

Critical Thinking and Epistemic Cognition: Barriers in the Japanese University EFL Context

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Abstract—Hofer [1] identifies epistemic cognition as “an essential element of critical thinking”, and Moon [2, p. 21] argues that the ability to use critical thinking is predicated on multiplistic, or higher, states of epistemic cognition. Dualistic thinkers, that is, those who see knowledge claims in simplistic terms of being right or wrong views, cannot engage in the nuanced requirements of critical thinking [3]. Research into the nature of epistemic cognition in university-age students worldwide has been extensive (see, for example, the papers in Khine [4]). However, a serious lacuna exists in the Japanese context. Many observers claim that Japanese university students do not engage critically with knowledge [5, 6, 7], suggesting the possibility of dualistic modes of thinking being the norm. If this is the case, this may suggest reasons why critical thinking pedagogy in the Japanese context is problematic. Therefore, to promote critical thinking pedagogy in the Japanese university context, educators require more detailed information regarding the epistemic cognitive states of university undergraduates.

A study was instigated to assess epistemic cognition among third-year Japanese university students. A purposive sample of nine English majors was invited to participate. This study generated three forms of data: writing samples on academic topics, online discussion board posts centred on epistemic issues, and semi-structured interview texts. King’s [8] template analysis within a phenomenological psychological framework [9] was used to analyse the interview and discussion texts qualitatively. The writing samples were analysed using Hofer and Pintrich’s [10] model. Findings indicate that the participants could be characterised at the level of the group and were at the upper naïve end of the epistemic cognition continuum that runs from naïve to sophisticated.

Index Terms—epistemic cognition, Japanese university, critical thinking, phenomenological psychology.

I. INTRODUCTION

Few educators, policymakers and business leaders doubt the need for a citizenry with critical thinking skills [11]. Dwyer, Hogan, and Stewart connect this need to the huge quantity of information currently available and the training of people to handle it. They argue that:

“due to what can be considered an exponential increase in the creation of new information every year, critical thinking skills are needed more than ever in order to aid individuals in becoming more adaptable, flexible and better able to cope with this rapidly evolving information ([12, p. 43])

The need for a citizenry with critical thinking skills is recognised by institutions worldwide [12], including Japan [13].

Critical thinking is a highly contested construct [14, 15, 2], yet most agree that it extends beyond memorisation and comprehension of information. Some sample definitions help clarify the range of cognitive processes within critical thinking. Moon’s [2, p. 25, italics added] synthetic definition of the construct recognises that conceptual clarity has not been achieved, “critical thinking *would seem* to be a gathering of various processes such as understanding, analysis, synthesis, evaluation and so on”. Cottrell [15, p. 2], however, assumes *understanding* and includes higher-order processes such that critical thinking “involves identifying...evaluating...weighing up...reading between the lines ...recognising techniques...reflecting on issues...drawing conclusions...[and] presenting a point of

view”. Paul and Elder [14, p. 4] relate the construct to “the art of analysing and evaluating thinking with a view to improving it”.

One “essential element of critical thinking” [1, p. 21] is epistemic cognition. Greene, Cartiff and Duke state that:

“In the last 50 years, there has been a rapid increase in interest in epistemic cognition, with commensurate increase in theoretical and empirical writing on the subject, largely buoyed by arguments that it is key to the kinds of higher level cognitive outcomes and *critical thinking* necessary for success in the modern world” [16, 16, italics added].

Commentators in the Japanese tertiary educational context often criticise Japanese undergraduates’ critical thinking skills [6, 5, 7]. Mineshima [13, p. 459] laments that “The inadequacy of Japanese learners’ critical thinking skills has long been pointed out”. Wakita [7, p. iv, my translation] argues that this may be a result of “Japanese language arts textbooks typically contain[ing] no critical thinking activities”. The examples given by Mineshima [13, p. 461] in the context of high-school English language arts are suggestive of the level of critical engagement. They are:

- 1) “Write 60 words or so about what you consider to be an ideal couple.
- 2) What are the advantages and disadvantages of studying abroad?
- 3) Why do Japanese players bow before they enter the playing area?”

Mineshima [13, p. 459, italics added] cites the Ministry of Education’s critical thinking learning objectives as “to foster students’ abilities to evaluate *facts* and *opinions* from

multiple perspectives and communicate through reasoning”. Sample items one and two elicit opinion-level responses and item three a fact-level response. Moreover, it is unlikely that facts or opinions can be given and then evaluated in “60 words or so”. Mineshima also notes that these questions are placed at the end of textbook units and that “one possible danger of this end-weight tendency is that the later lessons are more likely to be cut if the teacher cannot finish the textbook, which would result in learners experiencing even fewer critical thinking questions per lesson” [p. 464].

