What are we talking about?
D&I terms and models

Borsika Rabin

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A cross-sectional study of the number and frequency of terms used to refer to knowledge translation in a body of health literature in 2006: a Tower of Babel?

K Ann McKibbon1, Cynthia Lokker1, Nancy L Wilczynski1, Donna Ciliska2, Maureen Dobbins2, David A Davis5, R Brian Haynes1, Sharon E Straus2,6

Background: The study of implementing research findings into practice is rapidly growing and has acquired many competing names (e.g., dissemination, uptake, utilization, translation) and contributing disciplines. The use of multiple terms across disciplines pose barriers to communication and progress for applying research findings. We sought to establish an inventory of terms describing this field and how often authors use them in a collection of health literature published in 2006.

Methods: We refer to this field as knowledge translation (KT). Terms describing aspects of KT and their definitions were collected from literature, the internet, reports, textbooks, and contact with experts. We compiled a database of KT and other articles by reading 12 healthcare journals representing multiple disciplines. All articles published in these journals in 2006 were categorized as being KT or not. The KT articles (all KT) were further categorized, if possible, for whether they described KT projects or implementations (KT application articles), or presented the theoretical basis, models, tools, methods, or techniques of KT (KT theory articles). Accuracy was checked using duplicate reading. Custom designed software determined how often KT terms were used in the titles and abstracts of articles categorized as being KT.

Results: A total of 2,603 articles were assessed, and 581 were identified as KT articles. Of these, 201 described KT applications, and 153 included KT theory. Of the 100 KT terms collected, 48 were used by the authors in the titles or abstracts of articles categorized as being KT. For all 581 KT articles, eight terms or term variations used by authors were highly discriminating for separating KT and non-KT articles (p < 0.001): implementation, adoption, quality improvement, dissemination, complex intervention (with multiple endings), implementation (within three words of) research, and complex intervention. More KT terms were associated with KT application articles (n = 13) and KT theory articles (n = 18).

Conclusions: We collected 100 terms describing KT research. Authors used 46 of them in titles and abstracts of KT articles. Of these, approximately half discriminated between KT and non KT articles. Thus, the need for consolidation and consistent use of fewer terms related to KT research is evident.
## Diffusion-Dissemination-Implementation Continuum

<table>
<thead>
<tr>
<th>Diffusion</th>
<th>Dissemination</th>
<th>Implementation</th>
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</table>
| 1. Research diffusion  
...the passive process by which a growing body of information about an intervention, product, or technology is initially absorbed and acted upon by a small body of highly motivated recipients (Lomas, 1993).  
2. Diffusion research  
...centers on the conditions which increase or decrease the likelihood that a new idea, product, or practice will be adopted by members of a given culture (Rogers, 1995). | 1. Research dissemination  
...active process through which the information needs (pull) of target groups working in specific contexts (capacity) are accessed, and information is "tailored" to increase awareness of, acceptance of, and use of the lessons learned from science (Kerner, 2007).  
2. Dissemination research  
...the study of processes and variables that determine and/or influence the adoption of knowledge, interventions or practice by various stakeholders (Lomas, 1997). | 1. Research implementation  
...the utilization of strategies or approaches to introduce or modify evidence-based interventions within specific settings. This involves the identification of and assistance in overcoming barriers to, the application of new knowledge obtained from a disseminated message or program (Lomas, 1993).  
2. Implementation research  
...research that supports the movement of evidence-based interventions and approaches from the experimental, controlled environment into the actual delivery contexts where the programs, tools, and guidelines will be utilized, promoted, and integrated into the existing operational culture (Rubenstein & Pugh, 2006). |
<table>
<thead>
<tr>
<th>Term:</th>
<th>What we do (examples):</th>
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<tbody>
<tr>
<td>Dissemination</td>
<td>• Understand our target audience</td>
</tr>
<tr>
<td></td>
<td>• Package the evidence/intervention</td>
</tr>
<tr>
<td></td>
<td>• Create and use appropriate channels</td>
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<tr>
<td>Dissemination research</td>
<td>• Measure the rate and speed of dissemination</td>
</tr>
<tr>
<td></td>
<td>• Identify who was and wasn’t reached</td>
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<td></td>
<td>• Compare approaches</td>
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<tr>
<td>Implementation</td>
<td>• Support initial uptake and implementation</td>
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<tr>
<td></td>
<td>• Identify and work with local champions</td>
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<td></td>
<td>• Provide technical assistance/training</td>
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<tr>
<td>Implementation research</td>
<td>• Measure the level/degree of implementation</td>
</tr>
<tr>
<td></td>
<td>• Compare strategies</td>
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<td></td>
<td>• Identify barriers</td>
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And in Canada and other parts of the world...

