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Understanding Teachers' Knowledge and Practice of Lower Secondary Geographical Investigations

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KEY IMPLICATIONS

- There is a need to acknowledge and address teachers' professional identities during teacher professional development to align teachers' practice with the desired outcomes of a geographical education.
- Teachers' practice of geographical investigations (GI) can be better supported through the provision of professional development and curricular resources that:
  a. support more student-directed inquiry
  b. support teachers' knowledge about the scientific content related to GI and address issues of place-based knowledge with regard to the fieldwork sites.

BACKGROUND

The geography syllabuses emphasise fieldwork or GI to develop students' appreciation for the real world application of geographical knowledge and skills. While research (Brooks, 2010; Seow, 2016) has illuminated how geography teachers draw on their knowledge in classroom settings, there is scant research on knowledge and practice in the field.

FOCUS OF STUDY

This study focuses on the water quality GI at the lower secondary level. The research questions are:

- What types of knowledge do secondary school teachers in Singapore have about conducting GI?
- How do secondary school geography teachers conduct GI with their students?
- What is the influence of teachers' knowledge on their practice in conducting GI with their students?

KEY FINDINGS

1. Teachers have varying professional dispositions, beliefs, and attitudes about the purpose of GI. These include different emphases on scientific methodologies, geographical concepts, applied learning and environmental values.
2. All teachers expressed appreciation for the role of GI in student-led knowledge construction. However, this was not usually aligned to their practice. The GI observed were highly teacher-directed with time and manpower constraints cited as primary constraints.
3. Teachers needed support in terms of developing knowledge of scientific concepts related to water quality.
4. Teachers needed support in terms of understanding the hydro-social dynamics of fieldwork sites, as well as how to conduct reconnaissance of fieldwork sites for GI.

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5. Teachers used the geographical inquiry framework (Ministry of Education, 2014) to guide GI. They needed most support at guiding the Exercising Reasoning & Reflection phases of the inquiry cycle.

SIGNIFICANCE OF FINDINGS

1. Teacher professional development related to GI should address teachers' professional identities, and how they make meaning of GI to align them to the desired outcomes of geographical education.
2. There needs to be additional provision of resources to support teachers in conducting GI, including:
   a. Quality teacher-friendly information on water quality indicators pitched appropriately for the water quality GI.
   b. Materials on the hydro-social dynamics of relevant fieldwork sites, as well as how to conduct reconnaissance of fieldwork sites prior to GI.
   c. Time series data to complement the point data collected during fieldwork.
   d. Videos on fieldwork and sampling techniques.
   e. Instructional resources to showcase good pedagogical practices related to conducting GI.
   f. Technological applications to assist teachers in data collection and analysis.

   These findings have been used to guide the development of the Humanities and Social Studies Education Academic Group's (n.d.) Sustainability Learning Lab (n.d.).
3. Further research on facilitating data analysis and reflection through classroom talk is required.

PARTICIPANTS

Six Geography teachers from four schools participated in this explorative study from March 2016 to February 2018.

RESEARCH DESIGN

This research employed a qualitative case study design. The data collection methods include concept mapping and photograph elicitation exercises to help teachers articulate their content knowledge of the GI, as well as its importance to their students' education. The teachers also ranked and discussed the different influences on their practice. These were analysed together with in-depth interviews, classroom and field-based observations, and curriculum resources used by teachers and students.

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