Mapping New Theoretical and Methodological Terrain for Knowledge Translation: Contributions from Critical Realism & the Arts

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Abstract

Background: Clinical practice guidelines have been a popular tool for the improvement of health care through the implementation of evidence from systematic research. Yet it is increasingly clear that knowledge alone is insufficient to change practice. The social, cultural and material contexts within which practice occurs can invite or reject innovation, complement or inhibit the activities required for success, and sustain or alter adherence to entrenched practices. However, knowledge translation (KT) models are limited in providing insight about *how* and *why* contextual contingencies interact in the way that they do, the causal mechanisms linking structural aspects of context and individual agency, and how these mechanisms influence KT. Another limitation of KT models is their neglect of methods to engage potential adopters of the innovation in critical reflection about aspects of context that influence practice, the relevance and meaning of innovation in the context of their practice, and, the identification of strategies for bringing about meaningful change.

Discussion: This paper presents a KT model, CRARUM that combines critical realism and arts-based methodologies. Critical realism facilitates understanding of clinical settings by providing insight into the interrelationship between its structures and potentials, and individuals' actions. The arts nurture empathy, and can foster reflection on the ways in which contextual factors influence and shape clinical practice, and how these factors facilitate or impede change. Combining critical realism and the arts within the CRARUM model promotes successful embedding of interventions, and greater impact and sustainability.

Summary: CRARUM has the potential to strengthen the science of implementation research by addressing the complexities of practice settings, and engaging potential adopters to critically reflect on existing and proposed practices and strategies for sustaining change.

Background

In recent years, knowledge translation (KT) and evidence-based medicine have gained currency in health research through emphasis on moving "knowledge off the shelves and into practice, making it relevant and accessible to practitioners and patients" [1, p. 869]. For the past two decades clinical practice guidelines have been a popular tool for the implementation of best clinical evidence from systematic research to improve the quality of health care. However, it is now widely understood that guidelines do not automatically change practice simply by establishing a knowledge base for practitioners [2]. Viewing clinical practice as "an activity that simply attaches research to a local worksite" [3, p. 1064] overlooks the profound differences between settings in resources, and the established routines and cultural practices that influence and shape care [4].

Contrary to the view that best evidence can be disseminated across time and place and can achieve planned clinical behaviour change with reasonably predictable outcomes, a number of KT models have been developed to address the multiple and interrelated contextual interests, infrastructures, and procedures that are implicated in the adaptation of research to local health care practices [5, 6]. Common to many of these models is attention to identifying, describing, and assessing the practice environment and its influences, which can facilitate and/or impede the process of research transfer and use [6-9]. Other commonalities among the KT models are monitoring the progress of the transfer effort, and evaluating the actual use of the evidence-based innovation and its impact on outcomes of interest [2, 6, 9].

Notwithstanding these significant strengths, many of the existing KT models suffer from particular oversights. First, while they assert an interconnection between the elements of the process of research utilization, most commonly there is no theory embedded within the models to

explicate how these elements are interconnected, nor how these interconnections facilitate or impede research transfer and use. Despite notable consensus that the use of theory is crucial in the design and evaluation of implementation research [2, 6, 10-12], it is rarely and most often ineffectively used [11]. Critics suggest that theory development and use in the KT literature is a linear and discrete process [10, 11] rendering implementation models ill equipped to furnish understanding of the complex interrelationships between the various elements of the process of research utilization, including power relations, and *how* these interconnections facilitate or impede research transfer and use [2, 13]. A second oversight is that for the most part only quantitative methods are endorsed for the evaluation of the use of the evidence-based innovation and its impact on outcomes of interest [for example see 9]. Pawson and Tilley [14] argue that reliance on 'hard' outcome measures alone in evaluation frameworks does not facilitate understanding of the complexity of organizational systems and the multiple realities of stakeholders. This suggests that there is a need for a pluralist approach to the evaluation of implementation research in order to understand the interactions and complexities involved in KT initiatives [2, 8, 15].

A third oversight of KT models is that where effective translation strategies are identified [16-18] arts-based methodologies are neglected despite their educational potential to foster critical awareness, engage adopters to envision new possibilities, and affect change. Complex social interventions that target cognitive and/or psychosocial behaviour change are particularly difficult [14] because there is considerable leeway for misinterpretation, resistance, or even rejection of the innovation [19]. It is imperative therefore that complex interventions make use of approaches that facilitate critical self-reflection by professionals about how contextual and cultural factors influence and shape their understandings, assumptions, and practices [8, 20]. For

the most part, however, KT strategies do not facilitate this kind of critical reflection; a limitation that is increasingly recognized in the KT literature [20, 21].