Knowledge-for-Action terms:

• Knowledge translation:

  Knowledge translation denotes “a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge.” Knowledge translation occurs within a complex social system of interactions between researchers and knowledge users and with the purpose of improving population health, providing more effective health services and products, and strengthening the health care system.

• Knowledge transfer, Technology transfer, Knowledge exchange, Knowledge integration, Knowledge utilization, Research utilization

http://www.cihr-irsc.gc.ca/e/29418.html
A few other key terms

#1: Scale up: Expanding the coverage of a successful intervention

#2: Scale-out: Evidence-based interventions are adapted to a new population or delivery system (two main types: system fixed or population fixed).

1 Rabin BA and Brownson RC. Terminology for D&I research in health 2017
2 Aarons et al. Implementation Science 2017 12:111
Quality improvement versus Implementation Science

#1: **Quality improvement** is defined as the concerted and ongoing activities that are undertaken systematically by diverse stakeholders to improve care.

#2: **Shared goal**: improvement of patient health outcomes

#3: **Different** paradigms, methods, starting point, speed of action

#4: **QI**: local level, specific issues, smaller scope, iterative, rapid

#5: **IS**: starts with EBI, generalizability, more developed measures, larger scale, slower

Rabin BA and Brownson RC. Terminology for D&I research in health 2017
INTRODUCTION
Dissemination and implementation (D&I) research is increasingly recognized as an important function of academia and is a growing priority for major health-related funding agencies (e.g., the National Institute of Health [NIH], the Centers for Disease Control and Prevention [CDC], the National Institute on Disability and Rehabilitation Research [NIDRR], the Canadian Institutes of Health Research [CIHR]) and the World Health Organization [WHO]). One challenging aspect of D&I research is the lack of standardized terminology. As noted by Ciliska and colleagues: "closing the gap from knowledge generation to use in decision-making for practice and policy is conceptually and theoretically hampered by diverse terms and inconsistent definitions of terms." A survey conducted by Nature Medicine on how their readers define the term "translational research" found substantial variation in interpretation by respondents. Some definitions were consistent with the NIH definition ("the process of applying ideas, insights and discoveries generated through basic scientific inquiry to the treatment or prevention of human disease"), others believed that only research that leads to direct clinical application should be defined as translational research, and only a small group emphasized the bidirectional nature of the process (i.e., bench to bedside and back). This phenomenon can be partly explained by the relatively new appearance of D&I research on the services research, HIV prevention, school health, mental health, nursing, cancer control, violence prevention, and disability and rehabilitation. Further complexity is injected by the variation in terminology and classification of terms across countries. This book uses the term "dissemination and implementation research" to denote the newly emerging field in the United States; however, other countries and international organizations (e.g., the United Kingdom, Canada, the WHO) commonly use the terms "knowledge translation and integration," "population health intervention research," or "scaling up" to define this area of research. Furthermore, Graham and colleagues identified 29 distinct terms referring to the same aspect of the D&I (or knowledge translation) process when they looked at the terminology used by 33 applied research funding agencies in nine countries. A more recent review by McKibbon and colleagues identified 100 terms alone just to describe knowledge translation or KT research.

Definitions presented in this chapter reflect the terminology used in the most frequently cited manuscripts, reports, websites, and databases on D&I research in health and in funding announcements of major federal funding agencies (e.g., NIH, CDC, NIDRR, CIHR). Identifying terms and definitions, an initial search of the language literature was conducted to identify peer-reviewed manuscripts and documents from government agencies (i.e., gray literature).
Dissemination and Implementation models defined

Theories present a systematic way of understanding events or behaviors by providing inter-related concepts, definitions, and propositions that explain or predict events by specifying relationships among variables. They are abstract, broadly applicable and not content- or topic-specific.

Frameworks are strategic or action-planning models that provide a systematic way to develop, manage, and evaluate interventions.

Models is used to describe theories and frameworks collectively.

