Cross-national Comparisons of Inquiry Learning in Secondary Geography Curricula

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Author Biographies

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Jeana Kriewaldt is a Senior Lecturer in the Graduate School of Education at the University of Melbourne. She has a strong applied background as a classroom teacher and school leader. Researching in teacher education, Jeana research focuses on how teachers learn across the career span. This work seeks to influence policy by theorising what are the important foundations for teacher development today, drawing in human and planetary equity

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dimensions. She recently co-edited Place and time: explorations in teaching geography and history. With foundational expertise in geography and sustainability education, she brings distinctive knowledge and insights to make significant contribution to teacher professional development as a means for conceptualising how teachers continue to improve their practice.

Margaret Roberts' career was grounded by teaching comprehensive schools in London, Leicestershire and Sheffield before moving to Sheffield University's Division of Education where she was responsible for the training of geography teachers for over 20 years. During this time, she carried out extensive research into the national curriculum and enquiry learning. Since her retirement in 2006 Margaret has been President of the Geographical Association (2008–09), edited the journal Teaching Geography and in 2011 ran ten workshops on 'Geographical Inquiry' for geography teachers in Singapore. Her most influential book, Geography Through Enquiry, was published by the Geographical Association in 2013.

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Declaration of Interest

No potential conflict of interest was reported by the authors.

Data Availability Statement

The data that support the findings of this study are available in the public domain. Please refer to Table 1.

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Internationally there is a clear turn towards inquiry as a core approach to learning secondary school geography. This research critically compares how inquiry learning is expressed and justified in six jurisdictions (Australia, China, England, Hong Kong, Singapore, USA). Through content analysis of national curriculum documents, we found that most of the jurisdictions have placed inquiry prominently in their curriculum. Despite national variations, inquiry is justified as a desirable pedagogy to develop conceptual understanding, build disciplinary knowledge and enable students to assess knowledge claims. An inquiry-rich curriculum in school geography promises to recalibrate the balance between how existing knowledge of geography is valued and taught, and how the skills of geographical inquiry can be integrated to expand students' experiences of building knowledge. This research addresses a research gap on powerful pedagogies like inquiry in the intended curriculum. We argue that pedagogy needs to be examined in tandem with knowledge in curriculum analyses, because enabling students to access knowledge and developing their capacities to inquire are intricately linked. We further argue that ideas about knowledge and pedagogy in curriculum are context-dependent, necessitating an understanding of jurisdictional influences on curriculum.

Keywords: inquiry learning; geography curriculum; knowledge; pedagogy

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Introduction

Globally, interest in inquiry[1] learning has grown throughout all levels of education and across all subjects (Barron & Darling-Hammond, 2010; Furtak et al., 2012). At the secondary school level, inquiry has been used as a domain-general approach as well as a discipline-specific approach in subjects like science, mathematics and history (Kidman & Casinader, 2017). In geography, inquiry learning gained prominence in the past two decades (Kuisma, 2018; Author, 2013). Inquiry is seen by humanities scholars as ambitious instruction (Howell & Saye, 2018) and a powerful pedagogy (Author, 2014). Field-based inquiry in particular is key to geographers' work and is geography's signature pedagogy for socialising students into the discipline's practices, concepts and values (Seow et al., 2019).

Several jurisdictions now recommend inquiry as a core approach for secondary school geography. However, just as definitions and approaches to inquiry vary widely in literature, these jurisdictions differ in how they conceptualise inquiry and justify its importance for geographical learning. The purpose of this study is to compare how inquiry learning is expressed and justified in six jurisdictions (Australia, China, England, Hong Kong, Singapore and USA), and how these reflect jurisdictional beliefs about how knowledge is constructed and learnt within the subject. Examining official curricula is critical for understanding the contexts within which school geography is taught. We acknowledge the complex relationship between the intended and enacted curricula within and across contexts[2]. Nonetheless how the intended curriculum articulates and selects knowledge and pedagogy can have a significant impact on teaching enactment and thus student outcomes in school and beyond school.

Literature

Constructivism, Inquiry and the Curriculum

[1] In some jurisdictions e.g. England and Hong Kong, 'inquiry' is commonly referred to as 'enquiry'. Both terms are similar in meaning when used in educational contexts (Author, 2013).

[2] Complexities exist within jurisdictions, as some schools may not be required to adopt published curriculum. For example, in England, 'maintained schools' funded by local councils are legally bound to follow the KS3 National Curriculum whereas 'academies' funded by the government are not legally bound although most do base their geography courses on the National Curriculum, encouraged by OFSTED (Office for Standards in Education). At KS4 and KS5, geography is not compulsory; students opt to follow GCSE, AS and A level examination courses, the requirements for which are set out in the documents listed in Table 1.

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Inquiry learning has a myriad of definitions and forms in literature. A non-exhaustive list includes problem-based learning, project-based learning, authentic learning and discipline-based inquiry (Scott & Friesen, 2013). Inquiry approaches also vary across disciplines (Kidman & Casinader, 2017). Contemporary ideas about inquiry have been influenced by Dewey (1938) who promoted active student participation in formulating problems and constructing knowledge. This departure from transmission-based learning is seen as essential not merely for engagement but also for developing dispositions for life. For Dewey, this meant preparing young people for participation in democracy. More recently, this meant developing 21st century skills such as critical and inventive thinking, cross-cultural understanding, and communication skills. Scholars have also argued for the importance of inquiry within disciplinary frameworks in apprenticing students to think like disciplinary experts (Levstik & Barton, 2011).

Author (2013) considered these benefits of inquiry learning to be justifications to teachers for adopting an inquiry approach to teach geography:

(a) inquiry enables students to understand the nature of geographical knowledge and how it is constructed,
(b) inquiry encourages constructivist learning, and
(c) inquiry contributes to broader educational goals including developing 21st century skills.

