KT4TT Update

A Publication of the Center on Knowledge Translation for Technology Transfer
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This edition of the Knowledge Translation for Technology Transfer (KT4TT) e-newsletter produced by the Center on Knowledge Translation for Technology Transfer, provides information on where to find tools and techniques for improving communication between the producers and consumers of new knowledge (knowledge translation), for the purpose of applying that knowledge within new products or services (technology transfer).

This newsletter will highlight the activities of the Center for KT4TT, offering cutting edge resources on Knowledge Translation as it relates to successful Technology Transfer.

You are also invited to learn more by visiting our website: http://kt4tt.buffalo.edu/

The KT4TT's Knowledge Base and the Need to Knowledge Model: *An Overview and Compilation of Resources*

Jennifer L. Flagg

The Center on KT4TT recently unveiled a unique new product development model - the Need to Knowledge "NtK" model. The NtK model is designed for use by applied researchers and new product developers who are employing research, development and production methods to bring new and unique technology-based products and services to the marketplace. Importantly, the NtK model recommends beginning all technology-based projects by defining a problem and solution prior to creating new knowledge.

That is, use the *need* (problem) to determine what *knowledge* (solution) should be generated by the project. It suggests that marketplace needs as well as research and development requirements should be formally assessed prior to initiating any project activities. Its stage-gate design then incorporates checks throughout the process to ensure that market potential of the problem's solution is maintained as increasing levels of resources are committed to successive rounds of research, development and production activities.

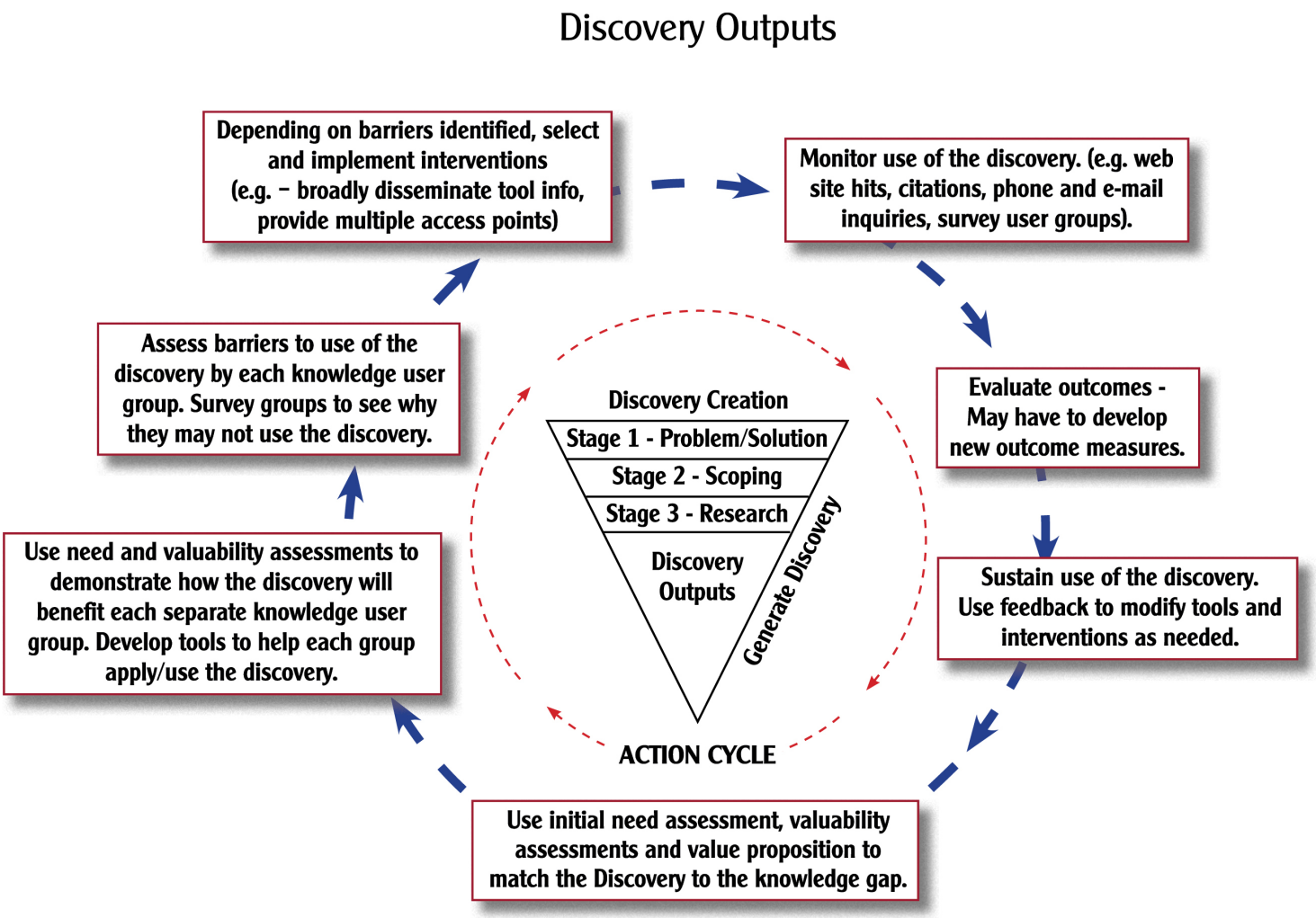
The NtK model is a combination of two models: 1) the Knowledge to Action Model from the Canadian Institutes for Health Research (CIHR), and 2) the New Product Development Model from the Product Development and Management Association (PDMA). It was initially developed by the KT4TT's Knowledge Synthesis Research Project to lay the foundation for a scoping review of literature. A complementary Development Project charged with developing a Knowledge Base and Toolkit for Technology Transfer then utilized that model to meet its

