

**Impact case study (REF3b)**

<p><b>Institution:</b> University of Hull</p>
<p><b>Unit of Assessment:</b> C19: Business and Management Studies</p>
<p><b>Title of case study:</b> Systems thinking in the public and private sectors: applications of methodological innovation in Australia and New Zealand</p>
<p><b>1. Summary of the impact</b> (indicative maximum 100 words)</p> <p>Hull-based research on critical systems thinking has been used for public, private and community benefit in Australasia, due to pivotal partnerships with the International Centre for Complex Project Management in Australia and the Institute of Environmental Science and Research (ESR) in New Zealand. Benefits include: the reconciliation of economic and environmental imperatives in NZ water management, valued at NZ\$1.7bn of economic growth; NZ\$6.2m for ESR projects serving government clients; improved stakeholder consultation on NZ science investments; the development of new systems thinking capacity in the Victoria Department of Primary Industries (Australia); and 5% cost savings in key Australian defence procurements.</p>
<p><b>2. Underpinning research</b> (indicative maximum 500 words)</p> <p>Two systemic intervention paradigms emerged between 1950 and 1985. The first involved the development of quantitative methodologies for understanding and intervening in complex social and organisational problems. The second focused on methodologies for structuring dialogue between stakeholders with different perspectives to enhance their appreciation of complexity and facilitate better mutual understanding. By the mid-1980s, these paradigms had become unhelpfully polarised, and the Centre for Systems Studies (CSS) at Hull played a leading role in transcending the paradigm divide and further enhancing the utility of systemic intervention.</p> <p>CSS staff initiated a research programme on <i>critical systems thinking</i> (CST). This featured two substantial theoretical and methodological developments, with key innovations published post-1993:</p> <ol style="list-style-type: none"> <li>1. <i>Boundary critique</i>: theory and methodology for understanding connectivity, multiple perspectives, stakeholder conflict and power relations when exploring complex issues. In particular, substantive research has been undertaken in CSS on processes of marginalisation during stakeholder engagement and how these can be addressed in systemic interventions (e.g., Midgley et al, 1998; Midgley, 2000).</li> <li>2. <i>Methodological pluralism</i>: methodology for creatively mixing methods drawn from different paradigms when seeking to address complex organisational, social and environmental problems. In particular, several influential books have offered theory and frameworks for understanding the strengths and weaknesses of a range of systems methodologies, and they offer guidance on designing bespoke systemic interventions that are responsive to the local context (e.g., Jackson, 2000, 2003; Midgley, 2000).</li> </ol> <p>CST research has developed systems theory and methodology alongside its application in systemic interventions to address complex issues and deliver benefits to organisations and their stakeholders. New theory has been tested in practice, and reflections on the latter have given rise to further theoretical and methodological developments.</p> <p>Over 50 systemic interventions have been undertaken by Hull staff and PhD students since 1993, and income for CST research has been received from a range of funders, including the ESRC; EPSRC; Office of the Deputy Prime Minister; British Council; National Natural Science Foundation of China; KPMG Ltd; Rowntree Foundation; Leverhulme Foundation; Hull City Council; the Children’s Society; and Manchester, Salford &amp; Trafford Health Action Zone. Innovations in boundary critique and methodological pluralism were generated in all of this externally-funded research. CST has informed decision making in government, industry and voluntary organisations since its inception, and significant impacts have been experienced since 2008, particularly in</p>

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Australia and New Zealand.

Members of CSS involved in the underpinning research have included:

- Robert Flood (Professor 1989-1998)
- Amanda Gregory (Research Assistant 1990-1996, Senior Lecturer 2000-present)
- Wendy Gregory (Lecturer 1989-2001, Senior Lecturer 2001-2003)
- Mike Jackson (Lecturer 1979-1988, Senior Lecturer 1988-1990, Professor 1990-1994 and 1999-2012, Emeritus Professor 2012-present)
- Gerald Midgley (Research Assistant 1990-1992, Research Fellow 1992-1997, Senior Research Fellow 1997-2002, Reader 2002-2003, Professor 2010 to present)
- John Oliga (Research Fellow 1993-1996)
- Norma Romm (Research Fellow 1993-1996, Senior Research Fellow 1996-2003)
- Jennifer Wilby (Research Assistant 1994-1996, Research Fellow 2000-2004, Lecturer 2004-2011, Senior Lecturer 2011-present).
- Zhichang Zhu (Lecturer 1995-1997 and 1999-2001, Senior Lecturer 2001-2007, Reader 2007-present)

Other staff, PhD students and international visitors were also more peripherally involved.

