An Image-to-writing Approach to Learning Science at the Elementary Levels

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Room 204, Runme Shaw Building, HKU

Abstract:
This presentation describes an image-to-writing approach to support the learning of abstract concepts of science at the elementary levels, and shares findings of students' learning and one teacher's PCK in the implementation of the approach. The presentation will begin with a description of the theoretical framework of the pedagogical approach based on the notion of visualization. The pedagogical approach will be illustrated with planned activities to help children develop the conceptual understanding and representational competences of two concepts, "temperature" and "heat". I will then report findings of the effectiveness of the pedagogical approach after its implementation with two classes of Grade 4 students. Taking a quasi-experimental approach, the findings show that the experimental group performed significantly better than the control group students in conceptual understanding, while representationally, the experimental group showed larger gains in their representational competences. Next, I will share how our findings about a participating teacher's pedagogical content knowledge (PCK) in his implementation of the planned activities for "temperature" and "heat" using this pedagogical approach. Taking PCK as a dynamic construction of knowledges that is manifested in classroom enactment, two main pedagogical actions used by the teacher were identified – dialectical shifts between iconic and conceptual images to connect the physical phenomena and the inferred entities and processes, and the use of graphic organizers to help students developing an understanding of the ontological nature of the concepts they are learning. These findings indicate the need for an expanded view of PCK to include representational knowledge and competencies, and nature of content knowledge, which need to be considered when preparing teachers in using this pedagogical approach.

About the speaker:

Jennifer Yeo is an Assistant Professor at the National Institute of Education, Nanyang Technological University, Singapore. She was previously a secondary school physics and English teacher. Jennifer's research interest is in understanding how students learn science, and designing learning environments to support students' science learning. Drawing from her multidisciplinary academic background in physics and linguistics, she is intrigued by the characteristics of the language of science, and the process by which students make sense of its language, communicate and build new knowledge with it. Her research has developed from earlier work that broadly explored the mediating factors that supported science meaning-making in problem-based, computer-supported collaborative learning environments to current inquiry into the role of representations in mediating students' thinking and reasoning and meaningful engagement of students in constructing representations to learn science. Her work has been published in *International Journal of Science Education*, *Instructional Science*, *Asia-Pacific Education Researcher* and *Cultural Studies of Science Education*. She is also an Associate Editor of the journal, *Learning: Research and Practice*.

~ All are welcome ~
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