

## **Towards More Meaningful Science Inquiry for Primary Pupils**

Tan Aik-Ling, Frederick T. Talaue and Shirley Lim

### **KEY IMPLICATIONS**

1. Institutional improvements in the teaching of science in elementary school should capitalize on teachers' desire to teach through inquiry while addressing the logistical requirements for this.
2. Discussions with the pupils raised the need to address in equal measure the social climate of the classroom and the cognitive gains from inquiry learning activities.
3. Further teacher training should focus on how, in addition to why, science should be taught through inquiry. This can be achieved through adopting a curriculum enactment paradigm that is responsive and contextualized to local school conditions.

### **BACKGROUND**

Different aspects of inquiry science practice in Singapore primary classrooms have been given attention by several research initiatives in recent years (e.g., Kim, Tan, & Talaue, 2012; Poon, Lee, Tan, & Lim, 2010). These case studies enrich our knowledge about local practices, but it remains to be seen if these reported views and methods of inquiry science are held by a broad number of teachers and across the range of teaching contexts in various schools. Further, previous studies did not examine students' views of learning science through inquiry which may prove useful.

### **FOCUS OF STUDY**

There is a tremendous need to develop a holistic and localized framework of inquiry science that helps teachers recognize their personal agency for change and enables them to work collaboratively with their pupils towards classroom learning environments that are productive and transformative. To aid in realizing this framework, a landscape study was conducted to explore quantitatively teachers' intentions to adopt inquiry as a pedagogical approach within the current context of teaching in Singapore primary schools. The classrooms of several teachers who have expressed strong intentions to teach through inquiry were studied, with a focus on their interactions with students during instruction. In addition, and more importantly, students' views were sought through cogenerative dialogues, so that the impact on students of teaching through inquiry could be assessed.

### **KEY FINDINGS**

In general, teachers felt a moderate to strong positive attitude towards implementing inquiry teaching. They believed it brings positive gains for students, such as enhanced collaborative skills and deep learning of science concepts. However, they were divided on practical issues associated with this method, including longer class time, greater demand for planning and

preparation, and classroom management concerns.

Teachers saw inquiry teaching as the interplay of set instructional goals, modes of integration with the curriculum, promotion of a safe and productive learning environment, appropriate instructional strategies, and teacher and pupil dispositions that facilitate learning.

For students, learning science through inquiry is embedded in the social life of the classroom. In their recollections of hands-on activities, discussions of concepts, and group work in class they were most concerned about the interactions and exchanges with their peers and teachers that facilitated or constrained learning.

## SIGNIFICANCE OF FINDINGS

The teachers' discourses suggested that their decision-making for inquiry teaching involves consideration of their interactional stance towards science learning, present teaching context, classroom learning environment and the available science curriculum resources (Forbes & Davis, 2010).

The students' feedback implied that the pedagogy used should value cooperation and collaboration and be balanced by clear learning goals and inclusive social dynamics.

Further research on local adaptations of inquiry science approaches would be valuable in understanding which productive configurations would afford meaningful student engagement in science.

## PARTICIPANTS/SUBJECTS

*Panel 2:* 454 classrooms, 2,100 teachers, 16,895 A total of 194 teachers from 43 primary schools participated in an online survey which explored their attitudes towards inquiry science teaching. This constituted Phase I of the study. In Phase II, the science classroom discourse of four Primary 4 teachers (from two different schools) was examined over one term. This was coupled with twenty-three cogenerative dialogue sessions with 34 Primary 4 pupils and seven teachers, from three schools.

## RESEARCH DESIGN

This research is informed by a multi-level and multi-method approach that is largely interpretive in nature (Tobin, 2012). The use of multi-level analyses allowed us to triangulate, formulate and understand the different sources of contradictions and hindrances in the enactment of science inquiry.

## REFERENCES

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