

How to Teach Critical Thinking?

An Insight from Japan

Skylar M.Y. FUNG

1. Introduction

Attention to critical thinking in both academia and the field of education has increased since the beginning of the 21st century. The modern philosophical debate on critical thinking can be traced back to John Dewey's idea of "reflective thinking" in the 1910s. The concept was further developed from the 1960s to the 1980s by scholars such as Robert. Ennis, John McPeck, Richard Paul. However, that debate remained mainly academic.

In 2002, the Partnership for 21st Century Learning introduced the "Framework for 21st Century Learning," now widely known as "21st-century skills." This framework classifies critical thinking and problem solving under "Learning and Innovation Skills," which are essential for navigating complex lives in a rapidly changing world (Battelle for Kids & Partnership for 21st Century Learning, n.d.). The 21st-century skills agenda drew attention to critical thinking from audiences outside academia, especially teachers and practitioners. More recently, the United Nations Sustainable Development Goals (SDGs), which aim to be achieved by 2030 have increased global focus on education. Critical thinking, as a higher-order skill, is recognized as an important component of Goal 4: Quality Education, which has driven an increase in empirical research in the field.

The cross-disciplinary debate on critical thinking spans cognitive psychology, education, philosophy, and other fields. Ongoing discussion centers on defining the term "critical thinking," and there is also sustained debate about which dispositions enable people to act in accordance with critical thinking. These two debates have been pursued mainly by psychologists and philosophers.

While the psychological and philosophical debates

continue, the field of education has examined various teaching strategies and models across thousands of studies. However, this large body of research has not produced a comprehensive, practical handbook for teachers and practitioners. The complexity of the concepts and the scattered nature of the literature may teachers seeking to implement critical-thinking education in the classroom.

Although much research has evaluated specific classroom strategies for teaching critical thinking and surveyed influential Western approaches, few studies offer practical, lesson-level guidance for teachers. Principles and meta-analyses identify important directions, but they do not tell teachers how to design a coherent single lesson or a sequence of lessons that translate those principles into classroom practice.

This paper addresses that gap by adopting Shōbi Inoue's theory of critical-thinking education within the Japanese Lesson Study framework—not as an object of evaluation, but as a lesson-based, teacher-centred method for lesson design. Drawing on a lesson-plan system, this paper proposes a practical, bottom-up approach that shows what teacher knowledge, lesson foci, and stepwise preparations are needed to enact lessons that develop students' critical-thinking skills.

2. Overview of Critical thinking research in education

According to Paul (1997), the critical thinking movement (1970–1997) can be divided into three waves. The first wave (1970–1982) focused on logic and was dominated by philosophers. However, tension between educational ideals and actual classroom practice was reported. The second wave (1980–1993) marked the peak of the movement, as

models of critical thinking itself and its instruction were developed for specific educational levels and subject areas. The most cited ideas, models, and principles used in current critical thinking research are mainly found in this period. The debate over whether critical thinking is a general skill or requires specific knowledge started in the 1980s and has influenced curriculum and lesson planning. The third wave 1990–present (e.g., at least by 1997, when Paul published), saw scholars integrate findings from the first and second waves with empirical research in cognitive psychology to construct rigorous, comprehensive theories of critical thinking. These scholars sought to establish shared principles and assessment methods, and to identify and critique pseudo-critical-thinking models and programs.

Starting in the 2000s, educational scholars shifted from researching models or definitions of critical thinking and the problem of disposition to conducting meta-analyses building upon the foundational work of philosophers and the prominent figures like Ennis, McPeck and Paul (Wade, 2016). The number of empirical studies on critical thinking has increased rapidly. For example, Dong et al. (2023) identified at least 2,043 studies on critical thinking education in the Web of Science for the period 2000–2021. Similarly, Misbah et al. (2022) found 1,788 documents on critical thinking in science education published between 2017 and 2022. The huge growth in critical thinking education makes this trend unavoidable.

Regarding meta-analyses or systematic review research on critical-thinking pedagogy, the effectiveness of different teaching strategies is examined. Abrami et al. (2015) grouped teaching strategies into four categories—individual study, dialogue, authentic or anchored instruction, and mentoring—to examine the effectiveness of instruction on developing critical-thinking skills and disposition. Closely, Jestad et al. (2025) identified four classroom strategies for fostering critical thinking in primary education: (1) a textual approach, which uses reading and critical writing to employ texts as frameworks for analysis; (2) a dialogic approach, emphasizing oral dialogue and classroom discussion; (3) a practical approach, centered on student inquiry, hands-on activities, and investigation rather than teacher-driven

instruction; and (4) a digital approach, incorporating digital tools (e.g., apps and games) to support critical-thinking development. Furthermore, Oxman et al. (2025) conducted a systematic review of teaching strategies for critical-thinking education in primary and secondary schools. They identified and broadly categorized 11 strategies reported in the literature, including didactic strategies, questioning and prompts, individual learning, and problem-based and inquiry learning.

