Investigating The Extent to Which Student-Led Inquiry is Supported By Fieldwork Booklet Design

Aaron Bermingham
Graduate from the Master of Teaching at The University of Melbourne
Teacher at Koonung Secondary College

Abstract

This study analysed the extent to which student-led inquiry is supported by fieldwork booklet design. Roberts' (2003) framework for learning through inquiry was used as lens for analysing the presence of student-led inquiry in the design of nine fieldwork booklets. Observations of teaching practice from two fieldwork activities were also analysed to understand how teachers behaviour can influence student-led inquiry during fieldwork. This study found that the fieldwork booklets provided frequent opportunities for students to make sense of data at increasingly complex levels of interpretation. In contrast, it was also found that the fieldwork booklets provided limited opportunities for students to plan their fieldwork inquiries, clarify their values, or reflect on the fieldwork inquiry process. The observations of teaching practice highlighted the importance of establishing student engagement and using appropriate questions to facilitate student-led inquiry. This study can assist teachers with incorporating genuine student-led inquiry into their fieldwork booklet design.

The purpose of this study was to develop a deeper understanding of the extent to which student-led inquiry is supported in fieldwork booklet design. The presence of student-led inquiry in nine fieldwork booklets was analysed through the lens of Roberts' (2003) framework for learning through inquiry (Appendix 1). In addition to this, observations of teaching practice were made from six field trips based on two fieldwork activities. These observations were used to develop an understanding of how teaching practice can facilitate student-led inquiry during fieldwork. The findings of this case study can be used to assist teachers to develop their understanding of student-led inquiry in the fieldwork context. This can assist teachers to incorporate genuine student-led inquiry into their fieldwork booklet design.

Guiding questions

Four key questions guide this case study:

1. How and to what extent are fieldwork booklets used to help with creating a need to know?
2. To what extent are students given responsibility for planning and collecting data?
3. To what extent does the fieldwork booklet provide scaffolds to assist students in making sense of the data?
4. Does the fieldwork booklet prompt students to reflect on the fieldwork or inquiry process?

The creation of these four key questions was guided by Roberts' (2003) framework for learning through inquiry which is closely aligned with the geographic inquiry outcomes of the Australian Curriculum (ACARA, 2015) (Appendix 1).

Appendix 1: Links between the Roberts Inquiry Model, the literature review, case study questions and the Australian Curriculum.

Inquiry Model Roberts (2003)	Literature Review (variables for enhanced learning from student-led inquiry)	Case study (Questions)	Geographic Inquiry ACARA (2015)
Create a need to know	Student motivation • Effects of student motivation; • Students responsible for creating geographic questions; • Guiding questions scaffold student creativity.	How and to what extent are fieldwork booklet used to help with creating a need to know?	Observing, questioning and planning

Inquiry Model Roberts (2003)	Literature Review (variables for enhanced learning from student-led inquiry)	Case study (Questions)	Geographic Inquiry ACARA (2015)
Using data	Student given responsibility for planning the inquiry • Guiding questions scaffold student-led inquiry; • Scaffolding student knowledge of data collection strategies; • Timely feedback.	To what extent are students responsible for planning and collecting primary/ secondary data?	Collecting, recording, evaluating, representing
Making sense	Design of guiding questions by teacher • Guiding questions scaffold student-led inquiry; • ICT scaffolds student-led inquiry; • Timely feedback; • Post-fieldwork activities.	To what extent does the fieldwork booklet provide scaffolds to assist students in making sense of the data?	Interpreting, analysing and concluding Communicating
Reflecting on learning	Design of guiding questions by teacher • Guiding questions scaffold student-led inquiry; • Student-led inquiry benefits students over long-term (reflection on inquiry and repeated opportunities for inquiry); • Metacognition enhances quality of student-led inquiry; • Timely feedback.	Does the fieldwork booklet prompt students to reflect on the fieldwork or inquiry process?	Reflecting and responding

Literature review

A review of the literature revealed that enhanced learning from student-led inquiry is dependent upon a range of variables. These variables include student motivation, level of student responsibility for planning the inquiry, design of guiding questions, and use of information and communications technology. There was a trend towards increasing the use of student-led inquiry during fieldwork in the modern literature (Chang et al., 2012; Oost, De Vries, & Van der Schee, 2011). Appendix 1 highlights the links between this case study and the literature review. This case study focuses on the intersection between student-led inquiry and how teachers plan and design their guiding questions in fieldwork booklets.

