A scoping review of the use of theory in studies of knowledge translation

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Abstract

Background. Advancing the science of knowledge translation (KT) in occupational therapy is critical. Explicit application of theory can advance this science; yet, how theory is applied and the degree to which it can guide research remain poorly defined. Purpose. To understand how theory is applied within KT research. Methods. A scoping review was conducted to examine and summarize the extent, range, and nature of the application of three specific KT theories: Diffusion of Innovations, Promoting Action on Research Implementation in Health Services framework, and Theory of Planned Behaviour. Findings. Theory use was seen most frequently in medicine and nursing. Only 3 of 90 articles were in rehabilitation. Five approaches to theory application were found, the most common being the use of theory to predict success of KT (57/90). Implications. In-depth study of the importance and methods of theory application in KT research is needed, in particular in occupational therapy.

Résumé

Advancing a research science requires the application of theory (Blesedell Crepeau, Cohn, & Boyt Schell, 2003). Developing hypotheses based on theory enhances understanding of the constructs under study and their relationships (Krefting, 1985). An understanding of these relationships allows interpretation of study results beyond the one study. As well, these relationships help differentiate the underlying construct that may have changed as a result of an intervention (Eccles, Grimshaw, Walker, Johnston, & Pitts, 2005a). While the overarching value of theory is rarely questioned, the methods of theory application and the degree to which theory is integrated into research are less than exact (Rycroft-Malone, 2007). A greater understanding of effective methods of theory application might assist in optimizing theory application in occupational therapy research.

Knowledge Translation and Theory

Knowledge translation (KT) is defined as “the exchange, synthesis and ethically-sound application of knowledge - within a complex system of interactions among researchers and users - to accelerate the capture of the benefits of research for Canadians through improved health, more effective services and products, and a strengthened health care system” (Canadian Institutes of Health Research [CIHR], 2008, p. 1). KT encompasses the activities involved in closing the gap between research and practice (Law & Baum, 1998). Studying optimum strategies or interventions to close this gap is the science of KT (Graham & Tetroe, 2007). The intent of this area of study is to determine best practice strategies that will facilitate the transfer of knowledge in a two-way exchange between the individual providing the knowledge and the individual receiving the knowledge (Law, Missiuna, & Pollock, 2008). Strategies include, but are not limited to, audit and feedback, local opinion leaders, educational materials, and conferences (Grimshaw et al., 2001).

Despite the significant attention that KT has received in the literature, the field has not advanced in identifying effective strategies (Grimshaw et al., 2004). The increased application of theory within KT research is a potential solution to this limited advancement (Eccles et al., 2005a). Several reviews have highlighted the limited use of theory to guide studies of KT (Davies, Walker, & Grimshaw, 2003; Grimshaw et al.), with one recent study indicating that only 6% of studies explicitly used theory to guide development of KT strategies (Davies, Walker, & Grimshaw, 2010).

The paucity of the use of theory is surprising given the number of KT theories developed (Sudsawad, 2007). Hundreds of theories exist across a broad range of paradigms including organizational theory, learning theory, and social cognitive theory (Grol, 1997). Contexts also range from the client perspective (e.g., increasing client use of assistive devices) to the clinician perspective (e.g., how to increase clinician use of standardized measures in OT practice) to organizational, educational, and policy perspectives (Grol). The abundance of KT theories and the multitude of factors that must be considered in KT research make theory application more difficult (Sudsawad). Increasing theory application will require an increase in knowledge of theories as well as best practices for applying them within KT research.

Knowledge Translation in Occupational Therapy

KT is viewed as an essential competency for occupational therapy (Law et al., 2008). Occupational therapists engage in KT in order to broaden their understanding of the relationship between research and practice but, also, to ensure that an occupational therapy-oriented approach to KT is developed (Lencucha, Kothari, & Rouse, 2007).

When considering KT in occupational therapy practice, it is helpful to understand the relationship between KT and evidence-based practice (EBP). EBP in occupational therapy involves bringing “research evidence together with clinical knowledge and reasoning to make decisions about interventions that are effective for specific clients” (Law & Baum, 1998, p. 131). KT is a more overarching term that includes components of EBP but also includes any of the tasks that might bridge the gap between what we know and how we use that knowledge to improve care (Law et al., 2008). These tasks may include how we educate our clients or how we make the necessary changes in practice to utilize a new intervention.

