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Using Weighted Hinge Questions (WHQs) to Assess Students' Causal Understanding

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Introduction

Assessment in Singapore's history classrooms has long reflected our teachers' enduring focus on preparing students to meet examination requirements. The most common assessment practices revolve around assessing students' proficiency in handling source-based case study questions and in using writing frames to answer essay questions asked in national examinations. Furthermore, many of these assessment tasks are typically assigned at the end of each topic or theme in the syllabus. There are, however, significant drawbacks to this assessment approach. First, this approach frequently offers delayed quantitative and qualitative descriptions of learner performance, thus preventing teachers from tracking their students' learning *during* the instructional process and adjusting their pedagogical strategies accordingly to address students' learning needs. Closing learning gaps only after analyzing students' responses to these assessment tasks would likely require teachers to allocate a significant amount of time to revisit the topic, which may not always be possible within limited curriculum time. Second, such assessment tasks are oftentimes tedious to mark, and the resultant feedback may not accurately identify areas for improvement, especially with regard to the student's apparent overlapping weaknesses. For instance, an inadequate Structured Essay Question (SEQ) response may be the result of several entrenched weaknesses, such as a lack of familiarity with the historical context, an inability to see relevance between content knowledge and the question requirements, or a specific linguistic difficulty in expressing relevant ideas. When faced with necessary and urgent feedback on numerous aspects of their responses, many history students (especially lower progress ones) are likely to be overwhelmed and demoralized.

To be sure, these assessment challenges are not unique to Singapore: Wineburg (2018) noted that in America, "assessment was history education's weakest link", as it "suffered from a poverty of imagination" (pp. 131-132). Any serious considerations towards improving assessment in Singapore's history classrooms must begin with certain core beliefs we hold regarding assessment as encapsulated in the Singapore Curriculum Philosophy (SCP). The SCP states that assessment designed with "clarity of purpose" is "integral to the learning process" – that is, teachers must first decide "what" and "how" to assess and then use appropriate assessment tools that gather timely, relevant and specific information to "address learning gaps and improve teaching practices" (Ministry of Education, Singapore, 2017). Applying these guiding principles to the enactment of Singapore's history syllabus and the associated teaching actions, we believe that assessment practices should offer students the opportunity to receive useful and targeted feedback that would help them build better understandings in history. In addressing potential learning gaps and the

expectations of what students should have learnt at the respective age levels, it is imperative for teachers to consider developing students' thinking in history and to assess their ability to make sense of historical knowledge.

Indeed, starting from the late 20th century, the Anglo-American educational research community has emphasized that historical conceptual thinking is the "*sine qua non* of historical knowledge development" (VanSledright, 2014, p. 6; Seixas, 1996), and that the historical inquiry cycle prizes knowledge as historical conceptual thinking's "highest aim" (Wineburg, 2018, pp. 92). In this paper, we suggest possible ways to develop students' conceptual knowledge and understanding of historical causation using specific assessment constructs. We demonstrate how teachers could use multiple-choice weighted hinge questions (WHQs) during the instructional process to translate the SCP's principles into a concrete assessment practice tailored for the history classroom. Our proposed WHQs combine key insights on formative assessment ideas derived from the works of Dylan Wiliam (2015) and Bruce VanSledright (2014).

Multiple-choice weighted hinge questions (WHQs) and progression models

Multiple-choice WHQs are *weighted* because, in the teacher's view, one of the options in such questions represents the most sophisticated historical conceptual understanding while the others represent levels of understanding that vary in sophistication (VanSledright, 2014). Furthermore, WHQs are *hinge* questions, because they are asked at any point in a lesson during which the teacher cannot proceed confidently until he/she has "elicited and interpreted" evidence of the students' historical conceptual understanding (Wiliam & Leahy, 2015, p. 88).