objective by structuring the NtK Model as a framework for a database collecting supporting evidence from academic and industrial literature. The resulting knowledge base combines work from the research and development projects to present the NtK as a stage-gate model. A nested series of levels provides increasing detail on the methods and measures involved in moving from conceptual discovery to prototype to product. View the model at the following link: http://kt4tt.buffalo.edu/knowledgebase/model.php.

Knowledge to action (KTA) cycles offer guidance to facilitate the communication of activity outputs from researchers to developers, or developers to manufacturers. Similarly, knowledge translation (KT) tables offer recommendations for communicating these outputs as information useful to members of six stakeholder groups: consumers, clinicians, manufacturers, brokers, policy makers and researchers.

We have extracted supporting evidence from literature in an effort to verify the stages, steps, and tips described within the model. At the present time, approximately 200 articles containing nearly 800 individual findings related to specific stages, steps, and/or tips in the NtK model have been reviewed and catalogued in the knowledge base. Summaries of stage-level information are being developed, while tools are being highlighted for steps and tips. Check back often for new information!

Since its unveiling, federal programs in the United States, Canada, and Europe have been inviting presentations on the NtK model as an approach for addressing societal problems through technology-based innovations. The KT4TT is also actively working with the National Institute on Disability and Rehabilitation Research's (NIDRR) newly funded Rehabilitation Engineering Research Centers, by reviewing their technology transfer plans in their first year of funding. The NtK Model



provides a comparative framework for assessing their planned path from problem to solution, which grantees report as helpful. Recent examples suggest that incorporating the NtK model during the project planning stage improves a proposal's coherence and provides the reviewers with a broader context for the current scope of work. However, it will take several years to determine if the NtK Model is being applied with fidelity, and the extent to which its use improves the outcomes and impacts of NIDRR-funded projects. We appreciate your feedback as we continue improving upon the model and knowledge base!

How can the NtK Model and knowledge base help you??

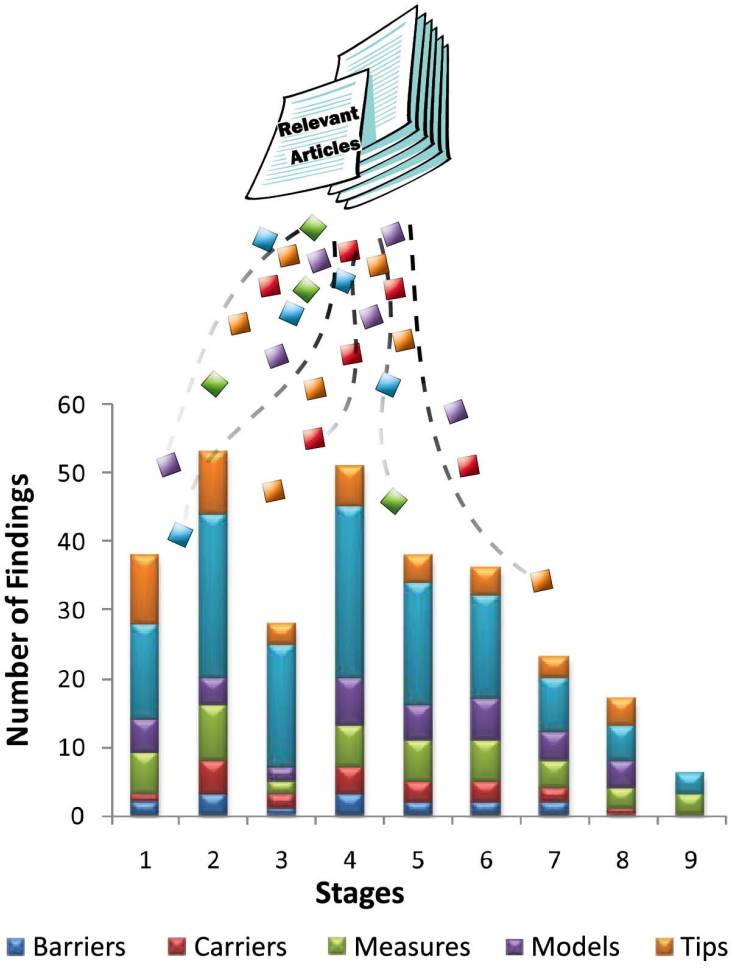
Academic New Product Development Researchers: Use the literature scoping review as a platform for systematic reviews regarding effective practices.

