts to the curriculum

coaches at Village's upper elementary school. This represents a classic case of itinerant brokerage, which was rare in our data: the ISD's staff move around the county linking school districts to one another. Second, the curriculum coaches served as gatekeepers, brokering the flow of information from the ISD to the rest of the staff in their school. This represents a classic case of gatekeeper brokerage, where the curriculum coaches acted as the gateway through which the ISD's information reached an entire school.

Long chains that did not include members of the research subgroup were also present in City district. For example, Chain B in Fig. 2 illustrates how teachers in City district learned about and adopted Curriculum Crafter, a web-based application tool developed by a nearby ISD to help teachers align their curricula. Chain B was corroborated by two participants and was described in detail across three quotes by one of these participants. First, in a case of representative brokerage, City's local ISD brokered information about the tool from another nearby ISD to the City curriculum director:

P: It's a <Nearby ISD> uh curriculum tool. And um people are getting trained on it now. (...) This specific one, one of our curriculum people, meets with <Local ISD>, uh once a month it with all of their curriculum directors. And it was presented to them and I would say several of the other school districts in the area uh have gone onboard with it. I: So they so she learned of it from <Local ISD> and they presumably have learned of it from the <Nearby ISD>? How interesting. P: Right, right, right (City district administrator)

Second, in a case of gatekeeper brokerage, City's curriculum director shared the information she received from her local ISD with the district's executive team:

<The curriculum director> went and then she presented it to us...the executive team.... (City district administrator)

Finally, in a case of coordinator brokerage, the district's executive team shared the information they received from the curriculum director with the district's instructional council:

...and we were interested and we have a little mini in-service and uh then we have what's called curriculum steering committees. And it's a teacher is a chairperson and uh a administrator is a chair person and that's for every subject area: art, music, PE, social studies, science, ELL, um ya know all of every area. And then we presented it to that council. (City district administrator)

This complicated chain—involving three different brokerage types—illustrates how the transfer of information about new educational programs and practices can take a convoluted path. Moreover, this chain did not include a member of the research subgroup, suggesting that researchers may be absent from or many steps removed in the convoluted path.

However, some of the long chains in our data did include members of the research subgroup. For example, Chain C in Fig. 2 illustrates how the City district learned about two classroom observation measures developed by university researchers. In this case, corroborated by 6 participants, information about these observational measures from a researcher at a private university on the East coast of the United States was initially passed by a local university outreach office to the City superintendent. After this initial representative brokerage, gatekeeper brokerage occurred when the City superintendent decided to implement these measures throughout her district.

Long chains that included members of the research subgroup were also present in Village District, as illustrated in Chain D of Fig. 2. This chain, corroborated by two participants, describes how information about Read180, an intensive literacy program developed by Scholastic, filtered to the secondary school buildings in Village district and eventually another Michigan school district. The program initially entered Village schools through two instances of liaison brokerage. First, Michigan's Integrated Behavior and Learning Support Initiative agency (MiBLISI) passed information from researchers with expertise in secondary literacy to the local county ISD. Next, the local ISD brokered information from MiBLISI to the Village secondary schools. Finally, as described below, the chain continued when Village High School scheduled a visit from another Michigan school district to observe their implementation of the Read180 program:

We're gonna host our third visitor to our Read180 lab. People are hearing about the impact we're having. And in fact in May coming up there's <Another Michigan School District> I think, if I recall, are coming to visit, and they're not close. They heard about our Read180 reading enrichment class and they want to come see it, and observe it, and talk to our teacher about it. (Principal at Village high school)

In this last part of the chain, the Village secondary schools—in particular, the high school—served as a gatekeeper, passing information about Read180 that they initially received from the ISD to another Michigan school district. This long chain highlights the need to consider how multiple brokers may be necessary to overcome the research–practice gap.

Discussion

Our analysis of the 73 information transfer chains described by our participants demonstrates that all five types of brokerage defined by Gould and Fernandez (1989) occur when members of the school staff practice community seek information about school programs and practices. This suggests that Gould and Fernandez's (1989) typology is a useful conceptual tool for understanding how school programs and practices get discovered, and highlights its potential for understanding practitioner learning processes in other contexts as well. When it comes to closing the research–practice gap, we observed only three types of brokerage at work. However, this still might be good news because it indicates there are multiple ways to close the gap. For example, in some cases a researcher may have an opportunity to share findings with an interested school staff member who can later share it with others in the school, thereby closing the gap via a gatekeeper. In other cases, a researcher may rely on his or her institution's outreach department to help disseminate findings to school administrators, thereby closing the gap via a representative. Indeed, although we did not observe instances of coordinator or itinerant brokerage in chains involving researchers, perhaps due to the in-depth nature of our interviews, which required a small sample, these might also provide ways to close the gap in other contexts. Future research should seek to clarify whether coordinator and itinerant brokerage are ever activated in researcher–practitioner information sharing, and the factors that influence which types of brokerage are most common or useful.