In seeking to transcend the above noted oversights without forsaking the existing strengths of KT models, we are advocating the integration of critical realism and arts-based methodologies into KT models that can best inform implementation research in the context of health care settings [12]. Such integration would achieve the following: 1) address the complexities of practice as a meaning-making activity; 2) optimize interventions for local circumstances; 3) target crucial factors in the organizational context that influence behaviour; 4) disseminate evidence in a way that captures the imagination of practitioners and engages them in critical thought; and 5) facilitate the achievement of best practice in health care settings. To illustrate this integration we have chosen the Ottawa Model of Research Use (OMRU, see Figure 1) [9], an adjuvant model [12] that is widely known and utilized [22] to promote the use and application of research in a variety of clinical areas such as neonatal intensive care [23], tertiary hospital care [24], ulcer care [25], and nurse call centres [26]. In order to distinguish our integration of critical realism and arts-based methodologies from the original OMRU, we have named our proposed model Critical Realism and the Arts Research Utilization Model (CRARUM, see Figure 2).

In the discussion that follows we explore the contribution that critical realism makes to program development and program evaluation. Critical realism is a philosophical approach [27, 28], central to which is the ontological claim that there is a dimension of reality that extends beyond observable phenomena, independent of individual perception, that includes deep underlying generative mechanisms that may or may not be triggered depending on circumstance. These mechanisms are real in the sense that they impact human activity, and thus must be

accounted for when seeking to explain social phenomena. The impact of these mechanisms can only be tendential because of human reflexive abilities to resist them or to strategically circumvent them [29]. Thus the effect of generative mechanisms is contingent upon the reflexive deliberations and creativity of social agents. As such, critical realism is a perspective that can illuminate mechanisms embedded in clinical settings and interventions, and facilitate understanding of the outcomes that may or may not result depending on whether and how the mechanisms are triggered, blocked, or modified by structural and agential capabilities. It is a theoretical base that will inform the choice and development of interventions as well as the interpretation of implementation study results. In addition to critical realism, we advocate the use of the arts as a key KT feature to enable tangible and lasting practice change. The arts engage audiences to critically reflect on the extent to which contextual/cultural factors influence and shape their understandings, assumptions, and practices, as well as how these influences facilitate or impede change efforts.

Discussion

Unpacking the Influence of Context: A Critical Realist Approach

Research utilization scholars have identified organizational context and culture as important factors influencing research use [2, 12, 30, 31]. Kitson et al. [32], Estabrooks [33] and Lomas et al. [34] have persuasively argued that changing practice is not just a matter of focusing on the behaviour of individual practitioners but also requires attention to the social, cultural and material context within which practice occurs. Contextual factors that have been identified as promoting the successful implementation of evidence into practice can be grouped under the broad themes of culture [35, 36] and leadership [8, 35, 37]. Culture refers to the basic assumptions, values, and beliefs that are embedded in institutions and organizations [35, 38].

Organizations most conducive to facilitating change are those that are described as 'learning organizations' [35, 39], which refers to an organization's capacity to recognize the value of new knowledge, assimilate it, and then implement it as the basis of decision making. As part of such a context, decentralized decision making, collaboration, teamwork, receptivity to change, and shared goals for improvement are typically valued [8, 35, 36, 38]. Reducing uncertainty that results from inconsistencies in unit management practices, technology-driven routinized work, and the complexity of teamwork have also been identified as necessary precursors to increasing research utilization [30].

McCormack et al. [8] have emphasized the importance of transformational leadership, also referred to as shared partnership and distributed leadership [37], for creating a culture of inclusion that recognizes staff of all levels. Balanced power, shared purposes and goals, shared responsibility for work, and mutual respect are requirements of such shared leadership [37] to effectively alter the prevailing organizational culture and create a context that is more conducive to the integration of evidence and practice.