KT is in its infancy in rehabilitation (Sudsawad, 2007). In a review of rehabilitation studies that evaluated KT strategies, Sudsawad found only five original KT studies in rehabilitation, indicating that few conclusions could be drawn based on the results. None of these studies investigated occupational therapy exclusively although two investigated the use of multidisciplinary stroke guidelines as a KT strategy that included occupational therapists. Only one of these studies explicitly used theory to guide the study: theory guided both content of a workshop and methods to implement change strategies (Pennington et al., 2005).

While awareness of the importance of KT is emerging, the evidence base and the practice of KT in occupational therapy requires attention to how theory and its application can support this development. For this reason, we conducted a descriptive review examining how three theories used in KT are applied within a broader spectrum of health research. A scoping review is appropriate for this purpose because it allows reviewers to describe the extent, range, and nature of a field of study (Arksey & O’Malley, 2005). An enriched understanding of how other disciplines use these theories to advance KT will provide a foundation on which to debate and determine theory application in occupational therapy.

Purpose

The purpose of this paper is to (1) facilitate understanding of KT theory in general by describing three theories used in KT and (2) facilitate understanding of their application by reviewing how these theories have been applied in KT research.

The Theories

Three theories were selected for this review: Diffusion of Innovations (Rogers, 2003), the Promoting Action on Research Implementation in Health Services framework (Kitson, Harvey, & McCormack, 1998) and the Theory of Planned Behavior (Ajzen, 1991). Given the wide array of theory in KT and the...
scoping review method, it was important to review the application of a range of different types of theory. It was also pragmatic to focus on those most likely to have sufficient studies upon which to draw findings. The specific theories were chosen based on the presence of a well-defined empirical basis to the theory and their prevalence in the KT literature.

The Diffusions of Innovations was first published in 1962 and arose in a non-health related field. It was selected for its longevity and widespread acceptance in KT research (Estabrooks, Thompson, Lovely, & Hofmeyer, 2006). The Promoting Action on Research Implementation in Health Services framework is a theory of research utilization, has a strong health care practice context, and was developed in nursing. This theory focuses on the organizational context of research utilization. The Theory of Planned Behaviour is a cognitive behavioural theory focusing on behaviour change at the individual level; it has been applied in KT studies because KT is a form of human behaviour (Eccles et al., 2005a).

In the following section, we provide an overview of each theory (see Figures 1, 2, 3) in order to (1) describe the major components of each theory and (2) facilitate understanding of the scoping review results. Further detail on each theory can be found in other sources (Eccles et al., 2005a; Kitson et al., 2008; Rogers, 2003).

**Diffusion of Innovations (DOI)**

The DOI (Rogers, 2003) was first developed in the 1940’s in the field of agriculture as a theory that explains how a new idea is spread (Rogers, 1962). “Diffusion is the process through which an innovation, defined as an idea perceived as new, spreads via certain communication channels over time among members of a social system” (Rogers, 2003, p. 5).

Time, communication channels, social systems, and the innovation itself are all important elements of this theory. The key aspects of this theory describe the process of diffusion as well as the human and nonhuman factors that contribute to this process. The stages of the innovation-decision process are as follows: knowledge (learning of the existence of an innovation); persuasion (an opinion is formed of the innovation); decision (activities are undertaken that lead to a choice of whether to adopt the innovation); implementation (the innovation is put into use); and confirmation (activities are undertaken to confirm the decision about using the innovation).

DOI theory presents a list of factors that are used to examine the likelihood that an innovation will be spread and adopted. These factors are observability (how visible using the innovation is); relative advantage (how much better the new idea is compared to the old); compatibility (the degree to which the innovation is consistent with the person’s values, needs, and past experiences); trialability (how easy it is to try the innovation); and complexity (perceptions of how easy or difficult it will be to try the innovation).

Finally, the DOI identifies personality characteristics associated with the likelihood that an individual will adopt an innovation. Innovators adopt an innovation first, followed by early adopters, early majority adopters, late majority adopters, and, finally, laggards.

