Transdisciplinary:

The Case of Aging & Technology

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Presentation Outline

- AGE-WELL
- Why is transdisciplinarity important?
- What is transdisciplinarity?
- What are the benefits?
- Barriers & facilitators to this approach
- Some ‘How To’s’

AGE-WELL Vision

- AGE-WELL: Aging Gracefully across Environments using Technology to Support Wellness, Engagement, and Long Life

- The vision of AGE-WELL is to harness the potential of technology to provide high-quality and sustainable services and solutions to meet the needs of the current and future generations of older adults in Canada.
- Our vision includes the creation of capacity for Canada to further establish its position as a global leader.

Key Objectives

I. Carry out world-class research
II. Break down the silos
III. Focus on real-world problems

III. Advance Canada's global competitiveness
IV. Train a new generation of "HQPs"

AGEWELL Aging Gracefully across Environments using Technology to Support Wellness, Engagement, and Long Life

AGEWELL by the Numbers*

*as of March 2017

Canada's Technology and Aging Network

33
MEMBER UNIVERSITIES AND RESEARCH CENTRES *across Canada*

300
HIGHLY QUALIFIED PERSONNEL (HQP)

150+
RESEARCHERS

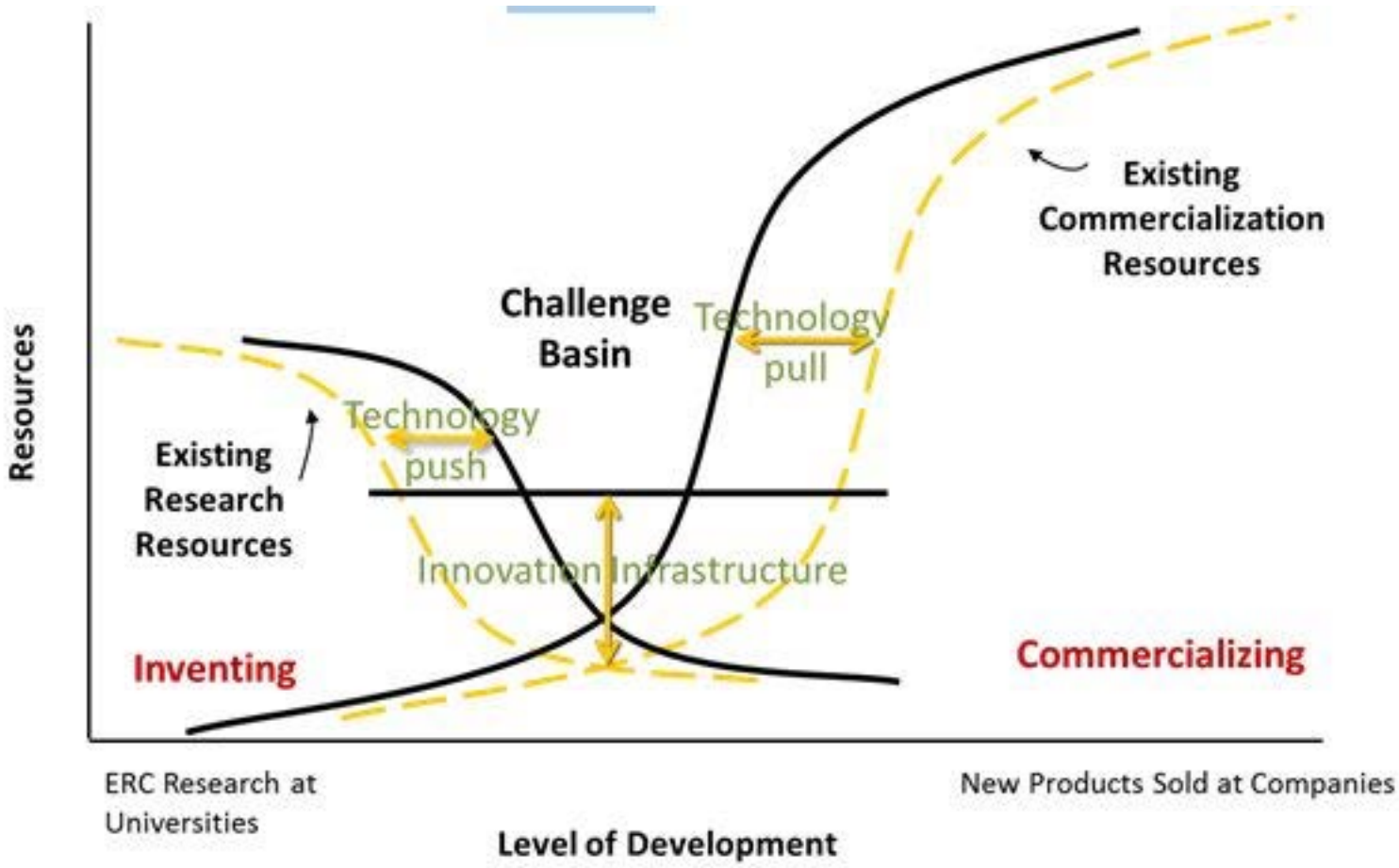
82
Industry & Community Partners

31
Federal & Provincial Departments & Agencies

$36.6M FUNDING (2015-2020) from the Networks of Centres of Excellence (NCE)

$22M+ CASH AND IN-KIND Contributions from Partners

Valley of Death

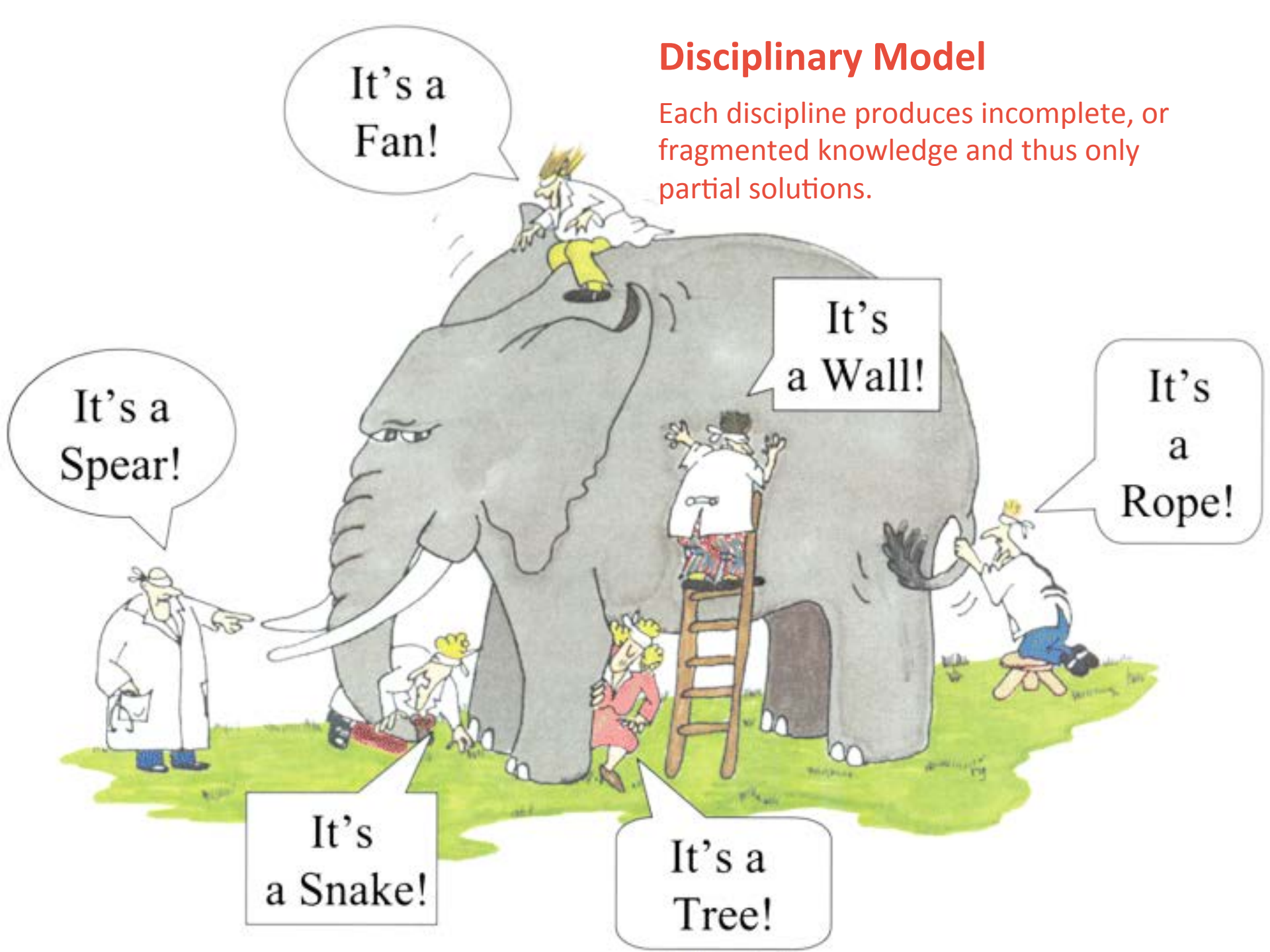


Why TD in AGE-WELL?

