
OER KNOWLEDGE BITES

OFFICE OF EDUCATION RESEARCH
NATIONAL INSTITUTE OF EDUCATION
SINGAPORE



Humanities Education in Singapore: *Where to Next?*

A Humanities Research Seminar

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VOLUME 8
2019

RESEARCH EMPOWERS

OER Knowledge Bites

Launched in May 2016 by the Office of Education Research at the National Institute of Education, Singapore, **OER Knowledge Bites** aims to share education research discussions and issues as seen in the Singapore context. It also serves as a platform for researchers to share thoughts and concepts of education research with policymakers, educators and the public.

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Acknowledgements

We would like to thank the following individuals from NIE, OER for contributing to this volume of OER Knowledge Bites:

- » Tan Minying (Knowledge Mobilisation Unit)
- » Nur Haryanti Sazali (Research Engagement & Publications Unit)
- » Genevieve Chan Xiang Ling (Research Engagement & Publications Unit)
- » Noorazleena Binte Sha'hri

CONTENTS

Introduction	04
CORE 3 Research Programme: Getting into the Heart of Social Studies Pedagogies in Singapore Primary 5 and Secondary 3 Classrooms <i>by Dennis Kwek</i>	05
Using the Critical Web Reader to Support Source Work and Inquiry in Social Studies <i>by Mark Baidon</i>	07
Developing a Learning Progression for Teaching Climate Change in School Geography <i>by Chang Chew Hung</i>	09
Exploring Local Microclimates with Open-source Environmental Sensors <i>by Kenneth Y T Lim, Ahmed Hilmy, Yuen Ming De & Joshua Lee</i>	11
The Sustainability Learning Lab: Enhancing Geographical Inquiry in the Field and Classrooms <i>by Tricia Seow, Kim Irvine & Julian Chang</i>	12
A Humanities Signature Programme: The Historian's Lab <i>by Suhaimi Afandi & Ivy Maria Lim</i>	14
Panel Discussion: Highlights	16

Introduction

By *Mark Baidon*

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New visions for humanities education are more vital than ever because it can provide the necessary means for young people to understand and address the increasingly pressing problems present in the 21st century. This includes the scourge of fake news, global climate change, inequality and social injustice, extremism and authoritarianism in all its varieties, and problematic neoliberal policies that attempt to reduce people to human capital (entrepreneurs, perpetually productive workers, consumers, etc.). Humanities education also offers the tools to help students learn to be critical, reflexive and imaginative as they confront these challenges. In doing so, humanities education can empower young people to consider the range of possibilities to create more just, sustainable and satisfying futures.

The presentations at *Humanities Education in Singapore: Where to Next?* highlighted the need to continue to move towards more authentic, relevant, and powerful visions and approaches to humanities education in Singapore. While there have been efforts to move toward student-centered classrooms involving the use of cooperative and collaborative learning strategies, the presentations suggested there remains a need to create more opportunities to hear students' voices and their ideas about the past, geographic issues, and societal concerns.

One way forward suggested by research done was to give more time and space for students' ideas (e.g., how they think about climate change or accounts in history) and for teachers to productively leverage these ideas to develop deeper conceptual understanding. Students would be encouraged to share and hear different views, taught to evaluate and adjudicate these perspectives, learn to monitor their own thinking, and formulate well-reasoned, evidence-based interpretations and conclusions, instead of passively receiving official accounts or the "right answers" to complex historical, geographic and social problems.

A second, related theme from the presentations was the need to engage students in authentic intellectual work in and outside

of classrooms (e.g., through fieldwork). The researchers highlighted that this can be accomplished by engaging students in various disciplinary processes, such as collecting and analyzing real world geographic data, evaluating different accounts of complex and contested historical events, and deliberating complex information sources (e.g., *YouTube* videos) about social issues and public policy. This would be first order work in classrooms, rather than preparing students to follow rote procedures for examinations.

The third overarching theme during the seminar was that creating opportunities for student voice and authentic disciplinary work are best achieved by engaging students in real-world issues, such as the ongoing debates historians have about the past, delving into controversial societal issues, and investigating the urgent problems of urban livability, water quality, and promoting sustainable futures. This reinforces the need to provide opportunities in and outside of classrooms for greater deliberation and discussion of real-world issues and issues that matter to students. Through engagement with real world issues, students can be exposed to different views, develop their reasoning, consider alternatives, and determine appropriate courses of action to address pressing issues.

"Where to next" in the "knowledge bites" that follow offers a vision of lively, engaged classrooms where students learn to care and reason about the world and their place in it. Humanities classrooms can become sites where students give voice to their hopes and ideas, wrestle with real-world problems, and develop competence in thinking critically, reflectively, and imaginatively to better understand and address the issues they will inherit as citizens. "Where to next" points to the need for educational research in these areas, as well as in the design of curriculum and professional development to move humanities education in new directions. We all have a part to play and I hope the short articles that follow will inspire new visions of classroom practice.

Core 3 Research Programme: Getting into the Heart of Social Studies Pedagogies in Singapore Primary 5 and Secondary 3 Classrooms

By **Dennis Kwek**

Dennis Kwek is Senior Research Scientist and Associate Dean with the Office of Education Research, National Institute of Education. His research interests include Asian philosophy and pedagogies, baseline research and classroom interactions.