Although the literature on teaching critical thinking offers many studies of specific strategies, practitioners still struggle to design coherent, systematic lessons from these aggregated findings. Some studies have investigated whether Lesson Study can enhance critical thinking (e.g., Yeşilçınar & Aykan, 2022; Marnita et al., 2021; Risnanosanti et al., 2019; Cheng & Chan, 2018), but these tend to analyze Lesson Study itself or function like meta-analyses of strategies. They do not provide step-by-step guidance on the teacher knowledge and lesson focal points needed to plan and teach a single lesson. To my knowledge, no research treats Lesson Study not merely as a strategy or object of evaluation but as a lesson-based framework for designing and enacting individual lessons. This paper therefore draws on Japan's Lesson Study as a lesson-centred framework to develop a practical, systematic approach for planning and implementing lessons that foster students' critical thinking.

3. Inoue's idea of "Logic Education through Language" as critical thinking education

I introduce Shōbi Inoue's ideas as a practical approach to the teaching of critical thinking. First, I will outline the main idea of "Logic Education through Language." Then I will explain how this theory can be combined with Japan's Lesson Study (*Jugyō Kenkyū*).

"Logic Education through Language," originally named "言語論理教育" (*Gengo Ronri Kyouiku*), can literally be translated as "Language Logic Education." This theory was first introduced in 1977 in Inoue's book *Gengo ronri kyōiku e no michi — kokugoka niokeru shikō* (*The Way to Logic Education through Language: Thinking in the Japanese Language Curriculum*). Before joining Tokyo Gakugei

University as a language-education specialist, Inoue taught Japanese at the junior-high level for eighteen years. While at Tokyo Gakugei University, he studied in the United States twice to research English-language education and to study general semantics under S. I. Hayakawa, which allowed him to engage more deeply with American research on critical thinking.

Building on the remarkable expansion of mass media since the 1970s, he anticipated that information would become more easily accessible and that the volume of information would increase substantially. To prevent people from being "swept away by vast amounts of information" (Inoue, 2000, p. 2), Inoue developed "Logic Education through Language". This theory for developing critical thinking aims to cultivate the ability to judge and evaluate information's "truthfulness", "validity", and "relevance" according to specified criteria (Inoue, 2012, p. 167). Here, "truthfulness" focuses on the truth value of propositions themselves; "validity" concerns the appropriateness of inference methods and patterns; and "relevance" examines the extent to which a proposition is useful within a given context. To achieve these aims, Inoue proposed two instructional foci: "types of argumentation" and "general semantics."

First, the "types of argumentation" are incorporated into instruction to develop the "validity" of information—that is, the ability to analyze and evaluate arguments correctly. Inoue did not advocate teaching only formal inference methods such as syllogisms, since much everyday discourse is not as neatly structured as formal logic (Inoue, 2007). To evaluate arguments encountered in daily life, which often blend rhetorical elements with logical ones, one must first extract the argument from rhetorical text. Accordingly, Inoue focused on the logical vocabulary and logical operations present within texts (Inoue et al., 2012, pp. 226-222). But how, in practice, should logical vocabulary and logical operations be taught to children? The specific form becomes clearer on close examination of Inoue's proposed curriculum for "Logic Education through Language" from elementary through secondary school.

Inoue's curriculum integrates knowledge of "types of

argumentation" by progressively expanding students' logical vocabulary from first grade through high school and teaching corresponding logical operations (Inoue et al., 2012, pp. 222–226). In grades 1–2, students are expected to learn simple logical operations such as "compare" and "same." By the end of elementary school, the curriculum envisages a structure that enables understanding of more abstract and advanced concepts such as "judgment" and "condition." In junior and high school, students are introduced to technical logical terms such as "hypothesis." By understanding logical vocabulary, students can identify the argumentative structures embedded in texts and speech and grasp how claims are being argued. Comprehending the structure of arguments and the logical operations underlying them is a prerequisite for evaluating "validity." The curriculum also expected students will understand and be able to apply logical vocabulary and operations.

