

## Eliciting, Formalising, And Debiasing Mental Models Through An Online Tool For Serious Discussions

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**Abstract:** A mental model is simplified representation of an individual's thought process about how something works. Mental models can play an important role in understanding thinking patterns of an individual or a group. Practitioners from fields as diverse as behavioural science, psychology, economics, education and sustainability could gain much insight from tools that enable them to understand mental models expressed by a group within a given problem. There are many online and offline forums/tools available for involving users in discussions but none of them are using/considering mental models and most of them do not extract insights from ongoing discussions, do not learn from them and do not enrich the discussions by such findings. The goal of this research is to develop a moderated tool that captures group's mental models from an online web forum and translates these into semi-quantitative computer models in order to make discussions more efficient and meaningful. This tool is capable of capturing opinions of users, in form of concepts, topics, and sentiments attached to those opinions, including the relationships between them by using various natural language processing techniques. These elements are used as building blocks to construct dynamic semi-quantitative models such as word clouds, cognitive maps, causal loop diagrams, etc. The framework allows the moderator (researcher, government agency, or non-profit organization) to extract and analyse cognitive maps that provide relevant and actionable insights about a group's mental model. These can be then fed back into the discussion, informing participants and helping to produce new and creative solutions to complex and controversial societal issues. This tool is particularly useful in Participatory Modelling providing a unified platform for engaging researchers, stakeholders and decision-makers in participatory process for better decision-making, with no restrictions neither for size of the group nor for the timing and location of their meetings.

**Keywords:** Decision-making; Sustainability; Participatory modelling; Semi-quantitative modelling; Text processing