practice

How can research mediators better mediate?: the importance of inward-looking processes

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Science can provide empirically-informed strategies and resources to inform and improve policy and practice, though all too often science, policy, and practice operate independently from one another. Research mediators play a critical role by attempting to connect these different worlds. This practice paper presents lessons learned and recommendations for improving the effectiveness of research mediators in bridging the science–practice gap based on the experiences of a Visiting Fellow in a United States federal research agency. To support evidence-informed policy and practice, research mediators must engage in inward-looking processes – they must attend to their own internal science–practice gaps, commit to interdisciplinarity, and institutionalise such work.

keywords research mediator • science–practice gap • interdisciplinarity knowledge broker

Introduction

Science can provide empirically-informed strategies and resources that are responsive to real-world concerns so as to inform and improve policy and practice. However, all too often these communities operate independently from one another, as though they are 'worlds apart' (Boaz et al, 2015). Research mediators play a critical role in bridging these worlds as they summarise and translate research findings, illuminate practice and policy implications, and facilitate important connections between key players, all in support of research use (see Sebba, 2013). Still, there is room for improvement. This purpose of this practice paper is to present specific lessons learned and recommendations for research mediators so that they may improve their effectiveness in bridging the science–practice gap. Based on the experiences of a Visiting Fellow in one United States federal research agency, research mediators should (1) attend to their own internal science–practice gaps, (2) commit to interdisciplinarity, and (3) institutionalise such processes.

The science–practice gap

The gap between science and practice has long been documented and continues to present a challenge for researchers, practitioners, and funders alike (for example, see Chew et al, 2013; Dwan et al, 2015; Kazdin, 2008; Miller and Shin, 2005; Sebba, 2013; Wandersman, 2003; Wandersman et al, 2008; Wright, 2013). Many researchers still subscribe to prevailing paradigms in implementation science that suggest the translation or mobilisation of scientific discoveries into practice requires little, if any, facilitation (for example, The Institute of Medicine model of Preventive Intervention Research (Mrazek and Haggerty, 1994; O'Connell et al, 2009). These paradigms assume that evidence of a successful intervention in controlled settings is sufficient for its successful adoption across all settings (Miller and Shinn, 2005). However, this simplistic model of decision making (see Miller and Shinn, 2005) does not hold as the dissemination and implementation of scientific knowledge into practice lacks consistency and uniformity across time and context. Indeed, the body of evidence on research use underscores the importance of intentional and structured engagement and interaction among researchers, policymakers, and practitioners to support research use (for example, Langer et al, 2016).

The role of research mediators in bridging the gap

To promote greater research use, it is necessary to bridge the gap between science and practice. Research mediators intend to do just that. As explained by Sebba (2013), research mediators connect the worlds of research with those of policy and practice, but do more than just move research evidence from one context (for example, the laboratory) to the other (for example, the community). Research mediators act upon the research evidence to increase its potential use. Research mediators may summarise and interpret research findings, explain their practice and policy implications, and broker meetings and networking among key stakeholders. While many different entities may undertake research mediation (for example, funders, educators, think tanks) and specific activities vary (for example, problem definition setting, policy analysis, community engagement), research mediators appear to play a critical role in stimulating knowledge exchange and ultimately supporting research use (for example, see Ward et al, 2009).

However, the persistence of the science–practice gap reminds us that there is always room for improvement. Research mediators' goal of supporting the use of research evidence 'out there, in the real world' means they are most frequently engaged in *outward-looking processes* that focus on individuals, organisations, communities, and systems outside of their own: how do we get individuals to use the most relevant research findings when making personal healthcare decisions? how do we get school officials to choose evidence-based curriculum? how do we get legislators to develop scientifically-sound policies? By always looking outward, research mediators may miss ways in which their own internal practices could be improved and thus impact their overall goal of supporting the use of research. In the following pages, this practice paper presents lessons learned and recommendations to improve the effectiveness of research mediators in bridging the science–practice gap, with a particular emphasis on *inward-looking processes*. These lessons learned and recommendations are based on the experiences of one Visiting Fellow in one United Stated federal research agency.

A brief overview of the host agency and Fellowship that culminated in the identified lessons learned and recommendations is provided.