These justifications speak directly to student outcomes e.g. understanding the nature of geographical knowledge, learning to investigate, developing skills and attitudes for beyond school. Author (2013) noted a further case for inquiry: when national curricula and/or examination standards specify inquiry as a requirement. This perhaps speaks directly to teachers; curricula which expect students to demonstrate the ability to inquire in standardised assessments can significantly influence the design of curriculum resources, local curriculum-making and significantly, teachers' enactment in classrooms.

These justifications are used to varying degrees by the six jurisdictions to convince their readers of the turn towards inquiry. All six jurisdictions also accept and promote constructivist learning without acknowledging controversies surrounding inquiry or constructivism itself. Here we briefly discuss two areas of concern about inquiry highlighted in literature. The first area is about the philosophy of constructivism itself. Ford (2010)

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emphasises that while knowledge claims are constructed by experts, they are shaped by peer critique. He argued that students need not only to construct meaning but also be able to critique their knowledge constructions. Stemhagen et al. (2013) similarly argued that constructivism should help students become skilled at evaluating knowledge, or "judging its worth" (p.58), using tools specific to each discipline. These critiques point to the need for inquiry to go beyond teaching students to construct knowledge, to enabling students to acquire the ability to assess disciplinary knowledge claims themselves.

Another area of concern about inquiry surrounds its efficacy or impact on student learning. In a study on cognitive architecture and loading, Kirschner et al. (2006) criticised unguided or minimally-guided instruction – a popular impression of inquiry learning – as ineffective and inefficient. Similarly Furtak et al. (2012) in a meta-analysis found that students had more learning gains from teacher-led inquiry lessons than in 'traditional (transmission-based) lessons and unstructured student-led activities' (p. 324). These and other studies e.g. Gee & Wong (2012), Kuisma (2018) provide convincing evidence that inquiry with minimal teacher guidance and scaffolding can be ineffective. The teacher's role in planning and enacting an inquiry curriculum is therefore very significant and warrants investigation. Since teaching is a highly contextualised activity, it is critically important that we examine the contexts in which teachers plan and enact inquiry.

National curriculum guidelines send important signals and intentions to teachers, teacher-educators, providers of ongoing teacher education and textbook authors about how learning should be conceptualised. The way official documents are interpreted and developed in curriculum plans and resources ultimately influences enactment. Deng (2020) termed national curriculum guidelines as the 'institutional curriculum'. Teachers' interpretation of the institutional curriculum was, he argued, an 'essential starting point for curriculum making' (p. 161). Contemporary sociological debates on knowledge in curriculum – stemming from Young's (2013) ideas about powerful knowledge and extended by others e.g. Hudson (2018) who argued for curriculum of high epistemic quality, McPhail (2020) who advocates curriculum that promotes deep learning – do not sufficiently account for jurisdictional influences. Furthermore the knowledge debate does not address pedagogy (Author, 2014); powerful pedagogies like inquiry in curriculum remain under-researched. We aim to address this gap by positing that an examination of the intended curriculum is an essential starting point for understanding inquiry teaching and learning.

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Geographical Inquiry Models

Examining the inquiry frameworks recommended by the intended curricula will reveal underlying jurisdictional beliefs about how learning should take place. Framework choices are not neutral as they can generate different kinds of questions thus influencing the type of inquiry and learning outcomes (Author, 2013).

As this study focuses on secondary school geography, two influential geographical inquiry models are employed as a lens for our analysis of each jurisdiction's choice of inquiry framework: Author's (2013) four essential elements of learning geography through inquiry and Bednarz et al.'s (2013) seven geographic practices (Figure 1). Both models are distinctively disciplinary, emphasising geographical thinking throughout the phases of inquiry. Both begin with posing questions in the conceptualisation stage, followed by the investigation stage of acquiring, organising and analysing information. The models diverge however in the final stages of inquiry. Whereas Author's model focuses on reflective thinking (reflecting on e.g. the sources of information, criteria of judgment, how the inquiry could be improved), the Bednarz model recommends more action-oriented goals such as answering questions, designing solutions, and communicating these to an audience. Regardless, assessing knowledge claims is an important component of both Author's reflective thinking and Bednarz et al.'s answering questions and designing solutions which includes having to 'evaluate one or more answers to a question or solutions to a problem'.

Materials and Methods

This study employs document analysis (see Bowen, 2009; Merriam & Bowen, 2015) as the key methodology, using a systematic procedure to identify and evaluate national curriculum documents from jurisdictions which advocate inquiry for school geography. Document analysis is particularly suited for this study as it provides data on the contexts within which geography inquiry teaching and learning is taking place – 'a case of text providing context' (Bowen, 2009, p.29). Additionally, documents can be assessed for completeness or how comprehensive, selective, or silent they are about inquiry, providing critical insights into underlying beliefs and assumptions.

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We analysed the curricula on three levels. The first level is a quantitative content analysis of inquiry terms in the documents to obtain an overall picture of the expression of inquiry. The second level of analysis compares each jurisdiction's inquiry framework with Author's and Bednarz's geographical inquiry models. Finally we conduct a qualitative content analysis of how each jurisdiction justifies the importance of inquiry for student and disciplinary outcomes. In sum, our analysis is guided by the following questions:

(a) How is inquiry expressed?

(b) What model of inquiry is promoted?

(c) How is inquiry justified?

Curriculum documents examined

The six jurisdictions were selected to provide geographical reach across four continents which represent different educational traditions. Singapore, Australia and England are aligned with the authors' respective expertise. England and USA were selected as much of the educational research on geographical inquiry have come from these two countries. The inclusion of China in this study provides insights into how a system with distinctly different educational traditions is approaching ideas on inquiry and constructivism from Europe and North America. Inquiry in the Chinese curriculum, and generally across Asian education systems, remains under-studied. Hong Kong was selected as the third non-Anglo-American context for this study as its curriculum has a history of negotiating Chinese traditions, British colonial influences, and its own social, political and economic conditions (Morris & Adamson, 2010).