To make logical operations easier for students to identify, Inoue introduced a three-tiered structure—"word-sentence-text"—as an entry point for analyzing the logical flow of a text. A text is divided into three linguistic units: words, sentences, and the whole text. First, the relations and logical connections among concepts expressed by words are examined; next, the truth or accuracy of the propositions expressed by sentences is confirmed; finally, the argumentative structure and line of reasoning embodied in the entire text are analyzed (Inoue et al., 2012, pp. 226-222). This three-tiered structure is introduced from primary grade 1, allowing students to begin analyses using the word-sentence-text framework even if they are not yet fully familiar with logical operations or cannot yet identify all occurrences of logical vocabulary. By providing early and progressive exposure to logic from the first grade and systematically teaching related concepts and operations, the curriculum is expected to cultivate the thinking skills necessary to discriminate information. Through this design, Inoue envisaged that seemingly difficult, advanced thinking skills can be learned steadily from an early stage such as grade 1.

Secondly, Inoue incorporated principles of general semantics into the "Logic Education through Language"

curriculum to cultivate students' ability to judge the truthfulness and relevance of information. General Semantics was proposed by Korzybski in 1933 as a theory that investigates the appropriateness of language use in propaganda. It is a system grounded in the philosophical stance of Language Symbolism and treats reality and language as separate entities—reality as such and language as symbol (Hayakawa, 1941). General Semantics regards language as merely subjective labels applied to reality and holds that language cannot fully and neutrally reflect reality; the theory therefore focuses on the limits and subjectivity of language. By introducing this theoretical framework into Logic Education through Language, Inoue aimed to prevent students from uncritically accepting language as objective and to make them consciously aware of language's subjectivity.

According to Inoue, introducing General Semantics in primary grades 1–2 is difficult; exposure should begin no earlier than grades 3–4. He proposed six instructional topics: (1) “The map is not the territory,” emphasizing the distinction between facts and descriptions; (2) “Report–Inference–Assertion,” focusing on factual reports, inferences based on descriptions, and assertions that include value judgments; (3) “Levels of abstraction,” distinguishing abstract from concrete vocabulary; (4) “Attend to an object's uniqueness,” highlighting the distinction between commonality and uniqueness; (5) “Language cannot exhaust everything,” drawing attention to the limits of a speaker's perspective; and (6) “Not only black or white,” introducing multivalent thinking (Inoue et al., 1974, pp. 104–111). By understanding and applying these six binary frameworks, students were expected to adopt a flexible perspective that prevents uncritical acceptance of materials used in class and of what they see, hear, and read in their surroundings, enabling them to recognize authors' positionality. Moreover, using these perspectives to analyze language subjectivity and to examine the intentions or viewpoints underlying expressions in a given context would allow them to judge those expressions' relevance.

From the objectives of “Logic Education through Language,” the capacity to evaluate information beyond its

surface is regarded as the kind of thinking skill the Japanese language curriculum should cultivate. Inoue held that education's responsibility is “to develop the ability to autonomously and critically select genuinely useful information—so as not to be submerged in the flood of information—and to form individuals who can function internationally in an information society” (Inoue, 1989, p. 12). In short, motivated by the question “How can students' thinking abilities be enhanced?,” he proposed Logic Education through Language to foster critical information-selection skills.

But the question of why fostering critical information-selection skills is so important remains. To answer it, we should examine how Inoue understands his educational goal of developing “thinking ability.” In his theory, “philosophy” functions as a key critical term. Here, “philosophy” does not refer to philosophy as an academic discipline but to an individual's way of questioning things—i.e., the judgments, evaluations, and perspectives one holds—using the reflective characteristic of academic philosophy. Although Inoue's use of “philosophy” resembles the notion of a “view” or “perspective,” he deliberately preferred “philosophy” to emphasize philosophical reflection rather than employ the term “view.” According to Inoue, “the aim of Logic Education through Language, as described above, is to cultivate the ability to think about matters as deeply and broadly as possible and to make comprehensive judgments and evaluations. In other words, this is nothing other than ‘teaching children philosophy’” (Inoue et al., 2012, p. 171). Inoue conceives “thinking ability” as the capacity to acquire one's own “philosophy,” “perspective,” and even “worldview” through the critical scrutiny of information derived from experience. In other words, it extends beyond mere evaluation of information to encompass the formation of a worldview that might be called an individual's “philosophy.”

From the foregoing, I have introduced the basic concept of Inoue's Logic Education through Language, including its educational goals, content, and curriculum for cultivating critical thinking. I treat Inoue's approach as a method for teaching critical thinking by drawing on the reflective

character of the skill he sought to develop—"critical information-selection skills." The overview of his ideas can serve as a guiding principle for designing critical-thinking instruction. However, practitioners and teachers still require concrete, practical guidance for lesson planning to provide actionable classroom insights.