The host agency and role of the fellow

The realm of criminal justice is no exception to the 'science–practice gap' (Alpert and Lum, 2014; Greenwood, 2014; Kazdin, 2008; Makse and Volden, 2011; Miller and Shinn, 2005; Wandersman et al, 2008). Though there exists a large body of research that articulates the underlying aetiology of crime and identifies 'what works' to reduce crime and increase justice, practice frequently operates independently of science (see Alpert and Lum, 2014; Greenwood, 2014; Makse and Volden, 2011). As a result, efforts to prevent, reduce, and manage crime are impeded, as practice and policy operate beyond the reach of research.

This science–practice gap presents a key challenge for the National Institute of Justice (NIJ). NIJ is the research, development, and evaluation agency of the US Department of Justice, and is committed to 'fostering science-based criminal justice practice' (NIJ, 2013). NIJ recognises that to achieve this aim, it must attend to and attempt to bridge the science–practice gap. To do this, NIJ supports rigorous scientific research that is reflective of real-world issues faced by criminal justice professionals (that is, practice informs research); utilises an array of vehicles to disseminate said research back to criminal justice professionals so that it may be used to inform policy and practice (that is, research informs practice); and invests in varied initiatives that support regular information exchange between researchers and practitioners (for example, researcher–practitioner partnerships and symposia). As a part of these efforts, NIJ sought and ultimately supported a Visiting Research Fellow in Fiscal Year 2014 (NIJ, 2014). The Fellow was to help NIJ staff be more systematic and deliberate in their bridging efforts; specifically, to be more systematic and deliberate in their conceptualisation of the science–practice gap; the development and implementation of activities intended to bridge the science–practice gap; and the operationalisation and measurement of impact accordingly. Through these means, the Fellowship was intended to help propel NIJ forward in its bridging efforts to ensure NIJ-supported research has on impact on criminal justice policy and practice.

The Visiting Research Fellow worked in residency at NIJ in Washington, DC for one year. During this time, the Fellow engaged in a wide range of activities to document NIJ's current conceptualisation of the science–practice gap, activities underway to target the gap, and corresponding operationalisations and measurements. Developing a comprehensive understanding of NIJ's current strategies was an essential first step as it would provide the foundation for organising and systematising future planning, management, and evaluation (see WK Kellogg Foundation, 2004). The timing of the Fellowship coincided with organisational change efforts across NIJ, initiated by new leadership in the Office of the Director. Therefore, it was necessary to rely on a wide range of data sources during this time of transition to capture varying perspectives on NIJ's role in bridging the science–practice gap. Accordingly, the Fellow assembled and met regularly with a working group, representative of NIJ staff, to provide insight into NIJ processes (see Knowlton and Phillips (2012) for a discussion of small groups in logic model development); met regularly with social science analysts working on NIJ's Translational Criminology Research Portfolio (see NIJ, 2014) and with the Director of NIJ; attended NIJ office-specific staff meetings (for example, office

of communications), all-staff meetings, and other NIJ events; conducted individual and group interviews with NIJ staff; and consulted archival records. These efforts culminated in a set of internal documents to be used by NIJ to plan for more systematic and deliberate bridging efforts in the future. This included a visualisation of NIJ's conceptualisation of the science–practice gap, a logic model linking NIJ's many bridging activities to their necessary resources and desired outcomes, and an evaluation plan for assessing impact.

The science–practice gap conceptual model, logic model, and evaluation plan exist as internal documents, intended to help systematise NIJ's bridging activities moving forward. The Fellow also engaged with NIJ staff to inform their bridging activities in real time. In this regard, the Fellow could best be described as a consultant. The Fellow helped connect NIJ staff and contractors to empirical research, theory, and methods from a wide range of disciplines that they could draw upon to guide their bridging efforts. Though the Fellow provided recommendations based on existing literature, prior experience, and areas of expertise, all decision-making power and ownership of specific tasks and projects remained with NIJ staff. For example, the Fellow developed a visualisation of a researcher–practitioner partnership (RPP) typology (adapted from Rojek et al, 2012) and designed an evaluation to examine the impact of a NIJ activity on RPPs; NIJ staff then implemented the evaluation. To support other evaluation efforts at NIJ, the Fellow provided a 'crash course' in efficiency analyses (see Rossi et al, 2003); NIJ staff then decided if an efficiency analysis was the best to way to illustrate a specific activity's impact. To inform a budding research initiative, the Fellow identified key literature on organisational development, adult learning and training transfer, evaluation theory, communications theory, systems change, and team science (Austin, 2009; Ford et al, 2008; Ford and Foster-Fishman, 2012; Miller, 2010; National Research Council, 2015; Rogers, 2003; Taylor et al, 2005; NIJ staff then decided which theories and strategies to use to guide implementation. Some of the Fellow's interactions with NIJ staff were more formal and long-term as the Fellow served as a participating team member, whereas other interactions were more short-term and *ad hoc*. Regardless, these interactions gained their value in the Fellow's ability to connect NIJ Staff to varied resources that could help inform their bridging work on the ground, leading to more systematic and deliberate processes.