Method

A combination of data analysis and fieldwork observations was used to complete this case study.

Data Analysis

Data analysis was used to evaluate the extent to which a selection of nine fieldwork booklets scaffolded student-led inquiry. The fieldwork booklets were used in field trips from Years 7, 8 and 9 across a variety of settings and schools. This analysis was completed using Roberts' (2003) inquiry model which is recommended for scaffolding geographic inquiry undertaken by adolescent students (Kriewaldt & Boon, 2012). Roberts' (2003) inquiry model identifies four stages of inquiry which contain a total of 35 inquiry items. The presence of these items in the fieldwork booklets was analysed to create a set of data tables, which illuminated the extent of the presence of student-led inquiry.

Fieldwork Observations

The fieldwork observation component was based on experiences that occurred during placement at a private girls school in Melbourne's south-eastern suburbs. Observations were gathered from six outings across two different field field trips: three Year 7 Liveability Street Surveys and three Year 8 Coastal Fieldwork activities. These fieldwork observations provide an insight into the behaviour of one teacher who implemented the two fieldwork activities. The data booklets for these fieldwork activities were also used in the data analysis section. Findings were derived from the observations taken before, during and after the six field trips. These observations were used to provide insight into the extent to which

the teacher provided opportunities for student-led inquiry.

Findings and discussion

The four key questions identified above guide the findings and discussion.

1. How and to what extent are fieldwork booklets used to help with creating a need to know?

Fieldwork booklets 5 and 8 (Appendix 2) contained questions that position students to 'ask questions' and 'generate ideas'. These booklets performed well in terms of creating a 'need to know' in students. However, this approach is not common when looking at the data from a broader perspective. In general, the data indicated that students are rarely given opportunities to generate ideas, ask questions, or 'plan how to research' (Appendix 2). This indicated a lack of opportunities for students to create hypotheses and plan their fieldwork. The literature review found that engagement increases when learning goals and skills are discussed with students during the planning phase (Oost et al., 2011). Based on the data and literature review, students should be given increased opportunities to create their own inquiry.

2. To what extent are students given responsibility for planning and collecting data?

It was found that all fieldwork booklets provided students with opportunities to collect data and students are often provided at least one opportunity to select evidence to be used in their inquiry (Appendix 3). From an inquiry planning perspective, the data indicated that this represented the extent to which students were involved in the planning of data collection. In most cases, teachers dictated a plan for collection and organisation of inquiry data (Appendix 3). Additionally, it was found that no opportunities were given for students to evaluate the way in which inquiry data were classified or sequenced (Appendix 3). This indicates that there is a distinct lack of student inclusion in the inquiry planning process. The absence of student inclusion limits opportunities for students to develop and reflect on their inquiry planning skills. The literature review found that student involvement in the inquiry planning process increases engagement (Remmen & Frøyland, 2014). Based on the data and literature review, students should be given

Appendix 2: How and to what extent does the fieldwork booklet help with creating a need to know?

