



Decision Support

Towards a new framework for evaluating systemic problem structuring methods



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ABSTRACT

Operational researchers and social scientists often make significant claims for the value of systemic problem structuring and other participative methods. However, when they present evidence to support these claims, it is usually based on single case studies of intervention. There have been very few attempts at evaluating across methods and across interventions undertaken by different people. This is because, in any local intervention, contextual factors, the skills of the researcher and the purposes being pursued by stakeholders affect the perceived success or failure of a method. The use of standard criteria for comparing methods is therefore made problematic by the need to consider what is unique in each intervention. So, is it possible to develop a single evaluation approach that can support both locally meaningful evaluations *and* longer-term comparisons between methods? This paper outlines a methodological framework for the evaluation of systemic problem structuring methods that seeks to do just this.

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1. Introduction

Participative methods facilitate the engagement of stakeholders and/or citizens in decision making to address complex organizational, social, environmental or technological issues. They are used by management researchers and practitioners (as well as other social scientists) in the context of interventions to stimulate deliberative dialogue and the development of change proposals (Beierl and Cayford, 2002; Rowe and Frewer, 2004).

A subset of the general class of participative methods is *problem structuring methods* (PSMs). A substantial number of these have been developed by operational researchers over the past 50 years, although the term ‘problem structuring’ itself was only introduced into the operational research (OR) lexicon a couple of decades ago (Rosenhead, 1989, 2006; Rosenhead and Mingers, 2001, 2004). A distinguishing feature of PSMs, compared with many other participative methods developed by social scientists, is the use of models as ‘transitional objects’ to structure stakeholder engagement (Eden and Sims, 1979; Eden and Ackermann, 2006) and provide a focus for dialogue (Franco, 2006). These models may use words, pictures

and/or numbers to represent, for example, people’s understandings of a problematic situation; the assumptions underpinning a particular stakeholder perspective; and/or the activities that might be needed to improve the situation. Usually, models are qualitative and are constructed collectively in a workshop, but sometimes they are brought in by a facilitator based on previous inputs from participants and are used to orientate engagement: “the model... plays a key role in driving the process of negotiation towards agreement through discussion and the development of a common understanding” (Franco, 2006, p. 766). However, a ‘common understanding’ does not necessarily imply consensus or agreement across the board: it may be an agreed understanding of the differences between people’s perspectives and what accommodations are possible in the circumstances (Checkland and Scholes, 1990). Qualitative models have traditionally been produced on flip charts using marker pens, but computer-mediated modelling is increasing in popularity, and this can facilitate remotely distributed and/or anonymous stakeholder participation, bringing advantages compared with face-to-face, pen and paper modelling (Er and Ng, 1995; Fjermestad, 2004; Fan et al., 2007).

Some PSMs are explicitly *systemic* (Jackson, 2000; Midgley, 2000, 2003). They not only seek to enhance mutual understanding between stakeholders, but they also support participants in undertaking ‘bigger picture’ analyses, which may cast new light on the

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issue and potential solutions. Notably, systemic PSMs are used to broaden the perspectives of participants in order to facilitate the emergence of new framings, strategies and actions. Typical questions addressed by different systemic PSMs include:

- Whose viewpoints and what aspects of the issue should be included in analysis and decision making, and what should be excluded? (e.g., Ulrich, 1994; Midgley, 2000).
- What are people's different perspectives on the issue, and what values and assumptions underpin these perspectives? (e.g., Checkland and Scholes, 1990; Checkland and Poulter, 2006).
- What interactions within and across organisational, social and environmental phenomena could produce desirable or undesirable outcomes? (e.g., Vennix, 1996; Maani and Cavana, 2007).

We argue in this paper that a new framework is needed for the evaluation of systemic PSMs. However, given that so little has previously been written on this subject, we also draw upon the wider literature about evaluating participative methods (beyond problem structuring, systems thinking and OR).

2. Evidence for the value of systemic problem structuring and other participative methods

When claims are made for the success or failure of systemic problem structuring and other participative methods, the authors making those claims are usually required to justify them. Various reviews of the literature on the evaluation of participative methods suggest that most of the justifications provided by researchers are based on personal reflections alone (Entwistle et al., 1999; Connell, 2001; Rowe and Frewer, 2004; Sieber, 2006; White, 2006). Clearly, many researchers are highly experienced, so their reflections should not be dismissed out of hand. Nevertheless, unless they think broadly and from different perspectives about the criteria they use to evaluate their participative interventions, they may miss evidence that does not fit their current thinking about what is important (Romm, 1996; Midgley, 2011). We therefore suggest that there is a need for caution in accepting researcher reflections alone as reliable evidence of success or failure.

