

Occasional Paper

This document aims to inform ageing research and add to existing discussion on policy and research developments.

What is interdisciplinary? Considerations for researchers (including applicants to the CARDI Research Grants Programme)

Summary

In awarding grants CARDI expects applicants to show real engagement across disciplines. Whilst it makes good sense for researchers to use expertise from another academic area, CARDI expects applicants to go beyond separate or sequential pieces of work i.e. where people from two or more disciplines work on different parts of a research study at different times. It will fund projects in which there is active engagement by people from a variety of disciplines in a shared effort to solve the many complex issues that face older people and society generally. Examples of interdisciplinary research are spread through the text of this article to help clarify what it might mean in practice.

This discussion paper is being expanded into a journal article. Comments are welcome on any of the issues covered – or on the constraints to interdisciplinary research and the supports needed to overcome them – and should be sent to paul@cardi.ie.

Background

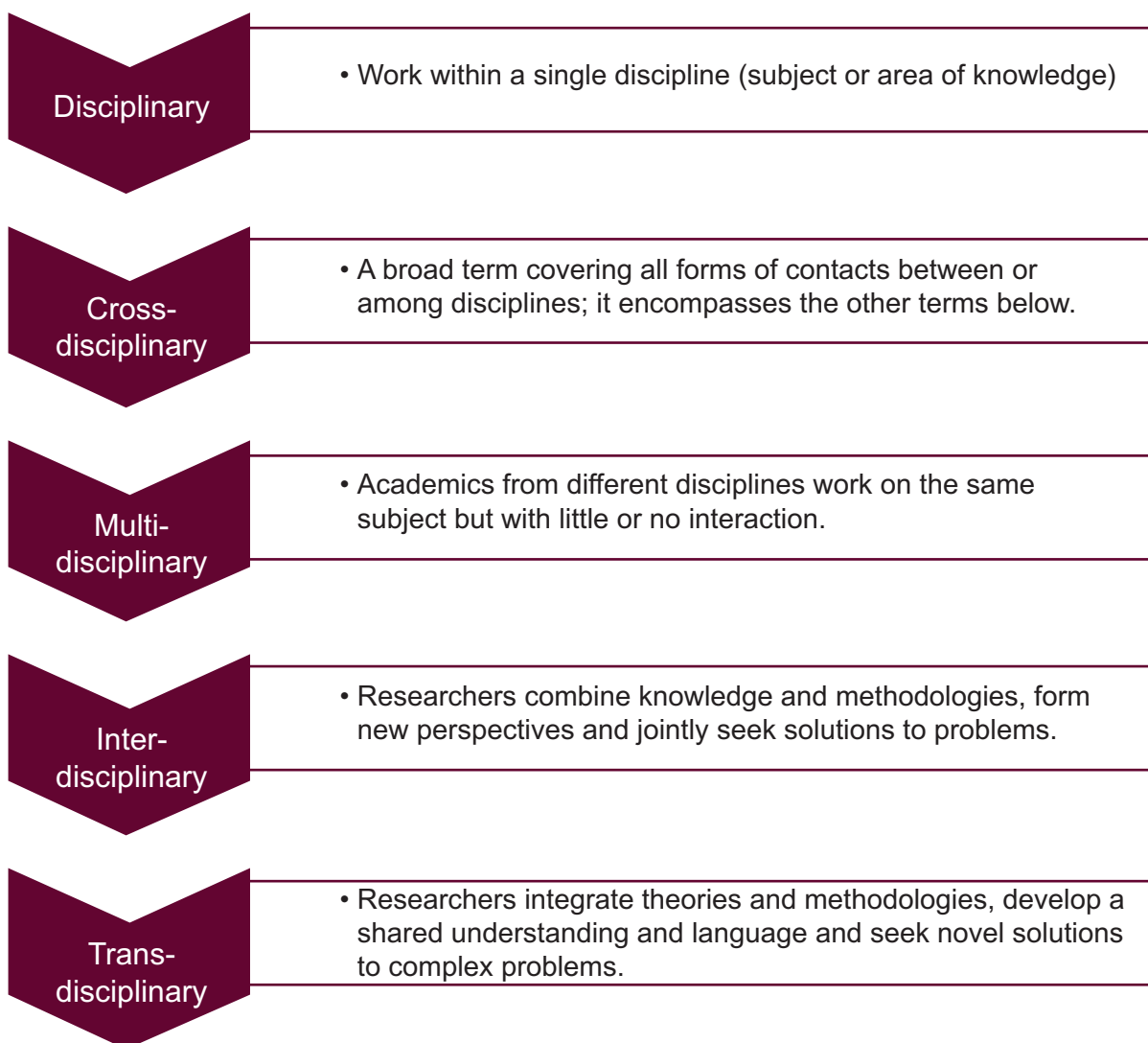
All applications for CARDI's Collaborative Research Grants Programme must be both cross-border and interdisciplinary. The first of these preconditions is straightforward but many researchers who applied in Call 1 did not appear to appreciate fully the nature or implications of interdisciplinary research or how the term differs from multidisciplinary or cross-disciplinary work.