	Year level	Booklet	Be curious	Speculate	Hypothesise	Use imagination	Generate ideas	Make links with existing knowledge	Identify issues	Ask questions	Plan how to research	Total
Water Field Investigation A	7	1	0	1	0	1	0	0	0	0	0	2
Water Field Investigation B	7	2	0	1	0	1	0	1	0	0	0	3
Liveability Street Survey A	7	3	1	1	0	1	0	1	1	0	0	5
Liveability Street Survey B	7	4	1	1	1	1	0	1	1	0	0	6
Coastal Fieldwork A	8	5	1	1	1	1	1	1	1	1	0	8
Coastal Fieldwork B	8	6	1	1	0	0	0	1	1	0	0	4
Coastal Fieldwork C	8	7	0	1	1	1	1	1	1	0	0	6
Land use change: Yarra Valley A	9	8	1	1	1	1	1	1	1	1	0	8
Land use change: Yarra Valley B	9	9	0	1	0	0	0	1	0	1	0	3

Data indicates students are given limited opportunities to create their own inquiry.

The guiding questions in these fieldwork booklets create opportunities to generate a 'need to know' in students.

1 Indicates evidence identified in fieldwork booklet

0 Indicates no evidence identified in fieldwork booklet

Appendix 3: To what extent are students given responsibility for planning and collecting primary/secondary data?

	Year level	Booklet	Locate evidence	Collect evidence	Select evidence	Sort data	Classify data	Sequence data	Total
Water Field Investigation A	7	1	0	1	0	0	0	0	1
Water Field Investigation B	7	2	0	1	1	1	0	0	3
Liveability Street Survey A	7	3	0	1	0	0	0	0	1
Liveability Street Survey B	7	4	0	1	1	0	0	0	2
Coastal Fieldwork A	8	5	1	1	1	0	0	0	3
Coastal Fieldwork B	8	6	0	1	0	0	0	0	1
Coastal Fieldwork C	8	7	1	1	1	0	0	0	3
Land use change: Yarra Valley A	9	8	0	1	1	1	0	0	3
Land use change: Yarra Valley B	9	9	0	1	1	0	0	0	2

Students are given very limited opportunities to plan the collection, organisation and evaluation of data.

Students always collected data and were often given opportunities to select evidence for their inquiry.

1 Indicates evidence identified in fieldwork booklet

0 Indicates no evidence identified in fieldwork booklet

more opportunities to be involved in planning their inquiries. There may, however, be significant context-related barriers to this such as time constraints, as well as student prior knowledge and baseline planning ability.

3. To what extent does the fieldwork booklet provide scaffolds to assist students in making sense of the data?

According to the data, there was consistent use of guiding questions by teachers to scaffold student progress through making sense of the data (Appendix 4). The fieldwork booklets offered regular opportunities for students to 'describe', 'explain', 'compare', 'analyse' and 'recognise relationships' in their inquiry data (Appendix 4). This showed that teachers are highly skilled and focused on designing fieldwork booklets that scaffold student abilities in making sense of data. However, it is notable that none of the fieldwork booklets provided opportunities for students to clarify their values in relation to the data (Appendix 4). This limits the opportunity for students to reflect and think critically about how their personal values relate to the data.

4. Does the fieldwork booklet prompt students to reflect on the fieldwork or inquiry process?

Fieldwork booklets are rarely used to provide opportunities for reflection on the inquiry process (Appendix 5). This may indicate an omission of reflection from the inquiry process, or it may indicate that teachers do not consider this to be the right setting for reflective questions. Teachers may also be utilising reflection in post-fieldwork activities that occur beyond the scope of this study. In stark contrast to the general trend, fieldwork booklet 4 utilised a small number of reflective questions to create multiple opportunities for students to reflect on the inquiry process (Appendix 5). This demonstrated the ease with which these questions can be incorporated into fieldwork booklets. The literature review found that students may derive long-term benefits, including enhanced cognitive awareness and geographic inquiry skills, from a student-centred approach that includes reflection on the inquiry process (Fuller, Rawlinson, and Bevan, 2000).

Appendix 4: To what extent does the fieldwork booklet provide scaffolds to assist students in making sense of the data?

