From concept to classroom

What is translational research?

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From concept to classroom

Translational research is a type of work that attempts to bridge the gap between basic research and the world of practice. For a range of reasons much valuable research is often not known to practitioners or is little used by them. Within the Centre for Educational Policy and Practice the Translational Research project recognises the dissemination and implementation of research as a priority. The audience for ACER's translational research activity includes teachers, and school and system-level leaders. The aim is to translate research findings into evidence-based practice, and to foster engagement and conversation between researchers and practitioners.

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Bridging the gap between research and practice

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Introduction

Why do we conduct research? Put simply the purpose of research is to learn more about a subject, but what happens to the knowledge generated by research?

The publication, dissemination and citation of research findings are key performance indicators for the research community, and historically researchers have relied upon the academic publishing industry and conference circuit for publication, dissemination and citation purposes. There is a criticism that this can result in researchers sharing new knowledge largely with other researchers, rather than with those who may need the knowledge most; practitioners and policymakers. Morris and colleagues (2011, p. 510) estimate that in medicine it takes an average of 17 years for clinical research to be fully integrated into everyday practice. The challenge beyond *doing* research is to make it easier for practitioners and policy makers to *find*, *understand* and *apply* research.

Translational research makes engagement with practitioners and the wider community its priority. It seeks to 'translate' research in ways that enable that research to be applied. It also 'closes the circle' by allowing practitioners to provide feedback to researchers based on their experience. Australia's Chief Scientist in 2012 identified translational research as a priority, with the warning that 'the more our international competitors invest in it while we lag behind, the more challenges face us in the future' (Chubb, 2012, p. 5).

Describing translational research

Translational research as a practice is already well established within medical and health research, referred to commonly as 'bench to bedside' research (Nunes, Carroll, & Bickel, 2002, p. 155). There is significant literature referring to clinical scientists translating research into new treatments, and health practitioners translating those treatments into practice. Australia's National Health and Medical Research Council funds projects through the Australasian Cochrane Centre to investigate 'the synthesis, interpretation, dissemination and implementation of research evidence for clinical practice and policy'. The National Library of Medicine's *Medical Subject Headings* describes translational medical research as 'the application of discoveries generated by laboratory research and preclinical studies to the development of clinical trials and studies in humans.' Note the second area of translational research which concerns 'enhancing the adoption of best practices'.

These two purposes of translational research provide the key – but also a potential source of confusion – to the development of an understanding of this field. Woolf (2008, p. 212) suggests that most people have the first of these meanings in mind when referring to, and funding, translational research, while it is the second area that is arguably more important. Those interested in the second area further divide the audience for translational research into two categories of knowledge synthesis: '*decision* support,' which is aimed at policymakers and '*knowledge* support,' which is aimed at practitioners (Thomson, 2012a, p. 5).

Licinio (2010) considers the two purposes of translational research to be engagement within the research community and engagement

with the wider community, which includes 'government, business communities, foundations and other philanthropic bodies as well as the public at large.'

While translational research is familiar to medical and public health communities, it is also being applied to other fields; for example, in plant biotechnology it looks to take new crops 'from pot to plot' (Nelissen, Moloney, & Inze, 2014, p. 277). Within education there are few examples of translational research, most notably the work of Leask (2013) who through the collaborative MESH initiative (www.meshguides.org) is seeking to improve the translation of findings from 'concept to classroom'.

Categories of translational research

So where does translational research fit in the categorisation of research?

The OECD (2002, p. 17) describes three categories of research: basic research, applied research and experimental development. Translational research aligns most closely to *experimental development,* that is, 'the process of translating knowledge gained through research into operational programmes, including demonstration projects undertaken for testing and evaluation purposes.' This process of translating knowledge involves more than disseminating basic or applied research.

Thomson (2012a, p. 1) considers translational research as a potentially integrative description for a set of terms such as research/knowledge utilisation, research/knowledge transfer, implementation science, and knowledge translation. Leask's background in educational knowledge management reflects this understanding of translational research, which seeks to addresses the problem of the 'know-do gap'.