Clearly contexts can invite or reject innovation, complement or inhibit the activities required for success, and sustain or alter adherence to entrenched practices [37]. While there has been much progress by way of identifying which aspects of context influence innovation adoption in healthcare, much less progress has been made in terms of understanding *how* and *why* contextual contingencies interact in the way that they do, and how their interaction influences KT [30]. This is troubling given the importance of understanding context for facilitating successful implementation. Many conceptual models depict relationships between the various different aspects of context [9, 35, 40] without recourse to theory to facilitate understanding of *why* appearances assume the form they do, and the *underlying factors* of the

complex realities of practice. Even those models that are informed by theory are limited in their capacity to conceptualize causal mechanisms that link structure and agency. There is either bias in favour of structural properties which are said to impinge upon agents so as to condition their actions (see for example organizational theories such as situated-change theory [41], and theories of culture [42]), or alternatively, agency is said to be the driving force behind, and primary characteristic of behaviour, as in the theory of planned behaviour [43] and community of practice theory [44].

Critical realism, with its commitment to elucidating both the structures which constrain and enable activities, and how individuals actions reinforce, challenge or transform structural impingements, offers a promising way to remedy the tendency to either strip agency of structure or structure of agency. Critical realism has effectively been used to evaluate cardiac rehabilitation programmes [45] and diagnostic and treatment delays in breast cancer [46]. It has informed the analysis of the affects of racism on occupational relationships between nurses and doctors and how its effects are mediated by professional ideology [47], the sociopolitics of evidence-based medicine [48], and has informed work in the fields of evaluation (realist evaluation) [14], organizations [49] (see the notion of engaged scholarship) [50], and health promotion [51].

Critical realism furnishes a sophisticated understanding of context. In critical realism, [27, 28] a distinction is made between the *real* (underlying nature and causal powers of objects/agents), the *actual* (what happens if/when those powers are activated), and the *empirical* (what is experienced/observed) [52, 53]. This distinction is central to the ontological conviction of critical realism that there is a reality that is distinct from and greater than the domain of the empirical [27, 28], and that this reality is comprised of structures and mechanisms independent

of our perception. Mechanisms can coincide under real world conditions to produce *emergent properties* contingent in time and space, properties which are irreducible to those of their constituents [52]. The notion of contingency contrasts with positivist notions of universal logical necessity (natural laws, generalizable truths) by highlighting the uncertain nature of phenomena (i.e. that propositions may hold true only under certain circumstances). In the domain of the actual, there are many mechanisms concurrently active where some reinforce one another, and others frustrate the manifestations of each other. In this sense, it can only be said that a certain object *tends* to act or behave in a certain way [54].

Danermark et al. [54] use the example of a match to illustrate the notion of tendency. The object (match) has within it the causal power for fire, but ignition requires this power be triggered by agential mechanisms through the act of striking, as well as by mechanisms of nature including sufficient oxygen, dry conditions, etc. Irrespective of an agent's intent, numerous combinations of mechanisms may influence whether the causal power (fire) will manifest itself in the realm of the empirical. Thus generative mechanisms are real in the sense that they provide the conditions that serve to constrain or enable individuals' actions. For critical realists, explanatory power derives not from counting the co-presence of observable phenomena and inferring causation on the basis of empirical co-occurrence, but from "identifying causal mechanisms and how they work, and discovering if they have been activated and under what conditions" [55, p. 14]. Consequently, context becomes redefined as the interrelationship between real and emergent or possible properties of structures and agents:

> The (local) mix of conditions and events (social agents, objects and interactions) which characterize open systems, and whose unique confluence in time and space selectively activates (triggers, blocks or modifies) causal powers (mechanisms) in a chain of reactions that may result in very different outcomes depending on the dynamic interplay of conditions and mechanisms over time and space [51].

In illuminating these aspects of context, critical realism is a perspective that is equally pertinent to program evaluation. Proponents of critical realist evaluation [56, 57] have argued that the central question is not so much *whether* certain interventions work in a generalizable way, but what *will* work with *these* stakeholders/actors in *this* setting at *this* time. This shifts the focus of evaluation of interventions from a program-based view of what works to causal pathways [48]. Opening the "black box" [58] of implementation is necessary to better understand the nature of the initiative, the need for refinement, and the factors important for replication [59], the capacities of agents [60], as well as their relational expressions or manifestations.

