Deliberative Mapping

CITIZENS AND SPECIALISTS INFORMING DECISIONS ON SCIENCE AND TECHNOLOGY

briefing 5

Using the Multi-Criteria Mapping (MCM) technique

This briefing describes Multi-Criteria Mapping (MCM), a computer-based appraisal technique, and considers its role in helping individuals identify and explain their preferred ways forward on complex and uncertain problems.

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What is MCM?

Multi-Criteria Mapping (MCM) provides a way of appraising a series of different potential ways forward on a complex and controversial policy problem. Like other multi-criteria approaches, it involves developing a set of criteria, evaluating the performance of each option under each criterion, and weighting each criterion according to its relative importance.

MCM has been used in the appraisal of energy, food, agriculture and health policy options. Ideally, it can be applied as part of a broader Deliberative Mapping process, which includes citizens and specialists in the appraisal, and involves group discussions as well as individual interviews (see Briefing 2 in this series).

Why was MCM developed?

Most decisions about which course of action (or option) to follow are based on a variety of very different considerations (or criteria). Narrow technical assessment processes like many risk or cost-benefit analyses tend to focus on a single criterion – such as human health or economic cost. Those elements of a problem which are not easily measured by a single criterion – such as the quality of life of patients following the introduction of a new therapeutic treatment, or preservation of a beautiful landscape – tend to be ambiguous or excluded. Focusing on a single criterion often fails to reflect the scope and complexity of the options under consideration, or the full depth and diversity of different viewpoints.

Like other multi-criteria approaches, MCM responds to these shortcomings. It prioritises the freedom of participants to include as many different factors as they wish. However, unlike some other multi-criteria techniques, MCM does not impose pre-ordained structures or definitions on criteria or weightings. Participants are free to introduce new options of their own choosing and are not forced to make trade-offs where they are unhappy about this. MCM focuses on transparency, for instance by revealing any hidden uncertainties and differences. In the end, it emphasises the exploration of the diversity of different perspectives, rather than artificially combining these into a single picture.

How does MCM work?

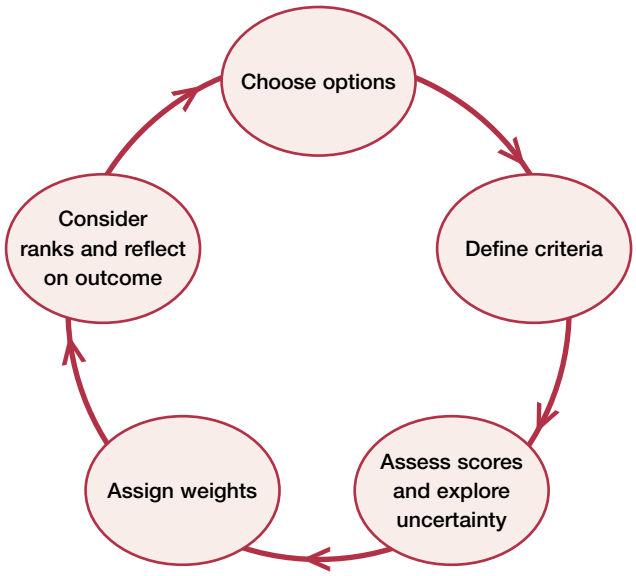
MCM is usually based on a long interview (2-3 hours) with each individual participant. The interviewer works interactively with the participant, using specially developed computer software to explore the performance of options against criteria, under different assumptions. The interview progresses through a number of stages which are described below and illustrated in Figure 1. The MCM inputs are stored on a computer file and the interview is also recorded on audiotape for later transcription and analysis. It is also possible to use an adapted MCM procedure in small groups.

Stages of an MCM interview

The interviewer develops a set of core options in advance through a review of the appropriate literature and discussion with key stakeholders and specialists.

Choose options
MCM uses a set of core options which permits comparisons to be made between the positions taken by different participants

Figure 1: Stages of an MCM interview



when the interviews are analysed. Participants can add to or divide these core options at any stage by defining new combinations of options or introducing entirely new concepts. This enables participants to address any issues which they feel have been neglected or unduly emphasised, leaving the overall scope of the exercise relatively unconstrained.

Define criteria
The interviewer asks the participant to make a personal judgement about issues of importance when evaluating the relative merits of the options. These issues are then developed into a set of criteria against which the options will be appraised.