Applied Researchers: Increase the chances that you will achieve beneficial impacts from your work by using the model as a guide to outline your projects in proposals or after funding has been awarded.

New Product Developers and Manufacturers: Utilize information from supporting evidence links and citations to optimize and streamline your new product development process.

Policy Makers and Grant Funding Agencies: Use the NtK as a benchmarking tool to ensure that 1) the work you are funding will achieve impacts, and 2) to provide grant reviewers who may not have a business background with the tools they need to assess the commercial potential of proposals.

Brokers (I.e. technology transfer offices): Use the NtK to create a common understanding of the rigors of technology transfer between industry and academia. Employ the KT action cycles to help researchers better develop information that will facilitate the hand-offs that you will be negotiating.



Technical Assistance Available

James A. Leahy

For the last two years NIDRR has circulated a memorandum to newly funded RERCs introducing the Center on Knowledge Translation for Technology Transfer (KT4TT) and detailing NIDRR's expectations for RERC interaction with the KT4TT center. As a follow-up to initial consultations, NIDRR and the KT4TT Center host a meeting the day before the annual RERC Project Directors' meeting, whereby new RERC grantees work with the KT4TT Center staff to finalize their technology transfer plans. As is NIDRR ongoing policy, new RERCs are required to submit their finalized plans to NIDRR by the end of their first year.

NIDRR is encouraging increased collaboration between newly funded RERCs and the KT4TT to accomplish the following requirement:

> *"increased transfer of RERC developed technologies to the marketplace. RERCs must contribute to this outcome by developing and implementing a plan for ensuring that all technologies developed by the RERC are made available to the public."*

NIDRR intends to improve "marketplace" outcomes from RERCs. In fact, they set specific goals to increase such outcomes by 20% by the year 2013. NIDRR needs to meet this goal to demonstrate results to the Office of Management and Budget. This is a serious program level mandate, with NIDRR's future funding in question if the performance goals are not met.

NIDRR sees evidence that successful outcomes result from valid opportunities implemented and managed through careful planning. And NIDRR recognizes that the dynamic market forces require project planning and implementation to occur sooner rather than later in the five year cycle of funding. Hence the requirement for each RERC to generate a plan for accomplishing Technology Transfer in its first year of a new funding cycle. As stated in the Federal Register:

> *"Under each priority, the RERC must be designed to contribute to the following outcomes: (6) Increased transfer of RERC-developed technologies to the marketplace. The RERC must contribute to this outcome by developing and implementing a plan for ensuring that all technologies developed by the RERC are made available to the public. The technology transfer plan must be developed in the first year of the project period in consultation with the NIDRR-funded Disability Rehabilitation Research Project, Center on Knowledge Translation for Technology Transfer."*

Based on our prior collaborations with RERCs, the KT4TT knows that grant proposals differentiate between projects that intend to contribute to the knowledge base through research activity, and projects that intend to generate new prototype programs, devices or services through research and development activity. Either form of output may be intended for use by others, or simply intended to advance the field's understanding of an issue or process. That is up to each RERC's discretion.

Any project that proposes to start with an idea for a technology-related activity (research and/or development and/or production) and intends for that idea to eventually be used by others to beneficially impact people with disabilities, qualifies as a project with intent for technology transfer. For example:

A) Projects that intend to generate draft or final Industry Standards, Clinical Protocols or Practice Guidelines.

