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Special issue on problem structuring research and practice: editorial

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Special Issue on **Problem Structuring Research and Practice**

Problem Structuring Research and Practice for the next decade: looking back to go forward

This special issue brings together a collection of papers concerned with problem structuring research and practice. Within the field of operational research, facilitated intervention through a combination of process guidance and modelling work is commonly associated with supporting individuals or groups facing complex problems. This focus has been the remit of research on *problem structuring methods* (Ackermann, 2012; Mingers & Rosenhead, 2004).

Since the 1970s, problem structuring research and practice have produced a range of well-known approaches such as SODA (Eden & Ackermann, 2001), Soft Systems Methodology (Checkland, 1981), and Strategic Choice (Friend & Hickling, 2005), augmented with methods such as Robustness Analysis (Rosenhead, 2001), Drama theory (Bennett, Bryant, & Howard, 2001), Group Model Building (Vennix, 1996) and Value Focused Thinking (Keeney, 1992). In addition, books and past special issues reflecting their underlying theory and practice (Franco, Shaw, & Westcombe, 2006; Mingers & Rosenhead, 2012; Reynolds & Holwell, 2010; Rosenhead & Mingers, 2001; Shaw, Franco, & Westcombe, 2007) have provided valuable resources for researchers and practitioners alike. However, whilst there have been notable successes, thinking and reflection on the development of the field reveal some challenges that need to be addressed if the field is to continue moving forward.

We start this editorial with a brief discussion that picks up and explores eight specific challenges, namely: (1) maintaining high quality standards in problem structuring work; (2) identifying generalisable model findings; (3) building on prior problem structuring research; (4) developing effective support for multi-organisational collaborative working; (5) ensuring the desired level of neutrality in modelling process and content; (6) developing effective procedures for mixing methods; (7) developing and using problem structuring support in non-western cultures; and, (8) borrowing and developing theory to understand and inform problem structuring practice. We hope that highlighting these challenges will prompt current and future researchers to address the emerging drawbacks and be a catalyst to take the field of problem structuring further.

The challenges

The first of the challenges is *ensuring that the intervention practice in this area is conducted in a high quality manner*. Not surprisingly, problem structuring work involves dealing with subjectivity and, therefore, there is the risk that any intervention undertaken with any form of structured brainstorming fits within the remit. In addition, interventions that use particular tools from a problem structuring method (e.g. a 'rich picture') without paying careful attention to the method's underpinning theory or design rationale also pose a risk. Sadly this has resulted in cases appearing in journals presenting problem structuring work that is not theoretically or analytically sound, which potentially undermines the credibility of the area – a potentially fatal consequence given the scepticism shown by many in the operational research world for 'soft' OR modelling (Mingers, 2011). When conducting and reporting problem structuring interventions that involve existing or new methods, then adherence to the constitutive principles (Yearworth & White, 2014) or theoretical frameworks underpinning these methods is paramount if the field is to grow and be sustainable in the future.

This leads directly to our second challenge of *developing generalisable model findings*. Whilst there has already been some progress in determining generalizable process elements, as evidenced through recent work on modelling scripts (Ackermann, Andersen, Eden, & Richardson, 2011; Hovmand et al., 2012; Tavella & Papadopoulos, 2014) and facilitation practices (Azadegan & Kolfschoten, 2012; Taket, 2002; Tavella & Franco, 2014), there has been little consideration as to whether it is possible to derive from model findings generic problem archetypes for problem structuring work in the manner evidenced, for example, by the systems dynamics and decision analysis communities (von Winterfeldt & Fasolo, 2009; Wolstenholme, 2004). Research exploring whether and what motifs or configurations exist within the problem structuring research space would provide valuable help for those embarking upon the use of problem structuring methods, and would also provide interesting insights for further theoretical development.

Related to the above challenge is a third challenge, namely, *encouraging researchers to build on prior problem structuring research rather than continuously reinvent the wheel*. All four guest editors of this special issue have had experiences whereby they review papers that take no cognisance of prior published work. For example, conceptualisations and measurement methods for a range of claimed problem structuring intervention impacts (e.g. learning, consensus, commitment) have already been developed and tested (see the reviews mentioned

below). The lack of recognition of this body of knowledge results in the field not being moved forward as extensively as it could as well as potentially alienating researchers. One possible explanation for this is the fact that problem structuring methods attract academics and practitioners from a wide range of disciplines, not just operational research, and thus familiarity with previous work can be limited. This suggests a need for building 'knowledge reservoirs' where the research into the area can be pooled. Examples of such reservoirs are the reviews of evaluation studies (Mingers & Rosenhead, 2004) that are beginning to appear, as part of an evidence-based agenda (Franco & Montibeller, 2010; Learmonth, 2008; Rouwette, Vennix, & van Mullekom, 2002). Such a resource would also be of great interest to those teaching/learning problem structuring methods. Whilst there are a number of good books and publications, one of the biggest stumbling blocks has been, and probably will continue to be, how to become an expert in the use of problem structuring methods (Keys, 2006). The more the community can provide assistance in this area the more the frontiers are going to be extended.

