

**University of Canberra**

**Human Problem Solving:**

Exploring a systematic process for evoking and using extra-domain knowledge in the creative re-conceptualization of a problem

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A thesis submitted in fulfilment of the requirements of the Degree of Doctor of Philosophy of the University of Canberra.

MAY 2013

# Abstract

Creativity in human thought is highly valued but elusive, being most often associated with a small group of expert individuals. Yet all individuals possess the ability to respond to problem situations in creative ways. This thesis demonstrates that novices, facing complex, ill structured problem situations, can create novel responses by systematically mobilising their extra-domain knowledge that is normally dormant or only revealed in chance flashes of insight.

Literature that examines the development and use of mechanisms underpinning the evocation and use of extra-domain knowledge, though extensive, is dispersed and little studied in aggregate. This study designed a process for evoking and using knowledge by distilling and integrating key mechanisms present in four overlapping research fields: problem solving, creativity studies, analogical reasoning and embodied cognition. The knowledge process was then reified in a human-centred knowledge instrument.

A qualitative design science fieldwork project that explored the iterative development and trialling of the knowledge instrument was conducted from 2010-2011. Feedback from participants steered the incremental development of the instrument. The thesis recounts the increments using excerpts of participants' experience that illustrate and trace the movement in their thinking as they followed the knowledge process.

Analysis of the study's findings indicates that the majority of participants generated novel actions to address an ill structured problem in one domain by systematically evoking and using their own knowledge from a distant domain. In particular, the study's findings indicate that when faced with complex, ill structured problem situations novices can move beyond the ambiguous, spontaneous approaches reported in the literature.

The thesis demonstrates that the knowledge process provides a promising tool for systematically using an individual's knowledge and concludes that the knowledge process warrants further trialling and exploration in other contexts that require the unlocking of context-bound knowledge.

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# Acknowledgements

This dissertation journey would not have been possible without the guidance and help of numerous individuals who extended their invaluable assistance and support in the preparation and completion of this study.

My thanks go first to my supervisors for their unselfish and unfailing patience, expertise and support. To Professor Trish Milne, my initial primary supervisor: every journey starts with a single step and in my case a push. To Trish, my thanks for the push and for staying with me for a much lengthier ride than we anticipated and for helping me juggle work, life and study. To Professor Craig McDonald, my second primary supervisor, many thanks for agreeing to take up my supervision and for providing the academic guidance and pragmatic navigational cues when I sought to alter course yet again. I am particularly grateful to Professor Sally Burford, my support supervisor, for her patience, expert insights and her eye for detail.

I am grateful to Rosemary Jennings for her invaluable assistance in the early editing process and to Jennifer for the final copy edit. I would like to acknowledge the financial support and flexible work environment provided by Octo Consulting and the financial support provided by the University of Canberra in my final semester. Thanks also to the staff of the Graduate Support Office and the UC Library.

I am grateful to all those who agreed to participate in this study. Study participants gave up their valuable time to engage in a lengthy interview process involving somewhat abstruse cognitive tasks. Thanks for persevering! Special thanks to Pete Morris, for first enduring the process, and then agreeing to facilitate the process with a number of other participants.

I thank my friends for their support, encouragement and humouring of what, for many of them, seemed an odd pursuit. Many thanks to my parents Joyce and Peter and my extended family for clapping from the sidelines even though their hands became very sore (nice line Pip). Particular thanks to my parents-in-law, Tom and Moira, for their ongoing encouragement and support over the years and for a very timely structural edit of this thesis.

Finally, and most importantly, thanks go to my immediate family. Mid-life crises often result in the purchase of fast cars. In my case it was a long slow ride on a penny farthing. Sitting high in my saddle I had a great view but I never moved particularly fast. I thank Kate, for her unstinting belief in me; her love and support I cherish. Our children, Alyce and Jack, have supported this project from the start and I am grateful for their acceptance of their rather unorthodox father. Their love and laughter have sustained me on the journey.