Asking students questions during the instructional process is seemingly unremarkable, but WHQs have specific features that distinguish them from other types of questions:

First, when asking WHQs, teachers must get a specific response – and not just a "choral response" – from *every* student (Wiliam, 2015, p. 41). A popular way to do this is to use Kahoot!, an interactive ICT learning platform that allows teachers to create their own multiple-choice questions for students to answer on their own devices. Yet, as of now, Kahoot! reveals only the percentage of students who selected a particular option, thus preventing teachers from identifying specific students. Alternatively, teachers could simply display the WHQ on a PowerPoint slide, ask students to use their fingers to indicate their response and scan the classroom to check their responses (Wiliam, 2015). Other simultaneous response modes include using mini-whiteboards or response cards labelled A, B, C, D, which some schools have provided for in their student handbooks (Kagan & Kagan, 2009).

Second, WHQs are "*diagnostic* questions", not "*discussion* questions" (Wiliam & Leahy, 2015, p. 89). The objective of asking WHQs is to quickly check for students' understanding to inform the teacher on how he/she should proceed with the lesson. Because WHQs and their options are intentionally crafted to uncover students' understanding of a historical concept on which "the lesson hinges", teachers should be able to accurately interpret a student's response on its own without additional explanation from the student (Wiliam & Leahy, 2015, p. 88).

Third, unlike conventional multiple-

choice questions, WHQs do not only have one "correct answer". The objective of crafting other plausible options is neither to "snare students" nor to engage them in "a game of intellectual hide-and-seek" where they guess the expected answer the teacher is fishing for (Wineburg, 2018, p. 18; Beghetto, 2007, p. 265). Instead, the options presented to students correspond to different levels of students' historical conceptual understanding as informed by research-based progression models (VanSledright, 2014). Good WHQs elicit students' responses that accurately correspond to their respective levels of understanding.

Uncovering students' levels of historical conceptual understanding is crucial to improving assessment practices in history classrooms. While history education researchers may not agree on what primarily constitutes "historical thinking", they have collectively emphasized how thinking historically in general is fundamentally different from ordinary, common sense thinking. Wineburg (2001) characterised "fundamental" historical thinking – which is, to him, viewing the past as "discontinuous" with the present and thinking about it on its own terms – as an "unnatural act" (p. 109). Levisohn (2017), while critical of Wineburg's characterization, argued that students of history need to develop "domain-specific practices" to "speak the language of the discipline of history" (pp. 629, 626). Since the established consensus is that historical thinking is not intuitive, research-based progression models supply "scaffold[s] for the teaching and learning of history" by disaggregating historical thinking into key historical concepts and outlining the development (or a "progression") of actual students' understanding of the respective concepts (Lee & Shemilt, 2003, p. 113). Viewing the development of students' ideas as a *progression* in historical understanding suggests the possibility of looking at these initial ideas as "constructs" that allow or inhibit the kinds of thinking moves students are able to make (Lee, Ashby & Dickinson, 1996).

Three caveats are in order at this point. First, progression models, while organised into levels of understanding, are not prescriptive "learning path[s] for individuals" (Lee & Shemilt, 2003, p. 16). Rather, they outline "ideas likely to be found in any reasonably large group of children" and "the pattern of developing ideas we might expect" (Lee & Shemilt, 2003, p. 16). Teachers should use these models to find out how students currently understand a particular historical concept and trace their developing historical conceptual understanding across content topics, but should not intentionally teach, for instance, a Level 2 idea just because a student's understanding is at Level 1. Second, learning gaps between each level of understanding may vary. We do not attempt to suggest a timeline for specific levels of historical conceptual understanding to be met for "the average pupil" beyond that in the Ministry of Education's History Teaching and Learning Guide (Lee & Shemilt, 2003, p. 18). Third, progression research has largely centred on students in England. The few studies conducted outside of the UK, however, suggest progression models developed in the UK could, to a large extent, apply to students elsewhere. For instance, regarding students' understanding of historical accounts, Afandi's (2012) pioneering progression research in Singapore yielded largely similar findings when compared to research undertaken by British researchers who worked with students in England (Lee & Shemilt, 2004).

More importantly, using progression models to craft options in WHQs helps teachers to uncover students' existing

understanding of historical concepts and account for them during the instructional process. Since students "reconstruct information" to fit it into their schemas – that is, "information that already exists in [their] minds" – comprehending students' preconceptions ensures teachers' instructions are interpreted by students as teachers intended, building on desirable thinking dispositions while not inadvertently reinforcing misconceptions (Santrock, 2018, p. 267).