Lessons learned and recommendations

The Visiting Research Fellowship was primarily implemented to guide the work of NIJ. However, NIJ is one of many organisations that acts as a research mediator, connecting the worlds of research with those of policy and practice. Therefore, this inaugural Fellowship provided insight into ways that research mediators, more broadly, might increase their effectiveness in bridging the science–practice gap. Specifically, it is recommended that in developing and implementing bridging activities, research mediators engage in more *inward-looking processes*. Specifically, research mediators should (1) attend to their own internal science–practice gaps, (2) commit to interdisciplinarity, and (3) institutionalise such processes. These recommendations are summarised in Table 1.

Table 1: Summary of recommendations

Recommendation	Details
Attend to internal science–practice gaps	• Develop logic model(s) and a theory of change for programme / initiative activities • Review and revise models regularly to ensure they accurately reflect programme / initiative activities and incorporate 'cutting edge' research and theory
Commit to interdisciplinarity	• Identify goals and objectives first • Explore a wide range of disciplines for relevant theory, research, and methods to guide action, accordingly
Institutionalise the process	• Determine how best to integrate an Interdisciplinary Executive Scientist (IES) into the research mediator • Create, fund, and fill a role for the IES

Attend to internal science–practice gaps

Research mediators are committed to supporting empirically-informed practice. For example, while NIJ strives to provide empirical evidence to inform the work of criminal justice professionals in the United States; the National Institutes of Health (NIH) 'seek knowledge about… living systems… to enhance health, lengthen life, and reduce illness and disability' (NIH, 2013); and the WT Grant Foundation 'invests in research with the potential to advance theory, policy, and practice related to children and youth' (WT Grant Foundation, nd). Although the specific topical areas vary across these organisations, their commitment to helping support science-based policy and practice is shared.

However, it cannot be assumed that because a research mediator is committed to supporting science and its application to practice and policy 'in the real world,' that all of its *internal* activities and endeavours are guided by the most relevant and up-to-date research. NIJ's focus on criminal justice necessarily means it is not focusing primarily on health disparities. Similarly, NIH is not considered the expert in criminal justice policy. Each research mediator has elected to develop depth and expertise in a limited set of topical areas, necessarily at the expense of others. Therefore, it is possible and even expected that a new initiative or endeavour in any research mediator is at risk for operating independently of the most relevant and up-to-date scientific scholarship; this may be because the new endeavour is informed best by a domain beyond the research mediator's current area of expertise. It is also possible that long-standing activities have continued to operate 'as-is,' in spite of more recent research suggesting there is a better way; this may be because resources have not been allocated to take stock and update organisational practices on a regular basis. So while research mediators have been focusing on supporting science-informed practices in particular arenas, they may have overlooked their own *internal* science–practice gaps. This is problematic because internal science–practice gaps ultimately impact a research mediator's ability to produce practice- and policy-relevant research and disseminate it effectively. For example, if the research mediator is not well-versed in the most recent research on team science (for example, see National Research Council, 2015), their ability to facilitate empirically-informed practice 'in the real world' via researcher–practitioner partnerships may be compromised.
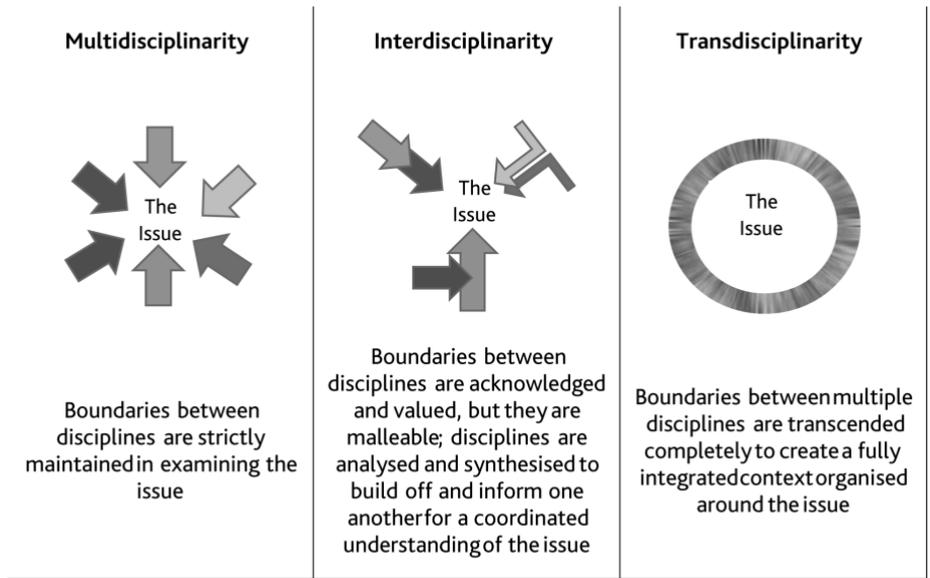
Therefore, it is recommended that research mediators dedicate time and resources to developing a shared understanding of two key science–practice gaps: the science–practice gap 'in the real world' that is the primary focus of their organisation (for example, using science to inform criminal justice or policies affecting youth) and science–practice gaps that may exist *within* their organisation. To do this, research mediators should consider developing logic models that delineate their many different activities conceptually linked to necessary resources and intended impacts alongside theories of change that identify the theories and empirical evidence drawn upon to support their work (see Knowlton and Phillips (2012) for a discussion of logic models versus theories of change). These logic models and theories of change should be reviewed and revised on a regular basis to ensure they represent accurately the work of the research mediator and incorporate 'cutting edge' research and theory.

