Measuring KT in Technology-oriented Projects

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Knowledge Translation

K T 4 T T

Technology Transfer

Public Support for New Knowledge Creation

- Grant-based Scientific Research to Advance Understanding – Exploration to discover new knowledge about physical world (NSF/NIH):

    Grant-based Scholarship $\rightarrow$ Peer System $\rightarrow$ Publish for Tenure.

- Contract Engineering Development for Production Programs – Application to deliver products with national value (DOD/DOE):

    Contract-based Design $\rightarrow$ Performance Test $\rightarrow$ Produce for Profit.

- So-called "R&D" for "S&T" Innovation – Flawed hybrid of scientific methods and market mechanisms fails to achieve intended impacts.

    Scholarly outputs for tenure $\neq$ Corporate requirements for profit.

Four Approaches to Measure KT Activity

1. Construct an evidence-based model to track the generation and communication of knowledge in different states resulting from different yet complementary methods.

2. Create an instrument to track the recipients experience from the first instance of encountering new knowledge to their decision to apply that knowledge in action.

3. Conduct Knowledge Value Mapping of National Organizations to assess their potential role in KT.

4. Conduct RCT's to compare how various non-traditional stakeholder groups respond to new knowledge which is novel, valid and relevant to them.

1. Tracking Knowledge in 3 States
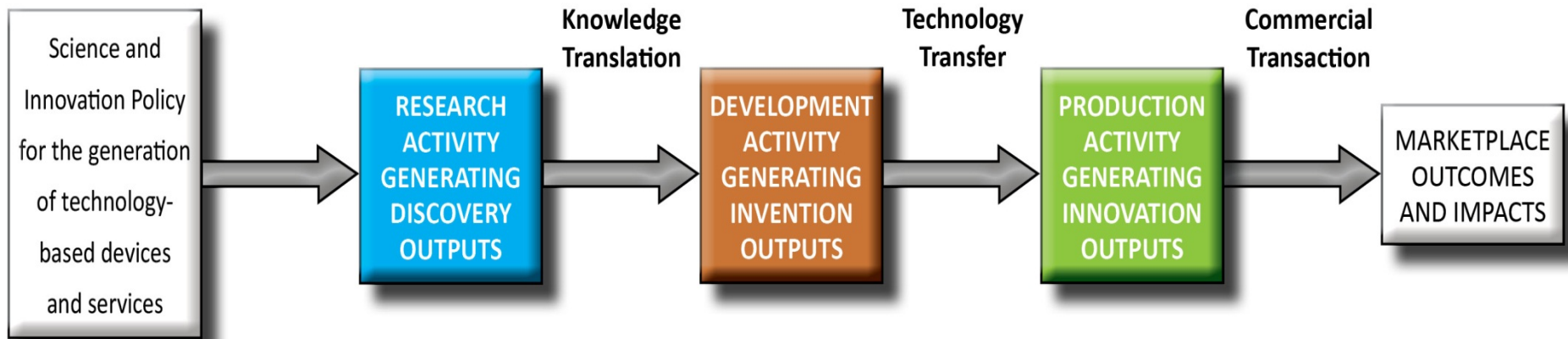
Need to Knowledge (NtK) Model

- Scientific Research methods generate knowledge in state of Conceptual Discoveries, requiring content <u>translation</u> to convey relevance to non-traditional stakeholders.

- Engineering Development methods generate knowledge in state of Prototype Inventions, requiring legal <u>transfer</u> of ownership & control for integration into products.

- Industrial Production generates knowledge in state of Commercial Innovation requiring market <u>transaction</u> for acquisition and consumption.

Knowledge Translation Measurement
Concepts, Strategies and Tools

Hosted by SEDL's Center on Knowledge Translation
for Disability and Rehabilitation Research (KTDRR)
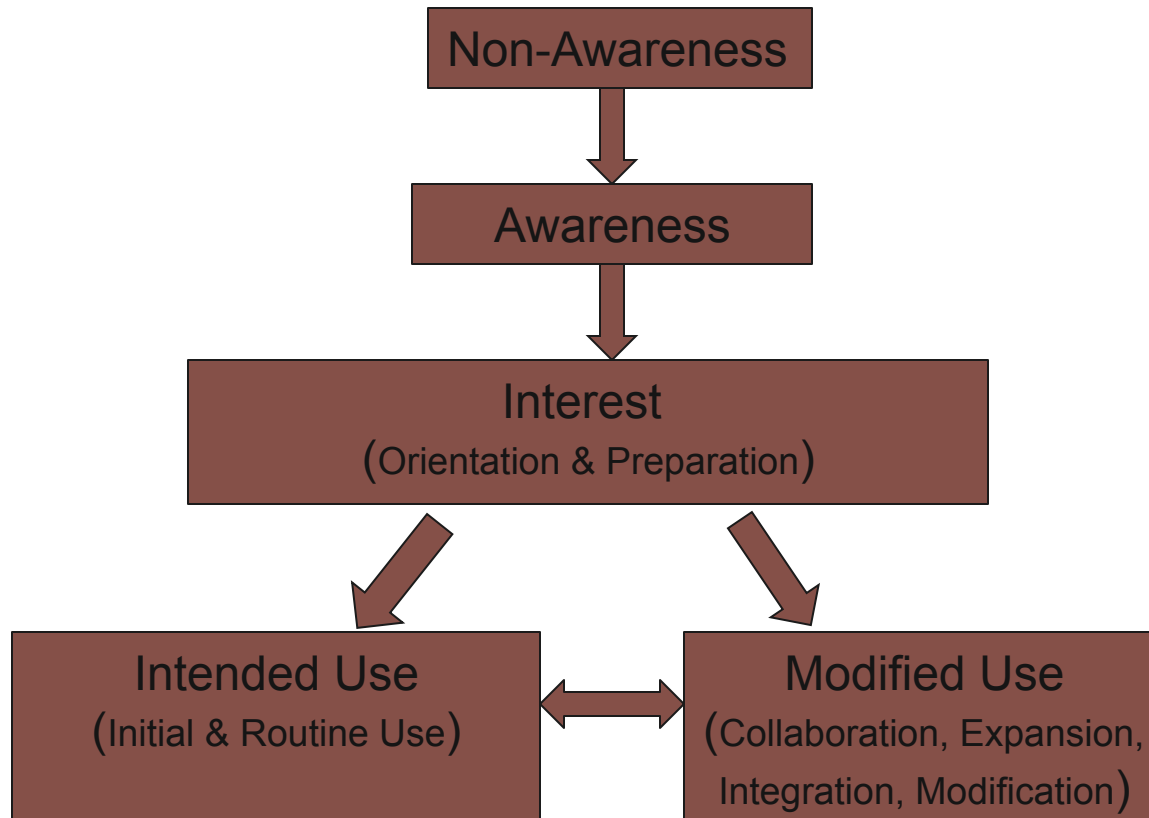
Knowledge Communication – 3 Strategies for 3 States