4. Lesson Study for Critical Thinking Education

In this section, I introduce Inoue's principles for conducting lesson study aligned with the traditional Japanese lesson-study system, which has become widespread worldwide.

First, a basic understanding of the Japanese lesson-study system is necessary before presenting Inoue's ideas. Lesson Study, is "the approach has only a loose, common goal, which is improving the classroom activities and students' learning, but the process is not strictly defined" (Kawaguchi & Iwata, 2021, p. 1) in Japan. Concisely, Lewis (2002), a leading English-language scholar of Japanese lesson study, defines it as "the whole idea of instruction as something that can and should be improved through consultation with colleagues, trial in the classroom and critique" (pp. 32-33). She summarized the lesson-study cycle into four phases: (1) setting goals and planning the lesson; (2) conducting and observing a research lesson; (3) holding a post-lesson feedback session; and (4) consolidating learning (Lewis, 2011, p. 2). Thus, the lesson-study process is a comprehensive framework that encompasses preparation for, enactment of, and reflection on classroom lessons with the aim of continuous improvement. It can include activities such as lesson planning, reading and analyzing accounts of exemplary classroom practice, and related tasks.

Inoue, who worked as a practitioner teaching Japanese language in secondary schools for approximately twenty years, is undoubtedly familiar with this traditional Japanese educational practice. On the one hand, he was a pioneer in introducing the idea of critical thinking to Japan; on the other hand, he has served as an expert in Japanese language education and a researcher of its pedagogy. In existing literature, Inoue's theory and pedagogy remain under-researched. At the same time, understandings of logic

education through language and Inoue's Japanese language pedagogy are fragmented and have not been integrated. I therefore argue that these two theoretical strands can be integrated through lesson study to generate valuable insights for critical thinking education.

In 2006, Akitakata City Mukaihara Elementary School launched an experimental project to establish the subject of "Logic." The subject aimed to equip students to: (1) interpret the content expressed in texts and stated objectives; (2) assess the truthfulness of information and the validity of reasoning; and (3) articulate facts and ideas in a coherent, logically structured manner (Inoue et al., 2008, p. 66). Inoue joined the project as a guest speaker for theoretical training, providing practitioners at the elementary school with a foundational understanding of "logical skills" (Inoue et al., 2008, pp. 4-5, 55-57). Educational objectives, content, and evaluation procedures were discussed during this training. Although Inoue was not fully in charge of the program, the educational objectives closely align with the goals of Inoue's Logic Education through Language, suggesting that his ideas likely shaped how teachers and practitioners implemented the project. Therefore, I will use materials from this project as evidence of Inoue's influence. At the same time, it implies that the experimental project at Akitakada City Mukaihara Elementary School is an initiative in critical thinking education.

Begin with step 1 of lesson study (in the broad sense): lesson planning. Materials from Akitakata City Mukaihara Elementary School can indicate how Inoue's ideas influenced lesson planning. Although there is no fixed format for writing a lesson plan, one commonly includes several sections: (1) unit title; (2) understanding of the unit, including "view of students" and "view of teaching materials"; (3) educational objectives for the chapter; (4) assessment criteria; (5) plan for instruction and assessment; and (6) instruction for the current lesson. However, the lesson plan for the subject "Logic" includes some additional sections that are uncommon in other cases.

Akitakata City Mukaihara Elementary School (likely Inoue) added two distinctive columns to its lesson plan: "Key Focus of Instruction" and "Logical Vocabulary to Be

Acquired” (see Inoue et al., 2008, pp. 72–73 for the full lesson plan). First, under “Key Focus of Instruction,” teachers specify both the teaching format and the instructional elements. Teaching formats are divided into two types: Type I and Type II. Type I denotes instruction that emphasizes individual instructional elements, whereas Type II denotes instruction that integrates those elements organically. The instructional elements correspond to Inoue’s concept of “logical words” in *Logic Education through Language*, including terms such as “comparison,” “classification,” “analysis,” “evaluation,” “selection,” “inference,” and “formulation.” Teachers who choose the Type I format indicate which instructional elements they will emphasize.

In addition, the “Logical Vocabulary to Be Acquired” column should be linked to the “Assessment Criteria” section. Examples of logical vocabulary given in the plan include “relation,” “case,” and “order.” This design not only reflects Inoue’s influence on the project but also signals that logical vocabulary should be considered during the preparatory phase of Lesson Study for critical-thinking education. This lesson-plan feature indicates that teachers should clearly identify the logical relationships and terms they intend to emphasize in a given lesson, and that these items should also serve as learning objectives for assessment.