**3. References to the research** (indicative maximum of six references)

1. Flood, RL & Romm, NRA (eds.) (1996) *Critical Systems Thinking: Current Research and Practice*. Plenum Press, New York.
2. Jackson, MC (1999) Towards Coherent Pluralism in Management Science. *Journal of the Operational Research Society*, 50, 12-22.
3. Jackson, MC (2000) *Systems Approaches to Management*. Kluwer/Plenum Press, New York.
4. Jackson, MC (2003) *Systems Thinking: Creative Holism for Managers*. Wiley, Chichester.
5. Midgley, G, Munlo, I and Brown, M (1998) The Theory and Practice of Boundary Critique: Developing Housing Services for Older People. *Journal of the Operational Research Society*, 49, 467-478.
6. Midgley, G (2000) *Systemic Intervention: Philosophy, Methodology, and Practice*. Kluwer/Plenum Press, New York.

References 1, 3, 4 and 6 are fully refereed books with reputable publishers. References 2 and 5 are in a journal rated 3\* by the Association of Business Schools. Primarily, books have been chosen for this list because each one represents a key advance in CST inquiry. These books have been widely cited, and have been read by many non-academics (later, evidence is presented that the CEO of Environment Canterbury read book 6, and this was pivotal in the delivery of an impact).

**4. Details of the impact** (indicative maximum 750 words)

This case study focuses on impacts in Australia and New Zealand (NZ) that were enabled by two CSS researchers working with non-academic partner organisations. The model for impact generation in both countries was:



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In Australia, Professor M Jackson has been working with the *International Centre for Complex Project Management* (ICCPM). The purpose has been to improve the delivery of complex projects by applying systems thinking. Jackson's research on CST was strongly influential in the design of ICCPM's *Complex Project Manager Competency Standards*, Version 4.1, 2012 (see especially Preface, Foreword, 'Projects as Systems' and View 1: 'Systems Thinking and Integration'). The CEO of ICCPM can attest to the influence of Jackson's research on the Standards [7].

Jackson's work was also central in the design of an Executive Masters Programme in Business (with streams in 'Complex Project Management' and 'Strategic Procurement'), launched in 2008 and jointly developed by ICCPM, Queensland University of Technology (QUT) and the Defence Materiel Organisation (DMO). The aim was to provide a vehicle to educate senior project managers in the Standards. Jackson's 2003 book is a core text on the programme; Module 1 ('Systems Thinking') is based on his CST research; he has authored a 'Learning Guide' and case studies for this module; and regularly teaches on the degree. The DMO has formally audited the programme and identified "a 5% cost/benefit realisation if graduates from the program are placed on major DMO projects after completing the program" (letter from the General Manager Commercial, Australian Government Department of Defence, 30/5/2011 [8]).

Finally, the ICCPM Executive Education course 'Systems Thinking and Complex Project Management', the most popular of its foundation courses, was developed by Jackson; it uses his 2003 book; employs a 'Learning Guide' authored by him; and Jackson, as an Associate Partner of ICCPM, frequently delivers the course. Since its launch in August 2011, this course, for which Jackson has intellectual property rights, has been taught to over 250 delegates. There have been 11 deliveries in Australia to 325 delegates from organisations such as DMO-Maritime, DMO-Land Systems, Defence -Joint Logistics Command, Australian Submarine Corporation (ASC), Boeing, Australian Aerospace and Airservices; with further international deliveries in Canada (Thales), the USA and the UK (BAE Systems, twice). The CEO of ICCPM, can evidence this [7].

