Knowledge Synthesis and Integration: Changing Models, Changing Practices

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University of British Columbia

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Canadian Partnership Against Cancer

InSource
~ Research Excellence for Practical Solutions
Overview

• Framing knowledge integration
• Shifting the paradigm
• Building a toolkit
• Moving to action
• Making recommendations
• Becoming a revolutionary
Generations of Knowledge Thinking  
1: Linear Models (1960s-mid 90s)

<table>
<thead>
<tr>
<th>LANGUAGE</th>
<th>KEY ASSUMPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Dissemination</td>
<td>• Knowledge is a product</td>
</tr>
<tr>
<td>• Diffusion</td>
<td>• Key process is a handoff from research producers to research users</td>
</tr>
<tr>
<td>• Knowledge transfer</td>
<td>• Knowledge is generalizable across contexts is a function of effective packaging</td>
</tr>
<tr>
<td>• Knowledge uptake</td>
<td></td>
</tr>
</tbody>
</table>

Best A, Hiatt RA, & Norman CD. *Pat Ed & Counsel*  
2008;71:319-327
Clinical research can be viewed as encountering 2 separate roadblocks on the way toward improving public health. These 2 translational blocks have different factors creating each, but whereas the National Institutes of Health has been consistently targeting the bench-to-bedside block, no one is taking responsibility for the second, which is integrally tied with the funding of the health care delivery system.

Generations of Knowledge Thinking
2: Relationship Models (Mid-90s to present)

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<th>LANGUAGE</th>
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<tr>
<td>Knowledge exchange</td>
<td>Knowledge from multiple sources research, theory, and practice</td>
</tr>
<tr>
<td></td>
<td>Key process is interpersonal, involving social relationships</td>
</tr>
<tr>
<td></td>
<td>Networks of research producers and research consumers</td>
</tr>
<tr>
<td></td>
<td>Collaborate thru production-synthesis-integration cycle</td>
</tr>
<tr>
<td></td>
<td>Knowledge is context-linked, and must be adapted to local setting</td>
</tr>
<tr>
<td></td>
<td>Degree of use is a function of effective relationships and processes</td>
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Circular Models 2 ~ NHS Systems Change

## Generations of Knowledge Thinking
### 3: Systems Models

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<tr>
<td>Knowledge integration</td>
<td>• Knowledge cycle is tightly woven within priorities, culture, and context</td>
</tr>
<tr>
<td>Knowledge translation</td>
<td>• Explicit and tacit knowledge need to be integrated to inform decision making and policy</td>
</tr>
<tr>
<td>Knowledge mobilization</td>
<td>• Relationships mediate throughout the cycle, and must be understood from a systems perspective, in the context of the organization and its strategic processes</td>
</tr>
<tr>
<td>Knowledge exchange and uptake</td>
<td>• Degree of use is a function of effective integration with the organization(s) and its systems</td>
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INITIAL KIQNIC MAP

Network/Quitline Characteristics
- Management style
- Values & goals
- Leadership
- Trust
- Reputation
- Attitudes towards connecting
- Centrality
- Multiplexity
- Density

Local Context & Culture
- Funding
- Stability
- Strength of other networks

Decision-Making
- Intrinsic constraints
- Extrinsic constraints
- Learning style

Knowledge Integration
- Innovation
- New practices
- Dedicated resources
- Readiness for change
- Monitoring & feedback

NAQC
- Communication
- Skill
CAPTURE

Knowledge
- Report/Report Cards
- Graphs/Maps
- Guidelines
- Tools/Costs

Exchange of evidence-based information to yield beneficial outcomes
- Create knowledge products
- Access knowledge products
- Identify and review appropriate information
- Adapt into practice
- Determine indicators of interest
- Identify source, methods, and tools to collect data

Achead actors

Data
- Database
- Registries
- Repository
- Data sets
- Health Indicators
- Quality of life indicators