Using weighted hinge questions (WHQs) to assess students' historical understanding

We offer two examples of WHQs that could be used to assess students' historical conceptual understanding: a concept-based question that deals with students' reasoning ability (Example 1) and a topic-based question that requires students to apply their conceptual understanding to a specific topic (Example 2). Here, we focus on the historical concept of causation and use the corresponding progression model by Lee and Shemilt (2009) in crafting the options in our WHQs.

Example 1

The first example below is a question that attempts to delineate students' preconceptions when explaining causes in history.

To explain why Event X happened, it is *best* to find out:

a. More details about Event X itself
b. Who made Event X happen and what they did
c. What sequence of events led to Event X
d. What conditions allowed for Event X to happen
e. How circumstances and actions related to Event X are interlinked

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When to use: This WHQ could be used before the teacher introduces a topic that hinges on students' historical understanding of causation. Before the teacher displays the question to students, he/she should explain to students that there is no single "correct" response and that they should choose the option which *best* represents their current understanding. The teacher may also add that students' responses would help him/her decide on the best way to facilitate their learning of the topic. The following table shows how these options correspond to the respective levels of understanding and summarizes our suggested pedagogical adjustments based on the responses of the majority of students in class.

Table 1: Correspondence of options to levels of understanding (Example 1)

WHQ Option	**Level of understanding**	**Suggested Pedagogical Adjustment** (when introducing a new topic)
(a) More details about Event X itself	1 - Explanation in terms of description	Start with details of Event X, model a causal explanation by asking students why the event happened
(b) Who made Event X happen and what they did	2 - Explanation in terms of agents and actions	Start with details of Event X and its trigger, and ask students why the event happened the way it did regardless of the intentions of the actors involved

(c) What sequence of events led to Event X	3 - Explanation in terms of causal chains and/or networks	Discuss the multi-faceted and variable implications of each event in the sequence • Why did the events happen in this sequence?
(d) What conditions allowed for Event X to happen	4 - Explanation in terms of conditions for actual and possible events	After explaining the conditions, ask students if the conditions suffice in causing Event X to occur • What about the role of human agency? • Were there potential triggers prior to the actual trigger? If so, why did Event X not occur earlier?
(e) How circumstances and actions related to Event X are interlinked	5 - Explanation in terms of contexts as well as conditions	Adopt the conventional approach of discussing each factor chronologically as presented in the textbook

Interpretation

If the majority of students in the class select **Option (a)**, they are likely to perceive an explanation in terms of simple description (Level 1). At this level, students uncritically accept the story that is told and are convinced by sleek explanatory narratives that bury "causal complexities". Most are led to think that "historical explanations are true or false in the same way that statements of fact are true or false" (Lee & Shemilt, 2009, pp. 43-44). This thinking coheres with common sense, but obstructs students from understanding causal explanations in history as constructed and provisional. To guide students to think critically about such explanations, the teacher could first describe Event X when introducing the new topic and ask why it happened to guide students to differentiate between descriptive and causal explanations. Through iterative questioning focused on causal thinking, the teacher could model the process of finding a causal explanation for the students.

Option (b) reflects a causal explanation in terms of agents and actions (Level 2). Although students in this level may use the language of causation, they tend to ascribe agency to "impersonal factors and events" (Lee & Shemilt, 2009, p. 44). For instance, a student may claim that the 1947 announcement of the Marshall Plan caused the Cold War, reflecting how, to these students, '"events" are equated with "actions" and "intentions" are thought to shape "outcomes"' (Lee & Shemilt, 2009, p. 44). To shift students away from focusing so heavily on agency-based explanations, the teacher could ask iterative "why" questions that inquire about the motivations behind such actions and uncover the underlying reasons contributing to the key event in the new topic. These questions include: "Why [did] things turn out differently from what anybody… want[ed]? Why [were] intended outcomes accompanied by so many unintended ones?" (Lee & Shemilt, 2009, p. 44).

