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Developing Source Analysis Skills in Upper Secondary History Students: Incorporating RCC and IPSS into Structured Academic Controversy

Jason Seng Yang Sun

Peicai Secondary School (Singapore)

Abstract

This paper proposes an integrated approach to strengthen source analysis skills among upper secondary history students by leveraging Structured Academic Controversy. It synthesises principles from humanities education with two key frameworks from the learning sciences: the Information Processing and SEEKING System (IPSS) and the Readiness, Coherent Construction, and Consolidation (RCC) framework. This synergy is designed to deepen students' skills in analysing sources and enhance their appreciation for the real-world relevance of interpreting historical sources. The author argues that this approach fosters sustainable learning experiences by tapping into intrinsic motivation and structuring cognitive processes, leading to the development of durable and transferable critical thinking abilities.

Introduction

This paper proposes integrating the Readiness, Coherent Construction, and Consolidation (RCC) framework with the Information Processing and SEEKING System (IPSS) to create a revised structured academic controversy approach, enhancing source analysis skills in upper secondary history education through the use of the upper secondary history textbook.

Students often struggle to apply effective source analysis skills in their academic studies and daily lives. This is compounded by a motivational issue where students develop scepticism about the relevance of History in their lives due to 'History not widely regarded as a subject that fosters the high-level thinking that is necessary to function or compete in a knowledge-based economy' (Afandi & Lim, 2022).

Teachers and students are concerned about this because source analysis skills tie in strongly with assessment, comprising 70% of the final grade for the GCE 'O' level History examination (SEAB, 2023). However, the use of primary sources for the teaching of upper secondary History in Singapore may serve mostly to prepare students for school-based assessments and national examinations in many History classrooms because 'accountability and pragmatic concerns over academic performance remained important considerations in determining pedagogical decisions History teachers make in their classrooms' (Afandi & Lim, 2022). This exam-centric approach in teaching students source analysis skills may have the

unintended consequence of causing students to associate historical sources only with examination questions, reducing their ability to think critically about sources beyond answering examination questions. This contradicts the upper secondary History syllabus's objective of developing within students an 'inquisitive mind' with the ability to 'ask relevant questions about the past and examine a range of sources critically in their historical context to reach substantiated judgements about the past' (SEAB, 2023). Although the short-term objective of students doing well in the GCE 'O' level examination may be achieved, students who are exposed to an exam-centric approach to learning source analysis skills may eventually forget the skills due to a lack of practice and appreciation of their relevance to their daily lives after completing their national examination.

At the community and national levels, students need to be able to critically evaluate the sources of information they encounter, especially in this digital age, where they have access to a wide variety of unregulated sources. There is a rapid uptake in the use of artificial intelligence (AI) technology to synthesise information available online to provide quick answers. Individuals are utilising AI chatbots like ChatGPT to assist them with personal and professional queries. However, these AI chatbots can draw upon unreliable sources of information when producing responses (Tham et al., 2023). Disinformation researchers also cautioned that conspiracy theorists can use AI chatbots to create more convincing 'conspiracy theories and misleading narratives' (Hsu & Thompson, 2023). Hence, it is crucial for teachers and students to intentionally develop source analysis skills in using the History textbook in this age of disinformation.

Literature Review

This review pulls together academic discourse from the fields of Learning Sciences and Humanities Education. It can be categorised into three areas: teachers' challenges and strategies for teaching source analysis, curiosity as a motivation for developing source analysis skills, and considerations for the proposed approach.

Teachers' Challenges and Strategies to Teach Source Analysis

In 'Reflecting on Assessment of the Humanities for Better Classroom Practices', Aljunied shared that History teachers struggle with juggling the teaching of skills and content in class because of limited time. Teachers also experience difficulty providing specific and targeted feedback for each student's work due to the large number of students under their care across multiple classes. She called for teachers to set clear learning targets and outcomes, share success criteria with students, and provide meaningful feedback for classroom assessments (Aljunied, 2016). This highlights a tension where the development of critical thinking skills in students may conflict with the constraints of curriculum coverage and large class sizes.