B) Projects that intend to generate Instruments or Tools for use by others in research or practice.

C) Projects that intend to generate hardware devices or software systems that will be made available for free access by request or direct download.

D) Projects that intend to generate a device or service intended for release into the commercial marketplace.

Any project that intends to involve technology transfer requires articulation of a Technology Transfer Plan. RERC grant proposals typically describe a range of research and/or development projects. Each project may or may not include narrative describing the Principal Investigator's intent for the project output to be transferred for use by others. For those that do intend use by others, there may be language stating that intent, or there may even be a general outline of the resources and stakeholders involved in accomplishing that intended transfer and use.

The KT4TT recognizes that one might consider the expressed intent to transfer to be equivalent to a plan for transfer. However, such language does not constitute a formal Technology Transfer Plan. Instead, during the first year of operation, each RERC project that intends to accomplish transfer for use needs to generate an operational framework describing:

A) The stages/steps/tasks involved;

B) The monetary and staff resources dedicated to each;

C) The timeline and resource loading by the grantee and expected by others;

D) Anticipated milestones for tracking and evaluating progress through the process.

The KT4TT recognizes that not everyone has access to a template for a Technology Transfer Plan, therefore we have created a stage/gate framework that articulates nine stages (three each for Research, Development and Production activity), and the steps and tasks that typically accompany each one. The link to that model is: http://kt4tt.buffalo.edu/knowledgebase/model.php.

1) The model represents ALL activities required between the initial identification of a problem within a target population, and the eventual impact of the technology -based solution on that target population.

2) The model shows the many tasks that have to be successfully completed and the stakeholder decision points (gates) that must be passed in order to move from the initial problem to beneficial impact.

3) No one project is expected to complete all three phases of Research, Development and Production activity, and certainly not in one grant cycle. However, each plan should articulate who is expected to complete the external phases of activity and when.

4) No grantee is expected to perform all of the stages in the model internally within a cycle, as the research may have already been done by the grantee or others, or the production may be done later by others. Again, that should be explained in the plan itself.

5) Note that Stages 1 and 2 of the model precede the decision to initiate a research and/or development project. These stages should have been completed before the project was proposed within the grant. Sometimes grantees are reluctant to question the value of a project once it is funded, but there is no guarantee that the review process included a careful examination of each project's potential value and likely impact. We suggest that even though funding was already awarded, this is the last good chance to go back to reexamine the internal assumptions and motivations of each project's PI, as well as to study the evidence of external stakeholder validations, that underlies and justifies the project.

Since both research projects and development projects may plan to generate technology-based outputs for use by others, each one that does requires its own Technology Transfer plan. If there is no plan accompanying a project, NIDRR assumes that the expected outputs are not technology-based or expected to have a beneficial impact on the target population.

For those projects that do qualify for a Technology Transfer plan, the KT4TT suggests RERCs use the stages and steps from the model as a referenced template to generate the operational detail for internal and external participants, and over the timeline envisioned from problem identification to solution impact. In those cases where stages were completed in a prior cycle of funding, or completed by others, that information should be stated and shown on the timeline. In other cases, the proposed work may required the full five year cycle, with transfer to external stakeholders expected in year six or beyond. That should also be stated and shown on the timeline.

For assistance with generating your Technology Transfer plan please contact Jim Leahy of the KT4TT at 716-204-8606 ext. 201 or email Jim at jimleahy@buffalo.edu.

Resources

Learn more about knowledge translation for technology transfer, and why the NtK model was developed:

Translating three states of knowledge- Discovery, invention and innovation

Implementation Science Journal Article

Stakeholders adopt and use knowledge that has perceived utility, such as a solution to a problem. Achieving a technology-based solution involves three methods that generate knowledge in three states, analogous to the three classic states of matter. Research activity generates discoveries that are intangible and highly malleable like a gas; development activity transforms discoveries into inventions that are moderately tangible yet still malleable like a liquid; and production activity transforms inventions into innovations that are tangible and immutable like a solid. The paper demonstrates how the KTA model can accommodate all three types of activity and address all three states of knowledge. Linking the three activities in one model also illustrates the importance of engaging the relevant stakeholders prior to initiating any knowledge-related activities.