In broad terms, the role of Social Studies as a curriculum subject is to prepare students for active participation in society (Sim, 2011). In Singapore, Social Studies “seeks to ignite students’ curiosity to inquire into real-world issues that concern their lives. Through inquiry and authentic learning experiences, Social Studies helps students to attain relevant knowledge and understanding about these issues, develop critical and reflective thinking skills, and appreciate multiple perspectives” (Ministry of Education, 2016, p. 2). Unlike other core subjects like English, Mathematics or Science, Social Studies has a unique place in the school curriculum in its emphasis on the relationships between self and others, nation and world, and the importance of students becoming “informed, concerned and participative citizens” (Ministry of Education, 2016, p. 2).

Having a rich disciplinary tradition since the United States’ 1916 Report of the Committee on Social Studies of the National Education Association’s Commission on the Reorganization of Secondary Education (cited in Baildon & Damico, 2011, p. 2), Social Studies education emphasises “inquiry-based social practices for understanding and addressing problems, especially complex multi-faceted problems”, and can “help students develop the knowledge and the interpretive, reflective, and deliberative practices necessary to make sense of new historical realities” (Baildon & Damico, 2011, p. 1, 11). The importance of Social Studies in schools cannot be understated

despite its often perceived “lower status” relative to the above-mentioned core subjects. In an increasingly globalised and information-saturated world, Social Studies can equip students with the knowledge, skills, attitudes and values that can help them to carefully and productively navigate complex identities and knowledges.

In Singapore, the Core Research Programme, of which we are now at the third iteration (Core 3) has been centrally focused on the questions of “How do teachers teach, and why do they teach the way they do”. The clear methodological focus and design philosophy of Core 3 is on “everyday classroom pedagogy, on the intellectual and discourse work of teachers and students in the classrooms” (Luke, Freebody, Shun, & Gopinathan, 2005, p. 9). We first collected classroom observational data on Social Studies pedagogy in 2004, at the cusp of *Thinking Schools, Learning Nation* and *Teach Less, Learn More* reform initiatives. We collected data on Social Studies pedagogy again in 2016–2017.

We sampled a number of mainstream schools and teachers in average Primary 5 (P5) and Secondary 3 (S3) classrooms—seven each, and collected 121 lessons in P5 and S3. We segmented the lessons into 5 minute phases and coded these for key pedagogical practices that

we believe should be happening in classrooms, drawing from both the local curriculum intentions and international understandings of what Social Studies teaching and learning should be about. We also conducted interviews with teachers and focus groups with students.

In terms of Knowledge Focus, or what the knowledge emphasis is during the lessons, we saw that on average, P5 and S3 teachers tend to focus on Factual Knowledge (62.5%) and Conceptual Knowledge (61.4%), and less on Procedural Knowledge (35.9%), Metacognitive Knowledge (6.3%) or Moral and Civic Knowledge (11.9%). When we compare this to our Core 1’s 2004 data on Social Studies, the difference is striking: Factual Knowledge in 2004 was 93.7%, Conceptual Knowledge was 16.5% and Procedural Knowledge was 13.6%, indicating decreases in emphasis on factual knowledge and increases in conceptual and procedural forms of knowledge.

We often see teachers in 2016/17 using examples and analogies and weaving together different ideas and concepts to help students better understand the subject matter. S3 teachers are more likely to exercise procedural knowledge, largely due to the source-based case studies

▶ that students are eventually assessed on. While teachers tend to ask closed-ended questions about half of the time in our observed lessons, they also ask open-ended questions about one quarter of the time, with encouraging extended responses from students. These positive results can be attributed to the curriculum reforms which has increased the emphasis on inquiry-based teaching and learning.

We examined how teachers enact the processes of Social Studies Inquiry—Sparking Curiosity, Gathering Data, Exercising Reasoning, and Reflective Thinking—as well as the continuum from teacher-directed to student-driven inquiries. Our data shows that Social Studies lessons are typically strong in stimulating student interest and curiosity with teachers and students often sharing agency in ideation, idea exchanges, and accessing prior knowledge.

As part of inquiry, students are often presented with the data by teachers, encouraged to make careful observations, and generate additional data from sources. When the inquiry cycle emphasises exercising reasoning, however, we observe predominantly data analysis or analyzing arguments (17.4% of all phases in P5, 22.7% in S3) and synthesising/summarising ideas (19.7% in P5, 13.7% in S3), but less observed are perspective taking (2.5% in P5, 4.5% in S3), or justifications of knowledge claims (5.8% in P5, 8.6% in S3), with teachers guiding students in the inquiry process about a third of the time.

The Reflective Thinking aspect of the inquiry cycle has the weakest emphasis in the observed lessons: Students are seldom asked to reflect on their own learning (7.3% in P5, 3.0% in S3), reflect on the inquiry findings (3.8% in P5, 1.1% in S3) or reflect on their own beliefs or assumptions (2.5% in P5, 0.8% in S3). Given the importance of reflection and metacognitive knowledge in student learning, and teachers often reporting “running out of time” to do this phase of the cycle in their rush to complete the curriculum, the infrequent opportunities for students to conduct their own

reflections can be worrying and is an important area for improvement in Social Studies pedagogy.

Our 2016/17 baseline study on Social Studies P5/S3 pedagogy includes teacher interviews where we asked them about their perceptions on Social Studies teaching and learning, and some of the challenges they faced. Overall, teachers do value and believe in the importance of Social Studies but saw the need to “tread a very fine line” when it came to sensitive issues or contexts, to quote a teacher. One teacher points out that the “meaning and beauty of Social Studies lies in the existing tensions” in society and the world students live in, and teachers often enjoy drawing in authentic examples and events to help students make meaning of the subject and open up discussions.