Characteristics of strong D&I studies

1. **Significance**: The proposal meets the goal of D&I PAR to improve practice through research
2. **Use of mixed methods**: The proposal utilizes mixed methods (quantitative and qualitative), as encouraged by the PAR.
3. **Sampling strategy and selection criteria**: Regardless of the method, sampling strategies and selection criteria are well-articulated and justified.
4. **Sustainability**: The proposal addresses the sustainability of the project or innovation.
5. **Feasibility and Generalizability**: D&I is concerned with real-world applicability of interventions and innovation. Strong proposals promote interventions that are feasible and practical for real-world settings.
6. **Targeting diverse, underserved and understudied populations and settings.**
7. **Potential for advancing the methods for dissemination and implementation.**
8. **Community Collaboration**: To be relevant to real-world settings, D&I research must foster collaboration with communities and community-based organizations.
9. **Strong Study Teams**: Proposals feature strong, experienced, inter-disciplinary study teams.
10. **Conceptual frameworks**: proposals present relevant and specific frameworks, theories or models to guide their work.

**+2 weaknesses:**

1. The proposal fails to clearly articulate its overall significance, aims, relevance to the field of D&I, or generalizability to broader settings and populations.
2. The proposal fails to adequately articulate its framework, theoretical background and conceptual models.

Content analysis of funded NCI IS grants: [http://cancercontrol.cancer.gov/IS/pdfs/DandI-PAR-Grant-FundedContentAnalysis.pdf](http://cancercontrol.cancer.gov/IS/pdfs/DandI-PAR-Grant-FundedContentAnalysis.pdf)
D&I Models: Significance

What can they do:
• Ensure inclusion of essential D&I strategies

• Enhance the interpretability of study findings

• Provide systematic structure for the development, management, and evaluation of interventions/D&I efforts

Bridging Research and Practice: Models for Dissemination and Implementation Research

Raelene G. Tabak, PhD, Elaine C. Khong, BS, David Chambers, DPhil, and Rose C. Brownson, PhD
Prevention Research Center in St. Louis, Brown School, (Tabak, Khong, Brownson), Division of Public Health Sciences and Alvin J. Blattner Cancer Center, School of Medicine, (Brownson), Washington University in St. Louis, St. Louis, Missouri, National Institute of Mental Health (Chambers), NIH, Bethesda, Maryland

Abstract

Background—The quantity and diversity of conceptual models in translational science may complicate rather than advance the use of theory.

Purpose—This paper offers a comparative thematic analysis of the models available to inform knowledge development, transfer, and utilization.

Method—Literature searches identified 47 models for knowledge translation. Four thematic areas emerged: (1) evidence-based practice and knowledge transformation processes, (2) strategic change in procurement of new knowledge, (3) knowledge exchange and synthesis for application and inquiry, and (4) designing and interpreting dissemination research.

Discussion—This analysis distinguishes the contributions made by leaders and researchers at each phase in the process of discovery, development, and service delivery. It also identifies the selection of models to guide activities in knowledge translation.

Conclusions—A flexible theoretical stance is essential to simultaneously develop new knowledge and accelerate the translation of that knowledge into practice behaviors and programs of care that support optimal patient outcomes.

Keywords

Translational science; evidence-based practice; knowledge translation; dissemination research; theory

A Thematic Analysis of Theoretical Models for Translational Science in Nursing: Mapping the Field

Sandra A. Mitchell, CRNP, PhD, ANOCN®1, Cheryl A. Fisher, RN-BC, EdD1, Clare E. Hastings, RN, PhD, FAAN1, Leanne B. Silverman, BA2, and Gwenyth R Talken, RN, PhD1
Clinical Center, National Institutes of Health, Bethesda, MD

Abstract

Background—Addressing deficiencies in the dissemination and transfer of research-based knowledge into routine clinical practice is high on the policy agenda both in the UK and internationally. However, there is lack of clarity between funding agencies as to what represents dissemination. Moreover, the expectations and guidance provided to researchers vary from one agency to another. Against this background, we performed a systematic scoping to identify and describe any conceptual/theoretical frameworks that could be used by researchers to guide their dissemination activity.

Methods—We searched eleven electronic databases (including MEDLINE, EMBASE, and PsycINFO), the reference lists of included studies and of individual funding agency websites to identify potential studies for inclusion. To be included, papers had to present an explicit framework or plan either designed for use by researchers or that could be used to guide dissemination activity. Papers which mentioned dissemination but did not provide any detail in the context of a wider knowledge translation framework were excluded. References were screened independently by at least two reviewers. Disagreements were resolved by discussion. For each included paper, the source, the date of publication, a description of the main elements of the framework, and whether there was any explicit/flexible reference to theory were extracted. A narrative synthesis was undertaken.