	Year level	Booklet	Relate existing knowledge to new knowledge	Describe	Explain	Compare	Analyse	Interpret	Recognise relationships	Analyse values	Clarify values	Reach conclusion	Total
Water Field Investigation A	7	1	0	1	1	1	1	0	1	0	0	0	5
Water Field Investigation B	7	2	1	1	1	1	1	0	1	0	0	0	6
Liveability Street Survey A	7	3	1	0	1	1	1	1	1	0	0	1	7
Liveability Street Survey B	7	4	1	1	1	1	1	1	1	0	0	1	8
Coastal Fieldwork A	8	5	1	1	1	1	1	1	1	1	0	1	9
Coastal Fieldwork B	8	6	1	1	1	1	1	0	1	1	0	0	7
Coastal Fieldwork C	8	7	1	1	1	1	1	1	1	1	0	1	9
Land use change: Yarra Valley A	9	8	1	1	1	1	1	1	1	1	0	1	9
Land use change: Yarra Valley B	9	9	1	1	1	0	0	0	0	0	0	0	3

No fieldwork booklets provided opportunities for students to reflect on and clarify their values in relation to the data.

Consistent use of guiding questions by teachers to scaffold student progress through making sense of the data.

1 Indicates evidence identified in fieldwork booklet

0 Indicates no evidence identified in fieldwork booklet

Fieldwork Observations

The four key questions have been used to inform and guide fieldwork observations. The guiding questions have been edited for the purpose of increasing their relevance to the context in which the observations were made.

1. How and to what extent did teacher behaviour help with creating a need to know?

When introducing the fieldwork, the teacher used an enthusiastic and wondrous approach to inspire a need to know. This was evidenced by the teacher's enthusiasm and expressiveness when communicating with the highly engaged students. The teacher related the classroom to a stage, "if you put on a good show, you will have the students' attention" (personal communication, April 24, 2015). Students did not question why they were learning the content and were inspired by their teacher's energy and commitment to the fieldwork.

2. To what extent did teacher behaviour give students responsibility for planning and collecting data?

It was observed that students were not given responsibility for planning the collection of inquiry data. The planning stage was completed by the teacher in advance of introducing the students to the fieldwork activities. When it was time for the students to collect data, the teacher assisted students by providing verbal prompts and asking questions. The teacher asked questions such as "What are people doing over there?" or "Why have they designed it in this way?" With questions such as these, the teacher avoided spoonfeeding answers to the students and encouraged them to take responsibility for data

Appendix 5: Does the fieldwork booklet prompt students to reflect on the fieldwork or inquiry process?

	Year level	Booklet	Data sources	Skills and techniques used	Criteria for making judgements	Opinions	What has been learnt	How it has been learnt?	How the inquiry could be improved?	How the inquiry could be further developed?	The value of what has been learnt?	Total
Water Field Investigation A	7	1	0	0	0	0	0	0	0	0	0	0
Water Field Investigation B	7	2	1	0	0	0	0	0	0	0	0	1
Liveability Street Survey A	7	3	0	0	0	0	0	0	0	0	0	0
Liveability Street Survey B	7	4	0	0	1	1	1	1	1	0	0	5
Coastal Fieldwork A	8	5	1	0	0	0	0	0	0	0	0	1
Coastal Fieldwork B	8	6	0	0	0	0	0	0	0	0	0	0
Coastal Fieldwork C	8	7	1	0	0	0	0	0	0	0	0	1
Land use change: Yarra Valley A	9	8	0	0	0	0	0	0	0	0	0	0
Land use change: Yarra Valley B	9	9	0	0	0	0	0	0	0	0	0	0

Fieldwork booklets are rarely used to provide opportunities for reflection on the inquiry process.

A small number of reflective questions created multiple opportunities for students to reflect on the inquiry process.

1 Indicates evidence identified in fieldwork booklet

0 Indicates no evidence identified in fieldwork booklet

collection. Thinking time was also given at many locations during the fieldwork to allow students time for interpretation of sites and collection of data.