However, teachers struggle with balancing between opening up space for active and sustained classroom discussions and the need for curriculum coverage, with some teachers worried that students may not be ready for discussions if they lack the language skills or do not read widely. To help students, teachers would assign readings or pre-discussion tasks before engaging students in classroom discussions. Our student focus group discussions reveal that while students enjoy Social Studies lessons, they would appreciate having more time to discuss and share their personal views, and some students, especially in S3, do perceive them as a form of propaganda.

From our study, a number of recommendations can be made. First, to help teachers to address the tensions relating to time for discussions and curriculum coverage. Second, to help students to appreciate Social Studies through authentic and personal engagement so that the subject would appear less as a means of indoctrination. Third, to promote pedagogical strategies that facilitate collaborative learning, engaging in multiple perspectives and reflective thinking. Finally, we believe there is a need to promote better questioning techniques from both teachers and students, such that productive dialogic exchanges can

occur around complex ideas, and students can make strong connections between the personal, and the societal and cultural knowledges and identities.

Ultimately, as Alviar-Martin and Baildon (2017, p. 89) point out, the challenge for Social Studies “lies in how schools can become spaces where students are empowered to make full meaning of present life... and actively connect civic values as they envision novel forms of citizenship, engagement, and society”.

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How to Cite

Kwek, D. (2018). Core 3 Research Programme: Getting into the Heart of Social Studies Pedagogies in Singapore Primary 5 and Secondary 3 Classrooms. *OER Knowledge Bites Volume 8* (pp. 5–6). Singapore: National Institute of Education.

Using the Critical Web Reader to Support Source Work and Inquiry in Social Studies

By *Mark Baildon*

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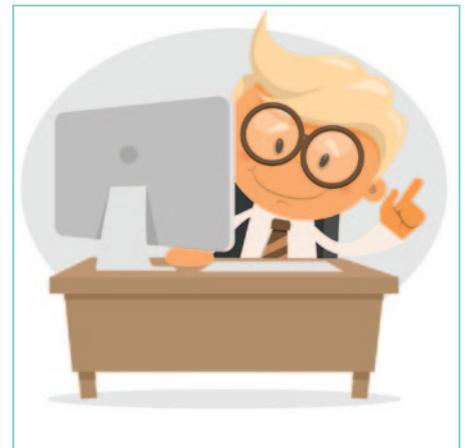
The terms “post-truth” and “fake news” have gained currency as citizens contend with the sheer velocity, volume and veracity of information available in an ever-increasing variety of formats (e.g., online videos, websites, social media posts, tweets, etc.). These information sources are often multimodal, combining different modes of communication to make claims about complex issues such as climate change, inequality and transnational conflict. Authorship and purposes of information may be difficult to discern and the information may be designed to deliberately deceive or misinform people.

To complicate matters, people are often not careful or critical thinkers with

information. We are prone to *fast thinking*, driven by our intuitions, emotions and biases, rather than *slow thinking* that is more careful, deliberate, critical and disciplined (Kahneman, 2011). We are also susceptible to a range of biases (e.g., confirmation bias) and create echo chambers where we choose information that aligns with pre-existing beliefs or interpret information in line with those beliefs (Manjoo, 2008). Recent studies have also found that fake news is more likely to attract our attention and arouse strong emotions to spread faster, farther and with more impact than accurate information (Vosoughi, Roy, & Aral, 2018).

The Critical Web Reader

Research suggests students of all ages have difficulty identifying who is behind the information presented online, and evaluating claims and evidence with complex online sources (Baildon & Damico, 2011). In response to these challenges, researchers at Indiana University and the National Institute of Education (NIE) created the *Critical Web*



Reader (CWR), a set of web-based tools designed to scaffold students to become skilled readers of online information sources.

Utilising an inquiry-based curriculum design framework (Figure 1), the *CWR* takes any online source, places it within a frame (i.e., a lens) that teachers can customise to provide guiding questions and other scaffolding to help students evaluate information (Figure 2). An integrated writing tool enables students to record and save all their work. A Teacher Dashboard (Figure 3) enables teachers to create new inquiry activities, lenses and rubrics, share these with other teachers, and manage their classes.