Results—Thirty-three frameworks met our inclusion criteria. 20 of which were designed to be used by researchers to guide their dissemination activities. Twenty-eight included frameworks were undertaken at least in part by one or more of these different theoretical approaches, namely purposive communication, diffusion of innovations theory, and social marketing.

Conclusions—There are currently a number of theoretically informed frameworks available to researchers that can be used to help guide their dissemination planning and activity. Given the current emphasis on enhancing the uptake of knowledge about the effects of interventions into routine practice, funders could consider encouraging researchers to adopt a theoretically informed approach to their research dissemination.
Wealth of existing models for D&I:
- 61 models with research focus (Tabak et al., 2012)
- 25+ models with practitioner/clinician focus (Mitchell at al., 2010)
- 33 models from a UK perspective (Wilson et al. 2010)
Criteria for selecting implementation science theories and frameworks: results from an international survey

Sarah A. Birken1, Byron J. Powell1, Christopher M. Shea1, Emily R. Haines1,2, M. Alexis Kirk1,2, Jennifer Leeman3, Catherine Rohwerder4, Laura Damschroder5 and Justin Presseau6,7,8

Abstract

Background: Theories provide a synthesizing architecture for implementation science. The underuse, superficial use, and misuse of theories pose a substantial scientific challenge for implementation science and may relate to challenges in selecting from the many theories in the field. Implementation scientists may benefit from guidance for a theory for a specific study or project. Understanding how implementation scientists select theories will help inform efforts to develop such guidance. Our objective was to identify which theories implementation scientists use, how they use theories, and the criteria used to select theories.

Methods: We identified initial lists of uses and criteria for selecting implementation theories based on seminal articles and an iterative consensus process. We incorporated these lists into a self-administered survey for completion by self-identified implementation scientists. We recruited potential respondents at the 8th Annual Conference on the Science of Dissemination and Implementation in Health and via several international email lists. We used frequencies and percentages to report results.

Results: Two hundred twenty-three implementation scientists from 12 countries responded to the survey. They reported using more than 100 different theories spanning several disciplines. Respondents reported using theories primarily to identify implementation determinants, inform data collection, enhance conceptual clarity, and guide implementation planning. Of the 19 criteria presented in the survey, the criteria used by the most respondents to select theory included analytic level (58%), logical consistency/plausibility (56%), empirical support (53%), and...
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- 100+ models used by an international sample of colleagues
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- 33 models from a UK perspective (Wilson et al. 2010)
- 100+ models used by an international sample of colleagues
- 150+ KT models in an under review publication
SO WHICH ONE SHOULD I USE?
Diffusion of innovations in service organizations

The innovation
- Relative advantage
- Compatibility
- Low complexity
- Triability
- Observability
- Potential for reinvention
- Fuzzy boundaries
- Risk
- Task issues
- Nature of knowledge required (tacit/explicit)
- Technical support

System antecedents for innovation
- Structure
  - Size/maturity
  - Formalization
  - Differentiation
  - Decentralization
  - Stack resources
- Absorptive capacity for new knowledge
  - Preexisting knowledge/skills base
  - Ability to find, interpret, recodify, and integrate new knowledge
  - Enablement of knowledge sharing via internal and external networks
- Receptive context for change
  - Leadership and vision
  - Good managerial relations
  - Risk-taking climate
  - Clear goals and priorities
  - High-quality data capture

System readiness
- Tension for change
- Innovation-system fit
- Power balances (supporters vs. opponents)
- Assessment of implications
- Dedicated time/resources
- Monitoring and feedback

Adopter
- Needs
- Motivation
- Values and goals
- Skills
- Learning style
- Social networks

Assimilation
- Complex, nonlinear process
- “Soft periphery” elements

Implementation process
- Decision making devoted to frontline teams
- Hands-on approach by leaders and managers
- Human resource issues, especially training
- Dedicated resources
- Internal communication
- External collaboration
- Reinvention/development
- Feedback on progress

Outer context
- Sociopolitical climate and mandates
- Interorganizational norm-setting and networks
- Environmental stability

Resource system
- Linkage

The innovation
- System antecedents
- System readiness
- Adoption/assimilation
- Implementation
- Consequences

Knowledge purveyors
- Change agency
- Diffusion
- Linkage

User system
- System antecedents


Lobb R & Colditz GA. Annual Review of Public Health 2013 34:1, 235-251
Consolidated Framework for Implementation Research

Exploration, Preparation, Implementation, and Sustainment (EPIS) Framework

Aarons, G.A et al. (2011). *Administration and Policy in Mental Health and Mental Health Services Research.* 38, 4-23.
Practical, Robust Implementation and Sustainability Model (PRISM)

Practical, Robust Implementation and Sustainability Model (PRISM)

Cross-cutting features of ‘optimal’ D&I models

• Multi-level
• Contextual
• Intuitive
• Measures are available
• Tested in your context/population/health problem
And a few more considerations on using D&I models...

