



Exploring applications of GMB to support decarbonising the transport sector



Jittrapirom, P.
Global Carbon Project, NIES
jittrapirom.peraphan@nies.go.jp

Hiekata, K.
University of Tokyo
hiekata@edu.k.u-tokyo.ac.jp

Abstract

Global greenhouse gas (GHG) emissions continue to rise rapidly despite the urgency to address climate change. The stagnation is highly apparent in the transport sector; 95% of the energy consumed by the sector is still from fossil fuels. In an effort to support the sector transformation toward a low carbon future, we examine here how a participatory approach in Group Model Building (GMB) can engage communities and inspiring climate actions.

We set up three GMB pilot workshops to explore application of GMB with master students from University of Tokyo. We varied the workshops configurations to compare how provisions of a preliminary Causal Loop Diagram (CLD) and a computerised collaborative tool (IC-T) affected the group work and assessed the effects using CCIC (communication quality, consensus forming, insights, and commitment) questionnaire.

The results indicate that the participants recognised GBM to support group communication and enhanced the levels of consensus and commitment toward the outcomes; GMB can be a useful tool to support the decarbonisation of the transport sector. We report the effects of IC-T and preliminary CLD and suggest possible improvements to the process.



Fig. 1 Interactive communication tool (IC-T) setup



Fig. 2 GMB workshops

Table 1: Workshops information and schedules

Workshop A: Japanese shipping industry (facilitator) n = 10	Workshop B: Rural transport system (facilitator) n = 4	Workshop C: Rural transport system (IC-T instructor) n = 4
Introduction (20 min)	Intro. and briefing of initial CLD (20 min)	Intro. and briefing of initial CLD (20 min)
Variable elicitation using the Group Nominal Technique & clustering (40 min)	Variable elicitation using the Group Nominal Technique & clustering (40 min)	Variable elicitation and clustering using IC-T (40 min)
Break (15 min)	Break (15 min)	Break (15 min)
CLD construction & review (90 min)	CLD construction & review (90 min)	CLD construction & review (90 min)
Break (15 min)	Break (15 min)	Break (15 min)
Debrief and evaluation (60 min)	Debrief and evaluation (60 min)	Debrief and evaluation (60 min)

Findings and conclusions

- Challenges:** limited time to even complete the first draft of CLD; CCIC survey was highly complicated and time-consuming to complete; difficult to control variables between workshops and in evaluating the outputs (CLD).
- CCIC attributes of Workshop B compared with those of Workshop A, suggests that **the provision of a preliminary CLD model may reduce the positive contributions of GMB** toward addressing the problem (attributes: 1,3,5,7,9,10,14,16, and 19).
- IC-T demonstrated a potential use of facilitation tools to enhance our GMB session;** Workshop with IC-T (Workshop C) increased ten positive attributes (1,2,3,4,5,6,10,13,18, and 19) and lowered four negative traits (7,9,14, and 16). The platform also captured the elicitation activities enabling them to be replayed to analyse how the participants contributed to the discussion.

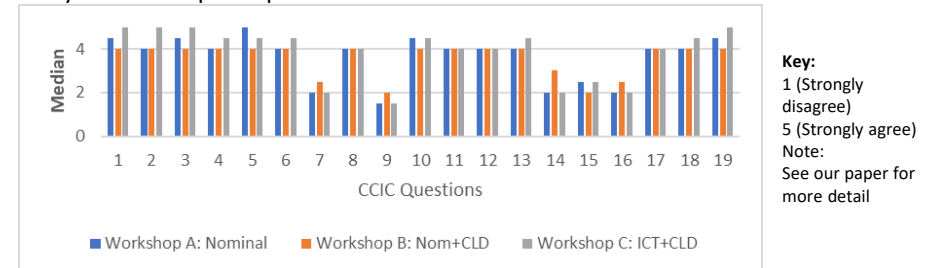


Fig 3: Comparison of the CCIC scores from the three workshops

- Process enhanced my insight into the problem
- GMB help to reach a shared vision of the problem
- I support the group conclusions
- The process enhance insight into the problem
- The causal diagrams integrate diverse opinions
- The process can be replete
- The underlying causes of the problem are still unclear
- The process helped to understand diverse opinions
- Consensus could not be reached
- CLD heled to clarify the communication
- The process help to align our opinions
- The conclusions reached will be upheld
- The process gave more insight into the feedbacks
- The process gave little insight into other's opinions
- Some persons dominated the discussions
- The process has not helped to id how to steer the problem
- I will try to convince others the importance of these conclusions
- Using modelling in approaching the problem is efficient
- All in all, I think these meetings were successful

Method

The three workshops were organised with master students of University of Tokyo. The collaborative tool or IC-T (Interactive Communication Tool) is a Linux-based application, developed by Dylan De la Porte of Global Teamwork Lab (GTL). It enables participants to input their ideas into the shared working space visible to the group members in a post-in format. The inputs can be made via several keyboards and mice (two sets are shown in Figure 1). IC-T also allows ideas to be clustered and linked straightaway. The tool is thought to enhance efficiency and effectiveness in the entity elicitation and clustering processes.

The objective of the workshops was to develop CLDs that illustrate the dynamics within the system of interests to support the decarbonisation of the system (i.e., Japanese shipping industry and the transport system of a rural town). We developed the workshops' itineraries from the template available on Scriptapedia. Each workshop lasted approximately 3 hours (see Table 1).