**Figure 1. Diffusion of Innovations. Reprinted with permission.**

**Promoting Action on Research Implementation in Health Services (PARiHS) Framework**

Initially developed in 1998 (Kitson, Harvey, & McCormack, 1998), the PARiHS framework was based on assumptions that most KT theories were too linear and not sufficiently focused on the context in which KT is taking place (Rycroft-Malone et al., 2004). The PARiHS framework posits that simultaneous and equal interplay between three elements (evidence, context, and facilitation) indicates the likelihood of success in research implementation. Utilizing the theory requires a determination of each of the three elements on a continuum from high likelihood of success to low likelihood of success. Consideration is given to the type of evidence, the qualities of the context in which the evidence is being integrated, and the ways in which the process is facilitated. Descriptions are provided to assess the level on the continuum. For example, one could have a situation of high evidence (high likelihood of success), high context (high likelihood), and low facilitation (low likelihood). Framing the context in this way can provide guidance about how best to proceed to increase utilization of the evidence. The PARiHS framework defines success for KT as increased use of research in practice.

Although this theory continues to be refined and validated, it has a strong base of development to date and can be readily applied within clinical contexts. Recently, Kitson and colleagues (2008) proposed that evidence and context must be evaluated before assessing the facilitation element of the theory.

**Theory of Planned Behaviour (TPB)**

The TPB is a social cognitive theory originating in the field of social psychology (Ajzen, 1991). The theory is predictive of human behaviour change (Ajzen) and is one of the most widely used theories for this purpose (Hardeman et al., 2002). The TPB is an extension of the Theory of Reasoned Action (Fishbein & Ajzen, 1975) and proposes that the likelihood of a person changing behaviour is directly related to the strength of his or her intention to change (Ajzen). Intention strength is determined by three variables: attitude, subjective norms, and...
they wish to gain approval from these people or groups. Perceived behavioural control is a function of how easy or difficult people believe that the change is going to be and how much control they have over these issues. A robust procedure has been described for developing a questionnaire to measure the constructs outlined in this theory within a health care context (Francis et al., 2004).

The TPB has a strong empirical basis for its development and its usage is rapidly growing in KT studies (Eccles et al., 2005a).

**Methods**

A scoping review is an effective method to map a field of study, and this approach was used to guide this study (Arksey & O’Malley, 2005). The steps of this method are identifying the research question; identifying relevant studies; study selection; charting the data; collating, summarizing, and reporting the results. In contrast to a systematic review, which assesses quality as a basis for study inclusion, a scoping review summarizes all of the literature within a defined set, regardless of quality, in order to examine the range of studies that exist (Arksey & O’Malley).

**Identifying the Research Question**

The specific scoping review question is “What are the extent, range, and nature of how three theories are presently being applied in research that investigates changing service provider behaviour in health care?”
Identifying Relevant Studies and Study Selection

The search strategy included articles found in CINAHL, MEDLINE, and EMBASE from 1996 to September 2008 that explicitly utilized one of the three theories in a KT context. The year 1996 was chosen as the start date due to the prevalence of KT publications since that time (Rycroft-Malone, 2007).

The review was on articles that explicitly used one of the theories of interest and hence, the specific theory names were the primary search terms. Searching by theory name was effective for the PARiHS framework and TPB but yielded too many articles for the DOI (2,130 articles). The term “diffusion of innovations” is a subject heading and locates articles that pertain to diffusing innovations that have not employed the DOI theory. The search terms “theory” and “models” were added to narrow the search for DOI articles.

Inclusion criteria.

While the primary interest was informing rehabilitation practice, it was expected that there would be insufficient studies specific to this area were expected. Thus, the review included a broader health care focus including core disciplines of rehabilitation, nursing, and medicine. All study designs and review articles were included. The key criterion was explicit application of one of the theories.

Exclusion criteria.

Articles were excluded if the theory had been altered from its original form or if the article was validating the theory. Articles that recommended the theory but did not apply the theory were excluded. Articles heavily focused on organizational influences were also excluded as the three databases used would not have provided a thorough review of organizational literature and context.

Charting the Data and Collating, Summarizing, and Reporting the Results

All selected articles were reviewed using a data-charting form developed by the first author. To determine the extent and range of use, study tracking included the number of articles that used the theory explicitly, counts for the different health fields involved in each article, and descriptive examples of the target behaviour change or innovation.