For critical realists, agential capacity is not innate or static, but *relational*. It is activated in the mobilization of various forms of capital: social, cultural, and material/economic [61]. Power is exercised in relation to others who are likely to mobilize stocks of capital and resources in order to promote their own interests. Human action is enabled and constrained by power inequities, but this action, in turn, reproduces or transforms those structures of power [46]. For example, those with more or better knowledge, money, social connections, 'credibility', and stronger social skills often prevail. These stocks of capital are not randomly assigned but tend to follow time-honoured cleavages of race, gender and social class, suggesting that social structures (including institutional practices, policies and regulations, cultural norms) play a role in the production and often (re)production of inequalities amongst social groups. This "indebtedness of agency to structure", as Scambler [62, p. 37] terms it, underscores the dialectical relationship that exists between the two: human action is enabled and constrained by power inequities, but this action, in turn, reproduces or transforms those structures of power [46].

Power relations may be ubiquitous, but they manifest in different ways in different settings, in part because other mechanisms are also at play which may be local manifestations of

much broader processes (e.g. gender and race relations, management-labour relations). Contemporary neoliberal 'logics' of management practice (concerned primarily with profitability, cost reduction, cost-per case efficiency, and standardization) must figure prominently in any such discussion. This kind of managerialism [63] seeks to parse healthcare into discrete tasks that can be measured easily with written standards pertaining to how much time can be spent on a given task and how it should be done [64]. The measure of care lies with the physical task rather than the quality of human interaction and, as a consequence, the relationship between the care provider and recipient is not always quintessentially one of caring unless those most closely involved make a point of making it so [65].

Thus interventions aimed for example at 'humanizing' care must acknowledge that such interventions intersect powerfully with other dynamics (decision latitude, service delivery trends, atomization of the nuclear family leading to loss of proximal family members, etc.) in ways that, by virtue of the underlying causal powers at play, have the ability to either enhance or undermine change initiatives. Critical realism proffers a view of evidence-based practice that concentrates on an elaboration of mechanisms and the logic of causation rather than a program-based view of what works in terms of research-manipulated interventions and independent outcome measures. It is an approach to implementation evaluation (also referred to as formative evaluation) [59] that, when combined with outcomes evaluation, creates a powerful "hybrid style approach for implementation research" [59, p. S2] which provides a clearer direction for action because the decision maker not only has knowledge of the outcomes but also of what produced the observed outcomes (or their lack).

Recovering Agency: An Agenda for Active Engagement

More is at stake here than an exhortation to be mindful of context as a kind of general backdrop for interventions. In seeking to understand how mechanisms play out in a particular setting, with particular agents, at a specific time, we must also take account of how reflexive agents perceive, negotiate, unwittingly reinforce or selectively resist the effects of these broader trends and influences in the context of their own life biographies, socialization, and the micro-social context of peer relations in the workplace. Critical realism is a perspective that deems the creative tactics of individuals to deal with impingements in the social and material contexts of everyday life to be of equal importance to the social structures that furnish such impingements [46]. Deep underlying generative mechanisms do form the basis for structural impingements on human activity, but structural relations of gender, class, and race can for example be actively resisted or reproduced during encounters with the healthcare system by practitioners (or patients) mobilizing their own stocks of capital in particular settings and contexts [46].

Diverse disciplines, practices and literatures have identified the problematic of *engagement* (the need for it, and how to do it) as a central issue for a myriad of professional practices. Taking agency seriously means finding ways to work with practitioners to help them understand their situation, examine their values, identify barriers and opportunities for change, implement solutions, and evaluate the results while never losing sight of the ways in which generative mechanisms operate to constrain and/or enable change in particular settings. This requires a more sophisticated approach to engagement and dialogue that draws in and works with the whole person in his or her 'multiple literacies' [66]. This is where the arts, as a medium for reaching and engaging others, can be particularly powerful.

Staging the Data for Research Transfer

There can be considerable leeway for evidence to be (mis)interpreted, resisted, adapted, and even dismissed by potential adopters [19]. It is therefore imperative that when bringing evidence-based innovations to practice and encouraging their adoption, use is made of approaches that facilitate interpretation by engaging potential adopters as beings capable of reflecting critically on their own assumptions, and on the relationship between their practice and its context [15]. KT strategies have ranged, for the most part, from passive unplanned efforts (diffusion, e.g. publication of research findings), to targeting and tailoring the evidence and the message for a particular audience (dissemination, e.g. direct mailing), to systematic efforts to encourage adoption of the evidence (implementation, e.g. use of incentives and sanctions) [67]. There is evidence to suggest that interactive educational interventions such as workshops can result in significant changes in professional practice [17]. The arts, however, have been neglected as a KT strategy that has enormous interactive, emancipatory and educational potential; an omission that our model, CRARUM specifically addresses.