The most recent publicly available secondary geography curriculum documents, collected from the websites of the Ministries of Education or relevant authorities, formed the primary data for this study (Table 1). We acknowledge that these documents are subject to ongoing changes. This paper will focus on documents published as at May 2020. The focus is on secondary-level curricula for 11-18-year-olds, because in most of these jurisdictions, geography becomes a standalone subject only at the secondary level.

For education systems that are not centralised — Australia and the USA — we could not always refer to a single national document. For Australia, we focus our analysis on the Australian Curriculum (AC), acknowledging that individual states and territories make minor

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variations to this national curriculum. ln the USA, school geography is taught alongside civics, economics and history in the Social Studies curriculum. There is no national curriculum for Social Studies. For this study, we will consider the 'College, Career, and Civic Life (C3) Framework for Social Studies State Standards' (C3 Framework) produced by the National Council of Social Studies (Swan et al., 2014). States and schools are encouraged to use the Framework to guide the design of the local curriculum. While it is not a curriculum document, the C3 Framework is influential for social studies curriculum makers and teachers in USA schools and is therefore a suitable document choice for our study.

Results and Discussion

Expressions of inquiry

In the first level of analysis, we asked 'How is inquiry expressed?' We used the word frequency function in NVivo 12 software to obtain a preliminary indication of the level of emphasis each curriculum places on inquiry. Word frequency refers to the percentage of times selected words are mentioned relative to the total number of words in the document. We searched the documents in English for the term 'inquiry/enquiry' and its stemmed words, then terms implying inquiry: 'investigate' and 'fieldwork', and their stemmed words. The choice of these terms is deliberate. 'Fieldwork' is often seen as the main expression of geographical inquiry (Author, 1998; Seow et al., 2019). 'Investigate' is historically favoured in the English documents over 'enquire' as the former is less controversial (Rawling, 2001).

In jurisdictions where more than one curriculum document is in scope, we used the average across the documents. We ranked the jurisdictions according to the three groups of keywords searched for: inquiry/enquiry, investigate, fieldwork. Overall, the English curriculum ranked highest in frequency of use of all the inquiry terms, followed by Australia, Singapore, USA and Hong Kong (Table 2). This form of analysis is limited, nonetheless it was a starting point for an understanding of each jurisdiction's overall emphasis on inquiry. The next two levels of analysis are critical for deeper understanding.

Frameworks of inquiry

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Our second level of analysis involved a qualitative content analysis of the documents based on the question 'What model of inquiry is promoted?' Table 3 juxtaposes the inquiry models recommended by the six jurisdictions. Author's and Bednarz's geographical inquiry models are used as objective references to help us evaluate each jurisdiction's framework.

Australia

The AC ranks relatively high in overall frequency of expression of inquiry because of the centricity of inquiry throughout the curriculum, evident in how 'geography inquiry and skills' is presented as a key strand alongside 'knowledge and understanding'. The curriculum consistently refers to the inquiry strand, from the curriculum aims to the content scope and sequence. There are also specific achievement standards for inquiry for each year level.

The AC states that the inquiry process begins with 'why', 'where' and 'why there' questions. As information is collected and evaluated, there will also be the 'so what', 'what ought', 'what might happen', and 'what if' questions. Finally, reflection on the investigation includes thinking about 'how we know what'. The AC's choice of questions for inquiry harks back to the 5Ws template (originally developed by Nichols & Kinninment, 2000) adding additional questions with a futures dimension ('what might happen') and an ethical or decision-making dimension ('what ought')[3].

The AC then lists seven inquiry steps (Table 3) which adeptly combine all the elements from both Author's and Bednarz's models. The AC is the only policy in this study that includes the elements of 'reflective thinking', 'designing solutions' and 'communication' in one framework. Inclusion of the seven-steps process is evidence of the AC's recognition that generic inquiry questions are insufficient for the construction of geographical knowledge. Instead, these questions need to be supported by geographical thinking for effective inquiry . Overall, Australia's policy on geographical inquiry is comprehensive in demonstrating the central role of inquiry for geographical thinking and construction of geographical knowledge. It also recognises the potential for knowledge to produce actionable outcomes.

[3] The values dimension of inquiry is valued by the AC, which advocates the investigation of current geographical events as these may raise "ethical questions about human rights and citizenship,… and about group and personal responsibilities" (ACARA, 2011).

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China

China's educational tradition is distinct from the other jurisdictions' which all have Anglo-American influences. Chinese educational policy is informed by the traditions of indigenous philosophers and scholars, and foreign influences including the former USSR. Influenced by the ideology of Russian educator Kairov since the 1950s, Chinese educational policy has long defined school subjects as knowledge points and teaching as the transmission of knowledge points (Tan & Chua, 2015). Current educational reforms represent a political intention to shift from an 'exam-oriented education' (yingshi jiaoyu) that is constricting creativity, collaboration and communication amongst students (Fu, 2020) to a 'quality-oriented education' (suzhi jiaoyu) emphasising learner-centredness. This has meant a shift from curriculum as being 'synonymous with topics… to be tested in exams' to curriculum as 'classroom engagement, innovation, creativity, inquiry' (Tan & Chua 2015, p.690). The documents being analysed here reflect these educational reforms.