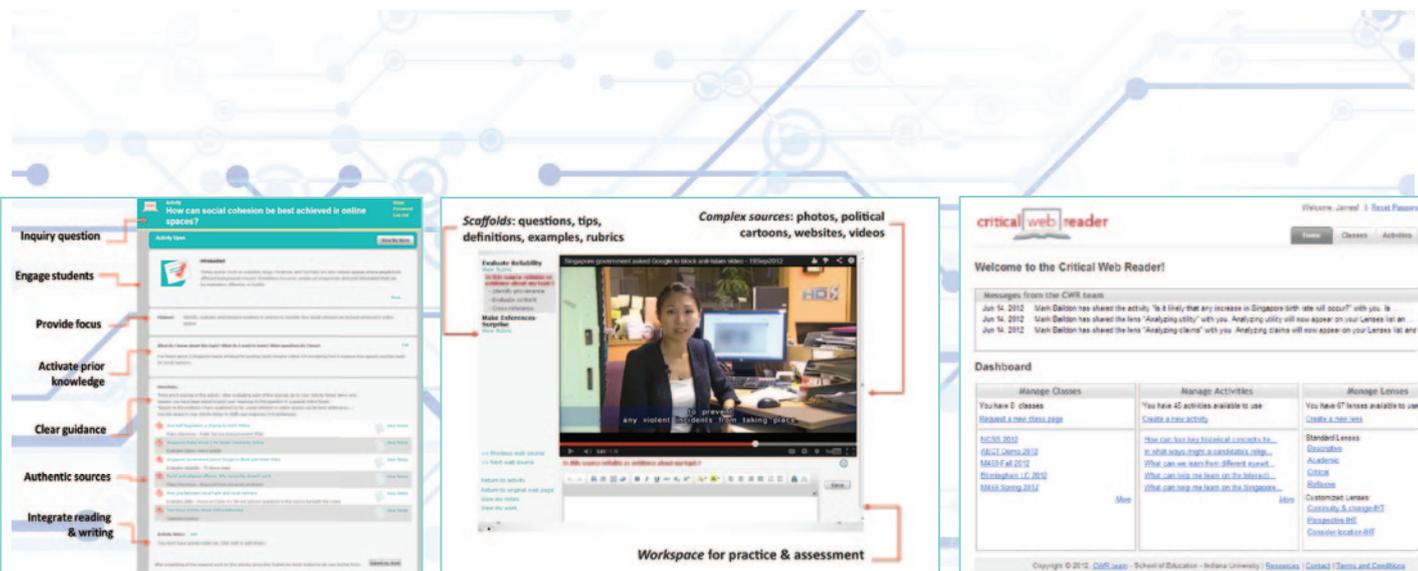


Figure 1. Inquiry-based curriculum design framework.

Figure 2. CWR lens.

Figure 3. Teacher dashboard.

Procedure	Key Conceptual Understandings
Evaluate provenance	<ul style="list-style-type: none"> Author background/expertise affect their competence to speak about an issue (depends on issue they discuss and their experience with it). Authors are biased or have limited views but we must determine if the bias is acceptable or if it should disqualify them. Disclosure, which states one's background, interests and positions, is important. If not stated, conduct background checks.
Assess purpose	<ul style="list-style-type: none"> All sources are written/created with some purpose in mind. Some purposes are explicitly stated while others may be vague, implied or hidden. Some purposes are more trustworthy than others (e.g., balanced purposes are more trustworthy than efforts to mislead, deceive, or solely promote self-interest).
Analyze content and cross reference	<ul style="list-style-type: none"> Claims and evidence must be evaluated for accuracy. This requires evaluating reasonableness, if content fits with what is already known, what other sources say, etc. Need to check content for errors, bias, and tone (e.g., if it is emotive, one sided, advocacy-focused, etc.). Need to corroborate information and check to see if it is consistent with or could be refuted by other sources.
Ascertain reliability	Each of the above factors must be weighed together to make an overall judgment of reliability because informed conclusions and decisions require reliable information.

Table 1. Procedures and conceptual understandings to evaluate reliability (Damico & Baildon, 2015).

► Teacher Findings

The *CWR* project at NIE investigated how Secondary 3 Social Studies teachers and students worked with online information sources to inquire into social issues. The project found that the types of *CWR* activities teachers designed and implemented in their classrooms varied along a continuum of three stages:

- » **Stage 1:** Teachers digitised existing print sources, moved pen and paper exercises into the *CWR*, and used scaffolding similar to what they previously used to teach source work.
- » **Stage 2:** Teachers used more complex web sources, such as YouTube videos, Facebook pages and websites, and identified the challenges of scaffolding students to evaluate and analyze these complex sources.
- » **Stage 3:** Teachers took steps toward inquiry (e.g., designed stimulating inquiry questions and culminating activities that required students to share positions on issues) and designed scaffolding to help students focus on particular source features and synthesise their findings.

Student Findings

The project found that students preferred using computers and authentic online sources, stayed on task and were more

engaged using the *CWR*. Students were also more self-directed, autonomous and resourceful online (e.g., used online dictionaries, *Wikipedia* and translation programmes to help them understand information).

Although students were aware of certain procedures to evaluate online sources, they would benefit from developing conceptual understandings associated with each procedure. Table 1 highlights conceptual understandings central to evaluating reliability.

Implications

The centrality of source work and the source-based skills in the Social Studies curriculum holds promise for instruction aligned with 21st century education. Teachers can do a great deal to scaffold students' conceptual understanding about the nature of online information sources and online source evaluation, as well as about the issues under investigation. To develop essential 21st century skills, students need a range of opportunities for authentic inquiry into real-world issues and meaningful dialogue, deliberation and discussion about information sources that provide different perspectives on these issues.

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How to Cite

Baildon, M. (2018). Using the Critical Web Reader to Support Source Work and Inquiry in Social Studies. *OER Knowledge Bites Volume 8* (pp. 7–8). Singapore: National Institute of Education.



Developing a Learning Progression for Teaching Climate Change in School Geography

By *Chang Chew Hung*

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Research Problem

Several questions arise, including “Why were students unable to build on what they have learnt and why are there continued misconceptions?” and “How can students progress in the learning of key geographical concepts?”. From earlier research, Chang & Pascua (2016) have found that the common misconceptions that students have about climate change include, regarding greenhouse gases as a thin layer that traps heat rather than being ubiquitous in the lower atmosphere; greenhouse gases destroy the ozone layer; heat destroys the ozone layer and that heat trapped by the greenhouse gases destroys the ozone layer. If we can analyze and identify the component concepts and progression of learning these concepts, a systematic way of correcting these misconceptions can be achieved.