The aim of this article, therefore, is to elaborate on the idea of interdisciplinarity so that applicants for Calls 2 and 3 can have a better understanding of what we require and that others interested in this issue can plan their research more effectively.

Definitions

There are differences in terminology in the literature on disciplinarity and relations between different disciplines. Figure 1 gives working definitions of different terms along a continuum; they will be discussed further below.

Figure 1: a continuum of research



Why interdisciplinary research?

We can answer the question of what we mean by interdisciplinary research, and more particularly what CARDI is seeking in grant applications, if we understand the reasons for it.

One starting point is that life is inherently complex because of the interplay of many different influences. Research needs to reflect this complexity; it cannot examine issues through one lens but must study them comprehensively if it is to understand them. Research can help solve societal problems only if it takes account of the many forces that combine to create them. This is particularly true of ageing research since the issues facing our society and older people span every subject imaginable. The United Nations framework for ageing research, for example, covers 109 different subjects (McGill 2008).

Stokols (2006) argues that the demand for transdisciplinary research is implicit in Kurt Lewin's call after World War II for research to solve problems in society like prejudice and racial conflict, even though Lewin worked in the single discipline of psychology. Later writers argued in addition that problem-solving research: "depends heavily on the adoption of community partnering strategies in which researchers, lay citizens and community leaders work together, often over extended periods, in a highly collaborative and equitable fashion" (Stokols 2006 p64). Hence, CARDI's focus on cross-sectoral work (academic, public, private and voluntary sectors) and the engagement of older people in research.

A common theme in the literature is that interdisciplinary research is particularly concerned with exploring issues that arise in society, from the challenges of nanotechnology or the potential of bioengineering to the genetics of ageing or the role of older people

Interdisciplinarity research example 1

A research network is being proposed linking up spatial planning, rural development, clinical and population studies, geography, social care and others to investigate healthy ageing in rural communities. (CARDI Grants Programme Call 1)

in diaspora studies. Klein (1990 p188) argues that inter-disciplinarity is "neither a subject matter nor a body of content. It is a process for achieving an integrative synthesis, a process that usually begins with a problem, question, topic, or issue". Brewer (1995 p328) argues that in interdisciplinary research: "Problems designate theory and methods, not the reverse, in sharp contrast to discipline-based and curiosity-driven inquiry."

Looking at the reasons for interdisciplinary research from a different angle, the National Academy of Sciences in the USA teamed up with the National Academy of Engineering and Institute of Medicine, in a major National Academies study of the subject. Its report (2004 pp 30-39) set out four powerful drivers of interdisciplinary research:

1. the inherent complexity of nature and society
2. the drive to explore basic research problems at the interfaces of disciplines
3. the need to solve societal problems
4. the stimulus of generative technologies

Interdisciplinarity research example 2

Psychology, electrical engineering, physiotherapy, neuroscience and medicine are coming together to examine the issue of cognitive decline in older people and recovery from neurological illness. (CARDI Grants Programme Call 1)

Defining interdisciplinarity – the literature

A review of the literature yielded several definitions of interdisciplinary research; indeed some writers on the subject, such as Heckhausen (1972), have identified as many as six different gradations of the concept. Likewise an early definition from the OECD (1972) emphasises that there is a continuum of engagement within interdisciplinary effort itself.