In many cases the participant will consider the trade-offs which may sometimes be necessary. Alternatively, there may be issues which the participant believes to be fundamental matters of principle, under which no compromises or trade-offs may be considered. If so, these are effectively ruled out of consideration for that participant.

Assess scores and explore uncertainty
The participant assigns numerical scores to represent the performance of each option under each of their chosen appraisal criteria.

An important and unusual feature of the MCM technique is that participants are asked to assign two performance scores to each option under each criterion. One score reflects performance under the most favourable assumptions, the other under the most pessimistic assumptions. In this way, participants are able to express any uncertainty they feel in assigning scores or variations in performance across different contexts. This provides a systematic framework and also a cue for the interviewer to document, by open-ended questioning, some of the crucial factors underlying the participant's assessments. For instance, 'best' and 'worst' scores can reflect differences between good and bad implementation, or between appropriate and inappropriate applications.

Assign weights
Participants express the priority that they attach to each of their appraisal criteria by means of a numerical weighting. These weightings reflect the relative importance, to the participant, of the differences between best and worst performance under each of their performance criteria. In contrast to the relatively technical business of scoring, this weighting process reflects intrinsically subjective judgements over different values and priorities. This weighting, multiplied by the normalised performance scores, produces an overall numerical ranking for each option. Because participants provide 'best' and 'worst' performance scores, the rankings are expressed as ranges of values rather than single numbers.

Consider ranks and reflect on outcome
Participants view the results of the exercise on a computer-generated graph, with the

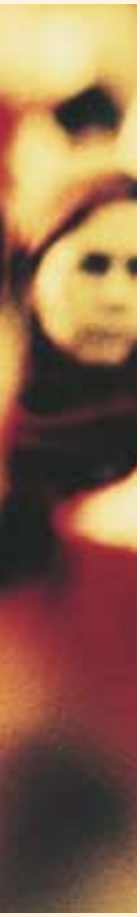
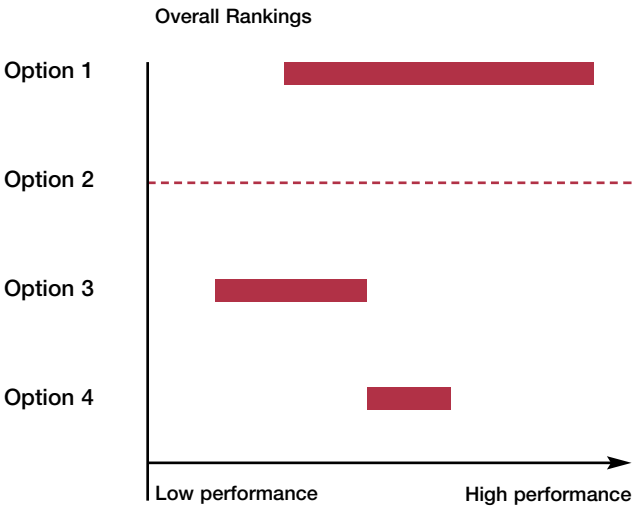


Figure 2: Summary of performance options



The final ranking of each option for every participant is displayed on a computer graphic like the above illustration. In this example:

- Option 1 has the widest range and – at its best – ranks highest overall
- Option 2 was ruled out on principle by this participant
- Although – at its best – Option 3 overlaps with part of the distribution for Option 1, at its worst it is ranked lowest overall
- Option 4 has a narrow range of performance relative to 1 and 3, and ranks second overall.

relative ranking of each option under 'best' and 'worst' assumptions. The participant can evaluate their rankings for themselves and consider any surprises in light of the process they have worked through. They can review the information until they are comfortable that all pertinent issues have been taken into account, and that the pattern of performance displayed in the option rankings fully reflects their own perspective.

About the Deliberative Mapping briefing paper series

This is one of five briefings which explain Deliberative Mapping. This is an approach designed to help specialists and members of the public weigh up evidence to reach a joint decision on a complex policy issue where there is no obvious way forward.

The five briefing papers are:

1. **Opportunities and challenges for involving citizens in decision making**
2. **The Deliberative Mapping approach**
3. **Deliberative Mapping in practice: the 'kidney gap'**
4. **Citizens' panels in Deliberative Mapping: a user guide**
5. **Using the Multi-Criteria Mapping (MCM) technique.**

Further information

These briefings are available to download at **www.deliberative-mapping.org**

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