Within subjects, a 'quality-oriented education' is focused on cultivating students' 'core subject qualities' (hexin suyang) (Ji & Zhang, 2019). The 2017 senior secondary geography curriculum lists four 'core subject qualities' for geography: (i) valuing the interconnectedness of physical and human environments, (ii) synthesis thinking, (iii) knowledge of regions, and (iv) geographical skills which include fieldwork and geographical investigation skills (PRC MOE, 2017, pp.3-4). To develop these qualities, the curriculum recommends that teachers 'build on the strengths of traditional teaching approaches, to experiment with other approaches' (PRC MOE, 2017, p.31). Amongst the four approaches recommended, only two are related to inquiry: problem-based learning (PBL) and applied learning. PBL is described as an approach whereby 'teachers design their teaching considering students' prior knowledge, and providing opportunities for students to discover new knowledge, ask questions, synthesise, and work collaboratively and creatively to examine an issue/problem'. Applied learning refers to conducting experiments and field investigations (PRC MOE, 2017, p.32).

The junior secondary curriculum speaks broadly about inquiry-based learning as a recommended constructivist approach that encourages 'independent thinking and autonomous learning' and allows students to 'experience the process of solving geographical problems and

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acquire problem-solving and analytical skills' (PRC MOE, 2011, p.20). There is no specific inquiry framework recommended; instead, the curriculum lists a set of inquiry process skills which teachers are encouraged to evaluate (Table 3).

The Chinese documents recognise the practical benefits of inquiry in promoting student-centredness and in helping students acquire procedural abilities and skills. However it does not advocate inquiry as unique to geography or key for knowledge construction within the subject. Neither is inquiry considered the only or core student-centred approach. Scholars like Tan and Chua (2015) argue that Confucian thinking values knowledge construction and learner-centredness so these are not merely imported constructs. However we propose that the Chinese policy documents reflect an ongoing tension between retaining China's diverse indigenous traditions and adopting global trends which are largely driven by Anglophone educational ideas. This tension is particularly evident in the senior secondary curriculum which recommends that teachers build upon the strengths of traditional teaching approaches when 'attempting' other approaches (PRC MOE, 2017, p.31).

England

The English curriculum has the highest overall frequency of inquiry terms because of its emphasis on fieldwork. Fieldwork is common across all three key stages, however inquiry is only emphasised in KS4 and KS5 which have been influenced by the legacy of the 1970s-1980s Schools Council Geography Projects which pioneered the inquiry approach. Most elements of both Author's and Bednarz's frameworks are evident at KS4, except Bednarz's element of 'designing solutions'. The inquiry framework is most explicit in the KS4 and KS5 compulsory fieldwork component. The KS5 document specifies a wide range of inquiry skills for independent fieldwork investigations and content study (Table 3). Criticality is emphasised e.g., students are required to 'undertake informed and critical questioning of data sources, analytical methodologies, data reporting and presentation' (DfE, 2014b, p.12). Students are also required to understand the ethical and socio-political implications of collecting, studying and representing geographical data about human communities.

In contrast to KS4 and KS5, which have been influenced by the legacy of Schools Council projects and by academic geographers, the key influence on the National Curriculum has been the government. Rawling, who has been involved in various versions of the National

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Curriculum, wrote that inquiry was considered ‘politically sensitive’ (Rawling, 2001, p.143). Conservative governments rejected inquiry-based approaches advocated in the 1970s and 1980s, considering them to be too child-centred. So, inquiry is not advocated in the current KS3 geography National Curriculum. Nevertheless, some inquiry skills are listed in relation to using GIS (analysis and interpretation of data) and fieldwork (collect, analyse and draw conclusions from geographical data).

Hong Kong

The HK curriculum features geographical inquiry extensively. However as the documents are lengthy, it has a low overall percentage frequency of inquiry terms. It explicitly contrasts inquiry to the ‘traditional, spoon-fed didactic approach’, arguing for the superiority of inquiry in enabling students to ‘master geographical concepts and knowledge’, ‘practise… generic skills’, and develop ‘positive values’ and ‘inquisitive attitudes’ (HK CDC, 2011, 73).

In terms of framework choice, the HK curriculum uses an adaptation of Naish et al.'s (1987) ‘route for enquiry’ which was originally designed for the UK Schools Council Geography Projects. This framework extends the 5Ws framework to include questions for investigation (‘what decision’) and questions with an ethical dimension (‘what do I think’) (HK CDC, 2011, p.74). The HK model (Table 3) follows Author’s inquiry model closely. There is little emphasis on creating and communicating solutions, even though it is an issue/problem-based inquiry model.

Apart from the Australian curriculum, Hong Kong is the only other jurisdiction that explicitly included the values dimension in its geographical inquiry model, arguing that inquiry ‘enables students to develop the important abilities involved in values clarification and value judgments, which are fundamental to whole-person development’ (CDC & HKEAA, 2017, p.2).

Singapore

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‘Inquiry’ is not a word that occurs frequently in the Singapore curriculum; instead ‘investigate’ and its stemmed words are more commonly used (Table 2). Like the English KS4 and KS5, the Singapore curriculum recognises the importance of inquiry for building geographical knowledge and skills. Field-based inquiry is termed Geographical Investigations in the syllabus, which explains the frequency of terms related to ‘investigate’. Geographical Investigations, defined as ‘a form of geographical inquiry where students investigate a geographical issue’ (CPDD, 2014, p.11), constitute a significant portion of the standardised national examinations at the GCE O, N, and A levels. Like the HK curriculum, the Singapore curriculum’s inquiry framework (Table 3) closely follows Author’s model.

When inquiry and fieldwork are evaluated through standardised written examinations, it seems inevitable that procedural thinking and skills are emphasised at the expense of other desirable skills and outcomes of inquiry, such as designing and communicating solutions in formats other than in writing.

USA

The C3 Framework has the most frequent mentions of the term ‘inquiry’. Inquiry is central to the C3 Framework; more than half the document is devoted to describing and elucidating ‘The Inquiry Arc’ (Table 3). The document argues strongly that ‘…a social studies education must begin with the kinds of compelling questions and investigations… because children are naturally curious but require adult intervention to reconstruct their ‘naïve’ ideas into ‘discipline-related ideas’ (Swan et al., 2014, pp.83-84).