- Problem: How can we help people age well by harnessing the potential of technology?
- This is a wicked problem; messy, complicated to solve, but socially pressing
- We need real world solutions that make a difference to people's lives
- So: A new approach to research and innovation in technology that is action-oriented, collaborative & integrative; a transdisciplinary approach

Disciplinary Model

Each discipline produces incomplete, or fragmented knowledge and thus only partial solutions.



Combining Disciplines

Each discipline produces incomplete, or fragmented knowledge; and thus only partial solutions. Combining disciplines can move us towards a more complete understanding of complex problems and is thereby more able to develop holistic and sustainable solutions

Multi

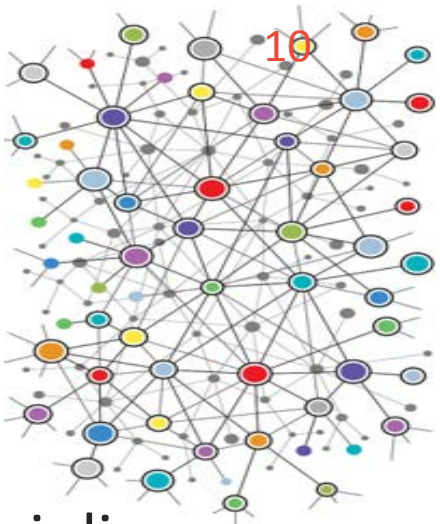
Silos within Academia. Work on same problem with own assumptions

Inter

Interactions/reciprocities within academia. Some overlap of disciplinary boundaries, with some blending of common assumptions, restrictions, & philosophies

Trans

Transcending boundaries, transformations beyond academia



Scoping Review Objectives

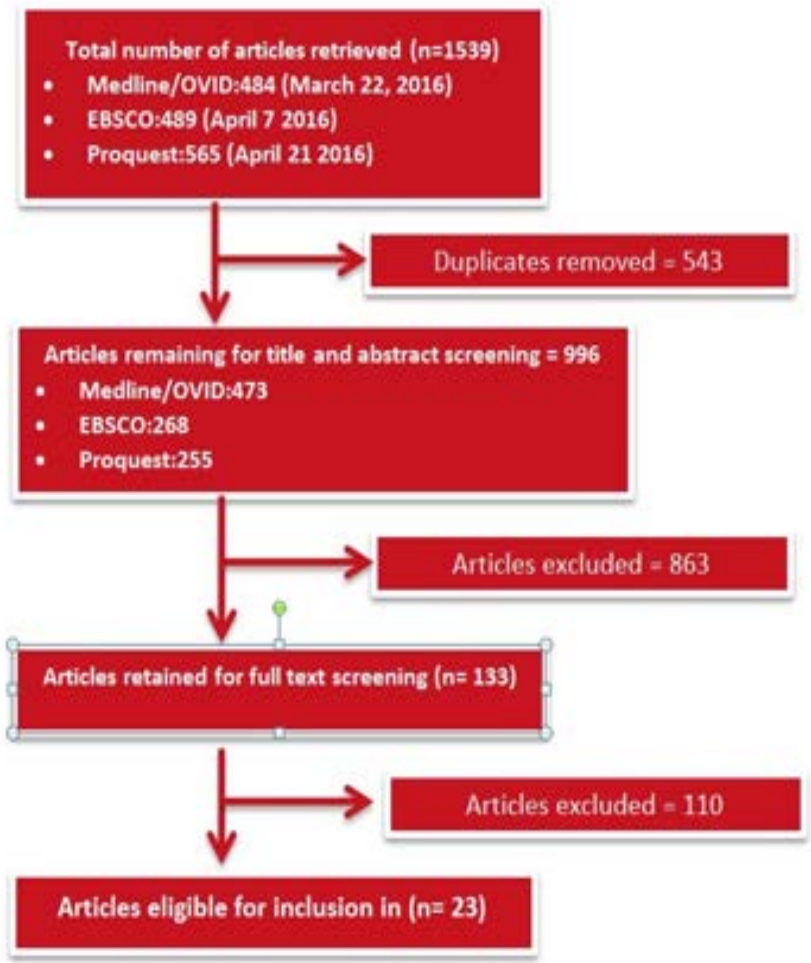
- To determine:
  - Key features/principles of Transdisciplinary Research (TDR)
  - How transdisciplinary research is currently operationalized across studies
  - Barriers and enablers to successful implementation and outcomes
  - The impact it has on research processes, outcomes and impact (e.g. social change)