• No new models please....
• Adaptation of the model might be necessary
• Integrate the models well and throughout
• Sometimes not the whole model is used
<table>
<thead>
<tr>
<th>Table 1</th>
<th>JJ-TRIALS Implementation Strategies Matrix</th>
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<tbody>
<tr>
<td><strong>Strategy Applied for Both Conditions</strong></td>
<td>Study Period</td>
</tr>
<tr>
<td>1. Formation of interagency collaboratives and coalitions</td>
<td>Baseline</td>
</tr>
<tr>
<td>2. Local Needs Assessment and Site Feedback Report</td>
<td>Baseline</td>
</tr>
<tr>
<td>3. Learning collaborative</td>
<td>ALL STUDY PERIODS</td>
</tr>
<tr>
<td>4. Strategic planning</td>
<td>Baseline</td>
</tr>
<tr>
<td>5. Data-driven decision making (DDDM)</td>
<td>ALL STUDY PERIODS</td>
</tr>
<tr>
<td>6. Plan-Do-Study-Act (PDSA)</td>
<td>Experiment, Post-Experiment</td>
</tr>
<tr>
<td><strong>Strategy Applied for Enhanced Condition</strong></td>
<td>Study Period</td>
</tr>
<tr>
<td>7. Local change team</td>
<td>Experiment, Post-Experiment</td>
</tr>
<tr>
<td>8. Implementation facilitator</td>
<td>Experiment</td>
</tr>
<tr>
<td>9. Ongoing training and support</td>
<td>Experiment</td>
</tr>
<tr>
<td>10. Local champion and leadership training</td>
<td>Experiment</td>
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</tbody>
</table>
Fig. 1 JJ-TRIALS linear application of EPIS
This interactive website was designed to help researchers and practitioners to select the D&I Model that best fits their research question or practice problem, adapt the model to the study or practice context, fully integrate the model into the research or practice process, and find existing measurement instruments for the model constructs. The term ‘Models’ is used to refer to both theories and frameworks that enhance dissemination and implementation of evidence-based interventions more likely.

**Select**

Search, view, and select D&I Models

**Adapt**

Read strategies for adapting D&I Models to research or practice context

**Integrate**

Read strategies for incorporating D&I Models into the full spectrum of your project

**Measure constructs**

Find a list of constructs and links to measurement tools associated with the D&I Models

To learn more: www.dissemination-implementation.org
D&I Research Decision Tree

Does an Evidence-Based Intervention or Practice exist?

- There is no EBI/EBP
  - Innovation development and/or safety testing
    - Testing the proof of concept in basic science, product development, phase I and II clinical trials or descriptive studies. Type I research.

- There is an EBI/EBP
  - Efficacy Testing
    - Testing whether the intervention works. Performed under optimal conditions, in a highly controlled setting. Type II research.
  - Effectiveness Research
    - Examining how an efficacious intervention works in a real-world setting in all its variations. Part of type III research.

Is the EBI/EBP applied adequately? (Is there a research-practice gap?)

Dissemination and Implementation Research as Primary Focus

Role of D&I Research

- Limited. Factors related to fidelity and context are controlled, but secondary aims (e.g., acceptability, feasibility, cost) can be incorporated. Also, efficacy of one or more intervention strategies can be evaluated simultaneously to efficacy.

Role of D&I Research

- Moderate. Implementation outcomes can be studied as contributing factors. Implementation outcome aims can be primary or secondary aims, utilizing the hybrid design. A study can also solely examine effectiveness of an implementation strategy.

See Sections 2 for introductory resources that provide an overview of D&I research.

Sources: Peters et al., 2013; Landsverk et al., 2012; Rubin & Brownson, 2012; NCI, 2002.

Note: A given research study may not fit neatly into the above boxes and could stretch across categories, as in the real world the boundaries are less rigid and research is not always uni-directional. The framework is simplified for instructional purposes.

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