Having been designed for an interdisciplinary subject with a citizenry focus, the Inquiry Arc focuses on communicating conclusions and taking action as the main outcomes from inquiry. Whilst the C3 Framework is most closely aligned to the Bednarz model, it notes that ‘learning is reflexive and recursive’ (Swan et al., 2014, p.19). Although the term ‘reflective thinking’ is not explicitly used in the Inquiry Arc, the process is very much implied and expected by the framework. The framework also recognises the importance of disciplinary thinking and knowledge, dedicating Dimension 2 to ‘applying disciplinary concepts and tools’. For geography, this means that inquiry provides students with ‘opportunities… to engage in spatial-reasoning investigations… in which they confront

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cognitive impasses created by their naïve everyday ideas… to restructure what they believe and know in more productive ways' (Swan et al., 2014, p.86).

Summary

Australia and USA are the only jurisdictions whose inquiry frameworks contain all the elements of both Author's and Bednarz's models. The AC's expression of inquiry is clearly the most comprehensive. USA stands out as the Inquiry Arc forms a key narrative in the C3 Framework; this may be because it does not have the burden of providing detailed content direction. The English KS3 document on the other hand provides mainly content direction and deliberately avoids prescribing pedagogy. Nonetheless, inquiry features strongly as fieldwork across the English documents, and the KS4 and KS5 documents further elaborate on the role of inquiry in content study not just in individual investigations. The Hong Kong and Singapore curricula follow the English tradition both in their choice of inquiry framework and emphasis on inquiry-oriented fieldwork and field investigations. All these curricula value critical and evaluative thinking, emphasised by Ford (2010) and Stemhagen et al. (2013), to varying degrees. They articulate the importance of inquiry not only for students to construct their own geographical knowledge, but also to evaluate geographical information sources and conclusions i.e. assess knowledge claims. Inquiry is one of several possible approaches advocated in the Chinese curriculum which gave it the least emphasis amongst the six jurisdictions. Based on this analysis, we revised the rank order of the jurisdictions for inquiry expression:

(1) Australia, USA
(2) England, Hong Kong, Singapore
(3) China

Justifications for inquiry

The final level of analysis examines each curriculum using Author's (2013) justifications for inquiry to determine the degree of justification by each jurisdiction. Not every curriculum makes a strong case for inquiry. The most used arguments for adopting inquiry are that it bolsters constructivism, and that it contributes to broad non-discipline-specific educational goals. Table 4 provides a summary of each jurisdiction's justifications and the rank order for strength of justification.

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Australia

The AC proposes that inquiry is fundamental to the construction of knowledge in geography. It defines inquiry as 'the methodologies that geographers use to find new knowledge… and the ways that they attempt to understand and explain what they have observed' (ACARA, 2011, p.19). The AC also recommends inquiry as a constructivist approach to develop students' 'general capabilities', a term used across all the subjects to refer to 'the skills, behaviours and attributes that students need to succeed in life and work in the twenty-first century' (ACARA, 2011, p.7). It explicitly argues that inquiry and/or fieldwork help develop each of these capabilities. For instance, critical and creative thinking is developed through fieldwork and inquiry learning when students puzzle over questions 'that do not have straightforward answers' (ACARA, 2011, p.8). Students also learn about 'ethical procedures for investigating and working with people and places', thus developing their ethical behaviour (ACARA, 2011, p.9).

In terms of assessment, the AC states that students are expected to demonstrate not only their knowledge and skills but also 'their understanding of how to think geographically and how to do geography' (ACARA, 2011, p.15). States and territories mandate that in the senior secondary years, fieldwork reports count towards the overall grading of the subject. The strength of justification for inquiry learning throughout the Australian curricula reflects a commitment to the approach and also an underlying belief in the centricity of inquiry for acquiring and constructing geographical knowledge.

China

Inquiry is not a main focus in the Chinese curriculum, which encourages teachers to use a variety of strategies. Inquiry is championed as one of several approaches that can help students develop broad skills such as independent thinking and learning. It also notes that inquiry exposes students to the process of geographical problem-solving (PRC MOE, 2011) but does not make further claims to the ontological importance of inquiry for the discipline. Scholars suggest that student-centred learning remains a challenge in Chinese schools as high-stakes examinations remain a strong influence (e.g. Fu, 2020; Tan & Chua, 2015).

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Whilst the documents signal a need for change, they are conservative in doing so, reflecting a political desire to retain Chinese education traditions amid reform.

England

The current KS3 geography curriculum does not advocate inquiry so there are no statements of justification. At KS4, inquiry is justified in several ways. First, GCSE specifications aim to enable students to 'think like a geographer' and 'study like a geographer' (DfE, 2014a, p.3) both of which would help students understand the nature of geographical knowledge and how it is constructed. Students also must understand 'the kinds of questions capable of being investigated by fieldwork' (DfE, 2014a, p.8). Second, the government document aims for students to become 'globally and environmentally informed and thoughtful, enquiring citizens' (DfE, 2014a, p.3) signalling the importance of inquiry skills for participation as citizens. Third, to signal to teachers the importance of inquiry, the assessment of inquiry skills contributes significantly to the final examination marks.

AT KS5 there is no explicit justification of an inquiry approach, although the requirements for examination specifications provide implicit justifications. First, students are expected to understand 'the nature of different types of geographical information' and 'the role of fieldwork in the generation of new knowledge' (DfE, 2014b, p.4). Second, a constructivist approach to learning is suggested by students needing 'to engage with qualitative and quantitative methodologies' throughout the study of the prescribed content. Third, there are broader aims for students to for instance, 'grow as independent thinkers and informed and engaged citizens' (DfE, 2014b, p.3) and able to 'engage, as citizens' with questions and issues related to people place and environment (DfE, 2014b, p.4). Fourth, students are required to produce individual investigation reports which contribute to 20% of the overall geography results.