In New Zealand, Professor G Midgley has been working with the government-owned *Institute of Environmental Science and Research* (ESR). In 2003, he took up the full-time position of Senior Science Leader in that organisation. For 7 years he led and contributed to ESR's systemic interventions in both New Zealand and Australia. He also mentored ESR social scientists in the application of CST before returning to CSS in 2010. ESR continues to use the ideas from his Hull research to inform applied projects for the benefit of government, stakeholders and communities. An impact on ESR of using Midgley's research to inform funding bids is income from 2008 to 2012 of NZ\$6.2m. Knock-on impacts for ESR's government clients and communities include the following:

In 2010, ESR undertook a project in partnership with Environment Canterbury (ECan), the Regional Government, to identify strategic water management options for Canterbury, NZ. The methodology for the project was selected through reflections by the CE of ECan on Midgley's 2000 book, plus discussions with the author (the CE may be contacted to provide verification [9]). The CE has said that the project was pivotal in the successful development and adoption of the Canterbury Water Management Strategy (CWMS), which is designed to balance economic growth and environmental protection into the future. Beneficiaries include farmers, the Regional Council, environmental groups, a Māori tribe, and all water users in Canterbury. Prior to the CWMS, there were entrenched conflicts over water allocations and water quality, plus costly court cases and decision paralysis in the Council. The ESR project identified options that all stakeholders could live with. Prior to ESR's work with ECan, a forecast was commissioned of the economic impacts that a CWMS would have if it was able to overcome the stakeholder conflict. This was valued at up to NZ\$1.7bn of additional GDP for NZ (Harris, 2009) [10].

In 2007/8, Midgley undertook an evaluation of the process of producing four 'Roadmaps' for 30 years of national investment in biotechnology, nanotechnology, energy and environment research. The client was the NZ Ministry for Research, Science and Technology (MoRST). The evaluation drew upon research on boundary critique (e.g. Midgley et al, 1998; Midgley, 2000) to inform both stakeholder identification and the design of a participative workshop to develop recommendations

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for change. “The final evaluation report... was discussed by the Ministry’s Senior Management team in a debrief of the direction setting process and influenced thinking on how best to communicate the rationale for future direction setting documents” (testimonial from the CEO of MoRST [11]). A key recommendation from the evaluation was that stakeholder engagement should happen before a 1<sup>st</sup> draft of a Roadmap is produced. This “had an immediate impact on how further direction setting work was undertaken. A follow-up Food Roadmap took into account the need for stakeholder engagement before too many decisions were made, and paid more attention to explaining how any information from those consulted would be used” (CEO of MoRST [11]). Immediate beneficiaries were MoRST (who had the means to make the Food Roadmap, and subsequent direction setting documents, more responsive to stakeholders than previous roadmaps) and science and industry organisations (who were offered greater influence on the framing of the Food Roadmap).

In 2009, Midgley was commissioned by the Department of Primary Industries (DPI), Victoria State Government, Australia, to externally review the DPI’s systems thinking programme of activities. He also gave public lectures on his research to over 600 policy makers; facilitated 3 workshops with DPI staff on how to use CST ideas in their practice; and met senior managers to discuss how the DPI’s systems thinking program could be further developed. These engagements all drew heavily on Midgley’s (2000) research. The impacts on DPI included renewal of funding for systems thinking capability development (AU\$250k); agreement by senior managers that systems thinking should be listed as an ‘essential skill’ for staff; and two DPI projects worth AU\$470k applied Midgley’s ideas to facilitate knock-on impacts for rural communities. One project facilitated farmers in influencing the State Government’s strategic spatial planning; and the other is supporting 6 local governments in collaborating on regional development (see testimonial evidence from the Centre Leader, Department of Primary Industries, Parkville [12]). This case illustrates a ‘domino effect’: Midgley’s research underpinned ESR work with the DPI, which in turn used the ideas to generate their own impacts in local communities.

**5. Sources to corroborate the impact** (indicative maximum of 10 references)

7. The CEO of ICCPM can attest to the influence of Jackson’s research on the ICCPM’s *Complex Project Manager Competency Standards*. He may be contacted.
8. Letter of support to QUT from the General Manager Commercial, Australian Government Department of Defence, 30/5/2011, attesting to a 5% cost saving in defence procurements. Available on request.
9. The ex-CE of Environment Canterbury (now a professor at the University of Canterbury) can be contacted to verify the information given concerning the influence on the Canterbury Water Management Strategy.
10. Harris (2009). *Economic Modelling: A Tool to Assist Evaluation of the Canterbury Water Management Strategy and Trial Scenario 1 Assessment*. Harris Consulting, Aqualink Research, Agribusiness Group & Butcher Partners: Christchurch, NZ.
11. Testimonial from the CEO of MoRST. Available on request.
12. Testimonial from the Centre Leader of DPI Parkville. Available on request.