Scoping Review Method

- Search terms and strings were developed/refined.
- 3 Databases were searched: Medline/OVID, EBSCO, ProQuest.
- English language peer-reviewed articles published between Jan. 1, 2005 to Dec. 31, 2015.
- Multiple rounds of review (title & abstract, full text of article).
- Inclusion criteria:
  - Is the article located in one of these 3 fields: health/ medicine, aging & technology? AND
  - Does the paper describe an evaluation of TDR? (e.g. how TDR made a difference to research project outcomes, processes or its impact?)
- At minimum, two investigators independently reviewed all titles, abstracts & full texts of all articles to determine inclusion in review, & extracted data.

Results

- 23 articles included in review.
- A diversity of disciplines.
- The majority focused on health and medicine research from U.S. –and Canadian contexts.
- Mostly descriptive program evaluations.
- Emphasis on assessing traditional markers of 'scientific excellence.'
- 1 article focused on technology; none on aging and technology.



Transdisciplinary Key Features

- Focus: wicked problem, real world focus
- Transcending disciplinary and crossing sectoral boundaries: innovative ideas, new methods, models…
- Stakeholder participation from the start (partner mapping).
- Mutual learning & collaboration between sci3nce and society
- Shared vision, aims and objectives
- Embraces complexity
- An interactive research process that involves the co-production, co-interpretation and integration of knowledge
- Challenges hierarchies in academia
- Application of knowledge in the real-world (e.g. real-world impact) to make a difference

Why 'Do' Transdisciplinarity?

- Supports scientific/academic usability and quality
  - Enhances research productivity (e.g. publications, collaborations) & funding success (Golden, 2014; Gutman, 2012; Hall et al., 2012; Loisel, 2009; Stokols, 2005)
  - Advances theoretical understanding of complex societal problems (Gutman, 2009; Hall et al., 2012; Ottoson, 2009)
  - Leads to more comprehensive & holistic solutions (Loisel, 2009; Maase, 2005; Orozco, 2008; Pelletier, 2015; Schensul, 2009; Simard, 2014)
  - Enhances scientists' careers (Gutman, 2009)

Why 'Do' Transdisciplinarity?

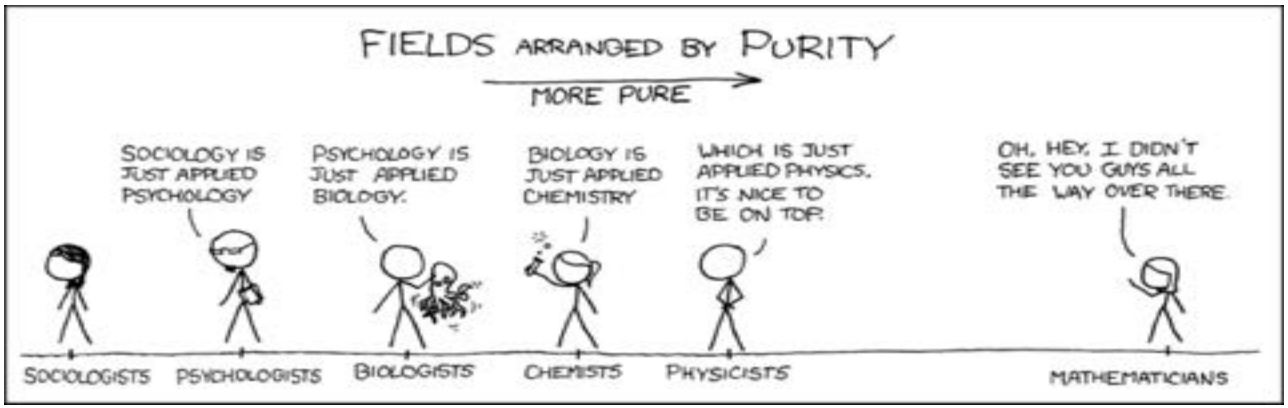
- Enhances social robustness:
  - Helps build relationships between & across scientists and society (e.g. to policymakers, and citizens), which supports translation of knowledge (Daudelin, 2011; Gutman, 2009; Hall et al., 2012; Ottoson, 2009)
  - Improves understanding of the problem (Masse, 2008; Pelletier, 2015; Schensul, 2006)
  - Enriches learning & training of trainees (Golden, 2014; Lambert, 2005; Loisel, 2009; Maase 2008; Orozco, 2008; Snow, 2010).