To determine the nature of theory use, a descriptive analytical method was utilized to develop a summary description of the application of each theory (as described by Arsky & O’Malley, 2005). Categories of theory use have been described (Rycroft-Malone, 2007) but not empirically validated. The intent of the process used in this review was to analyze articles without an a priori structure. Each article was reviewed, and the nature of how the theory was applied was given a description and a related category by the first author. As each article was reviewed, a determination was made about whether the application of theory fit into an existing category or if a new category was required. This was an iterative process, similar to coding in qualitative analysis, in which the various ways in which the applications could be summarized were reviewed and reorganized until a meaningful summary was achieved.

Not all reviewed articles could be described in the findings section or included in the reference list. In order to illustrate each category in the findings section, key articles that were representative examples of the category were described. A full list of references is available from the first author.

Findings

Extent of Theory Application

Searching DOI articles yielded 2,130 studies. This number was reduced to 77 once the additional search terms (theory, model) were employed. After review of the articles and application of the exclusion criteria, 27 were retained. The majority of articles that were excluded did not describe application of the theory explicitly.

Searching PARiHS framework articles yielded 21 studies. Eight studies that focused only on validity testing of the theory were excluded, and one study was excluded for lack of explicit theory application. Twelve articles were included in the scoping review.

Searching TPB articles yielded 339 studies. Of these, 225 were excluded as they investigated change in the health behaviour of patients, not of service providers. After review of the remaining 114 articles and application of the exclusion criteria, 51 were included in the scoping review. The majority of articles excluded were from disciplines other than medicine, nursing, or rehabilitation, for example, dentistry, pharmacy.

Range of Theory Application

Table 1 provides a summary of the different health fields that were the focus of each article in the scoping review. All three theories were used predominantly in medicine and nursing with few articles in occupational therapy or rehabilitation (3/90, or about 3%). In DOI articles, the innovations to be adopted ranged from general innovations, such as promoting research utilization, to more specific innovations, such as use of the Assessment of Motor and Process Skills (AMPS) in occupational therapy. The range of behaviours in PARiHS framework articles was much more limited, with most of the articles relating to improving evidence-based practice or research utilization. The range of

Table 1
Health Fields for Each Article

<table>
<thead>
<tr>
<th>Health field</th>
<th>DOI</th>
<th>PARiHS</th>
<th>TPB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine</td>
<td>10</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Nursing</td>
<td>9</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>Multidisciplinary*</td>
<td>6</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Rehabilitation†</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Social work</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

* Includes more than 1 health care discipline and if article stated it was multidisciplinary without clearly defining exact health fields (may include rehabilitation but not exclusively rehabilitation)
† Includes one or more rehabilitation professional (occupational therapy, speech language pathology, acquired brain injury rehabilitation professionals)
behaviours investigated in TPB articles was broad, ranging from intention to refer patients for spinal x-ray, screen for depression after a stroke, and recommend assistive devices.

**Nature of Theory Application**
Analyses indicated that the ways in which these three theories were applied within KT research articles clustered into five categories: a general philosophical framework for the article; a guide to the types of educational KT strategies selected; a way of identifying variables for correlation or prediction; a way of identifying variables to measure the effect of a KT strategy; or a guide to qualitative study design and/or analysis. Each category is described, the total number of articles within that category is reported, and representative examples are provided (see Table 2).

**General Philosophical Framework for the Article**
Articles in this category (n=11) used constructs from the theory to frame an aspect of the article, but the theoretical constructs did not specifically guide the study question, design, methods, or analysis. These articles typically discussed the theory in the introduction, discussion or both. Articles in this category used DOI and the PARiHS framework.

As an example, Pugh, Foreman, and Berlowitz (2006) examined the results of their article, which indicated poor adoption of recommendations for antiepileptic drug treatment, through a DOI “lens” (Pugh et al., p. 868). In their discussion, they presented possible factors, based on DOI concepts, that could explain their results. While these factors were speculative, they provided an opportunity to suggest future research directions. Half of the articles that applied the PARiHS framework (6/12) used the framework dimensions (evidence, context, facilitation) to structure presentation of a literature review focused on using research in practice (Milner, Estabrooks, & Myrick, 2006) or to suggest how one might use the framework as a checklist to develop KT strategies (Larkin et al., 2007).

While these applications of KT theory were not integral to the article, the theories provided a method to structure a complex area or provided a way of discussing study results.

**Guide Development of Educational KT Strategy**
These articles (n=9) all used constructs from the identified theory to develop a KT strategy that was designed to change provider behaviour through education. Most of these articles involved educational initiatives that were workshop-based, but some strategies were developed to occur within ongoing care.