In 'Guiding students in Singapore to investigate historical controversy using a disciplinary approach', Baildon, Afandi, Bott, and Rajah acknowledged that the 'examination-driven focus in History classrooms' caused a 'pedagogic culture of teacher-centred classroom practice that emphasises, with few exceptions, the transmission of knowledge and procedures for exam success, rather than conceptual understanding, classroom discussion and knowledge building'. They argued that to understand the historical controversy, students had to develop source analysis skills to understand sources as they engage

with ‘competing or contradictory historical accounts.’ (Baildon et al., 2018)

Curiosity as Motivation to Develop Source Analysis Skills

In ‘Primary Sources in History: Breaking through the Myths’, Barton argued that discussions about the use of primary sources in the teaching of History reveal the value of their use in the classroom to enable students to become curious about History (Barton, 2005). This is supported by Gregory and Kaufeldt’s claim in ‘The Motivated Brain: Understanding and Activating Your Brain's Desire to Learn’ that curiosity is crucial in motivating students. They shared that classroom norms, group work, agendas, and movement are important in creating a classroom environment that facilitates the ‘information processing and SEEKING system,’ which enhances student motivation to learn (Gregory & Kaufeldt, 2015).

Considerations

Jensen and McConchie (2020) in ‘Brain-based learning: Teaching the Way Students Really Learn’ claimed that ‘a thought-provoking inquiry question’ provided to students at the start of the lesson can enhance readiness and increase the possibility of change in students’ brains. The controversy posed by the inquiry question can trigger suspense and anticipation in students, which can emotionally invest them in the classroom activity and improve their focus, learning, and achievement by enabling the amygdala to embed the memory of their knowledge with meaning. When students are emotionally connected to a question or problem, their brains are primed and more receptive to learning. This aligns with Gregory and Kaufeldt’s claim that motivation can be actively cultivated by designing learning experiences that tap into students’ natural “SEEKING” system. This concept would be further elaborated in the following section.

Understanding the Frameworks: RCC and IPSS

The ‘Information Processing and SEEKING System’ **(**IPSS) framework, as described by Gregory and Kaufeldt (2015), is grounded in affective neuroscience to explain how the brain processes information and how intrinsic motivation, particularly the "SEEKING" system, drives learning. The IPSS is organised into three hierarchical levels as shown in the table below.

Table 1. Organisation of IPSS

Level	Description
Primary SEEKING	This foundational level of the “SEEKING” system is activated by novel, relevant, meaningful, thought-provoking, discrepant, or puzzling stimuli. It taps students' innate curiosity and emotional responses, creating an initial drive to explore and investigate. When students encounter something that sparks their interest or challenges their existing understanding, their primary “SEEKING” system is engaged, making them more attentive and motivated to learn.
Secondary SEEKING	After primary “SEEKING” is activated, the brain moves into secondary

	"SEEKING", which involves more deliberate and elaborative processing. This includes making connections to other learning, finding personal meaning in the information, engaging in cooperative learning situations, and utilising multiple intelligences. It also encompasses rote repetition for foundational knowledge. This phase is about actively working with information to deepen understanding and make it more memorable.
Tertiary SEEKING	This highest level of the "SEEKING" system involves complex cognitive processes such as creative and critical thinking, problem-solving, decision-making, project- and problem-based learning, and metacognition. At this stage, learners are not just processing information but are actively manipulating it, generating new ideas, evaluating different perspectives, and reflecting on their own learning processes. This level represents deep, transferable learning.

The 'Readiness, Coherent Construction, and Consolidation' (RCC) framework outlines three critical stages for ensuring that new learning is durable and transferable (Jensen & McConchie, 2020). It provides a cognitive structure for the child's learning experience, as illustrated in the following table:

Table 2. Overview of RCC Framework

Stage	Description
Readiness	This initial phase focuses on preparing the learner's brain for new information. It involves activating prior knowledge, setting clear learning goals, and generating curiosity or a sense of need for the upcoming content. The aim is to create an optimal mental state where students are receptive and motivated to engage. This can be achieved through pre-exposure to concepts, thought-provoking questions, or connecting new learning to students' existing experiences.
Coherent Construction	In this phase, students actively engage with the new information, making sense of it and integrating it into their existing knowledge structures. This is where active learning strategies come into play, such as discussions, problem-solving, hands-on activities, and collaborative work. The emphasis is on deep processing, meaning making, and building a coherent understanding rather than rote memorisation. Students are encouraged to connect new ideas, elaborate on concepts, and construct their own

	meaning.
Consolidation	This stage is essential for transferring learning from short-term to long-term memory. Consolidation involves deliberate practice, reflection, and the gradual application of new skills or knowledge over time. Strategies include spaced practice, relevant transfer activities where students apply the skill in a new context, and metacognitive reflection to strengthen neural pathways and ensure long-term retention.