As already mentioned, problem structuring research has had at its forefront an interest in supporting decision makers who are engaged with complex problems. One of the most significant of these is collaborative working. And whilst collaborative working within one organisation is often demanding due to the presence of many different personalities and positions, the demands increase exponentially in a multi-organisational environment. Indeed collaborative working between organisations in the form of alliances, partnerships and joint ventures is a common phenomenon in our present globalised economy. Similarly, many societal problems require careful management of multiple stakeholders representing multiple constituencies to arrive at a solution that is sustainable, politically feasible and manageable in terms of resources. Thus a fourth challenge is concerned with *developing effective problem structuring support for collaborative multi-organisational working*. Although this challenge is not new (e.g. Ackermann, Franco, Gallupe, & Parent, 2005; Eden & Ackermann, 2013; Franco, 2009; Rouwette, Bleijenbergh, & Vennix, 2014; Taket & White, 2000; White & Bourne, 2006), we contend that more work in this area remains an important priority for the problem structuring community.

Support for collaborative multi organisational working also highlights the issue of *ensuring the desired level of neutrality both in terms of the management of process and of content of the modelling effort*. There has been discussion focusing on the contribution of the facilitator – whether it should concentrate on process (P) and content (C) management or whether it

should also acknowledge and incorporate substance (S) (Eden, 1990; Huxham & Cropper, 1994). On the one hand, remaining independent of the situation problematique ensures that any outcomes emanating from the intervention have greater ownership and are thus more likely to be adopted; on the other hand, injection of substantive expertise can sometimes be helpful to a client, and perhaps inevitable in particular circumstances. Our view is that there is significant scope for further exploring this aspect of problem structuring practice.

Support for collaborative multi organisational working has also given rise to the rapidly growing field of *developing effective procedures for mixing methods* –our sixth challenge. We are strong advocates of mixing methods, as this allows the field to stay fresh and vibrant as well as allowing the necessary extensions/adaptations to provide the means for managing a broader range of problems –*the call for pragmatism*. Furthermore, the very act of mixing methods helps widen awareness of the research area as many of the mixes incorporates problem structuring research into different discipline backgrounds for example engineering, agriculture, health and energy. This will lead to innovative developments. That said, mixing for mixing's sake should be avoided: care does need to be exercised to ensure that a balance is maintained between renewal and rigour to adhere to the original guidelines of individual methods –*the call for theory informed approach*.

A seventh challenge focuses on *developing and using problem structuring methods in different cultures*. The majority of the work that is published in the literature is predominantly 'western' and thus very much focused on one paradigm of thinking. The work by Hofstede (2001) and Trompenaars and Hampden-Turner (2012) shows that there are quite different paradigms to be considered and therefore further frontiers to be researched. To date, with some notable exceptions (e.g. Li & Zhu, 2014), work in this area is almost nonexistent.

Finally, and allied to all the challenges noted above, there is the critical challenge of *borrowing and developing theory to further our understanding of problem structuring practice*. Concepts developed in psychology, sociology and economics are commonly used by management scholars to identify ways to understand and improve organisational practices (Whetten, Felin, & King, 2009). As a particular type of organisational practice, the use of problem structuring methods could be explained, informed and enhanced by concepts developed in these basic disciplines. Indeed, we argue that good theory borrowing can improve our ability to explain why problem structuring interventions are (or are not) successful in different or similar contexts. In addition, whilst borrowing theory can be useful,

new theories must also be developed if we want to push the field's boundaries further. And although it is unlikely that a single grand theory of problem structuring practice will ever emerge, the development of empirically-grounded mid-range theories (Merton, 1967) is possible and should be encouraged. Our recent efforts to borrow and develop new theories of problem structuring practice have appeared elsewhere (Ackermann & Eden, 2011; Franco, 2013; Rouwette & Vennix, 2006; White, 2009), but much more work is needed in this respect.

In the next section we introduce each of the special papers and refer to their contribution towards resolving the challenges identified above.

