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A method to assess how interactive water simulation tools influence transdisciplinary decision-making processes in water management

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In modern water management, often transdisciplinary work sessions are organized in which various stakeholders participate to jointly define problems, choose measures and divide responsibilities to take actions. Involved stakeholders are for example policy analysts or decision-makers from municipalities, water boards or provinces, representatives of pressure groups and researchers from knowledge institutes. Parallel to this increasing attention for transdisciplinary work sessions, we see a growing availability of interactive IT-tools that can be applied during these sessions. For example, dynamic flood risk maps have become recently available that allow users during a work sessions to instantaneously assess the impact of storm surges or dam breaches, displayed on digital maps. Other examples are serious games, realistic visualizations and participatory simulations.
However, the question is if and how these interactive IT-tools contribute to better decision-making. To assess this, we take the process of knowledge construction during a work session as a measure for the quality of decision-making. Knowledge construction can be defined as the process in which ideas, perspectives and opinions of different stakeholders, all having their own expertise and experience, are confronted with each other and new shared meanings towards water management issues are created.
We present an assessment method to monitor the process of knowledge construction during work sessions in water management in which interactive IT tools are being used. The assessment method is based on a literature review, focusing on studies in which knowledge construction was monitored in other contexts that water management. To test the applicability of the assessment method, we applied it during a multi-stakeholder work session in Westland, located in the southwest of the Netherlands. The discussions during the work session were observed by camera. All statements, expressed by the various members of a stakeholder session, were classified according to our assessment method.
We can draw the following preliminary conclusions. First, the case study showed that the method was useful to show the knowledge construction process over time, in terms of content and cognitive level of statements and interaction, attention and response between stakeholders. It was observed that the various aspects of knowledge construction all were influenced by the use of the 3Di model. The model focused discussions on technical issues of flood risk management, non-flood specialists were able to participate in discussions and in suggesting solutions and more topics could be evaluated in respect to non-interactive flood maps. Second, the method is considered useful as a benchmark for different interactive IT tools. The method is also considered useful to gain insight in how to optimally set-up multi-stakeholder meetings in which interactive IT-tools are being used. Further, the method can provide model developers insight in how to better meet the technical requirements of interactive IT tools to support the knowledge construction process during multi-stakeholder meeting