Synergy of IPSS and RCC

IPSS and RCC complement each other in the design and enactment of lessons. IPSS provides the motivational 'why' for learning by tapping students' innate curiosity, while RCC provides the structured 'how' for making that learning stick. IPSS ensures students are emotionally and intellectually engaged through the "SEEKING" drive, while RCC provides the sense-making process to guide students towards deep and sustainable understanding. Structured Academic Controversy activates the "SEEKING" system in IPSS through a compelling historical question that makes students receptive to the learning process. The Structured Academic Controversy activity provides a platform for active investigation and argument building, as seen in "Secondary SEEKING" and "Coherent Construction". Follow-up activities designed to apply and reflect on the skills they have learnt ensure long-term retention and transfer through the "Tertiary SEEKING" and "Consolidation" processes.

Proposed Approach

The proposed learning design incorporates the RCC framework and IPSS to enable students to form opinions based on the sources presented in the History textbook. These frameworks, derived from the science of learning, address student motivation and structure the learning process to ensure sustainability in learning. Figure 1 summarises how the discussion points brought up in the literature review will be incorporated into structured academy controversy.

Figure 1. Incorporation of Discussion Points

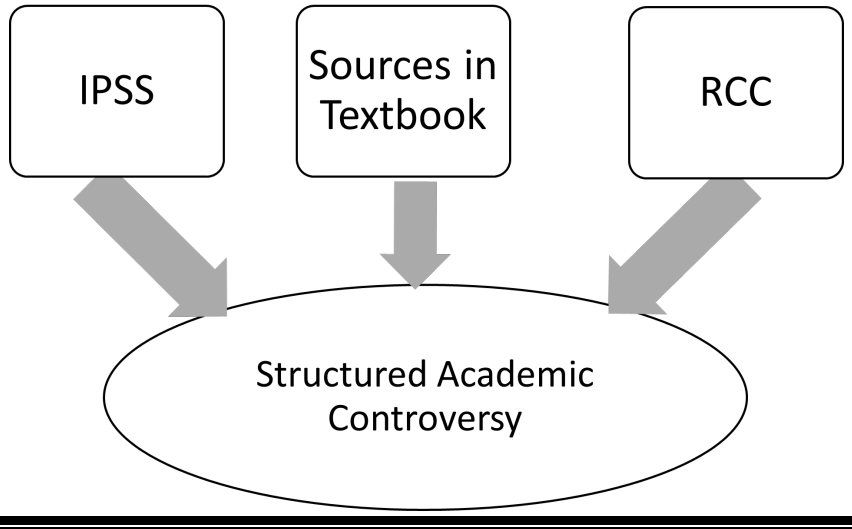
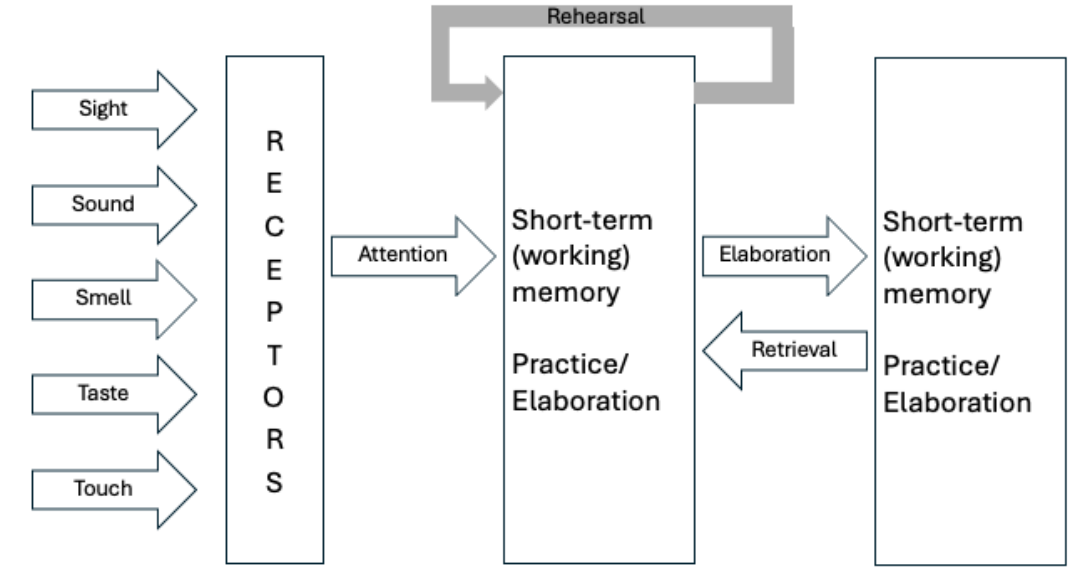