Some Facilitators

- Institutional support for research (e.g. multi-year funding, & extra-institutional infrastructure)
- Heterogeneous team make-up (e.g. teams composed of multiple & diverse social actors)
- Multiple methods and opportunities for communication and interaction, in person & virtually, utilitarian & social
- Strong interpersonal relationships and mutual trust
- Strong and involved leadership to develop and broker engagement between and across sites/ sectors/actors

Some Barriers

- Insufficient planning/late involvement of partners
- Diversity of goals
- Takes more time and effort (& funders may not want to pay)
- Established hierarchies and practices (What is considered good science? Evidence? Whose ideas are dominant? Value of publication versus than real world impact. Disciplinary purity)



Further Barriers

- Few models of "how to"
- Vocabularies
- Dealing with uncertainty
- Pressure for uni-disciplinary outputs

"I say we just take out that squiggly green thing and see how he is tomorrow."

How To FacilitateTransdisciplinarity

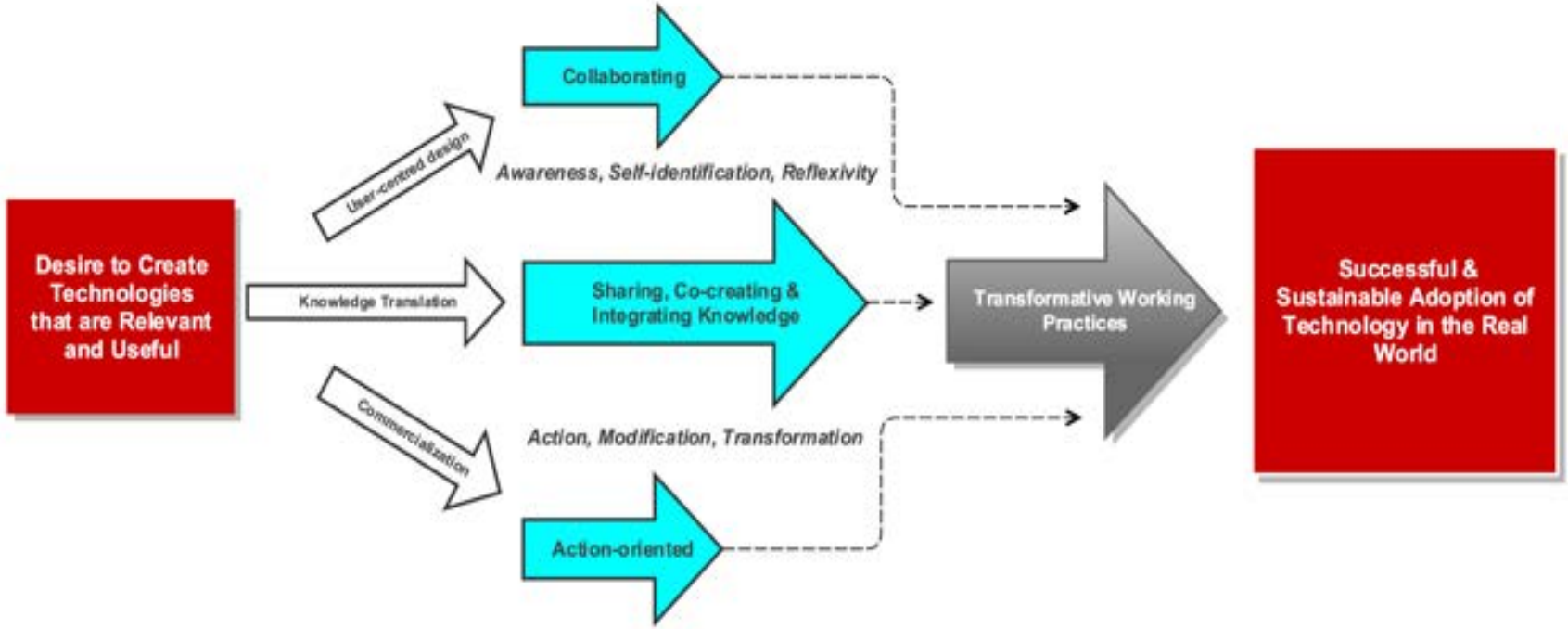
- TDR support
  - Seminars, journal clubs, interest groups, workshops, financial incentives, development of capacity via training/internships
- Diversity of stakeholders
  - Heterogeneous network of researchers with diverse backgrounds & expertise, industry & policy partners, service providers & experiential stakeholder partners
- Multi-directional communication
  - Feedback on performance, opportunities for networking & engagement with academics & other stakeholders from outside the network, space & opportunity for new ideas to grow.
- A ‘transdisciplinary attitude’
  - A push to build consensus, continual learning & self reflection, innovate & ‘commercialize’, include partners throughout the research process, openness to new ways of thinking, stepping into the unfamiliar.