One article used knowledge about the DOI theory to guide an educational initiative to increase research utilization (Pennington et al., 2005). The article compared a workshop on critical appraisal skills to a similar workshop that added teaching about the DOI theory itself in the hopes of increasing research use. Britto, Schoettker, Pandzik, Weiland, and Mandel (2007) developed an educational change package that provided information to improve perceptions of the five characteristics of the innovation (observability, relative advantage, compatibility, trialability, complexity). If perceptions of these characteristics were in favour of behaviour change, for example, a person has been convinced of the relative advantage of changing, adoption is more likely. One article took this idea a step further by identifying which of the five characteristics of the innovation were more correlated to adoption within the specific context and then implementing an educational strategy based on the identified characteristics (Mesters & Meertens, 1999). All of the articles that applied the DOI were descriptive case studies with inconclusive results; it is difficult to determine the effectiveness of the strategy or the value of the theory application.

The PARiHS framework was used to structure a workshop designed to engage staff by considering evidence, context and facilitation and to use discussions to develop an action plan for integrating research into practice (Owen & Milburn, 2001). The workshop encouraged participants to consider best approaches to facilitation and to determine whether the evidence was strong.

The TPB was utilized in much the same way as the other two theories in this category. Concepts within the theory were used to develop educational initiatives designed to change the beliefs predictive of behaviour change (Hatler et al., 2006; Townsend et al., 2003). If someone is in favour of the behaviour change (attitude), feels social pressure to change (subjective norm), and perceives the change will be relatively easy, then intention to change should be maximized and behaviour change more likely. Townsend and colleagues accomplished this using a multimedia presentation on the benefits of behaviour change (attitude), a research presentation on how the performance of the specific behaviour had doubled in recent years in the target peer group (social norm), and education to enhance the skills needed for behaviour change (PBC).

**Identify Potential Predictor or Mediator**
In these articles (n=57), potential predictors of successful behaviour change were identified based on the theoretical constructs. Examples of predictors included the relative advantage of the innovation (DOI) or the beliefs on social pressure to change (TPB). These articles identified influential constructs that might require greater focus when trying to facilitate behaviour change. This category captured the majority of articles that used DOI and the TPB.

All key components of the DOI were examined to identify potential predictors. Articles aimed at the characteristics of innovators were designed to learn about the attributes of early adopters versus later adopters (Castle, 2001; England, Stewart, & Walker, 2000). The intent of these articles was to understand more about the characteristics of early adopters in order to foster these attributes and potentially encourage adoption. The same approach was used with articles focused on the characteristics of innovations. One article that measured all five of the innovation characteristics across several different innovations found that characteristics correlated differently across contexts (Fox, Rankin, Costie,Parboosingh, & Smith, 1997). This suggests that targeting specific innovation characteristics that have been found to predict behaviour change may be important. Another article using characteristics of an innovation examined why a data warehouse service had not been adopted.
(Schubart & Einbinder, 2000). They found that simply providing existing data at a quicker speed was not enough to create relative advantage. This result provided important information about how to conduct future planning of the data warehouse.

One article that examined the innovation-decision process used an instrument developed to measure the DOI stages through which a person has advanced to adopt a specific innovation (Rodgers, 2000). Interestingly, for some innovations, participants seemed to adopt the innovation without first being persuaded by its value. This suggests that the innovation-decision was not fully supported by study findings.

Of the 51 TPB articles, 39 developed a questionnaire for the purposes of identifying predictors of behaviour change focused on TPB constructs. These articles determined which of the three variables (attitude, subjective norm, PBC) predicted intention to perform a specific behaviour or predicted both intention (or likelihood) and actual behaviour. The articles that included a measure of behaviour were conducted using either a proxy to actual behaviour, like a proposed vignette (n=4), or an attempt to measure actual behaviour (n=12).

Beatty and Beatty (2004) examined the intention/likelihood of anesthesiologists to violate one of three safety precautions. The analyses indicated that subjective norm best correlated to this intention or likelihood, implying that if a program was developed that focused specifically on social pressures, safety violations should decrease. Other similar articles investigated TPB correlates for important behaviours, including intention of health professionals to screen for depression after stroke (Hart & Morris, 2008) and intention of health professionals to wash their hands (Jenner, Watson, Miller, Jones, & Scott, 2002).