Issues in the field of translational research

The know-do gap

The 'know-do gap', as Bennett and Jessani describe it, is that gap between research and practice that results when people with the ability and authority to use good information to design their action either:

- *don't know* that the information exists, or what action to take, or
- *don't understand the information* – what it means, or why it is important, or
- *don't care* and see the information as irrelevant, not beneficial to their agenda, or
- *don't agree* and think the information is misguided or false. (2011, p. xxii)

Woolf notes a developing taxonomy amongst those who use the term translational research (2008, p. 211). There are up to six 'Ts' of translational research, described as:

T0 – the fundamental process of discovery. Translational research cannot be 'a bridge from nowhere' (Licinio, 2010); it is a bridge from fundamental research discoveries.

T1 – the 'bench to bedside' approach, or 'developing treatments and interventions' (Khoury et al, 2010).

T2 – the step of testing the efficacy and effectiveness of these treatments and interventions, often in the form of clinical trials.

T3 – considered 'emerging' and used to refer to the 'translation of new evidence into guidelines and policy' (Licinio, 2010).

T4 – the application of a treatment or intervention in terms of its 'impact at population level' (Khoury et al, 2010).

T5 – global implementations that emerge as the outcome of translation after research at the T4 level (Licinio, 2010).

While the literature on translational research diagrammatically describes the relationships and flows between these stages of translational research in various ways, all reinforce the primacy of feedback loops between researchers and the population they are researching.

Conducting translational research

Regardless of the level of description, the common element of all translational research is translation. The key activities of translational research include reviewing existing research; disseminating findings to make them accessible; engaging with the wider community; collaborating, in teams of researchers and practitioners, to develop and trial interventions; and measuring impact.

Reviews

Reviews are critical to the work of translational research. The synthesis of existing research information is a feature of the early stages, often in the form of either narrative or systematic reviews. From a knowledge translation perspective, original research articles may be too narrowly pitched for immediate application. Summarising findings in a review represents a valuable service for time-poor practitioners.

Knowledge synthesis at the later stages of translational research is more complex, 'drawing on a wide range of both quantitative and qualitative research, and surveillance and contextual information' (Thomson, 2012, p.1). In the area of Indigenous public health, Thomson (2012a, p.14) discusses the use of systematic *search* as well as systematic *reviews*. He takes an inclusive approach to identifying relevant material, looking beyond traditional sources to the 'grey literature' (Lawrence et al., 2014, p. 2) produced by organisations outside the commercial or scholarly publishing industry.

Dissemination

While there are academic journals *about* the field of translational research, such as *Translational Research*, (www.translationalres.com) the dissemination channels that are used *for* translational research are broader than journals and conference proceedings. It is not just the literature reviewed in translational research that may be grey; findings may be presented in any number of formats to meet the needs of a diverse audience.

Dissemination formats used by the Australian Indigenous Alcohol and Other Drugs Knowledge Centre (www.aodknowledgecentre.net.au) for example, include guidelines, toolkits and manuals in its translational work, as well as brochures, checklists, factsheets, journal articles, online multimedia and posters.

Dissemination channels are likewise extensive, limited only by the imagination and budget of the translating organisation.

Engagement

Engagement with potential end-users is a distinctive feature of translational research. The translation of research into highly readable reviews, stimulating infographics or multimedia presentations is no guarantee of reaching the community that would benefit from the application of the research. This requires a step beyond dissemination with the goal not just of delivering research to a community, but engaging that community with the research and its application. In science research, the emerging field of science communication employs professionals (including scientists, journalists and media producers) who specialise in presenting science research to the general public in an engaging way (Cormick et al., 2015, p. 274).

Collaboration

Translational research focuses on the development and trialling of treatments and interventions. Typically this involves collaboration between researchers and practitioners, and between researchers from different disciplines. Translational teams are built that combine expertise in relevant methodologies, with experience in the research topic and ability to communicate these to end-users. In health, for example, teams may include communications specialists, designers, developers, librarians, patients and paraprofessionals in addition to research staff. Facilitation and feedback that enhances the participation of all contributors in such teams are key factors in the success of translational research activities.