Commit to interdisciplinarity

To identify relevant research and theory that can guide new and ongoing activities within a research mediator, it is necessary to know what research and theory is available. Though as previously discussed, there is often a tradeoff between depth and breadth; as individuals and organisations develop expertise in specific topics (that is, depth), it is frequently at the expense of knowledge in an array of other areas (that is, breadth). Therefore, research mediators must commit to interdisciplinarity to help ensure that while they continue to develop depth in a specific topical area (for example, in disparities among youth), they also develop breadth across a wide range of disciplines; this will enable research mediators to draw upon varied research and theoretical knowledge for new and ongoing activity development and implementation. Increased interdisciplinarity is recommended here. However, the terms interdisciplinarity, multidisciplinarity, and transdisciplinarity are frequently used interchangeably, without much consideration of the distinctions between these approaches (Alvargonzález, 2011). This may contribute to the misuse and overuse of these terms in contexts frequently void of any observable multi-, inter-, and transdisciplinary efforts. Yet there are important differences between these approaches and the contexts in which they should be applied. Multidisciplinarity and interdisciplinarity draw on different disciplines. However, the former maintains boundaries between the different fields and traditions, while the latter analyses and synthesises links between them to develop a coordinated understanding or whole (Choi and Pak, 2006). Transdisciplinarity moves a step further by completing transcending traditional boundaries of natural, social, and health sciences to produce a fully integrated humanities context (Choi and Pak, 2006), frequently organised around a social problem or area of concern. Figure 1 summarises these distinctions, alongside figures that represent their key characteristics. The different colours in the figures represent different disciplines.

Of these three approaches, interdisciplinarity might be the most useful for research mediators committed to bridging both internal and 'real world' science–practice gaps. In contrast to multidisciplinarity, this approach calls for drawing upon theory or research from one discipline and applying it to another to gain new insight, develop new models, or advance understanding. However, unlike transdisciplinarity, it embraces the importance of specialised training offered by only select traditions that might otherwise be lost if all disciplines were to be integrated fully. With this approach, users

Figure 1: Visualising multi-, inter-, and transdisciplinarity

Multidisciplinarity	Interdisciplinarity	Transdisciplinarity
The Issue	The Issue	The Issue
Boundaries between disciplines are strictly maintained in examining the issue	Boundaries between disciplines are acknowledged and valued, but they are malleable; disciplines are analysed and synthesised to build off and inform one another for a coordinated understanding of the issue	Boundaries between multiple disciplines are transcended completely to create a fully integrated context organised around the issue

are free to explore and apply research, theory, and methods from multiple disciplines, while also considering the benefits and challenges inherent in each. This approach proved fruitful for the Visiting Research Fellowship as the selected Fellow was a community psychologist with a background in systems change, organisational change and development, and evaluation. The Fellow's multidisciplinary training allowed for interdisciplinary application once in residency at NIJ: she was able to draw upon a wide array of traditions, theories, and methods to find the best fit to guide ongoing and future efforts.