**Identify Outcome Measures to Assess Effectiveness of KT Strategy**

In these articles, the constructs in the theory were operationalized as variables to measure the effect or outcome of a KT strategy. Only four articles in the scoping review, all using the TPB, were applied in this capacity.

Cameron, Penney, MacLennan, McLeer, and Walker (2007) used TPB constructs as outcomes to measure the effectiveness of three different types of audit. The intent was to determine which audit approach was more successful at changing the beliefs (attitude, subjective norm, PBC). No statistically significant results were found, but the study design may provide a framework for future studies aimed at behavioural constructs for KT strategies.

Edwards and colleagues (2007) examined the effect of a peer education program that was based on the TPB but also used TPB constructs as outcomes. The peer education program was described as “information giving, small group discussion, and session evaluation” (Edwards et al., p. 1972). TPB outcomes were measured using a survey method.

**Framework for Qualitative Interview/Analysis**

In these articles (n=10), constructs from the theories were used to develop the probing questions that were part of a qualitative interview or were used to provide structure to the coding procedures for analyses.

Colon-Emeric and colleagues (2007) completed a qualitative study examining barriers and facilitators to clinical practice guideline (CPG) use. They then linked their barriers and facilitators to the different stages of the DOI innovation-decision process to determine at which stage each barrier or facilitator should be focused. Ellis, Howard, Larson, and Robertson (2005) used the three PARiHS framework dimensions to structure and report results of qualitative interviews examining the translation of four key evidence-based practices at six hospitals. Rashidian, Eccles, and Russell (2008) used a similar approach with the TPB to learn more about the underlying attitudes and beliefs of physicians about CPGs for prescribing behaviour. In all cases, the theories provided a structure on which to interpret findings, present results, and make suggestions for how behaviour change could be facilitated.

**Discussion**

This review has outlined the extent, range, and nature of application of three theories in KT articles aimed at service provider behaviour in health contexts across the disciplines of rehabilitation, nursing, and medicine. Ninety articles were found in total with 27/90 (30%) using the DOI, 12/90 (13%) using the PARiHS framework, and 51/90 (57%) using the TPB. Few articles in rehabilitation were found. Five different categories for applying the theories were found: (1) a general philosophical framework to the article, (2) a guide to educational KT strategies, (3) to identify variables for correlation or prediction, (4) to identify variables to measure the effect of a KT strategy, and (5) a guide to qualitative study design or analysis.

The three theories used in this review can all be applied in KT research. Consideration of the DOI characteristics of an innovation have been recommended for KT in occupational therapy (Sudsawad, 2005), and many of the other components of the DOI have been recommended in health care in general (Berwick, 2003). A recent review of the PARiHS framework stated that the framework is useful as a theoretical and practical guide to KT research and practice (Kitson et al., 2008). The
framework was developed within a clinical context, potentially easing the application to clinical practice. The TPB has been suggested as the optimum theory for studying the changing of service provider behaviour in health contexts (Eccles et al., 2005a) and may be particularly important for areas of practice in which providers need to make significant changes to behaviour.

The TPB has been applied most frequently (n=51) and in the most uniform way (40/51 TPB articles were designed to identify potential predictors or mediators of behaviour change). The DOI was applied broadly; yet DOI articles were frequently excluded for lack of clarity in application. Since the DOI is perceived by some to represent the gold standard in KT (Estabrooks et al., 2006), researchers might, therefore, use the DOI as a global reference in a study as a basis for including theory in the study even though no specific theory application is planned. The PARiHS framework is a relatively new theory, and this may explain why this theory was utilized the least and when used was predominantly a general guide. Continued refinement of this theory is in progress (Kitson et al., 2008).

All three theories were used predominantly in articles within medicine and nursing, with only 3% of articles addressing rehabilitation and only one article specifically targeting occupational therapists. There is a reason to believe that the rehabilitation context will affect the KT process, but it is unknown how the usefulness of theory would vary across professional contexts. Few studies have addressed whether KT strategies designed using a theoretical approach are superior to those designed pragmatically. Given the limited evidence on the value of theory application and the dearth of KT research in rehabilitation, it is important to ensure that these gaps are addressed in future studies.