Figure 2: definitions of interdisciplinarity

Authors	Aims	Features
OECD (1972)	To work on a common problem	Mutual integration of organising concepts, methodologies, procedures, epistemologies, terminologies and data. Continuous intercommunication
Heckhausen (1972) (composite interdisciplinary)	An effort at problem solving	Apply different techniques
Mosilla and Gardner (2004)	To reach a cognitive or practical goal eg understanding, solving a problem. Advance understanding (e.g., explain phenomena, craft solutions, raise new questions)	Disciplinary lenses integrated. Mutually informative networks. Integrates knowledge and modes of thinking
National Academies USA (2004)	To advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline	Integrates information, data, techniques, tools, perspectives, concepts, and/or theories. An integration and synthesis of ideas and methods
Davies and Devlin (2007)	To investigate areas too complex for a single discipline	Combine expertise
Kagan (2007)	[Concern with promoting community psychology, the study of people in context eg natural catastrophes]	Researchers bring their different practices and methodologies, integrate their knowledge, share information and work closely together on an issue

This helps to explain why, in Call 2 of the CARDI grants programme, interdisciplinarity is both a precondition and a criterion for assessing applications. Some degree of interdisciplinarity will need to exist for an application to be considered at all (the precondition) but the grants panel will be looking for the greatest degree of collaborative work possible (the criterion).

Figure 2 sets out six definitions that have been used and the aims and features their authors have identified for interdisciplinary research. They reveal a good deal of common ground. For example there is general agreement on the idea that interdisciplinary research requires some degree of 'integration', a word that is used specifically in four of the definitions. People cannot work independently of one other, doing separate bits of a research project, but rather must share ideas, knowledge and concepts from their varying disciplines in a manner that combines (or 'integrates') them to form new theories and perspectives.

This demands effective communication, from Kagan's reference to sharing information through to the OECD's more demanding requirement for continuous intercommunication. This requires a high level of engagement from all the researchers participating in a research project; they have to communicate not only with fellow academics from other disciplines but also with older people, people from different sectors and policy-makers and service-providers.

A third aspect of the definitions that merits comment is the extent to which they reinforce the point made earlier – that research is not carried out for its own sake but in order to throw light on issues affecting society. All six commentators make this point whether implicitly, such as Davies and Devlin; by example, such as Kagan's reference to the role of psychology in recovery from natural disasters; or by explicit

Interdisciplinarity research example 3

Academics from bioengineering, psychology, civil, structural and environmental engineering and health come together to examine accidents to older people on buses; they use their varying expertise to make a case for changes to bus design and to driver training to modify acceleration and braking (Palacio et al 2009).

reference to problem-solving in the other four definitions.

In order to make the definition of interdisciplinary more explicit, this article concludes by setting out two of the definitions in more detail, both of them reflecting the sort of engagement CARDI is seeking in its grants programme. The first is from the National Academies (2004, p26):

"Interdisciplinary research (IDR) is a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or field of research practice."

Interdisciplinarity research example 4

In order to treat malnutrition in older people, it is important to be able to assess not only a person's food intake but also physical, mental health and cognitive factors that might be contributing to the problem ... This research will not only improve measurement of nutrition, physical health, mental health and cognitive function but will also improve our understanding of the relationships between these factors. Astell (2008, p6).

The report explains how this differs from multidisciplinary investigation:

“Research is truly interdisciplinary when it is not just pasting two disciplines together to create one product but rather is an integration and synthesis of ideas and methods ... For purposes of this discussion, multidisciplinary research is taken to mean research that involves more than a single discipline in which each discipline makes a separate contribution. Investigators may share facilities and research approaches while working separately on distinct aspects of a problem. For example, an archaeological program might require the participation of a geologist in a role that is primarily supportive.” (p27)

Another definition of interdisciplinarity comes from UK research where Kagan (2007), building on the work of Rosenfield and Stokols, believes it occurs when:

“Researchers or practitioners from different fields bring their different practices and methodologies, and integrate their knowledge, share information and work closely together on an issue.”