Literature and theatrical performance are increasingly being used as a means to humanize medical education [68]. Shapiro and Hunt [69, p. 923] contend that live theatrical performances contribute significantly to medical education because they have "a uniquely compelling emotional quality, making it difficult to avoid or intellectualize the struggles and suffering portrayed". A growing number of health researchers are turning to theatrical performance as an innovative approach to extending research findings beyond the discipline in which they were generated and thereby making research more accessible and relevant in health care settings [70-73]. Research-based productions about schizophrenia [74], substance abuse [75], breast cancer [70], prostate cancer [76], ovarian cancer [69], AIDS [69], Alzheimer disease [71], and traumatic

brain injury [77] are some examples. Dramatic performance is particularly effective in engaging the imagination and fostering sympathy because it privileges the phenomenological complexity of life and thus has the advantage of drawing the observer into a particular social and cultural world with all its textures, sounds, gestures, and movements [71]. In contrast to textualism, which flattens out "the flux of human relationships, the ways meanings are created intersubjectively as well as intertextually, embodied in gestures as well as in words…" [78, p. 188], performance privileges lived experience.

Dramatic performances have been successful in helping practitioners and medical trainees reflect on the care they provide and increase their understanding of patient care issues [69, 76, 79]. For example, in post-performance evaluations of *No Big Deal?* [76], a production based upon a study about the experiences of men with prostate cancer and their spouses, physicians, nurses, and allied health professionals indicated that attending the performance resulted in a new level of awareness or understanding of how patients are affected by cancer diagnosis and treatment. Post-performance evaluations of a research-based drama about personhood in Alzheimer's disease [80] found experienced nursing and allied health professionals acquired a new level of understanding of the expressiveness of persons with cognitive impairment. Deloney and Graham [81] have similarly validated the use of drama as an effective method to provide training about end-of-life issues and doctor-patient communication. These evaluations support the effectiveness of research-based drama as a KT strategy with the potential to positively impact practice.

Improvisational theatre developed out of the political-theatrical mandate of Augusto Boal, a Brazilian theater director, writer, and theorist, is an important form of drama that is influencing the way social and health scientists are incorporating drama into their research [82].

Boal's Forum Theatre is a method of teaching people who are not actors how to recognize oppression in their lives and how to possibly transform the conditions that create their oppression. The theatrical goal is to engage those who are disempowered and to create ways to liberate the disenfranchised [83]. A short play is performed for an audience, followed by an identical presentation in which audience members are encouraged to stop the performance and physically replace the main character when they feel inspired to enact an alternative approach that they feel might result in a more favourable outcome [84]. Forum Theatre is highly interactive, imaginative, and its self-empowering processes of dialogue help foster critical thinking about the lived reality of the participants, the root causes of the situation, solutions to these problems, and change. The collaborative process is intended to address the need for participants to step outside "the apparently solid 'matrix' of 'this time in this place' and collectively de-codify the 'myth of fixed reality' – engendering hope for transformation" [84, p. 642]. Attitudes, beliefs, conflicts, failures, successes, and aspirations are shared, and emerging from this process is a vision of how things could be different [82]. Mienczakowski [82], for example, has used elements of Boal's Forum Theatre techniques in ethnographic performance projects about schizophrenia and persons who are alcohol dependent. His use of these techniques was intended to provide emancipatory opportunities and insights for both health professionals and health consumers [82].

By offering the potential to foster critical awareness, to facilitate understanding, and nurture sympathy, arts-based approaches are well positioned to strengthen initiatives that seek to transform health care. In a recent review of the literature on the use of research-based drama for KT [85], a number of areas for further exploration have been identified: 1) little is known about *the extent* to which drama impacts health audiences, *why* it has the impact that it does, and

whether and how this impact leads to real world application; 2) distinguishing the aesthetic qualities of the performance from its content has not yet been done and this too would lead to a better understanding of the particularities of drama that work so well as a KT strategy; and 3) because the most common methods employed in evaluation studies have been unstructured feedback (e.g. reflective journals from students and informal discussions), and self-report questionnaires, qualitative methods are recommended to generate a rich data set for understanding how research-based drama operates as a KT strategy.