Students who choose **Option (c)** are likely to conceive the present as the product of the past, but see history as "a one-way street of over-determined landmarks on the route from 'then' to 'now'" (Lee & Shemilt, 2009, p. 45). This conception reflects these students' focus on causal chains that

determine the sequence of events leading to Event X (Level 3). To build on students' current understanding, the teacher could discuss the multi-faceted and variable implications of each event in the new topic to highlight that each subsequent event is not an inevitable outcome of the previous event. Furthermore, the teacher could use guiding questions to encourage students to consider the complex inter-linkages between various events with other circumstances and historical agents.

Option (d) would likely be selected by students who consider explanations to be based on conditions for actual and possible events (Level 4). From their perspective, the past is determined "since prevailing 'conditions' permitted the occurrence" of Event X, but "not over-determined" because the same conditions also *allowed* the occurrence of Event Y, which "did not but could have occurred" (Lee & Shemilt, 2009, p. 46). This marks a watershed in students' understanding of causation. To advance their understanding beyond Level 4, the teacher could guide students to think more deeply about the agents that triggered the Event X in the new topic by asking if the conditions alone suffice in causing that event to occur. Additionally, the teacher could prompt students to consider potential triggers prior to the actual trigger and why Event X did not occur earlier.

Students who choose **Option (e)** reflect a sophisticated level of understanding and are likely to view causal explanations in terms of historical contexts as well as conditions (Level 5). Only when students already recognize that the inter-linkages between circumstances and actions are crucial in explaining Event X's occurrence should the teacher adopt the conventional approach of discussing each factor chronologically as presented in the textbook and provide opportunities for students to share their understanding of these inter-linkages.

Example 2

We now turn to a topic-based WHQ that would enable teachers to differentiate their instruction to help students improve their historical understanding of causation *after* introducing the content of a particular topic. Consider this WHQ:

Based on what we have discussed in class, which of the following responses offers the best *reasoning* that explains why war in the Asia-Pacific broke out?

a. War in the Asia-Pacific broke out because President Roosevelt declared war on Japan after Japan attacked on Pearl Harbour in 1941.

b. War in the Asia-Pacific broke out because Japan pursued an aggressive expansionist foreign policy to conquer territories and gather more resources.

c. Japan's ambition to establish itself in Asia and Europe in the late 19th and early 20th centuries led to the crises in Japan in the 1930s. These crises drove Japan's expansionist foreign policy, which guided Japan's responses to world developments in the 1930s. These responses triggered the outbreak of war in the Asia-Pacific.

d. The weaknesses of the League of Nations made it possible for war in the Asia-Pacific to break out as it failed to restrain certain countries' aggression towards others. Japan's expansionist foreign policy, however, was more important as it forced the outbreak of war.

e. While Japan's expansionist foreign policy had increased tensions in the Asia-Pacific, Japan's responses to

world developments in the 1930s were the clearest cause of the outbreak of war because they led directly to war.

When to use: Topic-based WHQs are best confined to a "contextually bounded space" – in this case, limited to the classroom discussion based on factors presented in the textbook – to prevent students from relying extensively on other sources of information to choose an option (VanSledright, 2014, p. 61). In so doing, the alignment of each response with its corresponding level of understanding remains valid. Besides informing students that there is no single correct response, the teacher could also remind students to focus on the *quality* of reasoning presented in the options, rather than their personal opinions about the factors' relative importance.

Students could be grouped based on their responses and then be assigned differentiated tasks to expand on the explanation they have chosen. The complexity of these tasks should match students' readiness and current level of understanding (Tomlinson, 2017). The following table shows how the WHQ's options correspond to the respective levels of understanding and summarizes our suggestions.

Table 2: Correspondence of options to levels of understanding (Example 2)