Figure 2. Information Processing and SEEKING System (Gregory and Kaufeldt, 2015)



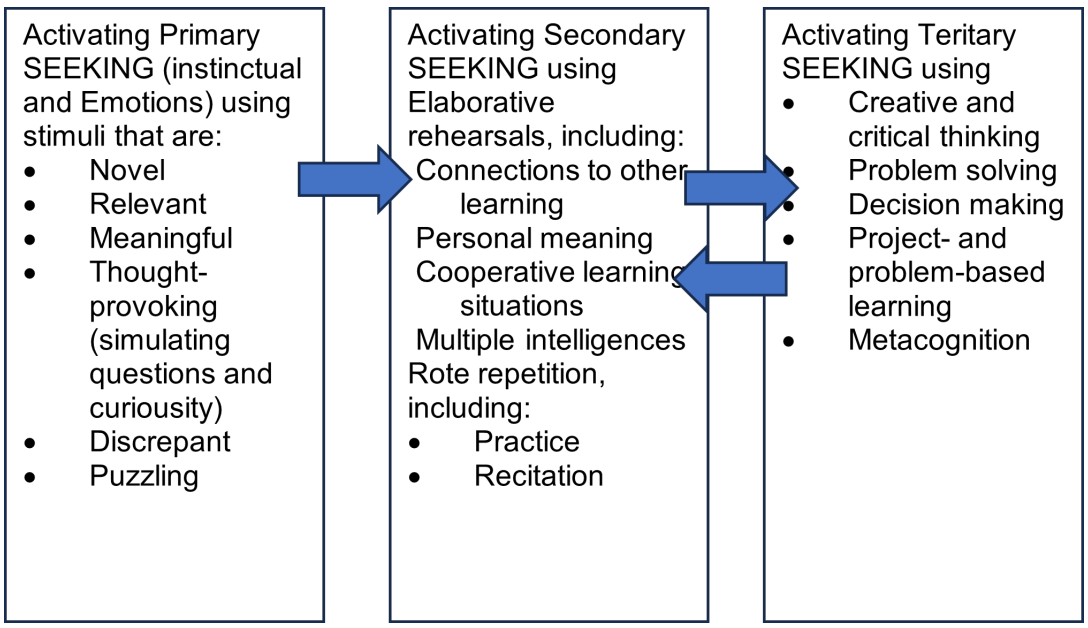
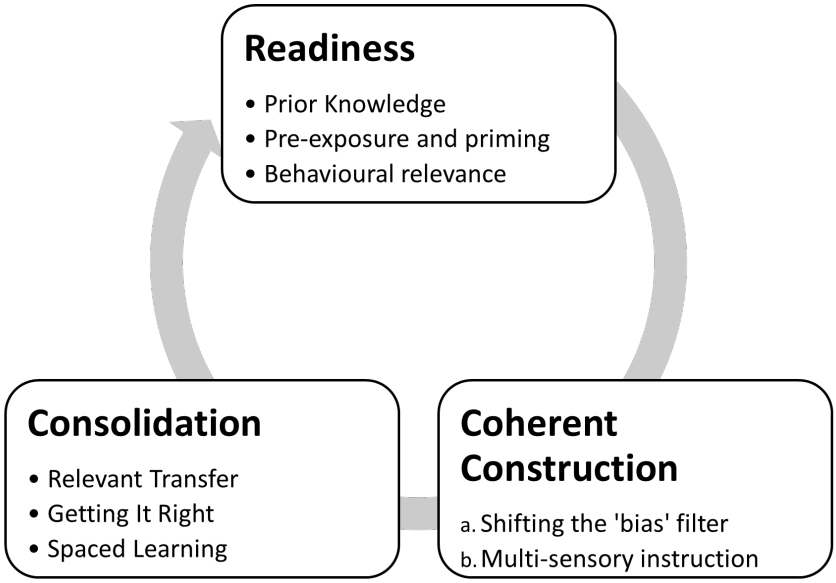