Moving from Theory to Practice

How would CRARUM help to guide users in successfully implementing evidence into health care settings? Following the logic of critical realism, as a necessary first step, qualitative and quantitative methods of data collection can serve to identify causal generative mechanisms to care provision within the targeted site for practice change. These data can inform an understanding of current practice of individual practitioners, contradictions between what is espoused about practice and the reality of practice, and existing barriers to effective practice. These data elucidate the social, cultural and material conditions under which practice occurs enabling the intervention to be introduced in a manner that is relevant and meaningful to health care practitioners within their care setting. For example, understanding the context of long-term care would be critical when implementing an educational intervention for front-line dementia care practitioners about a person-centred approach to care. Theorizing the dynamic interrelationship between individual agency, organizational rules and regulations, and the larger health care restructuring agenda can facilitate the tailoring of the intervention such that its relevance, feasibility and success are maximized.

Practitioners might feel constrained in their ability to treat patients as whole persons and experience "emotional dissonance" [86] as a consequence of what they are not able to provide their care recipients. Other practitioners may evade organizational rules in order to deliver prescribed care in accordance with the care philosophy and approach that administrators mandate. Understanding how administrators and practitioners negotiate the potential paradox of front-line staff being mandated to provide person-centred care despite organizational rules and regulations that constrain their ability to do so would further inform the development of adoption strategies for facilitating practitioners' use of the new approach to care into practice. Moreover, because organizational hierarchies can limit practice change [20, 87], engaging administrators in the development of adoption strategies can increase the likelihood of successful implementation.

Critical realism can generate insights about context that can inform the effective aligning interventions with the social environments in which change efforts are undertaken. However, tailoring interventions to better fit local settings alone is insufficient to achieve optimal care settings. The arts provide an innovative approach to the challenge of engaging practitioners to imagine new possibilities for more humanistic care giving practices by helping practitioners to see the humanity of their care recipients [80]. The use of drama can raise critical awareness of taken-for-granted assumptions about standard care practices, and effect change through reflection on the nexus of personal assumptions, staff behaviour, and organizational policy [88]. In so doing, it can facilitate the development and implementation of an agenda for change that derives from the critical awareness of stakeholders themselves [15].

Critical realist evaluation of the intervention takes into account both the process and context of change. This entails an exploration of outcomes (e.g. non-pharmacological approach to behavioural management in dementia care) but also the conditions that were present to enable

those outcomes (e.g. administration support for person-centred care). Qualitative and quantitative data collection can inform understanding of what happened/did not happen within the study relative to the intervention, and what factors in the setting influenced the observed degree of adoption of the approach to person-centred care. Thus, in addition to answering whether the intervention works, critical realist evaluation facilitates understanding of why it worked, for whom, and in what circumstances.

Summary

KT, which is central to evidence-based medicine, has been identified as the most important contemporary initiative committed to reshaping biomedical reasoning and practice [3]. While the move to establish scientific research as a fundamental ground of medical decision making has had an enthusiastic reception, it has also generated considerable debate [3, 48, 89]. Critics have focused on the separation that evidence-based medicine creates between research and practice-based settings and the one-way linear model of the relationship between the two that is characteristic of evidence-based medicine [48]. Indeed, built into the evidence-based movement is the assumption that the clinician can take guidelines and translate them into the 'messy' realities of clinical engagement [48]. It is our contention that KT initiatives that neglect the settings for practice change can undermine successful uptake, prediction about both what will work best in a given context, and understanding about how interventions work. Another limitation of KT initiatives is their neglect of methods to engage potential adopters of the innovation in critical reflection about practice, the relevance and meaning of innovation in the context of their practice, and, the identification of strategies for bringing about meaningful change in practice settings.

Given the inescapably interpretive dimension of evidence [19], and the complexity of health care settings [90, 91] we advance the KT model, CRARUM, which we argue overcomes limitations of other KT models. In its emphasis on arts-based methodologies, CRARUM underscores the importance of engaging potential adopters as beings capable of reflecting critically on their own assumptions, and on the relationship between their practice and its context. Central to this critical reflection amongst practitioners is an examination of the relevance and feasibility of the evidence-based innovation in relation to other political, strategic, contextual, and stakeholder considerations. We have embedded critical realism in the model to shed light on the structures, powers, generative mechanisms and tendencies that characterize clinical settings. We have argued that these data will not only help successfully embed interventions in settings, thereby ensuring greater impact and sustainability, but also generate understanding of how and why interventions work (or fail) in a particular setting including the actual degree of adoption, and the extent to which the adoption occurred as intended [59].