Systematically monitor, collect, and store data

Action
- Policy
- Programs
- Interventions
- Projects
- Models
## Knowledge Synthesis Framework

<table>
<thead>
<tr>
<th>SYSTEM/ POLICY</th>
<th>TEAM/ ORGANIZATION</th>
<th>INDIVIDUAL</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
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<td>BASIC</td>
<td>CLINICAL</td>
<td>POPULATION</td>
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## Sample Strategies

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<td>• incentives</td>
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<td>• interagency networks</td>
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<td>• report cards</td>
<td>• supportive funding policies</td>
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<tr>
<td>• detailing</td>
<td>• KE platforms linking producers and users</td>
</tr>
<tr>
<td>• office systems</td>
<td></td>
</tr>
<tr>
<td>• active training</td>
<td>• communities of practice/knowledge networks</td>
</tr>
<tr>
<td>• on-demand evidence tools</td>
<td></td>
</tr>
<tr>
<td>• self-monitoring</td>
<td>• user friendly MIS</td>
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<tr>
<td>• follow-up</td>
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| INDIVIDUAL | |
|------------||
| • detailing | |
| • office systems | |
| • active training | |
| • on-demand evidence tools | |
| • self-monitoring | |
| • follow-up | |

| CLINICAL POPULATION | |
|---------------------||
| • user friendly MIS | |

**Clinical Population**

**Individual**

**Team/ Organization**

**System/ Policy**
Seminal Articles

SYSTEMS THINKING

CHANGE THEORY

KNOWLEDGE TO ACTION MODELS
Van De Ven’s Three Lenses

1. Knowledge transfer problem
2. Problem is different theory and practice knowledge
3. Knowledge production problem

“Engaged Scholarship”
## Linking Change Theory to KTA

<table>
<thead>
<tr>
<th>TRANSFER (linear)</th>
<th>EXCHANGE (relationship)</th>
<th>CO-PRODUCTION (systems)</th>
</tr>
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<tbody>
<tr>
<td>Cognitive</td>
<td>Social learning</td>
<td>Complexity</td>
</tr>
<tr>
<td>Educational</td>
<td>Social network and influence</td>
<td>Leadership</td>
</tr>
<tr>
<td>Motivational</td>
<td>Teamwork</td>
<td>Organizational</td>
</tr>
<tr>
<td>Communications</td>
<td></td>
<td>culture, learning and innovation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quality Management</td>
</tr>
<tr>
<td></td>
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<td>and integrated care</td>
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Overview

• Framing knowledge integration
• **Shifting the paradigm**
• Building a toolkit
• Moving to action
• Making recommendations
• Becoming a revolutionary
# A Paradigm Shift

<table>
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<tr>
<th>Reductionism</th>
<th>Complexity Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metaphor is a machine</td>
<td>Metaphor is a living system</td>
</tr>
<tr>
<td>Change by Plan &amp; control. Standardization of parts</td>
<td>Feedback loops and adaptation. Change by Learn &amp; adapt</td>
</tr>
<tr>
<td>Single causative factor</td>
<td>Multiple causal factors interacting</td>
</tr>
<tr>
<td>No connection between micro and macro</td>
<td>Multilevel influence and emergence</td>
</tr>
<tr>
<td>Controlled</td>
<td>Context dependency</td>
</tr>
<tr>
<td>High internal validity</td>
<td>High external validity</td>
</tr>
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</table>
Comparison of Knowledge Types

<table>
<thead>
<tr>
<th>MODE I</th>
<th>MODE II</th>
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<tr>
<td>Focus is knowledge generation</td>
<td>Focus is problem-solving</td>
</tr>
<tr>
<td>Basic to applied research</td>
<td>Learn by doing</td>
</tr>
<tr>
<td>Scientist as expert</td>
<td>Knowledge is co-created and context dependent</td>
</tr>
<tr>
<td>Clear standards of knowledge</td>
<td>Flexible methods &amp; general guidelines for quality</td>
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</table>