Learning Progression Framework

Learning progressions are mapped to describe the successive development of

sophisticated understanding to achieve the mastery of a topic, which are defined by the achievements of milestone anchors over a span in time. The upper anchors define what students are expected to know and do at the end of the progression while lower anchors define and describe the prior knowledge and skills of the learners before they enter into the progression. The learning progression framework can help students build on their knowledge and correct the fragmented and often incomplete understanding of climate change. The learning progressions developed can help learners advance in their understanding. This has implications on the design, structure and sequence of the curriculum to facilitate the achievement of knowledge, understanding, skills and competencies.

Hypothetical Learning Progression

The research project has developed five learning progressions based on the causes, impacts and management of climate change. Table 1 shows an example of the learning progression ►►

In Singapore, climate change was included in the Upper Secondary School syllabus as early as 2008 to achieve quality education and to highlight the real world relevance of the causes, impacts and management of climate change. Students’ understanding and conceptualisations of climate change, however, are often found to be inaccurate, erroneous and incomplete (Chang & Pascua, 2016; Wang, 2004). In particular, they are unable to build on what they have already learnt (e.g., atmospheric processes and social relations) to develop an accurate and comprehensive understanding of climate change.

Level	Description on Level of Achievement
Hypothetical	No evidence of understanding.
Lower Anchor (LA)	a. Students understand that all matter contains heat energy. b. Students can describe heat gain/loss in our everyday life (P3/P4 Science Syllabus).
1 (1A)	Students understand that the Sun is the primary source of heat and light energy that drive weather on Earth (P5/P6 Science Syllabus).
2 (2Aa)	a. Students can identify if some common gases are greenhouse gases (Sec 1 Geography textbook, p. 101).
2 (2Ab)	a. Students can describe how greenhouse gases trap heat in the atmosphere (Sec 1 Geography textbook, p. 101).
3 (3A)	Students can use the concepts of incoming and outgoing radiation to explain the natural greenhouse effect (Upper Sec Geography text).
4 (4A)	Students can explain energy exchange in detail, and the process of the greenhouse effect about how heat is trapped, e.g., LWR (Upper Sec Geography text).
Upper Anchor (UA)	Students can argue that the natural greenhouse effect keeps the Earth warm within its natural variability. They can also critique if the natural greenhouse effect is responsible for the observed climate change in the last 150 years (Year 1 University course at NIE).

Table 1. Hypothetical learning progression for natural greenhouse effect.

► developed on the natural greenhouse effect and the different anchors of that described the levels of achievement.

Based on the hypothetical learning progression, to achieve the upper anchor of understanding of the energy balance and natural variability, students need to understand incoming and outgoing radiation, energy exchange and explain the natural greenhouse effect at anchors 3 and 4. To explain the natural greenhouse effect, students should first be able to describe how greenhouse gases trap heat in the atmosphere and identify greenhouse gases at anchor 2. Prior to anchor 2, students should be able to understand that the sun is the main source of heat and light energy at anchor 1 and describe heat gain and heat loss in everyday life at the lower anchor.

It is important to note, however, that learning is not linear and students need not necessarily follow the progression to learn about the natural greenhouse effect. It is also not mandatory to achieve the previous anchor to progress to the next

anchor on the progression. In addition to the learning progression on the natural greenhouse effect, we have also developed the learning progressions for the enhanced greenhouse effect, human interaction and climate change, impacts of climate change and the management of climate change.

Contributions to Geography Education

This research project is one of the first attempts to describe the learning progression for climate change education in Singapore. It is also a consolidation of earlier research of students' misconceptions in climate change learning progression based in Singapore. In addition, we employed a cross sectional study rather than longitudinal study to provide a pragmatic solution without having to compromise the assumptions of the need for understanding learning across different levels in the education system. The research also aims to provide an empirical validation of the learning progression model for the improvement of student learning in Geography. The

data from Singapore can contribute to the existing international research on learning progressions. Implementation of the learning progression model in schools can also contribute to curriculum making in Singapore.

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How to Cite

Chang, C. H. (2018). Developing a Learning Progression for Teaching Climate Change in School Geography. *OER Knowledge Bites Volume 8* (pp. 9–10). Singapore: National Institute of Education.



Exploring Local Microclimates with Open-source Environmental Sensors



By **Kenneth Y T Lim, Ahmed Hilmy, Yuen Ming De & Joshua Lee**

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The relatively multidisciplinary nature of Environmental Science and its values orientation make it an ideal candidate for STEM-based curriculum design. Traditionally, however, data presented to students is often abstract, decontextualised and presented in forms which presume relatively high numeracy and graphicacy among students. During the National Weather Study Project 2007–9, for example, participating schools were given a set of weather instruments, with a view to “crowdsource” weather data for Singapore. However, the resulting datasets were too coarse to be meaningful to students; for instance, from the point-of-view of a student in one part of the island-nation, it would not have been very meaningful or authentic to know that it was raining somewhere else the preceding day.

Since conventional weather data is complicated by the microclimate of the built environment, especially due to urban heat island effects, conventional methods may not be particularly suited to the very dense urban geography of Singapore. Moreover, as students typically have no access to a mesh of data points and means to observe concomitant weather phenomena, the cause-and-effect reasoning is usually abstract and

far removed from their daily lives. With their own sensor mesh and a means to visualise data, we believe students will be better able to “talk” through these data to surface their intuitions, confront them and develop the means to move from nascent forms towards more expert forms of knowledge.

