Optimising Visual Solutions for Complex Strategic Scenarios

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Thomas Jack Huggins

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I. Abstract

Attempts to pre-emptively improve post-disaster outcomes need to reflect an improved understanding of cognitive adaptations made by collaborating researchers and practitioners. This research explored the use of visual logic models to enhance the quality of decisions being made by these professionals. The research looked at the way visual representations serve to enhance these decisions, as part of cognitive adaptations to considering the complexity of relevant pre-disaster conditions constituting community resilience. It was proposed that a visual logic model display, using boxes and arrows to display linkages between activities and downstream objectives, could support effective, efficient and responsive approaches to relevant community resilience interventions being carried out in a pre-disaster context.

The first of three phases comprising this thesis used Q-methodology to identify patterns of opinions concerning building a shared framework of pre-disaster, community resilience indicators for this purpose. Three patterns identified helped to assess the needs for applied research undertaken in phase two. The second phase of this thesis entailed building an action-focused logic model to enhance associated collaborations between emergency management practitioners and researchers. An analysis of participant interviews determined that the process used to build this logic model served as a catalyst for research which could help improve community resilience interventions. The third phase used an experimental approach to different display formats produced during phase two to test whether a visual logic model display stimulated a higher quality of decisions, compared with a more conventional, text-based chart of key performance indicators. Results supported the use of similar methods for much larger scale research to assess how information displays support emergency management decisions with wide-ranging, longer-term implications.

Overall, results from these three phases indicate that certain logic model formats can help foster collaborative efforts to improve characteristics of community resilience against disasters. This appears to occur when a logic model forms an integrated component of efficient cognitive dynamics across a network of decision making agents. This understanding of logic model function highlights clear opportunities for further research. It also represents a novel contribution to knowledge about using logic models to support emergency management decisions with complex, long term implications.

II. Preface

This thesis is based on three research manuscripts. The first manuscript was published in the Journal of Contingencies and Crisis Management in 2015, following two rounds of peer review. The second manuscript was published in the International Journal of Disaster Risk Science in 2015, following two rounds of peer review. The third manuscript was published in Disaster Prevention and Management in 2015, following one round of peer review.

The ideas presented in this thesis are completely my own. My supervisors helped me to refine my arguments. They provided me with advice regarding methods and statistical analysis and they helped to edit each of the three manuscripts. For these reasons, Dr Robin Peace, Dr Stephen Hill, Dr David Johnston and Dr Alicia Cuevas Muñiz have been acknowledged as co-authors for the three publications comprising this thesis.

Thomas Huggins
Doctoral Candidate
Massey University

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[1] This is the official trading name of the organisation formerly known as the Institute of Geological and Nuclear Sciences.

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VI. List of Abbreviations

ICoE:CR	International Centre of Excellence: Community Resilience
IFRCRCS	International Federation of Red Cross and Red Crescent Societies
IKM4DRR	Information and Knowledge Management for Disaster Risk Reduction
IRDR	Integrated Research on Disaster Risk
UNISDR	United Nations Office for Disaster Risk Reduction
VMEP	Visual Monitoring and Evaluation Planning
WREMO	Wellington Region Emergency Management Office