Although we were able to extract detailed information about 73 information transfer chains from our interviews, only 13 of these included researchers. This might be viewed as evidence that the research–practice gap is quite severe, and indeed it is consistent with this interpretation. However, as is common in studies attempting to trace chains of communication (e.g. Dodds et al. 2003), our data is censored. The 60 chains that did not include a researcher might have if we had been able to trace them further back. For example, in Chain A illustrated in Fig. 2, we were able to trace the Village district's knowledge of the enVisionMATH curriculum back to other Michigan school districts. Not surprisingly, our participants did not know (or at least did not mention) how these other Michigan school districts learned of this curriculum. But, it is possible that these other districts learned about it from a researcher, and thus while the 3-step version of this chain appears to illustrate a research–practice gap, perhaps a more complete 4-step version would demonstrate the gap is in fact closed. This form of censoring represents a limitation of our data that future studies may seek to overcome by tracing

communication chains further back. However, despite this limitation, we are able to conclude that even if researchers are present in these 60 chains, they are quite distant from the practitioner community. This distance likely degrades the quality of communication between researchers and practitioners, even if it exists.

In this study, we aimed to understand when chains of communication exist between researchers and practitioners, and who facilitates these chains of communication by serving as information brokers. We contend that the existence of a chain of communication between a researcher and a practitioner is necessary, but not sufficient, for the practitioner's intentional adoption of evidence-based programs. That is, a practitioner's intentional adoption of evidence-based practices requires direct or indirect contact with a researcher, but this contact does not guarantee the adoption of such programs. Future research should explore the relationship between the presence or absence of a researcher in the chain and whether or not the adopted program is evidence-based. Likewise, in cases where a researcher is present in the chain, future research should explore the relationship between the researcher's distance from the practitioner in the chain and whether or not the adopted program is evidence-based.

Whether the observed chains did or did not include researchers, our data included 19 chains that involved more than three parties and more than one type of brokerage. Because Gould and Fernandez's (1989) brokerage typology focused exclusively on three-party discrete instances of brokerage, it did not provide a way of classifying these longer chains and compound forms of brokerage. This highlights a future direction for theoretical studies of brokerage generally, as well as empirical studies of brokerage in specific contexts like the educational research–practice gap. Specifically, future research may explore whether certain combinations of Gould and Fernandez's brokerage types are particularly common or uncommon, and whether these compound brokerage forms have unique characteristics. Among the five types of brokerage, there are 25 distinct ways they could be combined in compound pairs, but in our data we observed only 7 of these possible combinations. For example, frequently a liaison broker is followed by a gatekeeper broker, but never by a coordinator broker. Similarly, coordinator brokers tend to be preceded by other coordinators or by gatekeeper brokers, but never by representative brokers. These patterns raise questions about whether “liaising gatekeepers” or “coordinating coordinators” are novel types of brokerage, but at least here their appearance highlights that information transfer generally, and closing the research–practice gap in particular, is likely to involve complex chains involving multiple kinds of participants.

Throughout this paper, we have treated brokerage in a generally favorable light. This treatment is partly driven by our data, which only allows us to see cases where information was successfully brokered and reached a school administrator. However, it is important to note that brokerage can also have dark sides that may be hidden in these data. First, an individual or organization may have the potential to serve as a broker, but nonetheless fails to effectively facilitate the transfer of information. In some cases, this may be a conscious decision on the part of the potential broker. For example, an individual who is in contact with both education researchers and educators and who personally favors abstinence-only sex education may purposefully not share information about the effectiveness of comprehensive sex education. Second, an individual or organization may effectively facilitate the transfer of information (i.e., serve as a broker), but expect something in return. This phenomenon is known as *tertius gaudens*, which means “the third who benefits” (Simmel 1950). In our context, this might occur when a publisher shares a piece of research with a school district, but expects the district will purchase their curriculum that implements this research. Future research should recognize both the positive and negative aspects of brokerage.

Although our findings identify multiple avenues for future research on the research–practice gap, they also offer a few concrete recommendations for confronting the gap. From the perspective of researchers seeking to disseminate their work to practitioners, our findings highlight the critical role of gatekeeper brokers. Researchers must recognize not only that gatekeeper brokers exist, but as our data suggest, are quite common and thus that effective dissemination efforts will require identifying key gatekeeper brokers and securing their buy-in. Social network analysis could further support the identification of key gatekeeper brokers within existing practitioner settings (e.g., Kornbluh and Neal in press). As the data from this study illustrated, school administrators are not passive agents and may hold critical positions in facilitating dissemination efforts. From the perspective of practitioners seeking to locate useful research, our findings likewise highlight the critical role of representative brokers. Practitioners must be aware that representative brokers exist, often in the form of university outreach services, and that they provide a helpful point of access to information that might otherwise be inaccessible because it is too complex, too long, or just not available. Finally, from the perspective of both researchers and practitioners, our findings highlight the importance of liaison brokers who are themselves neither researchers nor practitioners, but nonetheless can broker the flow of information between these two communities, albeit perhaps with their own agendas (Scott and Jabbar 2014).

Although there is discussion of *bridging* the research–practice gap (e.g., Wandersman 2003), it is also important to consider *brokering* the research–practice gap. The current study takes a step in this direction by exploring the types of brokerage that occur when schools seek information, including research evidence. Additional studies that explore the phenomenon of brokerage and interventions that seek to capitalize on the potential of brokers may help narrow this enduring gap.

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