3. To what extent did teacher behaviour provide scaffolds to assist students in making sense of the data?

Data collection was the primary focus whilst out on fieldwork. Students were encouraged to make sense of the data during post-fieldwork activities, including fieldwork report writing. It should be noted that a number of the fieldwork booklets indicated that teachers made a distinction between using the fieldwork booklet for data collection and using a separate instructional document for scaffolding fieldwork report writing. In relation to the two fieldwork activities, it was observed that the teacher broke the report writing down into a step-by-step procedure in order to help students to make sense of the data. However, there was a low focus on asking students to analyse and clarify their values which is similar to the findings of the data analysis.

4. Did teacher behaviour prompt students to reflect on the fieldwork or inquiry process?

Students were not given an opportunity to reflect on the fieldwork or inquiry process. Students completed their fieldwork reports for homework whilst the lesson content moved on to new topics in the curriculum. Although limited by time pressures, this highlights a concern that when students miss the opportunity to reflect on their fieldwork, they also miss out on the opportunity to develop a stronger, more positive and insightful relationship with fieldwork.

Limitations

This case study has several limitations which are largely due to the narrow focus on analysing fieldwork booklets. The study does not include data on the extent to which teachers are creating a need-to-know during pre-fieldwork activities. Additionally, given its scope this study was not able to investigate student involvement in planning inquiry during pre-fieldwork activities. There was also minimal data relating to whether

teachers were addressing reflection on the inquiry process during post-fieldwork activities.

Conclusion

Based on the broader literature and the findings of this case study, it was found that whilst teachers are including some elements of student-led inquiry in fieldwork booklets, there is scope for more. Although limited, the data indicated that teachers are designing fieldwork booklets that are good at helping students to make sense of their inquiry data. However, the analysis also found that students may be missing out on opportunities to plan, evaluate and reflect on the inquiry process. Observations of teacher behaviour revealed that the student-led inquiry process can and should be supported by activities that largely lie beyond the scope of this case study. Future research could extend the scope of this study to include teacher behaviour and pre- and post-fieldwork activities in the data analysis. This may provide a deeper understanding of the extent to which students are actually involved in student-led inquiry when conducting fieldwork.

References

Australian Curriculum, Assessment and Reporting Authority [ACARA]. (2015). *7–10 Geography*. Retrieved from http://www.australiancurriculum.edu.au/humanities-and-social-sciences/geography/curriculum/f-10?layout=1

Chang, C., Chatterjea, K., Goh, D., Theng, Y., Lim, E., Sun, A., Razikin, K., Kim, T., & Nguyen, Q. (2012). Lessons from learner experiences in a field-based inquiry in geography using mobile devices. *International Research in Geographical and Environmental Education*, *21*(1), 41–58.

Fuller, I., Rawlinson, S., & Bevan, R. (2000). Evaluation of student learning experiences in physical geography fieldwork: paddling or pedagogy? *Journal of Geography in Higher Education*, *24*(2), 199–215.

Kerawalla, L., Littleton, K., Scanlon, E., Jones, A., Gaved, M., Collins, T., Mulholland, P., Blake, C., Clough, G., Conole, G., & Petrou, M. (2013). Personal inquiry learning trajectories in geography: technological support across contexts. *Interactive Learning Environments*, *21*(6), 497–515.

Kriewaldt, J., & Boon, D. (2012). Geographic inquiry. In T. Taylor, C. Fahey, J. Kriewaldt, & D. Boon, *Place and time: Explorations in teaching geography and history* (pp. 129–146). Frenchs Forest, NSW: Pearson Australia.

Oost, K., De Vries, B., & Van der Schee, J. (2011). Enquiry-driven fieldwork as a rich and powerful teaching strategy – school practices in secondary geography education in the Netherlands. *International Research in Geographical and Environmental Education*, *20*(4), 309–325.

Remmen, K., & Frøyland, M. (2014). Implementation of guidelines for effective fieldwork designs: exploring learning activities, learning processes, and student engagement in the classroom and the field. *International Research in Geographical and Environmental Education*, *23*(2), 103–125.

Roberts, M. J. (2003). Learning through enquiry: making sense of geography in the key stage 3 classroom. Sheffield: Geographical Association.