Figure 3. Readiness, Coherent Construction, and Consolidation (RCC) Framework

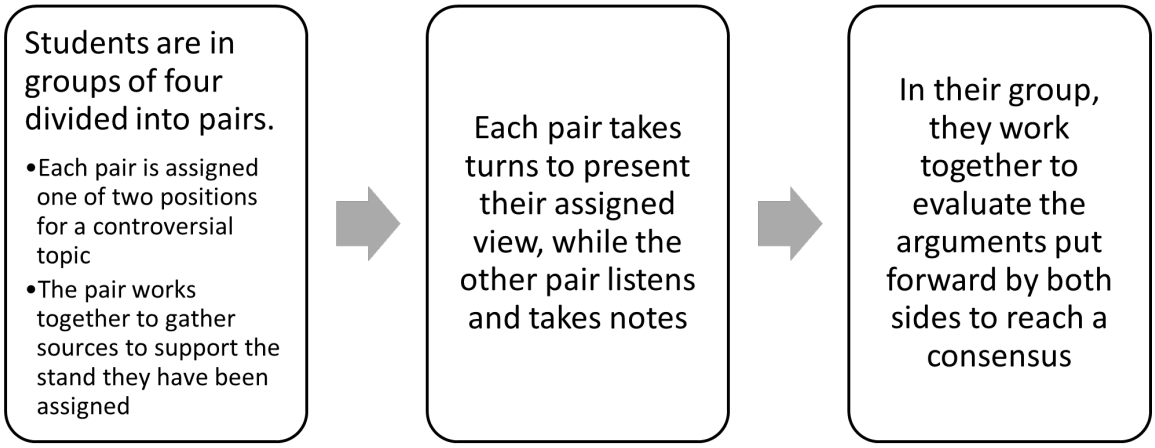


The approach will bring students through the activation of primary, secondary, and tertiary "SEEKING" illustrated in Figure 2 above. The approach will guide students through the RCC framework, as illustrated in Figure 3.

Existing Practice

Structured academic controversy is a cooperative learning teaching strategy. First, students take turns sharing their findings with group members, which they have gathered by evaluating sources from their assigned perspective. Next, they will work together to consider the merits of the arguments from both sides to reach a group consensus. Figure 4 summarises the key stages in a traditional structured academic controversy lesson.

Figure 4. Traditional Structured Academic Controversy Lesson



Contribution of the Approach

When structured academic controversy is conducted in the classroom, it is typically one-off and limited to the topic being taught. Teachers may revert to teaching source analysis skills using the drill-and-practice method to prepare students for examinations, which may cause students to overlook the connection between this learning approach and their acquisition of essential source analysis skills for examinations. The proposed approach aims to enhance sustainability and boost student motivation by providing a framework for teachers to incorporate relevant topics into the upper secondary History syllabus, utilising the textbook to develop students' source analysis skills in conjunction with the teaching of content knowledge. It is designed with mixed-ability classes in mind and can be further adapted to the learning profile of the class.

Structure of Lessons

Lesson	Activity	Elements of RCC	Elements of IPSS
Pre-Lesson	• Teacher shares a Google Site used for the lesson package. • Students complete self-assessment. • At the end of the lesson, the teacher fosters anticipation within students by putting up sources providing differing perspectives surrounding the controversial issue on Google Site and the class notice board.	Readiness **Prior Knowledge** **Pre-exposure and priming**	Primary SEEKING **Relevant, meaningful**
Lesson 1	• Teacher introduces students to the controversial question and briefs the class. • Teacher assigns students into groups of 4. • Each pair within the group is assigned a stand they	**Behavioural** **Relevance**	Secondary SEEKING