The special issue

The paper by Cunningham, Hermans and Slinger explores an extension to existing work on a synthesis of conflict analysis, hypergame analysis, theory of moves and the analysis of options and as such meets challenge 1 and challenge 5 as the paper proposes a new method through the integration (mixing) of existing methods. The authors set out clearly the boundaries of their proposed framework and associated rationale, recognising the subset of problems the proposed method aims to assist. They also sensitively consider the extant literature from a number of domains to produce the framework adding depth to the paper. Finally, they expand the theoretical basis for problem structuring methods by recasting these approaches as game structuring methods.

Curtis, Rajesh and Moon provide a useful contribution to the field from a mixing methods point of view (challenge 6). They start from a 'substrate' model that operates as an agreed picture of issues of concern, which forms a basis for developing prioritised options for consideration by decision-makers. Two different methods for accomplishing this are explored, one based on sequential examination of events in a process and the other using a functional (influence diagram like) approach. They explore the use of substrate models as a substitute for conceptual models in a military setting. The cases used are rich and informative. While the paper was short on evaluating the impact of the approach for the stakeholders, it did provide some general insights into the value of modelling, simulation and problem structuring methods in general (challenge 3). The area of application is novel and thought-provoking. It is a context full of contingencies that call for facilitation and modelling.

In their paper, Keisler, Turcotte, Drew and Johnson address simultaneously two of our challenges. First, their account of the application of a Value Focused Thinking approach with a range of community development corporations, led them to identify a set of potentially generalisable objective hierarchies structures (challenge 2). Second, they make explicit use of an established theoretical framework (the Technology Acceptance Model) to examine the impact of their intervention (challenge 8). This enables them to suggest that community-based operational research practitioners might find organisations similar to the CDC studied in their research to be especially receptive to the use of Value Focused Thinking methods to articulate their objectives.

The paper by Kolfschoten, French and Brazier raises another interesting challenge –that of *aligning problem structuring with research in cognition*. Whilst cognition is not new in this area (with problem structuring approaches such as SODA being supported through cognitive maps) more explicit engagement with the area provides powerful food for thought. Work on resolving this challenge will also touch on the challenge regarding the development of mid-range theory as new contributions from areas such as cognition provide gravitas to the research arena (challenge 8).

Lami, Abastante, Bottero, Masala and Pensa describe the design and implementation of an innovative mixed method approach to support the discussions of a multinational stakeholder group concerned with the planning of the Genoa-Rotterdam railway corridor. The approach combines the Analytical Network Process (ANP) with an Interactive Visualisation Tool (InViTo), and exhibits many elements that are common to a typical problem structuring intervention such as facilitation, visual models, and model-supported dialogue. The approach is intended to be deployed as problem structuring method, with a view to creating a common language for the actors involved and a shared basis for generating fruitful discussions. Seen in this light, the approach presented by the authors takes problem structuring ideas into a novel field of application, while addressing the challenge about developing effective mixed methods procedures identified earlier (challenge 6).

Ormerod's paper is directly related to challenge 1 on ensuring high quality practice. He takes a look at the competences of the facilitator in problem structuring interventions. Similar to traditional OR interventions, he identifies three core facilitation competences: (i) conducting analysis, (ii) managing the process of intervention, and (iii) understanding context. The paper is also an excellent example of building upon prior published problem structuring research

(challenge 3) to produce a novel contribution to the field. He reviews the growing literature on the competences required to deploy problem structuring methods, and identifies the particular demands these methods place on practitioners. Specifically, Ormerod proposes a competence schema in which facilitation skills and the ability to recognise when facilitation is useful, together with an increased emphasis on contextual understanding and ethical concerns feature prominently.

Finally, the paper by Slinger, Cunningham, Hermans, Linane and Palmer highlights the considerable scope for research and development in addressing challenge 4 on working with multi-organisational teams. While the participants were readily able to identify strategic outcomes and payoffs in the case, translating this into more concrete steps, by identifying actions in a well-timed sequence, proved difficult. This is reminiscent of Rouwette et al.'s (2014) finding that the inter-organisational team in their case wanted to discuss their issue on a generic level only. Finally, the paper is an excellent example of work addressing challenge 7 on using methods in different cultures, as it reports on a case study whereby a range of different stakeholders are brought together on the management of a South African estuary.

Overall, the contributions selected for this special issue suggest that problem structuring research and practice continues to attract scholars from a wide range of disciplines within and outside OR. We hope that the works presented here, together with the challenges identified, stimulate more problem structuring research and practice in years to come.

We would like to end this editorial by thanking a number of people without whom this special issue could not have been possible. First, we would like to express our sincere gratitude to all the authors who sent their manuscripts for consideration in this issue. We are also very grateful to all the referees who helped us in the reviewing process. Finally, we would like to specially thank the Editor-in-Chief of EJDP, Professor Ahti Salo, for his support and patience throughout the whole editorial process.

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