Evaluation

Traditional measures of publication and citation may not be appropriate for translational research. Pozen and Kline propose that translational research organisations develop a flexible framework for performance evaluation that 'tracks their progress, incentivizes fruitful activities, and aligns individuals throughout the organization' (2011, p.1). They suggest that metrics be considered in seven domains:

- funding
- talent
- creation
- validation
- dissemination
- external uptake
- collaboration

Dembe and colleagues (2014, p. 50) address evaluation in the field of translational research in health in terms of measuring the return on translational research investment, although quantifying the potential long-term cost-effectiveness of prevention and treatment strategies remains a challenge. Technology enhances the ability to measure dissemination, for instance through the use of altmetrics, and to some extent to measure engagement and external uptake.

Challenges in translational research

A number of challenges have emerged for those engaged in translational research over the past two decades.

Oversimplification

There is a potential risk in reducing complex questions, methodology, context and findings to a simplified or generalised infographic, or a single-paragraph summary. A practitioner who hears that intervention x or program y is effective may believe they know what the particular intervention or program is all about and apply their version in a different context in which it may be inappropriate. The challenge for those involved in translational research is to reduce complexity to just that point where nothing is lost in translation, while referencing all supporting research.

Ethics

Translational research in the health and social sciences field is centred on applying research to human subjects, which has clear ethical implications in terms of methodology, informed consent and privacy, especially in publication. Parks and Disis (2004) note a further concern in terms of an increased risk of conflict of interest where partnerships may blur the boundaries between basic research and industry.

The diverse audience for translational research from professional practitioners to parents to politicians presents particular challenges. Metcalfe and colleagues (2012) caution researchers to avoid the trap of becoming patronising in translation. Reporting on an audit of science engagement activities between 2011

and 2013 in Australia, they found almost 60 per cent failed to encourage participation and critical evaluation' (p. 1).

Skills

With a new field and type of research comes a need for new skills across the sectors involved in this work. Licinio (2010) suggests that new courses and dual degrees are strategies for building the specialised workforce that does not yet exist. Disciplines, such as education, that are coming lately to translational research have the added challenge of building a concept of translational research from other contexts, such as medicine. The skills required for translational research, such as knowledge of media, cultural sensitivities, professional practice, synthesis and policy development, may best be developed through partnerships rather than expecting people to hold dual qualifications or specialisations.

Time for collaboration

As well as time to develop skills for translational research, there are real challenges in creating the time and space required for effective collaboration. Long and colleagues (2012) identify the network structure and relationships of those collaborating as key factors in hindering or promoting successful translational research endeavours. This is particularly challenging when community members are also active participants. Researchers and practitioners for whom a translational research project may be in addition to their 'day job', may have difficulty in prioritising or protecting time for collaboration. Geographical separation of researcher and practitioner adds to the time and costs of collaboration, and for large translational research projects with dedicated staff there is significant benefit in co-location.

Who is working in translational research in Australia?

Australasian Cochrane Centre

(www.australia.cochrane.org) coordinates the activities of the Cochrane Collaboration in Australia and works with policymakers to ensure that systematic reviews are available in formats they can use. It manages Australia's national subscription to The Cochrane Library, and investigates the 'synthesis, interpretation, dissemination and implementation of research evidence for clinical practice and policy.'

Australian Indigenous Health*Info*Net

(www.healthinfonet.ecu.edu.au) based at Edith Cowan University, provides an extensive translational research service about Indigenous public health, 'bridging the gap between what is known and what is actually being done' in health.

Australian Science Communicators

(www.asc.asn.au) is a professional association bringing together science communicators, with the aim of involving the public in the processes and culture of science, to create an awareness of what science is attempting to achieve and to cultivate the 'need to know'.

Australian Science Media Centre

(www.smc.org.au) is an independent, not-for-profit service that aims to inform public debate on major issues by improving links between the scientific community and media.

Inspiring Australia

(www.inspiringaustralia.net.au) is part of an Australian Government strategy to increase engagement with and interest in the sciences, working across all levels of government and industry, with officers located in each state and territory.

Teacher

(www.teachermagazine.com.au) supports schools to engage with, share and adopt high impact, evidence-based teaching practices. An initiative of the Australian Council for Educational Research (ACER).

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