Solutions to Complex Problems

- Support individuals / individuals matter
- Match complexity to capacity
- Establish networks and teams
- Set functional goals
- Distribute decision, action, & authority
- Create competition and feedback loops
- Assess effectiveness at various levels

Places to Intervene in a system

“… an invitation to think more broadly about the many ways there might be to get systems to change.” Donella Meadows 1999

- The power to transcend paradigms
- The paradigm that the system arises out of
- The goal of the system
- The power to add, change, evolve, or self-organize system structure
- The rules of the system
- The structure of information flow
- The gain around driving positive feedback loops
- The strength of negative feedback loops
- The length of delays
- The structure of material stocks and flows
- The size of buffers and other stabilizing stocks
- Constants, parameters, numbers
Places to Intervene

- Paradigm
- Goals
- Structure (as a whole)
- Feedback and Delays
- Structural Elements

No. of actions

Increasing difficulty & effectiveness
Overview

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Action Research

WHOLE SYSTEMS METHODS

REFINING METHODS

Concept Mapping → System Dynamics → Network Analysis → Knowledge Integration

Administrative Databases
Surveillance, Info Systems, Report Cards
Systematic reviews
Better Practices Toolbox

STRATEGIC CHANGE

Rapid Learning Systems*

*Etheredge L, Health Affairs 2007 26(2): w107-w118
The Rapid Review Process

- Draft Research Question(s)
- Preliminary Literature Search
- Finalize Research Question(s)
  - Decision Maker, Expert Panel, Reference Group

- Draft Bibliography
- Retrieve Articles
- Finalize Annotated Bibliography
  - Expert Panel

- Synthesize Literature
- Draft Evidence Statements, Model or Framework
- Finalize Evidence Statements, Model or Framework
  - Expert Panel

- Draft Recommendations
- Finalize Recommendations
- Sense-making
  - Decision Maker, Expert Panel, Reference Group
Implications for Partnerships

- Clear common aims
- Trust
- Collaborative leadership
- Sensitivity to power issues
- Membership structure
- Action learning

Best A, & Hall N. *Rapid Review of Interorganizational Partnerships*. InSource, 2006
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CAPTURE
Building trust slide

• From our IOP review and CAPTURE agent-based model, partnership and trust essential prerequisite for integrated systems
• 44 leaders, 5 countries, multiple sectors for 2-day trust building workshop focused on obesity
• Explored the knowledge, attitudes, skills, and character traits necessary to build trust for collaborative action
• Identified key factors, resources, tools, approaches and structures to get to trust
Critical Factors for Trust

- Common ground
- Shared vision, agenda
- Leadership
- Commitment
- Communication
- Accountability
Envisioning CAPTURE

1. Method and tool platform
2. Integrative common framework, logic and language
3. Coordinated, comprehensive strategy
Critical Elements in Integrative Strategy

• Shared vision and goals
• “Servant” leadership
• Well-defined roles, responsibilities, and strategies for work sharing
• Matched resources and capacity building
• Common indicators and evaluation tools
• High-performance coordination, communications, and learning systems/networks/communities
• Approach to linking strategy and policy
Overview

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RECOMMENDATIONS

- **Lens.** Complex problems need systems solutions
- **Methods.** Invest in systems methods and tools
- **Funding.** Structure to support integrated Knowledge-Action-Data platforms
- **Coordination.** Orchestrate multi-level strategy for shaping paradigm, structure and elements
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1. Revolution in academia

• Van de Ven’s “engaged scholarship”
• Gabriele Bammer’s “integration and implementation science”
  – Systems thinking and complexity science
  – Participatory methods
  – Knowledge management, exchange and implementation

www.ecologyandsociety.org/vol10/iss2/art6/
2. Revolution in strategy

• Research a line item competing with patient service

• Transformative versus incremental strategy
3. Revolution in science

- Generalizable versus contextual knowledge
- Behaviour change AND system dynamics
- Clinical versus public health evidence