Poster Showcase
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A conceptual framework for communicating 'Uncertainty of Scientific model' for emergency management planning

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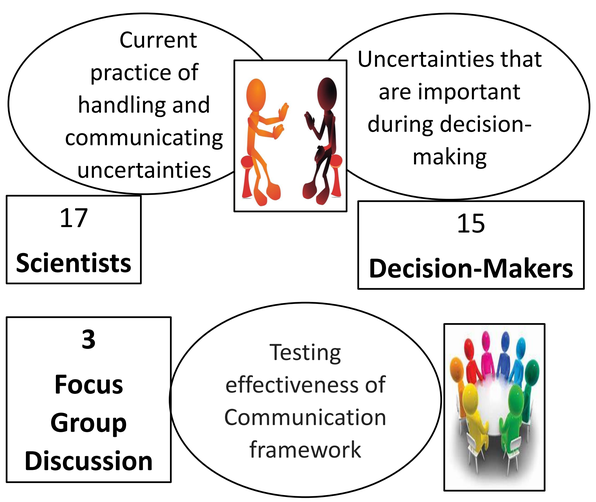
Background

- Scientific models are widely used in emergency management and recovery planning, where they assist in decision-making.
- Uncertainties arise in these models, from data that goes into the model, to the assumptions made to represent reality through these models, and processing and generating outputs to aid decision-making.
- It is essential to effectively communicate these uncertainties to ensure the decisions made, based on the model's recommendations, is well-informed and impactful.

Method

I have conducted semi-structured qualitative interviews with both scientists and decision-makers. Each interview took around an hour. As this research is still in progress, I have conducted 2 Focus Group Discussions (FGDs), and 1 still in the planning stage.



Findings

- Interviews with modelers/scientists provided an understanding of the current state of the art in analyzing and communicating uncertainty.
- Interviews with decision-makers helped understand their perspective around model uncertainty-related requirements during decision-making.
- By gaining insights into these two perspectives, a framework for communicating uncertainties has been developed using reflexive thematic analysis from the data collected.

I am always thankful to my supervisor Late Prof Douglas Paton

Scientist's View on Uncertainty and its Communication

- Model development process and representation of reality is an important uncertainty component
- The most prevalent language employed for communicating uncertainty is probabilistic language.
- It is essential to collaborate with decision-makers in the early stages of the model development process for effective communication of uncertainty.

Decision Maker's View on Uncertainty and its Communication

- Communicating context of modeling helps understand the associated uncertainty.
- Scientist need to understand their audience's perspective and tailor their communication tools accordingly.
- Effective communication of uncertainty is originated from collaboration and trust among scientists.

Communication Framework

- This communication framework has four major areas/components where uncertainties are manifested during a modeling exercise. They are input data (blue), model selection and model run (red), inference and projection (green), and expert judgment (orange).
- All these small boxes are different uncertainty sources in the respective components. The difference in the size of the boxes and the components presents the differential contribution towards overall uncertainty as identified by scientists (left), and decision-makers (right).
- Deep uncertainty in the core acknowledges that there is a vast amount of unknown unknowns within our current scientific understanding/knowledge system, which lies beyond our current modeling capacity.
- This communication framework is visualized using the "Doughnut diagram", as shown below.

In the doughnuts below. Scientist View (left) and decision-makers View (right). Identified sources and the comparative difference in the components are based on my research data. In the future, the relative size of the grids should reflect the identified contribution of that unique uncertainty source (box) to the overall uncertainty in the modeling exercise.