Hong Kong

The HK curriculum provides extensive justification for how an 'issue-based inquiry approach' (inquiry focusing on geographical issues and problems) helps achieve broader outcomes. It highlights that inquiry promotes the development of skills and disposition for 'learning in life' and 'learning for life' (HK CDC, 2011, p.62); lifelong learning has been a

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key feature of reforms in the post-handover era (Morris & Adamson, 2010). The curriculum also extols the benefits of inquiry for promoting constructivism describing it as superior to transmissive approaches:

> 'Enquiry learning can provide students with the capacity and motivation to become active learners, team workers, critical and creative thinkers, problem-solvers and decision makers... (and) helps them to become more open-minded... to respect different views... (and) to be more self-directed in their own learning.' (CDC & HKEAA, 2017, pp.44,65-66).

As a final justification for the shift towards inquiry, the curriculum reports that the senior secondary national written examination comprises compulsory fieldwork-based questions to assess students' fieldwork knowledge and skills (CDC & HKEAA, 2017, p.85). There is no mention of why inquiry is pertinent in geographers' work.

Notably, the HK curriculum is the only one that has used educational equity as an additional justification for using inquiry. It states that inquiry provides 'greater flexibility' and 'stronger social relevance' to cater to students of 'diverse abilities, interests and needs' (HK CDC, 2011, p.62), although there is no further explanation on how inquiry helps achieve equity.

Singapore

The Singapore curriculum describes a deliberate shift towards inquiry in the 2014 syllabus revision as representing a 'contemporary and timely paradigm shift' from rote memorisation to 'comprehension, extraction and application of information… to construct new knowledge and understanding' so as to 'empower students in their own learning and stimulate an interest in the subject' (CPDD, 2014, p.26). Clearly the turn towards inquiry reflects a desire on the policy front to shift towards constructivist learning.

Like Hong Kong, the turn towards inquiry is not merely for classroom engagement but for achieving broader educational goals at a systemic level (Seow et al., 2019). The curriculum describes the 'pivotal pedagogical role' (CPDD, 2014, p.28) of inquiry in enabling

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students to develop 21st century competencies like critical thinking and communication skills. Inquiry skills and 'an inquiring mind' would prepare geography students to become 'informed citizens' (CPDD, 2014, p.1). Finally, the Singapore curriculum also mandates the conduct of Geographical Investigations, which contributes to 25% of the standardised written examinations.

In sum, the Singapore curriculum advocates inquiry for its benefits in influencing learning stances and developing skills for participation in the future economy. In a system where standardised assessment significantly influences practice, inquiry has also been incorporated into standardised assessment sending a strong signal about the increasing priority of inquiry. There is little mention about the role of inquiry as a disciplinary tool or its specific role in helping geographers construct knowledge and understanding.

USA

The central aim of the C3 Framework is to prepare students for college, career and civic life, and inquiry is key to achieving this aim. The document provides extensive research evidence to justify the shift towards inquiry. It identified didactic teaching of social studies, in which students consume rather than build their own knowledge, as the root cause of students' persistent low interest and poor achievement in social studies (Swan et al., 2014). The Inquiry Arc is presented as antithetical to didactic teaching. The Arc also emphasises the application of disciplinary concepts and tools in inquiry. The authors argue that the 'intellectual power' gained through disciplined inquiry would provide students with the tools, methods and 'disciplined thinking' to 'traverse successfully the worlds of college, career, and civic life' (Swan et al., 2014, p.6). The C3 Framework makes a coherent case for how constructivist learning, anchored in disciplinary thinking, promotes the development of essential skills for participation in life beyond school. We argue, however, that the weakness of the framework lies in its limited links to assessment. Although the framework seeks to demonstrate its alignment with the Common Core assessment standards (a set of uniform academic standards used by many states), one could still arrive at these standards without using geographical inquiry.

Summary

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Few jurisdictions refer to inquiry as specifically important to geography as a subject or discipline. Only the Australian, English and USA curricula make explicit reference to the ontological importance of inquiry for geography and argue for adopting inquiry to help students understand the nature of knowledge construction in the subject and be apprenticed into the discipline; none of the Asian jurisdictions refer explicitly to this.

It is noteworthy that Australia, England, Hong Kong and Singapore have chosen to include inquiry in standardised assessments. Evidently, an underlying policy belief in these four jurisdictions is that standardised assessments can have a strong influence on teacher practice so including inquiry in formal assessment is seen as essential for impacting its enactment on the ground.

Conclusion

Each jurisdiction's expression of inquiry and its silences reflect its interpretation of inquiry. The arguments it chooses to convince its stakeholders about inquiry reflect thinking about why inquiry should be used. Based on the rank orders derived from the analyses, we depict these two dimensions in an illustrative graph (Figure 2). We find that the expression of inquiry (the what and how of inquiry) is more comprehensive when the justification for inquiry (the why of inquiry) is stronger. We propose that an inquiry-rich geography curriculum is one that puts forth substantial arguments for the value of inquiry in geography and provides integrated elaboration on what geographical inquiry looks like and how it can be carried out.

This research shows a clear turn towards inquiry in many jurisdictions. The six curricula that we examined sought to foster conceptual and disciplinary knowledge to varying degrees, while not discounting factual content. However they also emphasised the value of school geography's role in developing capacity for disciplinary practices through conducting and evaluating geographical inquiry. Most of the jurisdictions, notably most strongly for Australia, England and the USA, have placed inquiry prominently in their curriculum. An inquiry-rich curriculum in school geography promises to recalibrate the balance between how existing knowledge of geography is valued and taught, and how the skills of geographical inquiry can be integrated to expand students' experiences of building knowledge. We believe

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that the overarching purpose of incorporating inquiry in school geography is to enable students to deepen their understanding of how knowledge of geography is achieved, and to learn to recognise the contestability of such explanations.