Besides lesson planning, analyzing teaching materials is another critical part of the Lesson Study preparation phase. Under pedagogical discussions in Japanese language education, Inoue argued that one criterion of a “good” lesson should be that “students’ contributions arise frequently and sequentially, and in patterns that are mutually related” and “those contributions are of high quality and show deepening of content” (Inoue, 2005, p.87). Teachers closely read, understand, and analyze teaching materials to prepare high-quality questions for use during class. Questions can be classified into five types, which Inoue labeled T1 through T5. T1 questions are procedural utterances for conducting the class such as calling on students, checking understanding, explaining, providing supplementary information, and summarizing / organising key points; T2 questions are questions that ask about vocabulary and basic factual

knowledge; T3 questions are questions about interpreting the content as presented in the textbook; T4 questions are inference and prediction questions which requires “reading between the lines”; and finally, T5 questions are questions about evaluation, critique, and appreciation with aesthetic judgment (Inoue et al., 1983, p. 31). The taxonomy itself indicates that T1 represents the most surface-level questions and T5 the deepest. However, this does not imply that T1 questions are undesirable and T5 questions inherently preferable. Inoue argues that question types should be used according to lesson progression: more T2 and T3 questions are appropriate at the beginning of the lesson, with increased use of T4 and T5 questions during the middle and climax to foster students’ thinking. Questions should not be posed spontaneously without preparation during the lesson. Inoue therefore recommends including a section titled “Main Questions and Instructions” in each lesson plan (though this element was not included in Akitakada City Mukaihara Elementary School’s lesson plans) (Inoue, 2005, p. 83). A corresponding taxonomy can be constructed for students’ responses: S1 responses refer to procedural answers, while S5 responses involve critique, evaluation, or appreciation.

These sets of labels for questioning and responding are also recommended for use in the next stage of Lesson Study—lesson analysis, that is, during classroom observation. During lesson analysis, teachers are advised to emphasize the questions and answers exchanged between teachers and students; transcripts are preferred for in-depth analysis. Observers should classify question and response types themselves during observations, marking symbols (e.g., “T1”) alongside the transcript (Inoue et al., 1983, p. 34).

My emphasis here is not on the procedure for conducting lesson analysis using Inoue’s symbols and taxonomy. Rather, I focus on the classification criteria of the T1–T5 (and S1–S5) taxonomy, which are grounded in logical cue words. T3 questions (and S3 responses) involve “interpreting”; T4 questions involve “inference” and “prediction”; and T5 questions involve “evaluation,” “critique,” and “appreciation.” A consistent thread runs from these logical words through lesson plans, teaching materials, and lesson analysis within a critical-thinking pedagogy.

5. Implications and Conclusion

From the foregoing discussion, Inoue's concept of "logic education through language" functions as a foundation for critical-thinking education and is applied at multiple stages of lesson preparation. Inoue offers an alternative perspective that prompts us to reconceptualize critical-thinking education. It is not merely a matter of selecting effective teaching strategies. Rather, each phase of the Lesson Study cycle (Plan, Do, See, Reflect) is tightly linked through "logical words." A teacher who intends to teach critical thinking should begin by identifying the logical words to be emphasized in a lesson as instructional elements. Questions and prompts should be deliberately designed in the spirit of those logical words to elicit students' active thinking. During lesson enactment and observation, attention to logical words helps teachers distinguish among types of questions and responses and supports more precise evaluation of the lesson. Thus, attention to logical words across planning, delivery, and observation is central, because those words themselves function as core elements of critical-thinking instruction. Critical thinking education should not be fragmented; rather, it should be integrated across lesson preparation, classroom practice, and post-lesson reflection.

To conclude, this paper introduces Inoue's "Logic Education through Language" as an approach to critical-thinking education. To connect the theoretical concept with actionable classroom insights, I argue that logical words bridge Inoue's theory and pedagogy, viewed through the lens of traditional Japanese Lesson Study. It opens a space for discussion that emphasizes teaching strategies for critical-thinking education while maintaining a continuous focus on lesson preparation and classroom practice.

I acknowledge that this study has limitations in addressing whether, and to what extent, the Japanese Lesson Study model can be adopted by educators worldwide. Nonetheless, I argue that the approach of emphasizing logical cue words in lesson planning, teaching-materials analysis, and classroom question-and-answer sequences is broadly applicable across cultural contexts and can serve as a practical starting point for practitioners seeking to develop

critical-thinking education.

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(Master's Student)

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