<table>
<tr><th>Lesson</th><th>Activity</th><th>Elements of RCC</th><th>Elements of IPSS</th></tr>
<tr><td></td><td>need to support by individually searching for relevant sources from the Textbook.
• Students are provided with a graphic organiser to record the main arguments of the author of their chosen source in response to questions guiding students to make inferences from the source, discern its purpose, and evaluate its reliability.</td><td></td><td>Cooperative learning situations</td></tr>
<tr><td>Lesson 2</td><td>• Students will be seated in their group next to the partner who is working on the same stand as them, as illustrated in the seating arrangement below.
<table><tr><td>Student A (Support)</td><td>Student B (Support)</td></tr><tr><td>Student C (Against)</td><td>Student D (Against)</td></tr></table>• With reference to their completed graphic organiser, each student takes turns to share their findings with their partner, while their partner takes</td><td><u>Coherent Construction</u>

Multi-sensory Instruction</td><td><u>Tertiary SEEKING</u></td></tr>
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Lesson	Activity	Elements of RCC	Elements of IPSS
	notes. Each pair agrees on the main arguments to be presented to the other pair using the Inference + Evidence + Explain framework. In their presentation, they will discuss possible reasons for the sources to be biased. • Each pair takes turns presenting to the other pair the main arguments they have chosen, while the other pair takes notes. • After both pairs have presented their responses, they will work together as a group to deliberate on a group consensus. After agreeing on the consensus, they will display it on a Padlet page embedded in the Google Site, explaining the reason for their choice through a critical analysis of the sources they have evaluated.	Visual: Graphic Organiser Auditory: Listening to a classmate's presentation Motor: Note-taking **Shifting the 'bias' filter**	**Decision making**
Lesson 3	• Each group presents their answers in class and answers questions posed		

Lesson	Activity	Elements of RCC	Elements of IPSS
	by classmates and the teacher. Classmates are invited to provide suggestions to improve each group's analysis. • Each group is tasked to design a propaganda poster to convince the audience to support the stand they have agreed on. They are to create a source-based question and develop the rubrics for the question based on the poster they have designed.	<u>Consolidation</u> **Relevant Transfer**	**Creative and critical thinking**
Lesson 4	• Each group swaps its poster and accompanying question with another group. They will work as a group to write out the answer to the question they have received. • Students engage in peer marking where the response of each group will be marked by the group that assigned the question using their designed rubrics. • Each group presents the response they have marked and the rationale for awarding the mark, and	**Getting It Right**	<u>Secondary SEEKING</u> **Rote repetition**

Lesson	Activity	Elements of RCC	Elements of IPSS
	the teacher will address any misconceptions or add to the explanation if necessary.		
Lesson 5	• Students complete a source-based practice on the topic covered and feedback is provided by the teacher.		
Post-Lesson Test	• Students are assigned a test to assess their understanding. • Based on the results of the test, groups can be reallocated by the teacher to ensure a mix of student ability within each group for subsequent structured academic controversy lessons. • After receiving their test results, students will review their areas for improvement with their teacher. • Students will complete a Google Form with their response emailed to them and their teacher to reflect on their learning and possible areas for growth.	**Spaced Learning**	Tertiary SEEKING **Metacognition**

Discussion

The synergy between elements of the RCC framework and IPSS in the lesson structure above enables an enhancement of students' appreciation for source analysis skills in the real world and fosters sustainable learning experiences for students. RCC and IPSS complement each other in the teaching of source analysis skills in the Humanities because they holistically address both the structured cognitive processes necessary for skill acquisition (RCC) and the intrinsic motivational drivers essential for deep, sustained student engagement with historical inquiry (IPSS). This enables students to develop source analysis skills while engaging with and learning from the historical content presented in the sources. Such an approach can potentially result in a more efficient use of classroom time, as it reduces the need for separate lessons that focus solely on skills or content.

Enhancing Real-World Appreciation of Source Analysis Skills

A common challenge faced in the teaching of source analysis skills is students' inability to see the applicability of source analysis to their everyday lives. The IPSS addresses this by tapping into the brain's innate "SEEKING" system, which is the drive to explore, investigate, and acquire knowledge. In the Readiness phase of RCC, the teacher introduces a thought-provoking inquiry question, which is designed to activate this primary "SEEKING" drive. This initial emotional connection is important because curiosity drives motivation. As Jensen and McConchie (2020) suggest, such a question can trigger suspense and anticipation, thereby fostering an emotional connection in students with the material being taught in class. This emotional connection is crucial because it primes the brain for learning and helps students see the immediate relevance of the task. When students are intrinsically motivated to resolve a historical controversy that they find compelling, they begin to understand that the skills of dissecting arguments, evaluating evidence, and identifying bias are not just academic exercises, but skills that apply to their daily lives.