Given the ascendancy of KT, CRARUM has the potential to make an important contribution to implementation research. Clegg [48] makes a compelling argument for critical realism, with its underlying themes of critique and emancipation, in that it offers a distinctive approach to the debate about evidence-based practice. We go a step further by combining critical realism and arts-based methodologies in a way that enables agency to take centre stage and to reclaim KT for critique and emancipation.

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

PK and BP developed the CRARUM model. PK is the lead author and co-ordinator of the paper. BP was involved in drafting the manuscript and revising it for inclusion of critically important intellectual content. Both PK and BP read and approved the final draft of the manuscript.

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Figure 1

Figure 1: The Ottawa Model of Research Use (OMRU)

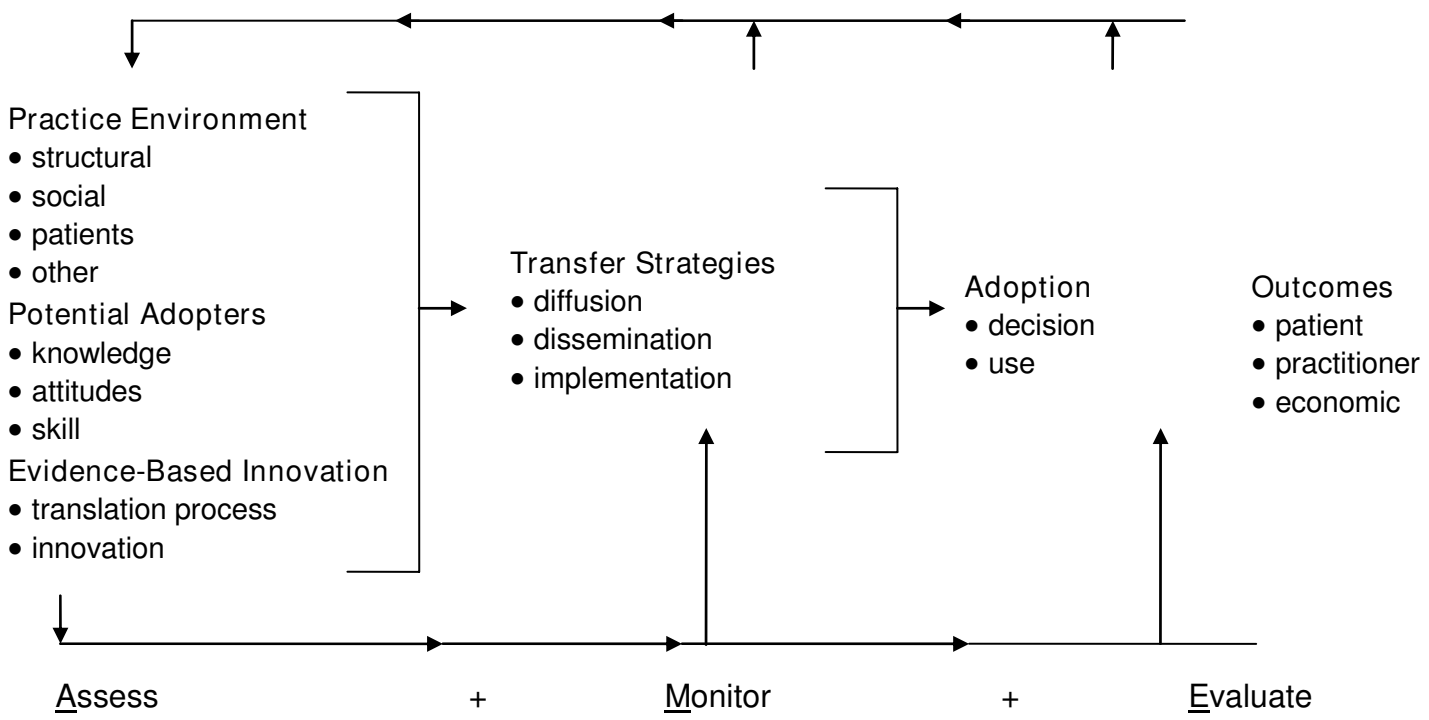

Figure 2

Figure 2: Critical Realism & the Arts Research Utilization Model (CRARUM)