Given this context, we are interested in investigating how children in Singapore perceive and understand the factors affecting, and systemic relationships between, their local environments. Specifically, an exploratory study is being conducted in collaboration with a school established with the mandate to approach STEM education with at-risk students in novel and authentic ways.

Through using a network of low cost, open-source and unobtrusive environmental sensors placed throughout the school campus, teachers in the school have designed a curriculum involving geography and science that would permit and encourage the interrogation of real-world microclimatic data within an environment already familiar to the students. This would enable their intuitions about local environmental factors and systemic relationships—which would otherwise have remained tacit—to surface and be dialogued upon in collaboration with their peers and teachers.

There are several advantages to this approach over any other potentially competitive design at similar levels of cost.

First, the approach builds data literacy and graphicacy among learners as they seek to analyse, interpret and represent the datasets to support their inferential activities.

Second, the approach is timely because initial enactments are carried out while learners’ memories of the 2013 haze are still relatively fresh—they would be better able to appreciate the purpose of their field-based inquiry.

Third, the approach is only recently technologically feasible, in that it leverages not only open-source software, but also the open-source hardware movement. It is only because of the widespread availability of open-source hardware such as Raspberry Pi and Arduino that devices can be custom-built to suit particular learning needs at affordable costs, and very often, by the learners themselves.

Fourth, the approach provides an objective source of data against which teachers and students might compare their own subjective interpretations of local environmental variables within the microclimate of the school campus. This would potentially lead to learners being more effective in self-monitoring and questioning their own assumptions.

Fifth, the approach is authentic to the learner because it involves the interrogation of datasets generated from within a campus they are already familiar with, as opposed to any similar efforts in the past in which the data would have been obtained from neighbourhoods unfamiliar to the learners. Because of this familiarity, learners will be able to frame their analysis, interpretation and re-presentation of the data in terms of shared understandings and discourse structures.

Finally, because the devices are affordable and easy to customise (open-source hardware), they can be placed in a much finer mesh around a limited space than was formerly possible—the datasets will therefore be potentially much less granular (both in terms of time and space) than before, allowing for increased opportunities for learners to practice their deductive and inferential skills.

How to Cite

Lim, K. Y. T., Hilmy, A., Yuen, M. D., & Lee, J. (2018). Exploring local microclimates with open-source environmental sensors. *OER Knowledge Bites Volume 8* (pg. 11). Singapore: National Institute of Education.

The Sustainability Learning Lab: Enhancing Geographical Inquiry in the Field and Classrooms

By *Tricia Seow, Kim Irvine & Julian Chang*

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Teachers draw on different knowledge bases and transform these in their pedagogy to create learning experiences for students to construct their own understandings. Geographical inquiry is a type of pedagogy premised on the constructivist view of knowledge and prioritises the need for students to make sense of things for themselves (Roberts, 2003; 2013). In Singapore, the Geography curriculum at the Secondary and Junior College levels privilege the inquiry approach as a “signature pedagogy” (Shulman, 2005) to construct geographical knowledge in the classroom and in the field. “Signature pedagogy” reflects an emphasis on disciplinary literacies and the need to help teachers and students understand the nature of disciplinary work (e.g., reading, writing, talking and working in the discipline). Shulman (2005) suggests that it consists of three dimensions: the concrete, operational practices employed by teachers; the deep structural understandings they have about knowledge in their subjects; and



the professional dispositions, beliefs and attitudes they have about their craft.

The Sustainability Living Lab (SLL) is a collective intervention by geography educators in partnership with geography teachers (Figure 1). It integrates real-world fieldwork sites (Jurong Eco-Garden, NIE Raingarden) equipped with environmental sensors and a virtual data portal with curriculum resources related to these fieldwork sites. The SLL affords unique opportunities for students to collect first-hand data of physical and human environments, make sense of a range of multimodal data and “have a go” at creating research questions or testing their hypotheses. The intention is to enhance teachers’ understanding and use of geographical inquiry as a “signature pedagogy” in order to induct

novice practitioners (i.e., students) into the disciplinary ways of constructing, representing and reconstructing knowledge.

The development of the SLL was guided by a qualitative exploratory study of six teachers in four secondary schools to investigate teachers’ knowledge of field-based inquiry into water quality, as well as the relationships with their concrete practices. The findings suggested that teachers had varying professional dispositions, beliefs and attitudes about the purpose of geographical inquiry. These included different emphases on scientific methodologies, geographical concepts, applied learning and environmental values. All the teachers expressed an appreciation for the role of inquiry in the construction of knowledge in geography. However, a key finding was the general misalignment among the concrete operational processes employed by teachers and their deep structural understandings and professional dispositions and beliefs. For instance, the field-based inquiries observed were highly teacher-directed (e.g., selection of hypotheses/inquiry questions, selection of sampling sites) with time and manpower constraints cited as primary factors. Finally, it was clear that teachers needed support with their content understanding of scientific concepts related to water quality indicators, and knowledge of the fieldwork site as a water catchment area.



Figure 1. The Sustainability Living Lab. The online component of the Sustainability Learning Lab can be accessed at <http://sll.hsse.nie.edu.sg/>.