Instead of a factual recall question like "What was the social impact of Hitler's rule?", the teacher could first show the class two contrasting historical sources for Lesson 1 – one a propaganda poster depicting happy, healthy Aryan families benefiting from Nazi policies, and another a personal account from a Jewish citizen describing how their lives became worse under the Nazi regime. The inquiry question could be: "Did Hitler's rule improve the lives of people living in Nazi Germany?" The conflicting narratives, presented to students as a trigger, would activate their primary "SEEKING" system. This would make them intrinsically motivated to reconcile this contradiction. In doing so, students would appreciate how evaluating evidence from sources is an essential skill that helps them navigate conflicting information in daily life.

Creating Sustainable Learning Experiences

The "Coherent Construction" phase of RCC, where students actively work with sources, discuss, and build arguments, aligns with the secondary and tertiary SEEKING aspects of IPSS. This phase is not about passively receiving information but instead involves actively making meaning. Students engage in "elaborative rehearsals" and make "connections to other learning" and "personal meaning" (Gregory & Kaufeldt, 2015). The Structured Academic Controversy structure itself, which requires students to argue from different perspectives before reaching a consensus, prompts them to engage in deeper cognitive processing, decision-making, and metacognition. This active,

constructive process leads to more robust and durable learning compared to rote memorisation. In Lesson 2, as students share their findings with their partner and then present to the opposing pair, they are actively engaging in secondary "SEEKING". One pair might argue that life improved for many Germans, citing sources such as accounts of the success of the 'Strength Through Joy' initiative. The opposing pair might argue that lives worsened for many, using sources like descriptions of how the Gestapo's activities resulted in limited freedom for people living in Germany. The act of explaining their reasoning using the Inference + Evidence + Explain framework forces them to make connections between the source content and their interpretation, deepening their understanding. Furthermore, when the entire group deliberates to reach a consensus on whether Hitler's rule improved the lives of Germans, they are engaging in tertiary "SEEKING" through decision-making and critical thinking.

The consolidation phase of RCC is explicitly designed for long-term retention and transfer. Activities like designing propaganda posters, creating source-based questions, peer marking, and post-lesson tests with reflection in Lessons 3, 4, and 5 serve as "relevant transfer" and "spaced learning" opportunities. This repeated retrieval and application strengthen neural pathways, making learning more sustainable. In Lesson 3, tasking groups to design a propaganda poster either celebrating or critiquing the social impact of Hitler's rule requires them to apply the conclusion that their group has arrived at to a real-world challenge of convincing others of their group's stance. This requires students to select and adapt visual elements within their poster to support their stand, deepening their understanding of how historical narratives can be constructed and manipulated. For example, a group arguing that lives worsened under Hitler's rule might design a poster highlighting the stark contrast between Nazi promises and the reality of persecution, drawing on specific details from personal testimonies they came across. Conversely, a group presenting a balanced view might incorporate elements that superficially appear favorable but subtly hint at underlying control or exclusion, reflecting the complexities of the period. The subsequent task of designing a source-based question and rubrics for their poster, followed by attempting each other's questions and peer marking in Lesson 4, allows students to undergo spaced learning and retrieval practice processes in a novel way. They will be able to metacognitively think about question design and answers they would expect, helping them become more familiar with assessment in History. This iterative process of creation, evaluation, and feedback, followed by a final source-based practice and test in Lesson 5, ensures that the skills are not only learned but also deeply embedded and accessible for future use, allowing for long-term retention of content and source-based skills.

Conclusion

This paper proposes a method for integrating the RCC framework, IPSS, and textbook content into Structured Academic Controversy to teach upper secondary history students source analysis skills. This approach offers a practical solution to the challenge of limited time experienced by teachers for discussing historical controversies in class. It enhances history students' motivation in developing source analysis skills by enabling them to appreciate its relevance to their daily lives. It could also encourage students to become more familiar with and think more critically about the sources available within the textbook. Teachers could consider adopting this approach to equip students with the source analysis skills essential for navigating the age of disinformation accelerated by AI technology.

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