Even more specifically, it is important to evaluate if and in which ways occupational therapy theory is compatible with KT theories and frameworks. Could occupational therapy knowledge of environments and environmental theory contribute to what is known about the environments in which KT occurs? Are there parallels between the occupational therapy notion of client-centred practice and the reciprocal nature of KT (exchange between the knowledge creator and user)? A substantial foundation of theory exists to support occupational therapy practice and must be considered within the context of KT theories and frameworks (Lencucha et al., 2007). Lencucha and colleagues suggest that occupational therapy—specific concepts need to be added to existing models of KT, specifically related to client preferences and experiential knowledge.

There is considerable debate in the field of KT regarding the imperative of using theory-derived strategies (Eccles et al., 2005b; Oxman, Fretheim, & Flottorp, 2005). Some believe that an approach based on common sense is preferred and that the value of theory to develop strategies needs to be empirically proven before becoming an expectation in KT studies (Bhattacharyya, Reeves, Garfinkel, & Zwarenstein, 2006; Oxman et al.). While it is a concern that the value of theory in improving KT has not been formally established and yet is widely endorsed, it would seem that there is a need to develop guidelines for how theory can be used to improve KT. Studies that examine both optimal methods and comparative effectiveness of theory application (versus pragmatic KT) are needed.

In terms of the explicit application of theory, this scoping review indicates a broad range in the degree to which theories were integrated into articles. Rycroft-Malone (2007) suggests that theory use can exist on a continuum as long as the relationship to the study question is direct and clear. This scoping review found valuable theory application that was not directly and clearly related to the study question. Applying theories to literature review provided useful structure to areas that are highly complex, and considering study results in relation to existing theory can assist with framing concepts for future study.

With the exception of the PARiHS framework, the predominant use of theory in KT research was on determining the correlates of KT success. Rycroft-Malone (2007) outlines three main uses of theory in knowledge translation: to develop and test a strategy; to identify appropriate variables, outcomes, or measures; and to guide evaluation of the processes involved in KT. Although these three uses were identified by this scoping review, the use of these theories was found to be more highly concentrated on identifying variables and outcomes than on developing and testing strategies.

Other issues in the application of theory include the measurement of theoretical constructs and replication of strategies. The deliberate use of theory to develop KT strategies may be one of the critical components for advancement of this field (Eccles et al., 2005a); yet interventions that are loosely based on theory are difficult to replicate and generalize (Bhattacharyya et al., 2006; Oxman et al., 2005). While some methods for the development of theory-driven KT strategies have been proposed (Eccles et al.; Foy et al., 2007), additional methods are needed.

Theories can yield the development of hypotheses that, when supported through theory testing, can be used to describe, explain, and predict phenomena. In order to use theory application to guide KT research and practice within rehabilitation, theory testing in different rehabilitation contexts is required as well as evaluating optimal fit of different models to rehabilitation contexts.

**Limitations**

This scoping review presents a description of the extent, range, and nature to which three theories have been applied in KT research. It does not address the quality of article designs or whether any of these theories are superior. Although key databases were used, additional databases may have yielded more articles. In order to limit the scope of the review and focus on health professions, articles were excluded; however, some of these articles may have proven valuable in terms of the use of theory. The process of summarizing the articles was iterative, and, although it represents an accurate summary, there are alternate ways of summarizing the articles. Only one person was involved in the article selection and analysis. Having utilized a second opinion for article selection and analysis of theory application would have strengthened results. The method described by Arkesy and O’Malley (2005) was utilized for this review with the exception of the consultation process. This consultation process is designed to gather relevance information from individuals who would use the results of the scop-
ing review and may have yielded helpful information for the discussion and application to rehabilitation. Such consultation could form a next step to further explore the relevance of these theories to KT in rehabilitation.

**Conclusion**

Three diverse but well-established KT theories demonstrated variable penetration in KT articles focusing on behaviour change among health professionals. Rehabilitation has seldom been the context studied. There is a need to define how theory can be used to develop and test KT strategies and the types of theories that apply best within a rehabilitation context. Comparisons between pragmatic and theory-driven approaches are needed to define whether theory improves the impact of KT strategies.

**Key messages**

- Theory is an important and often neglected dimension of knowledge translation study.
- There are many applications of theory within knowledge translation studies.
- Debate and study of the best knowledge translation theories for occupational therapy is required.

**References**


Graham, I. D., & Tetroe, J. (2007). Some theoretical underpinnings of


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