► In response to these findings, the first phase of the SLL was designed to help teachers address the issues faced in operationalising geographical inquiry. These include:

- » High quality time series data within which teachers can contextualise the point data collected by students during the one time they visit the site.
- » Videos on fieldwork methods and site characteristics so that students can more independently prepare for the field-based inquiry.
- » Lesson packages and videos on inquiry in action based on the fieldwork sites in the SLL to support teachers in conducting the inquiry.
- » A detailed teachers' handbook addressing the scientific content and application of water quality indicators to better prepare teachers to facilitate inquiry-based learning with their students.

At different points in its development, focus group discussions were held with partner school teachers to collect their feedback on the SLL features and whether it met teachers' needs. For instance, teachers requested that both the data and graphs on the SLL be downloadable in various data and image formats due to concerns about classroom internet connectivity.

To date, at least seven schools and 950 students have used the fieldwork sites and resources provided in the SLL. The online teachers' handbook has also had 1,663 reads.

The next phase of the SLL development will involve the following:

- » A water quality mobile application with geo-tagged, spatial mapping capabilities to support field-based inquiry and crowdsourced data collection. The prototype of the app will be demonstrated to partner school teachers for feedback by early to mid-2018.
- » Partnership with the Learning Sciences and Technologies faculty at NIE to test alternative, more cost-effective water sampling equipment that can provide time series data across an expanded range of sites.
- » Collaboration with the English Language Institute of Singapore (ELIS) to support geographical literacy around multimodal data, with accompanying videos and curriculum materials.
- » Procuring funding for the development of curricular modules on *Weather and Climate*, *Coastal Systems*, *Tourism*, and *Urban Liveability* topics.
- » Integration of IoT sensors, including air quality and noise sensors to assess the benefits of green space.

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A Humanities Signature Programme: The Historian's Lab

By *Suhaimi Afandi & Ivy Maria Lim*

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The Historian's Lab, a signature programme developed by the Humanities and Social Studies Education (HSSE) Academic Group, provides students and teachers with opportunities to learn about history in an immersive and experiential way by supporting "historical learning through apprenticeship". Activities are specially crafted to encourage the act of "doing history" through inquiry and with guidance by professional historians at HSSE. The programme bridges the gap between academic and school history by developing strategies to broaden participants' understanding of history as a craft and discipline. By focusing on an understanding of how historians work and the conceptual lenses that support historical ways of viewing the past, the Historian's Lab aims to excite students' classroom experiences through innovative teaching approaches.

Resources, scaffolds and instructional strategies developed in The Historian's Lab are designed to facilitate deeper understandings about the nature of historical knowledge, such as understanding how knowledge about the past is constructed, adjudicated and arbitrated. The Historian's Lab draws on important findings in history education research and attempts to incorporate them into pedagogical structures that support teaching and learning in the history classroom (Lee, 2005; Levstik & Barton, 2015).

Conceptualisations of instructional materials in the Historian's Lab are consistently guided by pertinent aspects of teaching and learning that include:

- » A commitment to disciplined inquiry.
- » A focus on disciplinary concepts.



- » A tilt towards "responsive pedagogy" (Afandi & Baildon, 2009).
- » An eye on progression in learning.

The Historian's Lab Research Agenda

Existing research work has focused on three areas:

Research Focus 1

The first research focus maps out Singapore students' preconceptions about the past and the range of ideas they operate with when making sense of the disciplinary aspects of history.

In exploring students' conceptions about Singapore's past, we found that students were likely to attach "importance" to events based on criteria such as recency and emotional impact. Events such as The Japanese Occupation and Separation from Malaysia—two fairly recent and traumatic experiences in Singapore history—were regarded as the two most important events in Singapore's history, while events that were distant and seemingly detached from current contexts—such as Singapore's pre-1819 origins and the British colonial period—ranked very low in students' list of important events. In addition, students'

responses bore strong correspondence with the national narrative (i.e., the Singapore Story) and their telling of Singapore's past closely resembled the way that narrative was arranged and presented. Constructions of Singapore's past pointed to sequential, trouble-free and uncomplicated development of events, without much mention of discordant, contested or controversial issues/events.

A study on students' understanding of historical causation indicated the possibility of building workable conceptions about causation through a card-based learning device, *Singapore Surrenders!*. Pre- and post-survey responses showed that students were able to move beyond single (monocausal) or non-related listing of factors, to manifold (multicausal) or multilayered explanations to how/why events occurred. Some students were also able to demonstrate more complex causal hierarchies (beyond linear sequences) and showed increased awareness of multifactorial relationships in studying causal links or networks. Further work and follow-up data analysis will be required to enable us to build higher resolution depictions of progressions in students' ideas/understandings.

Research Focus 2

The second research focus builds an understanding of teachers' conceptions about historical inquiry, the challenges of inquiry-based instruction in the history classroom and the ways some of these challenges can be addressed.

Initial work in this research focus offered a modest description of teacher thinking related to historical inquiry and inquiry-based learning. In isolating specific barriers to inquiry-based instruction, for example, we found that students' perceptions of history as a subject—its “image problem” and the view that the subject involved primarily routinised memory work—affected attitudes and aptitudes towards the study of history as a worthwhile pursuit. Such negative perceptions may be exacerbated by students' lack of readiness (e.g., absent content knowledge and weak academic skills) and teachers' inexperience (e.g., lack of knowledge and requisite skills) to effectively conduct inquiry-based lessons. Larger institutional constraints, such as limited time for inquiry, syllabus coverage, as well as rigid exam structures and the frequency of assessment cycles, posed formidable challenges for historical inquiry.