Science and Innovation Policy for the generation of technology-based devices and services

→ **RESEARCH ACTIVITY GENERATING DISCOVERY OUTPUTS**

Knowledge Translation

→ **DEVELOPMENT ACTIVITY GENERATING INVENTION OUTPUTS**

Technology Transfer

→ **PRODUCTION ACTIVITY GENERATING INNOVATION OUTPUTS**

Commercial Transaction

→ MARKETPLACE OUTCOMES AND IMPACTS

2. Tracking Individual's Knowledge Use

Level Of Knowledge Use Survey (LOKUS)

- Defines and tracks levels of use for non-traditional stakeholders under field conditions.

- Designed for web-based self-report (VOVICI).

- Five Levels of Use; each containing multiple types, dimensions and activities.

- Psychometric analysis shows LOKUS to be valid and reliable for measuring changes across levels and across various stakeholder groups.

LOKUS: 4 Levels / 5 Types of Use

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                    ┌─────────────────┐
                    │  Non-Awareness  │
                    └─────────────────┘
                             │
                             ▼
                    ┌─────────────────┐
                    │   Awareness     │
                    └─────────────────┘
                             │
                             ▼
         ┌───────────────────────────────────────┐
         │              Interest                 │
         │    (Orientation & Preparation)        │
         └───────────────────────────────────────┘
              │                         │
              ▼                         ▼
  ┌──────────────────────┐   ┌──────────────────────────────┐
  │    Intended Use      │   │        Modified Use          │
  │ (Initial & Routine   │◄─►│ (Collaboration, Expansion,   │
  │       Use)           │   │  Integration, Modification)  │
  └──────────────────────┘   └──────────────────────────────┘
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3. Assess National Organization's as KT Brokers

Knowledge Value Mapping

- Efficiently share knowledge from R&D projects with diverse and non-traditional audiences.

- Effectively communicate findings under existing time and money constraints.

- Understand how national organizations value new knowledge to properly tailor message.

Conclusion: National organizations can indeed serve as effective mediators and translation/ dissemination networks for various stakeholders.

4. Compare Three Communication Methods
Randomized Controlled Trials

- Scholars resist KT as a burden beyond the traditional mandate to publish study results, so we compared the results of three methods of communicating knowledge:

  - *Passive diffusion* expects initial peer-reviewed publications to eventually trickle down and out through stakeholder audiences.

  - *Active dissemination* expects scholars to allocate time to present their findings through conferences, workshops and webinars.

  - *KT* expects scholars to tailor findings to values and context of varied stakeholder audiences and apply targeted multi-media.

Findings: Awareness and Use are different. Use involves active engagement which is drive by <u>relevance</u> not rigor!

Related Publications

- Lane, J & Flagg, J. (2010) "Translating 3 States of Knowledge: Discovery, Invention & Innovation." Implementation Science, 5, 1, 9. http://www.implementationscience.com/content/5/1/9

- Stone, V. & Lane J (2012). "Modeling the Technology Innovation Process: How the implementation of science, engineering and industry methods combine to generate beneficial socio-economic impacts." Implementation Science, 7, 1, 44. http://www.implementationscience.com/content/7/1/44.

- Flagg, J, Lane, J., & Lockett M. (2013) "Need to Knowledge (NtK) Model: An Evidence-based Framework for Generating Technology-based Innovations." Implementation Science, 8, 21, http://www.implementationscience.com/content/8/1/21

- Lane, JP & Rogers, JD (2011). "Engaging national organizations for knowledge translation: Comparative case studies in knowledge value mapping." Implementation Science, 6:106. http://www.implementationscience.com/content/6/1/106/abstract

- Working paper on LOKUS design and psychometric testing: http://kt4tt.buffalo.edu/publications/WorkingPapers/Updated%20Working%20Paper%20II%20for%20Website%2010%2010%2013.pdf

- Working paper on RCT comparing three methods of communication new knowledge: http://kt4tt.buffalo.edu/publications/WorkingPapers/Working%20Paper%20III%20_AAC%20Pilot%20RCT%20for%20website.pdf

- On-line access to Need to Knowledge Model, including links to all supporting literature and analytic tool descriptions, and case examples: http://kt4tt.buffalo.edu/knowledgebase/model.php

ACKNOWLEDGEMENT

However, those contents do not necessarily represent the policy of the Department of Education, and you should not assume endorsement by the Federal Government.