This article reveals significant insights into jurisdictional beliefs and thinking that shape the context within which teachers are making local curriculum. The knowledge debate in curriculum studies pays little attention to these contextual influences. We add to this debate on two levels. Firstly our findings signal an epistemological conundrum: enabling students to access knowledge and developing their capacities to inquire are intricately linked. Therefore a curriculum that focuses only on knowledge is only potentially powerful (Author, 2014); high epistemic quality and deep learning are fostered by teaching and learning approaches like inquiry that enable students to engage deeply and critically with knowledge. Secondly we argue that ideas about knowledge and pedagogy in curriculum are highly context-dependent. This necessitates an understanding of jurisdictional beliefs and ideas or the power behind the curriculum and its selection of knowledge and pedagogy.

Finally, we acknowledge that this analysis has focused on intended curriculum from official authorities. We recognise that there is a gap between intended and enacted curriculum but the interactions between the two are complex (Ziebell & Clarke, 2018) and vary within and across contexts. Our documentary analysis has raised questions that warrant further study including in-depth investigations into how the curriculum discourse in each jurisdiction influences the selection of knowledge and pedagogy. Research on inquiry could also benefit from more contextually specific research into the interaction between the design of an inquiry-rich curriculum and its use. Students' experiences of, and views on, inquiry approaches to learning geography also deserve investigation in researching the enacted curriculum and the extent to which the potential of an inquiry-rich curriculum is realised in practice.

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Figure 1. Two influential geographical inquiry models

Author's four elements of geographical inquiry (2013, 9)

Inquiry is question-driven The teacher sparks curiosity, creating a need to know. Students: • Are curious • Speculate • Hypothesise • Use imagination • Generate ideas • Identify issues • Ask questions • Plan how to research	Inquiry requires thinking geographically The teacher provides opportunities for students to make sense and exercise reasoning. Students: • Relate existing knowledge to new knowledge • Describe, Explain, Compare, Contrast, Analyse, Interpret • Recognise relationships • Analyse values • Clarify values • Reach conclusions
Inquiry is supported by evidence The teacher enables students to use sources of geographical information as evidence. Students: • Search for information	Inquiry is reflective The teacher provides opportunities for both students and teacher to reflect on learning. Students are critical in relation to: • Sources of information • Skills and techniques used • Criteria for making judgments

Bednarz, Heffron and Huynh's seven Geographic Practices (2013, 25)

Categories	Practices
Posing geographic questions	a. Identify problems or questions that can be addressed using geographic principles, models, and data; express problems and questions in geographic terms.
Acquiring geographic information	a. Identify geographic data that can help to answer a question or solve a problem. b. Collect data (including observations and measurements) about geographic phenomena, and/or gather existing data to help answer a question or solve a problem.
Organising geographic information	a. Organise data and create representations of data to help solve a problem or answer a question.
Analysing geographic information	a. Identify data analysis strategies that can be used to help solve a problem or answer a question. b. Find and describe spatial and temporal patterns in data, or find data that matches a pattern, to help solve a problem or answer a question. c. Construct an explanation or prediction for phenomena by comparing data to a model or theory.
Answering questions and	a. Construct an answer to a question or a solution to a problem using geographic principles, models, and data.

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• Collect evidence • Select evidence • Sort information • Classify information	• 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

designing solutions	b. Evaluate one or more answers to a question or solutions to a problem using geographic principles, models, and data.
Communicating geographic information	a. Inform or persuade an audience using geographic principles, models, and data.

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Figure 2. Illustrative graph for an inquiry-rich geography curriculum