Most researchers undertaking evaluations of participative methods beyond personal reflections tend to conduct post-intervention debriefings or interviews with project participants. These evaluations are often based on explicit criteria reflecting the researcher's experience, a given theory, a literature review and/or stakeholder expectations generated through a consultative exercise (Beierle and Konisky, 2000; Rowe and Frewer, 2004). In some cases, formal evaluation instruments have been developed and applied (e.g., Duram and Brown, 1999; Rowe et al., 2004; Berry et al., 2006; Rouwette, 2011). Also a number of researchers advocate triangulation across two or more evaluation methods, such as interviews, focus groups, participant observations, surveys, literature reviews and document analyses (Duram and Brown, 1999; Buysse et al., 1999; Charnley and Engelbert, 2005; Rowe et al., 2005; Cole, 2006; McGurk et al., 2006; Franco, 2007; Rouwette, 2011).

What is clear from the literature, however, is that only a very small minority of studies (e.g., Valacich and Schwenk, 1995a; Halvorsen, 2001; Rouwette et al., 2011) seek to compare between methods or across case studies undertaken by different researchers. A particularly significant study was undertaken by Beierle and Cayford (2002), who quantitatively compared broad classes of methods using a standard set of variables applied to 239 case studies of public participation. They concluded that more intensive processes (such as mediation workshops) are better than less intensive processes (such as public meetings) at achieving a wide range of outcomes. We suggest that the use of systemic PSMs is

relatively intensive compared with several of the other participative processes investigated by Beierle and Cayford (2002), so this gives us grounds to be cautiously optimistic. However, we cannot take this study as strong evidence because they did not specifically identify systemic PSMs as a category for comparison with other participative approaches.

Therefore, the overall picture is of many claims for the benefits of a diverse array of systemic problem structuring and other participative methods, with varying degrees of evidence provided by researchers to support these. Only a few studies have compared across methods, and even these have only been able to contrast broad classes of approach.

The key question is: what kind of evaluation is both necessary and possible? We have already argued that researcher reflections alone can be problematic, but are there methodological or practical reasons to prefer either locally focused evaluations (possibly with some learning across case studies, when this is feasible) or large-scale, quantitative comparisons between methods?

2.1. Different evaluation approaches

Rowe and Frewer (2004), reflecting on social science approaches to evaluating participative methods, classify them into three types. First there are *universal* evaluations: i.e., ones claiming to produce knowledge that is applicable across all types of participative method and intervention. According to Rowe and Frewer, to achieve universality, large-scale quantitative studies are needed. Nevertheless, to make comparisons possible, only variables of general relevance across all methods and interventions can reasonably be assessed. Next there are *local* evaluations: comparing between a subgroup of methods or intervention types. These require smaller scale studies and can incorporate more detailed questioning, as the variables to be examined may be relevant only to the subgroup of methods under study rather than to all possible methods. Some researchers working on local evaluations advocate a quasi-experimental approach, either testing methods in the laboratory or in controlled field conditions. Rowe and Frewer (2004) call the third and final type of evaluation, which the majority of researchers use, *specific*. This means focusing on only one method or intervention. The advantage of this is that the evaluation can be made locally relevant, drawing (for example) on information about the unique expectations of stakeholders to establish evaluation criteria. Rowe and Frewer argue that, while it is difficult (for practical reasons) to conduct truly universal evaluations, researchers should aim to achieve as much generality as possible, and should certainly do more than undertake evaluations with only a specific remit because generalising from these is highly problematic.

White (2006) argues that very similar distinctions have been made in the OR and group decision support literatures, and preferences for universality (to a greater or lesser extent) or specificity reflect the positivist and interpretivist paradigms respectively. Positivists are said to argue for objective, quantitative, comparative studies that are capable of revealing the generalisable advantages and disadvantages of different methods, although (like Rowe and Frewer, 2004) many are forced by the impracticality of undertaking truly universal studies to resort to more local quasi-experiments in either the laboratory or the field. Authors in this tradition include Nunamaker et al. (1991), Fjermestad and Hiltz (1998), Pinsonneault et al. (1999), Fjermestad (2004) and Joldersma and Roelofs (2004). In contrast, interpretivists (such as Eden, 1995; Eden and Ackermann, 1996; Shaw, 2003) argue that what matters most in an evaluation is what is achieved by the method *in a given context, judged from the perspectives of stakeholders*. It is therefore hardly surprising that most interpretivists are in favour of undertaking specific (single case study) evaluations. See Connell (2001), Bryant

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