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# Inquiry-Based Learning in Geographical and Environmental Education: The Example of Water Quality Studies in the Singapore Context



By *Tricia Seow*

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## Introduction

“Signature pedagogy” (Shulman, 2005) represents a conception of pedagogy as a means to induct novice learners into disciplinary ways of constructing knowledge about the world. It focuses on disciplinary literacy and the need to help learners understand the nature of disciplinary work. Within Geography education, field-based inquiry can be

seen as a defining feature of teaching and learning about the subject (Komoto, 2009, p. 129). In this study, we sought to understand the extent to which field-based inquiry is understood and practiced by geography teachers in Singapore as a type of signature pedagogy.

The study focused on 6 teachers with a range of teaching experience, in 4 secondary schools, as they carried out water quality studies with their Secondary 1 students. The details of the schools and teachers that participated in the study are provided in Table 1 below.

The findings indicated strong support for field-based inquiry as a signature pedagogy that inducts students into

disciplinary practices. All the teachers agreed that it provided students with authentic learning experiences which connected classroom knowledge to the real world.

However, the study also highlighted the divergent emphases of teachers when planning and carrying out the inquiry. These could be linked to teachers’ subject identity, in particular, their past academic training and current teaching subjects (see Table 2 on the following page).

For instance, Teacher 1 preferred to focus on the scientific method, and referred to the importance of scientific rigour in his academic training. In contrast, Teacher 4, a trained geographer who specialised

School	School Type	Teacher	No. of Classes Observed	Teaching Experience
School 1	Mainstream Sec	Teacher 1	1	1 year
School 1	Mainstream Sec	Teacher 2	1	2 months
School 2	Mainstream Sec	Teacher 3	1	5 years
School 3	Integrated Programme	Teacher 4	2	6 years
School 4	Mainstream Sec	Teacher 5	1	7 years
School 4	Mainstream Sec	Teacher 6	1	10 years

Table 1. School and respondent details.

School	Teacher	Emphasis	Academic Specialisation	Teaching Subjects/ First Subject Second Subject
School 1	Teacher 1	Scientific Method	Biology	Biology Geography
School 1	Teacher 2	Scientific Method	Physical Education	Physical Education Geography
School 2	Teacher 3	Relevance of Geography/ Applied Learning	Literature	Literature Geography
School 3	Teacher 4	Disciplinary Concepts	Geography	Geography Geography
School 4	Teacher 5	Responsible Citizenship	Sociology	Geography Social Studies
School 4	Teacher 6	Responsible Citizenship	Sociology	Geography Social Studies

Table 2. Emphases of field-based inquiry and teacher subject identity.

only in teaching geography, was less concerned with scientific accuracy and preferred to focus on geographical understanding through disciplinary concepts.

Another significant finding related to the challenges posed by a lack of knowledge about water quality content. For instance, Teacher 4 suggested that she was not able to explain to the students “why we want to test these things. Why these chemicals matter. Or what it really means”. Another finding was the lack of place-based knowledge of the field sites which could lead to the setting of inappropriate inquiry questions/ hypotheses, as well as a problematic selection of data collection sites. The field-based inquiries were also heavily teacher-directed across all schools.

The Sustainability Learning Lab (<https://knowledgebank.nie.edu.sg/sustainability-lab.html>) was developed to provide support to address the challenges identified and to encourage more student-directed inquiry.

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