Some recommendations teachers in the study put forward to help develop a culture of inquiry include:

- » Addressing impediments to pedagogical creativity and innovation.
- » Shifting mindsets and prioritising educational (more than assessment) outcomes.
- » Creating space for authentic inquiry and cognitive experimentation.
- » Building collaborative learning communities that support dialogic exploration of ideas.
- » Strengthening teacher education and continuing professional development.
- » Promoting teacher dialogue and sharing of best practices.

Research Focus 3

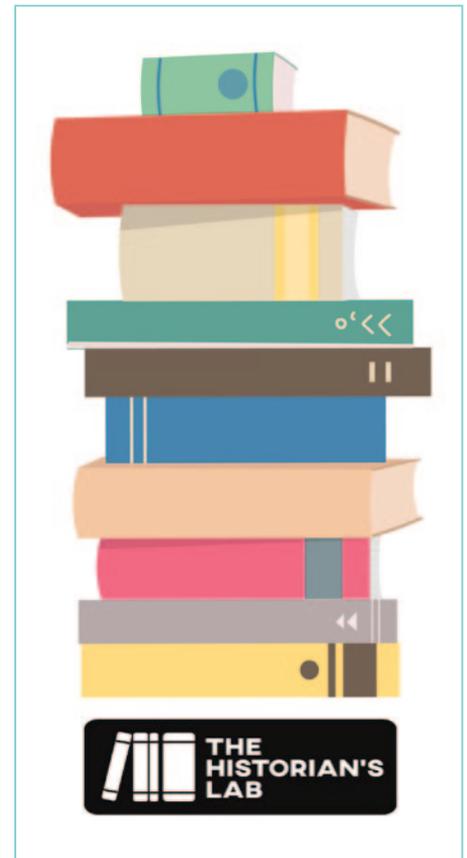
The third research focus evaluates the effectiveness of innovative pedagogical devices and their impact on the development of students' historical thinking.

This aspect of the Historian's Lab focuses on the impact the learning portal may offer in developing students' historical thinking. Using a combination of data collection tools, such as cognitive task-sets, student and teacher interviews, pre- and post-surveys, and classroom feedback from our partner schools, we generated findings to help improve existing (and future) learning devices. Feedback was also gathered through presentations at local and international conferences. The use of the Singapore Surrenders! game, for example:

- » increased students' understanding of chronology and grasp of causal relationships in history;
- » led to active and collaborative learning, stimulated the use of prior knowledge and developed students' capacity to make decisions/justifications about causal factors;
- » kept students interested, engaged and wanting to know more about the event;
- » helped introduce new content and supported better recall and retrieval; and
- » made learning fun, exciting and personally relevant.

The Historian's Lab—An Innovative Teaching Approach

The Historian's Lab provides an innovative teaching approach that can transform the way history is taught in schools. It seeks to meet the goals of providing students with positive experiences in the learning of history, while also offering teachers ease of use (of the lesson materials) as they assist students in developing more sophisticated or complex ideas about history and the historian's craft. By focusing on learning history through an “apprenticeship of the craft”, students are encouraged to “do history” and become immersed in thinking processes that simulate how historians think, read, write and talk about history.



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HIGHLIGHTS

From the Panel Discussion

After a series of presentations, Associate Professor Mark Baillon chaired a panel discussion themed “What new directions does humanities education need to take in this day & age?”. The panel comprised Dr Dennis Kwek, Associate Professor Chang Chew Hung, Dr Kenneth Lim, Dr Tricia Seow and Dr Suhaimi Afandi. Below are some highlights extracted from the discussion.

Inquiry in Humanities Education

- » Inquiry is central to humanities education for it encourages students to think about issues deeply and consider multiple perspectives.
- » For a culture of inquiry to take root in the classroom:
 - ◇ Teachers need to be provided with the pedagogical supports to lead inquiry-focused lessons.
 - ◇ Students need to be given opportunities to engage in discussions during lessons.
 - ◇ The curriculum has to be adequately robust and encourage greater thinking.
- » Panelists, however, acknowledged that institutional and systemic constraints, particularly limited time and the need for curriculum coverage, restrict opportunities for students to engage in inquiry.
 - ◇ Recognising that these challenges will take time to address, the team behind *The Historian's Lab* developed strategies to work around these constraints to provide opportunities for students to engage in inquiry.
- » Despite the presence of institutional and systematic constraints, panelists also noted that there are already shifts in assessment practices for subjects such as Social Studies, which encourage the spirit of inquiry in the classroom.

Role of Teachers and Teacher-Centered Pedagogies

- » There is consensus among panelists that fostering inquiry takes time and students may need different forms of guidance to do inquiry at different points of their learning.
- » Teacher-centered pedagogies, as such, still have a place in the humanities classroom, such as in enabling students to understand conceptual nuances.
- » Rather than consider inquiry as fixed, inquiry should be regarded as a continuum that spans from closed, teacher-guided inquiry (teachers curate questions, resources and leads discussion) to negotiated inquiry and finally open inquiry.
- » Ultimately, teachers have to understand the learning needs of students and customise their teaching approaches appropriately.

Directions Ahead for Humanities Education

- » Promoting reflexive thinking in the humanities classroom.
- » Translating awareness into deeper understanding and action.
- » Translating local action into global understanding.





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