Example of WHQ option for the outbreak of war in the Asia-Pacific:	**Level of understanding**	**Students' understanding of causation**	**Questions/tasks to develop understandings** (Differentiated learning)
(a) War in the Asia-Pacific broke out because President Roosevelt declared war on Japan after Japan attacked Pearl Harbour in 1941.	1 - Explanation in terms of description	Describes the trigger factor and its immediate outcome	Why did President Roosevelt declare war on Japan? Why did Japan attack Pearl Harbour?
(b) War in the Asia-Pacific broke out because Japan pursued an aggressive expansionist foreign policy to conquer territories and gather more resources.	2 - Explanation in terms of agents and actions	Solely focuses on intentions and actions	Was the outbreak of war in the Asia-Pacific solely based on Japan's policy choices? What made these choices possible? What made these choices more likely?
(c) Japan's ambition to establish itself in Asia and Europe in the late 19th and early 20th centuries led to the crises in Japan in the 1930s. These crises drove Japan's expansionist foreign policy, which guided Japan's responses to world developments in the 1930s. These responses triggered the outbreak of war in the Asia-Pacific.	3 - Explanation in terms of causal chains and/or networks	Simplistic chain reaction	Did each step of this causal chain necessarily lead to the next? Were there other implications at each step? What other possibilities could arise from each part of the chain? Why did these possibilities not happen in the end?

(d) The weaknesses of the League of Nations made it possible for war in the Asia-Pacific to break out as it failed to restrain certain countries' aggression towards others. Japan's expansionist foreign policy, however, was more important as it forced the outbreak of war.	4 - Explanation in terms of conditions for actual and possible events	Focuses on the contextual factors that cause the event	How did the impact of each of these factors intersect with that of other factors? How did these intersections cause the outbreak of war in the Asia-Pacific?
(e) While Japan's expansionist policy had increased tensions in the Asia-Pacific, Japan's responses to world developments in the 1930s were the clearest cause of the outbreak of war because they led directly to war.	5 - Explanation in terms of contexts as well as conditions	Complex causal explanation	How would you explain the causes that led to the outbreak of war in the Asia Pacific? Construct a comprehensive causal explanation using a mind-map or a concept map.

Interpretation

Students who choose **Option (a)** are essentially describing the trigger factor and its immediate outcome (Level 1). Their task could therefore be to inquire into why President Roosevelt declared war on Japan, and why Japan attacked Pearl Harbour. Their task would encourage them to continue asking a series of "why" questions to help build their causal explanation.

Option (b) focuses on intentions and actions (Level 2), so students who select this option could be tasked to consider whether the outbreak of war in the Asia-Pacific was solely based on Japan's agency. Possible guiding questions include "what made Japan's policy possible?" and "what made Japan's policy more likely?". These questions guide students to recognize the complex synergy between Japan's expansionist policy and other factors.

Option (c) reflects a chain reaction of "knock-on causes and effects" (Lee & Shemilt, 2009, p. 46). Students who choose this option could be assigned guiding questions that help them progress from their causal chain reasoning (Level 3) to a more complex causal reasoning that recognizes inter-linkages between an event and another that may not immediately follow it in chronological order.

Students who choose **Option (d)** are focusing on contextual factors (Level 4) and could therefore be encouraged to consider how the impact of these factors intersected with that of other factors and how this intersection caused the outbreak of war in the Asia-Pacific. This series of questions allows students to deliberate about the inter-linkages of these factors and subsequently develop more sophisticated causal understandings.

Option (e) represents the highest level of understanding that indicates an ability to comprehend complex causal explanations (Level 5). Students who select this option could be tasked to explicate a comprehensive causal explanation using a mind-map or a concept map. This task allows students to make their thinking visible for the teacher to check for their understanding of the causal relationships between the factors discussed in class.

Conclusion

We stress that good WHQs, backed by

research-based progression models, should be continually refined to ensure that students' answers accurately correspond to their respective levels of understanding. The teacher should thus occasionally ask students to verbalize their thoughts on what had led them to choose particular options. Additionally, we encourage teachers to adapt our suggested WHQs and the options we crafted to their lesson objectives and their students' language abilities. For instance, WHQs could also be used to uncover students' preconceptions of other historical concepts such as evidence and accounts: improved understanding of these concepts would enable students to craft better responses to source-based case study questions and some SEQs. We have focused on the historical concept of causation here because it has been a key focus of GCE O-Level SEQs. Students' WHQ responses provide a concrete basis for pedagogical adjustment when adopting a whole-class approach and for differentiated instruction to help students better appreciate the complex and multi-faceted outcomes of each cause and the inter-linkages between the various causes. Students' refined understanding of historical causation would enable them to write coherent and cohesive content paragraphs in their essays, and craft an evaluative conclusion that meaningfully engages with these causal complexities.

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