Questions and Ideas

- Who should be around the table?
  - Partner and expertise mapping
- How can a shared vision be established?
  - Deliberative dialogue
- How to integrate knowledge for step change innovation?
  - Appreciative Inquiry
  - Reflexivity (what works, why and for who)
  - Challenge hierarchies that stifle change (how do they work to advance or hinder innovation?)

PATHWAYS TOWARD TRANSDISCIPLINARITY IN AGING & TECHNOLOGY

CREATING NEW WAYS OF WORKING



Multidisciplinary	Interdisciplinary	Transdisciplinary
(i) Research and working practices involving sequential or additive combination of ideas, theories or methods from two or more disciplines (ii) Collaborations involve knowledge input from one or more fields to address a shared problem	(i) Research and working practices characterized by integration of ideas, theories, and methods drawn from two or more disciplines (ii) Collaborations are more interactional involving bi-directional knowledge transfer	(i) Research and working practices that seek to integrate and combine knowledge from different fields (ii) Cooperative creation of consensus from a diverse team with different backgrounds and viewpoints to solve real-world problems

Figure 1. A visual representation depicting cross-disciplinary pathways of working practices that support movement from multi-disciplinarity to interdisciplinarity and transdisciplinarity.

Inclusive transdisciplinary teamwork in action!!

Literature

- Augsburg, T. (2014). Becoming transdisciplinary: The emergence of the transdisciplinary individual. World Futures, 70(3-4), 233-247.
- Balsinger, J. (2014). Transdisciplinarity in the classroom. http://archive-ouverte.unige.ch/unige:39938
- Benard, M., & de Cock-Buning, T. (2014). Moving from monodisciplinarity towards transdisciplinarity: Insights into the barriers and facilitators that scientists faced. Science and Public Policy, sct099.
- Boger, J., Jackson, P., Mulvenna, M., Sixsmith, J., Sixsmith, A., Mihailidis, A., ... & Martin, S. (2016). Principles for fostering the transdisciplinary development of assistive technologies. Disability and Rehabilitation: Assistive Technology, 1-11.
- Gray B. (2008). Enhancing transdisciplinary research through collaborative leadership. American Journal of Preventive Medicine, 35(2 Suppl), 124-S132.
- Hall, K. L., Stokols, D., Stipelman, B. A., Vogel, A. L., Feng, A., Masimore, B., ... & Berrigan, D. (2012). Assessing the value of team science: a study comparing center-and investigator-initiated grants. American Journal of Preventive Medicine, 42(2), 157-163.
- Klein, J. T. (2008). Evaluation of interdisciplinary and transdisciplinary research: a literature review. American Journal of Preventive Medicine, 35(2), S116-S123.
- Klein, J. T. (2015). Reprint of “Discourses of transdisciplinarity: Looking back to the future”. Futures, 65, 10-16.
- Lang, D. J., Wiek, A., Bergmann, M., Stauffacher, M., Martens, P., Moll, P., ... & Thomas, C. J. (2012). Transdisciplinary research in sustainability science: practice, principles, and challenges. Sustainability science, 7(1), 25-43.
- Nowotny, Helga, Peter Scott, and Michael Gibbons. (2003). Introduction: ‘Mode 2’ Revisited: The New Production of Knowledge. Minerva, 41.3, 179-194.
- Pohl C, & Hirsch Hadorn, G. (2007). Principles for Designing Transdisciplinary Research. Munich: Oekom.
- Pohl, C. 2011. What is progress in transdisciplinary research? Futures, 43, 618–626.
- Polk, M. 2015. Transdisciplinary co-production: Designing and testing a transdisciplinary research framework for societal problem solving. Futures, 65, 110-122.
- Popa F, Guillermin M, Dedeurwaerdere T. (2015). A pragmatist approach to transdisciplinarity in sustainability research: From complex systems theory to reflexive science. Futures, 65, 45-56.