Conclusion

The definitions above make clear that interdisciplinary research can be defined in different ways and that the concept is quite broad. What is apparent is that it is more than just a casual borrowing of expertise from one discipline to another. It may be a sensible use of expertise, for example, for an academic to use a statistical expert to analyse data he/she has collected. For it to go beyond the notion of ‘multidisciplinary’ there must be a real meeting of minds from different disciplines.

As a minimum, interdisciplinary research must include active engagement by two or more disciplines and some integration of perspectives, language or methodology, leading to novel or enriched solutions to problems that would not be possible if investigated through the lens of a single discipline.

References

Astell A (2008). *NANA: Novel Assessment of Nutrition and Ageing* in NDA News, Issue two.

Brewer D G (1999). The Challenges of interdisciplinarity. *Policy Sciences*. 32, 327-337.

Davies M and Devlin M (2007). *Interdisciplinary higher education: Implications for teaching and learning*. Centre for the Study of Higher Education, University of Melbourne.

Heckhausen H. (1972). *Discipline and Interdisciplinarity* in *Interdisciplinarity: Problems of Teaching and Research in Universities*. Paris: OECD, pp. 83-89.

Kagan C (April 2007). Working at the 'edge' Making use of psychological resources through collaboration, *The Psychologist*, Vol 20 No 4. See www.thepsychologist.org.uk/archive/archive_home.cfm?volumeID=20&editionID=146&ArticleID=1172 (Accessed 9 July 2009).

Klein J T (1990). *Interdisciplinarity: History, Theory and Practice*. Detroit: Wayne State University Press.

Mansilla VB and Gardner H (2004). Assessing Interdisciplinary Work at the Frontier. An empirical exploration of 'symptoms of quality'. Paper at Rethinking Interdisciplinarity conference, Jan 2004, published online at www.interdisciplines.org/interdisciplinarity/papers/6 (accessed 6 August 2009).

McGill P (2008). Mapping research in Ireland against the UN Research Agenda on Ageing for the 21st Century (2007 Update). CARDI, Dublin and Belfast, available at www.cardi.ie/userfiles/UN%20mapping%20framework%206%20Jan%202009.doc

National Academy of Sciences, National Academy of Engineering and Institute of Medicine of the National Academies (2004). *Facilitating Interdisciplinary Research*.

Washington DC: The National Academies Press.
www.books.nap.edu/openbook.php?record_id=11153&page=1 (accessed 22 July 2009)

National Institutes of Health, USA (undated). *Inter-disciplinary Research*, published online at www.nihroadmap.nih.gov/interdisciplinary/ (accessed 31 March 2009).

OECD (1972). *Interdisciplinarity: Problems of Teaching and Research in Universities*. Paris: OECD.

Palacio A, Tamburroa G, O'Neill D, Simms C (2009). Non-collision injuries in urban buses—Strategies for prevention. *Accident Analysis and Prevention* 41 (2009) 1–9. Elsevier. Available at www.tcd.ie/bioengineering/documents/AccidentAnalysisandPrevention2009.pdf

Rosenfield PL (1992). The potential for transdisciplinary research for sustaining and extending linkages between the health and social sciences. *Social Science and Medicine*, 35, 1343–1357.

Stokols D (2006). Toward a science of transdisciplinary action research. *American Journal Community Psychology*, 38: 63–77.

For further information contact:

Paul McGill, Strategic Research Officer, CARDI, t: +44 (0) 28 9069 0066; m: +353 (0) 8679 04158; paul@cardi.ie

Forestview
Purdy's Lane
Belfast BT8 7ZX
t: + 44 (0) 28 9069 0066
f: + 44 (0) 28 9064 6604

Level 5
Bishops Square
Redmond's Hill, Dublin 2
t: + 353 (0) 1478 6300
f: + 353 (0) 1478 6319

www.cardi.ie
info@cardi.ie

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