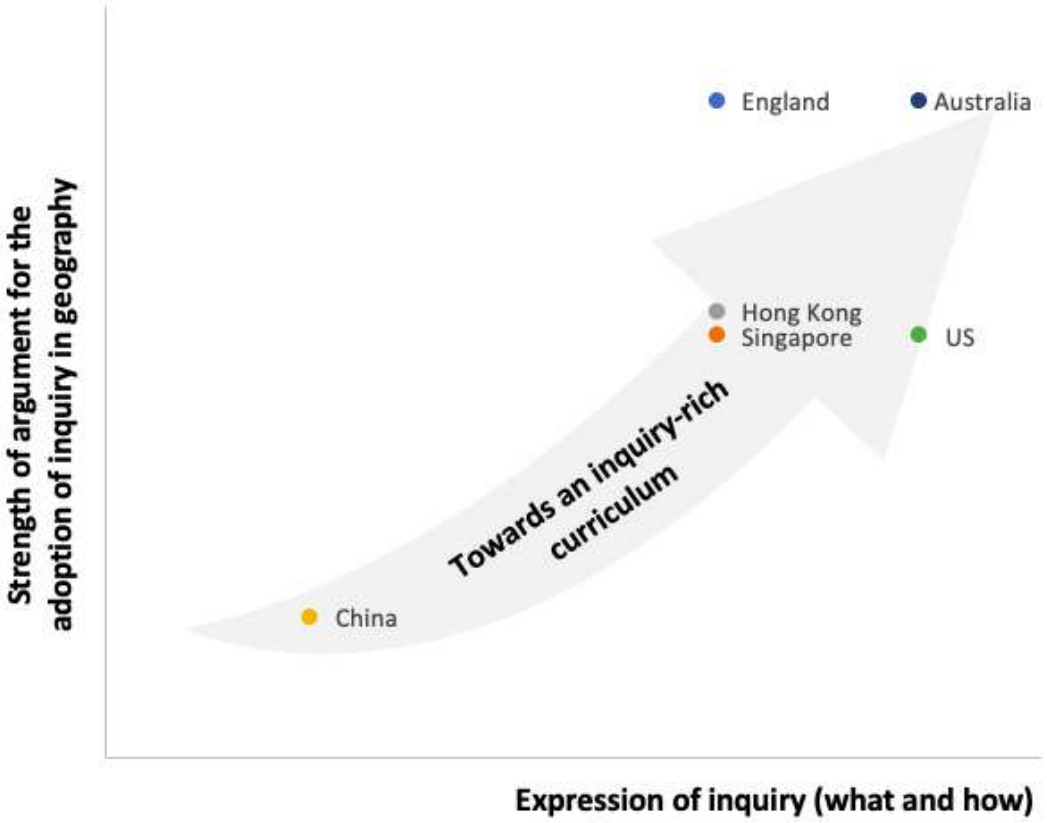

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Table 1. List of Geography Curricula

Country	Curriculum Document (Publication Year)	Target age group	Source of the document
Australia	Geography: Sequence of content 7-10 (2013) Geography: Sequence of achievement 7-10 (2013) Shape of the Australian Curriculum: Geography (2011) Australian Curriculum: F-10 Curriculum: Humanities and Social Sciences: Geography website Australian Curriculum: Senior Secondary Curriculum: Humanities and Social Sciences: Geography website	12-16 12-16 12-18 12-16 17-18	Retrieved 6 May 2020, from https://www.australiancurriculum.edu.au
China	Curriculum Standards for Compulsory Education Junior Secondary Geography (2011) Curriculum Standards for Senior Secondary Geography (2017)	12-14 15-17	Retrieved 23 May 2020, from http://www.pep.com.cn
England	National Curriculum Geography Programmes of Study KS3 (2013) GCSE Subject Content for Geography (2014) Geography GCE AS and A Level Subject Content (2014)	11-14 14-16 16-18	Retrieved 6 May 2020 from http://www.gov.uk
Hong Kong	Geography Curriculum Guide (Secondary 1-3) (2011) Geography Curriculum and Assessment Guide (Secondary 4-6) (2017)	12-15 15-18	Retrieved 23 May 2020, from http://edb.gov.hk
Singapore	Geography Syllabus Lower Secondary (2014) Geography Syllabus Upper Secondary (2017) Geography: Singapore-Cambridge General Certificate of Education Advanced Level Higher 2 (2018)	12-14 14-17 16-18	Retrieved 6 May 2020 from http://moe.gov.sg Retrieved 6 May 2020 from http://www.seab.gov.sg
USA	The College, Career, and Civic Life Framework for Social Studies		Retrieved 6 May 2020 from

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	State Standards (2014)	11-18	http://www.socialstudies.org/c3

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Table 2. Rank order based on frequency of inquiry expression in curricula

'Inquiry/Enquiry' and stemmed words	'Investigate' and stemmed words	'Fieldwork'	Overall Rank Order
1. USA (0.22%)	1. Australia (0.39%)	1. England (0.57%)	1. England (1.01%)
2. Australia (0.15%)	2. Singapore (0.34%)	2. Hong Kong (0.14%)	2. Australia (0.55%)
3. England (0.12%)	3. England (0.32%)	3. Singapore (0.04%)	3. Singapore (0.46%)
4. Hong Kong (0.12%)	4. USA (0.14%)	4. Australia (0.01%)	4. USA (0.37%)
5. Singapore (0.08%)	5. Hong Kong (0.07%)	5. USA (0.01%)	5. Hong Kong (0.33%)

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Table 3. Inquiry frameworks in the six curricula

Australia	China	England	Hong Kong	Singapore	USA
Steps in the inquiry process: • developing geographical questions • planning a geographical inquiry • collecting, evaluating and managing information • making sense of the information • communicating • planning and implementing actions • reflecting on the investigation	Inquiry process skills: • asking geographical questions • collecting and interpreting data • presenting data in graphical forms • drawing conclusions and evaluating them • participation in inquiry and discussion activities (PRC MOE 2011, 23)	Students are required to: • understand the nature and use of different types of geographical information • analyse and interpret such information, and demonstrate the ability to understand and apply suitable analytical approaches for the different information types • undertake informed and critical questioning of data sources, analytical methodologies, data reporting and presentation • communicate and evaluate findings, draw well-evidenced conclusions	Inquiry Route: • observation and perception • definition and description • analysis and explanation • evaluation, prediction and decision-making • personal evaluation and judgment (HK CDC 2011, 74)	Inquiry process • sparking curiosity (formulate guiding questions) • gathering data (identify and locate relevant data) • exercising reasoning (interpret and analyse geographical data; present findings and analysis) • reflective thinking (evaluate and improve on data collection and analysis) (CPDD 2014, 26)	4 dimensions of the Inquiry Arc: • developing questions and planning inquiries • applying disciplinary concepts and tools • gathering and evaluating evidence, and developing claims and using evidence • communicating and critiquing conclusions, and taking informed action (Swan et al. 2014, 12)

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(ACARA 2011, 21)		informed by wider theory, and construct extended written argument about geographical matters (DfE 2014b, 12)			

Table 4. Reasons used by the curricula to advocate the adoption of inquiry, and rank order based on strength of justification

Reason/ Curriculum	Inquiry is important for knowledge construction in geography	Inquiry encourages constructivist learning	Inquiry contributes to broader (non-discipline-specific) educational goals	Inquiry is required by standardised assessments	Number of justifications / Strength of justification	Rank Order- Strength of justification for inquiry
Australia	X	X	X	X	4	1. Australia, England 2. Hong Kong, Singapore, USA 3. China
China		X	X		2	
England	X	X	X	X	4	
Hong Kong		X	X	X	3	
Singapore		X	X	X	3	
USA	X	X	X		3	

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