2010 (Feb)/14 pages

Available at: http://implementationscience.com/content/5/1/9

Facilitating Technology-Based Knowledge Utilization

Focus Technical Brief # 26

This FOCUS presents a framework for integrating two distinct processes: knowledge translation (KT) and technology transfer (TT). The integration permits stakeholders involved in technology-based research and development activities to identify and coordinate their respective roles, and to optimize the eventual use of research by industry for production purposes.

2010 (May)/8 pages

Available at: http://www.ncddr.org/kt/products/focus/focus26

Knowledge Translation for Technology Transfer: Ensuring Beneficial Impacts from Research & Development

NCDDR Webcast # 18

The session introduces the concept of Knowledge Translation for Technology Transfer. It explains how the two processes can be linked to increase the relevance of technology-oriented knowledge from upstream academic research, through down¬stream industrial development and production, and out to persons with disabilities. The same linkage provides Federal sponsors with new opportunities to conduct evidence-based project tracking and program evaluation.

2009 (June)

Available at: http://www.ncddr.org/webcasts/webcast18.html

Begin with Knowledge Translation; Have the End- Technology Transfer- in Mind

NCDDR Webcast # 27

This one-hour presentation introduces the Center on Knowledge Translation for Technology Transfer's (KT4TT) PUSH award within a broader knowledge translation (KT) context. The Product Utilization Support and Help (PUSH) award is a peer-to-peer dissemination activity. It is based on the identification and distribution of 'best practice' approaches to the development, transfer and/or production processes utilized by technology grantees funded through the National Institute on Disability and Rehabilitation Research (NIDRR).

The goal is to offer exemplars of research utilization that have been proven effective to the broader NIDRR community. As part of this webcast we will identify and discuss exemplar processes utilized by the first PUSH Award winner, CreateAbility Concepts, Inc., and also provide and discuss other examples of how other organizations can embed their KT efforts throughout the Technology Transfer process.

2010 (June)

Available at: http://www.ncddr.org/webcasts/webcast27.html

Learn about the NtK model and knowledge base in detail:

The Need to Knowledge Model: A Roadmap to Successful Outputs for NIDRR Grantees

Focus Technical Brief # 28

This issue of FOCUS presents the Need to Knowledge (NtK) Model for new product development. The model was designed to encompass all activities from inception of a project through post-launch evaluation to paint a complete picture of the research, development, and production processes. This technical brief explains the details related to the model's stages and gates, while also introducing four specific opportunities to employ knowledge translation techniques.

2010 (Sept)/16 pages

Available at: http://www.ncddr.org/kt/products/focus/focus28/

The KT4TT Knowledge Base: Steps and Supporting Evidence to Improve Your Process!

NCDDR Webcast # 28

The Center on Knowledge Translation for Technology Transfer (KT4TT) has introduced a comprehensive knowledge base geared towards individuals who research and develop technology-base devices and services. The knowledge base consists of a new product development model - the Need to Knowledge (NtK) Model, and a searchable database of substantiating findings extracted from scholarly literature. The knowledge base is intended for use by federal grantees, small businesses, and others who have an interest in moving new technology-based devices or services from research and development laboratories out to the marketplace. More about the NtK Model is described in FOCUS Technical Brief #28.

This one-hour webcast will review the Center's online knowledge base including the NtK model homepage, search page, and results pages. The presentation begins with an overview of the model, and ways to view steps, tips, and supporting evidence. The audience will then be introduced to the knowledge base's search page, and given tips for effective searches. Finally, a question and answer session will complete the webcast.

2010 (Sept)

Available at: http://www.ncddr.org/webcasts/webcast28.html

Learn more about the processes used by these research and development projects:

New Product Development: Delivering Evidence of What Works

PDMA Conference Paper and Poster

New product developers are required to understand and apply a wide variety of processes and tools as they produce new devices or services. Individuals who are seeking alternative or new methods for their process may often be overwhelmed by the amount of academic and practice literature documenting "best practices." Unfortunately, new product developers may not have sufficient time to invest in exploring alternative strategies, resulting in the repetition of old - possibly outdated - practices. This paper presents the method and preliminary results of a scoping review designed to consolidate information on effective new product development practices into a comprehensive knowledge base. New product developers will enjoy the ease of finding alternative effective practices, while researchers will find value in the consolidated presentation of new product development practices and study methodologies that lend themselves to systematic reviews.

2010 (Oct)/Poster: 4 pages; Paper: 3 pages

Poster available at: http://kt4tt.buffalo.edu/publications/2010%20PDMA%20handout.pdf

Paper available at: http://kt4tt.buffalo.edu/publications/2010%20PDMA%20Paper.pdf

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