

Discussion Group 8: Researching Thinking Classrooms

Submitted by Gaye Williams (Deakin University, Australia) and Peter Liljedahl (Simon Fraser University, Canada)

These organisers began their conversations about '*Thinking Classrooms*' in Morelia, Mexico in 2008 and organised PME37 DG5 *Building Thinking Classrooms* as a result. *Researching Thinking Classrooms* is a sequel to this previous DG. It was organised in response to participant interest in exploring research questions arising from the *Building Thinking Classrooms* DG.

Research designs previously employed to study Thinking Classrooms from various theoretical perspectives include cognitive, social, affective, emotional, psychological, and volitional perspectives on student learning, and teachers' practices and beliefs. Research designs employed have included: self-reports of affective experiences (Liljedahl, 2013), video analysis in a 'reform classroom' (Cobb, Yackel, & Wood, 2011), video of own classroom practice (Lampert, 2001), video-stimulated student interviews (Williams, 2014), and study of the "entanglement of subject and object, mind and world" (sensuous cognition, Radford, 2014, p. 352) which employs video as an analysis tool. In addition, networking of theoretical frameworks has been a productive way to find out more about student and teacher activity in 'thinking classrooms' (Hershkowitz, Tabach, Rasmussen, & Dreyfus, 2014). Teacher guidance of student thinking has also been studied through video data (Funahashi & Hino, 2014).

The two DG sessions were focused in the following ways:

Session 1 (35-45 participants): Evidence-based

stimulation of discussion through focus on a Wordle <<http://www.wordle.net>> that captured frequently used words in the participant responses to the *Building Thinking Classrooms* (DG5 PME37). Groups then formulated their own definitions of *Thinking Classrooms* and generated more researchable questions about such classrooms. A Gallery Walk followed in which participants considered researchable questions generated by other groups and selected the three questions they would most like to explore.

Day 2 Included 35-45 participants, many from Session 1 and some new participants. Session 1 activity was reviewed in a Wordle representing the frequency of term usage in definitions of *Thinking Classroom* produced in Session 1 (see Figure 1). Differences between this Wordle and the one displayed in Session 1 (to capture terms used in discussing *Thinking Classrooms*) were discussed.

Categories of research questions formulated in Session 1 were then presented. An example question from each category is included herein: "What type of content (e.g., tasks etc.) promote a *Thinking Classroom*?" "How are mathematical structures introduced into discourse and does it matter whether students or the teacher bring them in?" "What are the tools (including competencies) that enable teachers to transition to a *Thinking Classroom*?" "How do teachers initiate and sustain *Thinking Classrooms*?" "How does thinking stop in a classroom and why does it stop?" "What techniques give the most

Discussion Group 8: Researching Thinking Classrooms (continued)

engagement?” “Given a *Thinking Classroom*, what are the outcomes?” Participants who wanted to focus on the same research question then formed groups and began to develop a research design that would help investigate their question. Various methodologies were considered and ideas were shared. At least one group decided to continue to research their question throughout the subsequent year. The interest stimulated through these questions suggests a Working Group on *Designing Research to Explore Thinking Classrooms* is warranted at PME39. The DG organisers intend to submit this WG.

Cobb, P., Yackel, E., & Wood, T. (2011). Young children’s emotional acts while engaged in mathematical problem solving. In A. Sfard, K. Gravemeijer & E. Yackel (Eds.), *A Journey in Mathematics Education Research* (Vol. 48 pp. 41-71). Netherlands: Springer.

Funahashi, Y., & Hino, K. (2014). The teacher’s role in guiding children’s

mathematical ideas toward meeting lesson objectives. *ZDM*, 46(3), 423-436. doi: 10.1007/s11858-014-0592-0

Lampert, M. (2001). *Teaching problems and the problems of teaching*. New Haven, CT: Yale University Press.

Liljedahl, P. (2013). Illumination: an affective experience? *ZDM*, 45(2), 253-265. doi: 10.1007/s11858-012-0473-3.

Hershkowitz, R., Tabach, M., Rasmussen, C., & Dreyfus, T. (2014). Knowledge shifts in a probability classroom: a case study coordinating two methodologies. *ZDM*, 46(3), 363-387. doi: 10.1007/s11858-014-0576-0.

Radford, L. (2014). Towards an embodied, cultural, and material conception of mathematics cognition. *ZDM*, 46(3), 349-361. doi: 10.1007/s11858-014-0591-1.

Williams, G. (2014). Optimistic problem-solving activity: enacting confidence, persistence, and perseverance. *ZDM*, 1-16. doi: 10.1007/s11858-014-0586-y.

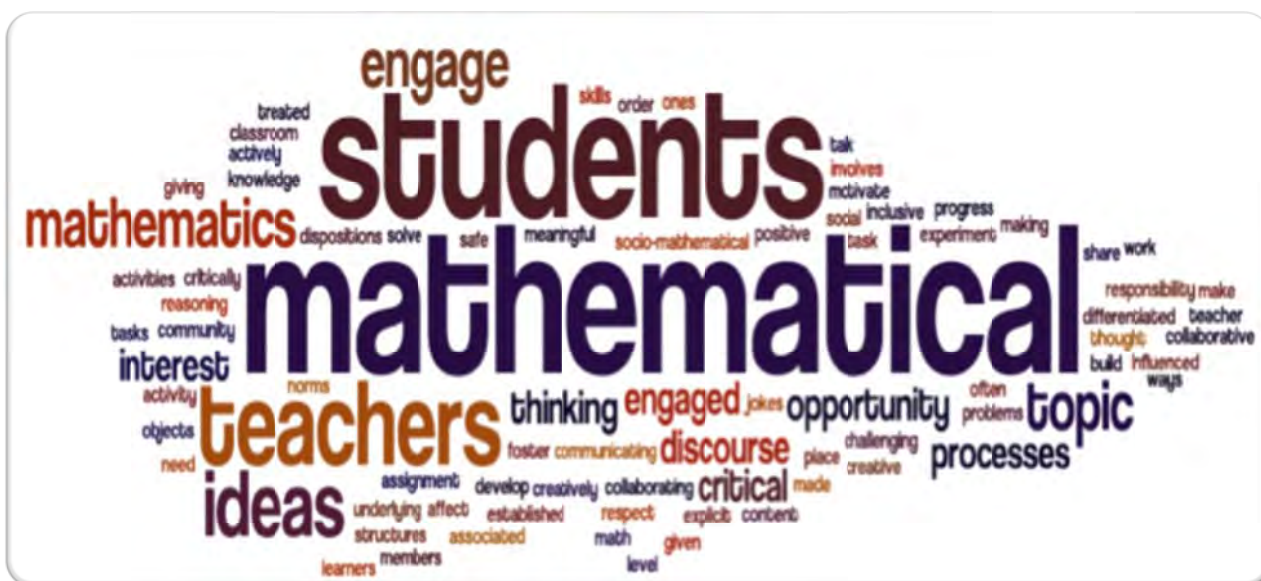


Figure 1. Wordle of terms used by participants in defining Thinking Classrooms