To implement an effective interdisciplinary approach, it is recommended that research mediators focus on identifying goals and objectives first, and then explore a wide range of disciplines for relevant theory, research and methods to guide action. For example, if a research mediator wants to ensure that their internal organisational change efforts sustain over time and do not compromise longstanding commitments to science-based practice, it would benefit from drawing upon the organisational development literature (for example, see Austin, 2009; Ford and Foster-Fishman, 2012); if the research mediator wants to ensure research is being disseminated in the most effective way to support its use, it would benefit from drawing upon the field of communications, and dissemination theories such as Diffusion of Innovations or Social Network Theory / Analysis (Borgatti et al, 2009; Rogers, 2003); if a research mediator is developing a training programme for practitioners in order to support the implementation of new science-based strategies, it would benefit from the literature on training transfer and adult learning (for example, see Keith and Frese, 2008; Taylor et al, 2005). Through committed interdisciplinarity, research mediators can be sure that they do not shy away from internal science–practice gaps, but instead bridge them with the same effort and commitment to empiricism as they exercise in attending to 'real world' science–practice gaps. And, as a result, produce increasingly relevant research that is disseminated in the most effective means possible to support implementation and utilisation among practitioners and policymakers.

Institutionalise the process

Staff and leadership within research mediators likely espouse interdisciplinarity and science-based internal practices, in addition to their explicit commitment to science-based policy and practice 'in the real world.' However, it may be difficult to identify precisely how these practices have been institutionalised. For example, how do staff members in a research mediator know that they are drawing upon the most relevant disciplines and bodies of research when developing a new research portfolio or trajectory? How do research mediators ensure that their staff is updated on innovative research that might inform revisions to long-standing dissemination strategies? And, given the current workload and developed expertise of staff in research mediators, is it realistic to expect all staff to also become familiar enough with a wide range of disciplines to know what to apply and when?

Staff members in research mediators are dedicated to understanding the history, fundamentals, intricacies and nuances, and contemporary developments in their areas of expertise (that is, depth). This means 'their dance cards are simply too full to also orchestrate the information flows necessary for efficient and effective interdisciplinary research' that can attend to internal science–practice gaps (Hendren, 2014). Therefore, to institutionalise interdisciplinary, science-based internal practices, it is recommended that research mediators invest in 'Interdisciplinary Executive Scientist(s)' (Hendren, 2014; National Research Council, 2015). Interdisciplinary Executive Scientists (IESs) provide the much-needed counterbalance of breadth for the already-developed depth among staff members in research mediators. IESs understand the interdisciplinary science approach and the importance of knowledge transfer between disciplines to respond to difficult challenges (Hendren, 2014). For research mediators, this might include the development and implementation of a new initiative, or persuading policymakers to use research evidence in their policy decisions. As a skilled communicator, the IES understands what information to share, how it can be applied, and when it will be useful.

If research mediators are committed to effective interdisciplinary science-based practices, they should make identified individual(s) responsible for it. That is, they should create an institutionalised position for the IES. This could be achieved via a series of visiting fellows, via paid staff position(s) within the research mediator, or by establishing a centre or office within the research mediator. Regardless, the role of the IES would remain the same – to draw upon diverse viewpoints, traditions, theories, research, and methods to ensure interdisciplinary, science-based practice. Though the Visiting Research Fellow was not explicitly identified as an IES, the Fellow served in this capacity to some extent, providing anecdotal evidence that the creation and institutionalisation of such a position is worthwhile. This idea has also been explored recently in healthcare (Chew et al, 2013; Wright, 2013).

Conclusion

To support the use of research evidence, such evidence must first be made available to the intended users. Research mediators take on this task by engaging in an array of activities to connect the worlds of research, policy, and practice. Though they have evidenced success in their endeavour (see Ward et al, 2009), the science–practice gap persists. Systematising *inward-looking processes* to complement already developed

outward-looking processes may be one way to improve research mediators' impact. The inaugural Visiting Fellowship at NIJ, dedicated to helping NIJ become more systematic and deliberate in its bridging efforts, evidenced NIJ's sustained commitment to supporting practice- and policy-relevant research and research-informed practice and policy. Additionally, it modelled what can be gained from a willingness to try something new and developed insight to inform the broader conversation on the role of research mediators in bridging the science–practice gap. An unwavering commitment to interdisciplinary internal and external bridging efforts, paired with a readiness for innovation, may be the key for research mediators to ensure research has an impact.

Acknowledgements

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