Taking Wakita’s [7] observation that Japanese language arts do not provide critical thinking practice and Mineshima’s [13] examples in the English language arts, a characteristic of secondary-level pedagogy may be noted that does not promote critical thinking which follows the definitions provided above. Commentators at the tertiary level respond to educationally encultured learners from Japanese high schools because they teach mainly first- and second-year students. Studies investigating third-year and later students are rare.

As epistemic cognition is known to be a key aspect of critical thinking [1, 2, 17], and critical thinking abilities seem to be low in the Japanese tertiary context, without knowing about epistemic cognition, we fail to isolate a potentially vital reason for low levels of critical thinking skill. This paper aims to investigate this issue.

II. REVIEW OF RELEVANT LITERATURE

A. Epistemic Cognition

Epistemic cognition comprises a system of integrated values, attitudes, and beliefs that people hold about knowing and knowledge [18]. Integrated systems operate in conjunction with each other, and individuals perceive their worldview as being logical as a manifestation of their personal integrity [19]. Naïve beliefs held in integrated systems are more difficult to overcome through pedagogical information delivery [20] partly because an individual’s self-esteem is damaged when confronted with conflicting views [21] and these personal systems have their genesis and development in conjunction with larger meso and macro systems, such as the educational system [22].

An influential model of epistemic cognition is by Hofer and Pintrich [10]. Hofer [1, p. 19] presents three questions that summarise the construct:

“What is knowledge? How do we know what we know? What influence might this set of beliefs have on how we think, reason, and learn?”

Hofer and Pintrich differentiate two main aspects in this model, the nature of knowledge, further subdivided into *connected knowledge* and *fluid knowledge* and the nature of knowing, further subdivided into *knowledge source* and *knowledge justification*.

The naïve and sophisticated views fall at the ends of a continuum. The many models of epistemic cognition recognise mid-way positions. This paper, following Kuhn

[23], labels this intermediate position *multiplistic*.

TABLE I. HOFER AND PINTRICH’S MODEL OF EPISTEMIC COGNITION

Dimension	Definition
<i>Nature of knowledge</i>	(N) Once knowledge is ‘discovered’, it is known once and for all. (S) Knowledge is fluid, changing, contingent on many factors; it is “tentative and evolving” (p. 107).
Fluid knowledge	
Connected knowledge	(N) Knowledge items can be known independently from others. (S) Knowledge items are related and connected, an “interconnected web of ideas” (p. 107).
<i>Nature of knowing</i>	(N) Knowledge comes from Authority with a capital A. Such knowledge is unquestionable. (S) Knowledge is the result of an integration of the objective (outside) and the subjective (inside) worlds, “originating inside the knower through their own meaning making” (p. 107).
Integrated knowledge	
Justified knowing	(N) As knowledge comes from Authority, that is the only justification it requires. (S) The full model is explicitly situated in demonstrable rules of justification, reasoning, evidence, theory and argumentation. Knowledge can be justified according to “multiple criteria, such as fit with evidence, coherence with other knowledge, or credibility of experts” (p. 107).

N: naïve view; S: sophisticated view

B. Epistemic Cognition and Critical Thinking

Muis, Trevors and Chevrier [24, p. 355] argue that “critical thinking, therefore, requires a certain level of epistemic development” based on the reasoning that “epistemological assumptions that support critical thinking include the notion that not all problems have one right answer, that what is at one point held as true can change, and that what seems contradictory can sometimes come together in a new light”. Aspects of the relationship between critical thinking and epistemic cognition have been established. Greene and Yu [17, p. 46] note that critical thinking requires two principle components: a skill component that comprises much of what was observed in the definitions above, and a dispositional component that influences individuals’ “will... to do so”. Epistemic cognition assesses this disposition.

King and Kitchener's [25] early but influential model of *Reflective Judgment* investigated the nexus of critical thinking

and epistemic cognition. It suggests that as individuals develop their critical thinking abilities, they become more capable of recognising the limitations of their knowledge. Furthermore, King and Kitchener found a clear relationship between individuals' ability to elucidate their self-knowing and their critical thinking skills, a finding echoed in Kuhn's [23] study into modes of argumentation. Bråten and Strømsø [26] found that Norwegian student teachers who held naïve epistemic cognition views were less likely to critically evaluate resources found on the internet. Valanides and Angeli [27] provided evidence that direct instruction in critical thinking positively influenced participants' epistemic cognition. Muis and Duffy [28] also found that an intervention that focused on epistemic issues led to significant improvements in both critical thinking and epistemic cognition scores. These studies indicate the strength of the interrelationship between critical thinking and epistemic cognition.

C. Japanese Tertiary Education Context

Research into the nature of epistemic cognition in university-age students worldwide has been extensive (see, for example, the papers in Khine [4]). Although a serious lacuna exists in the Japanese context, epistemic cognition is not unknown in Japan. This section reviews two key papers that discuss Japanese epistemic cognition and critical thinking. Hirayama and Kusumi [29] studied 426 undergraduates whose average age was 19.1 using Schommer's [30] scale and found that those who have a relationship between self-acquired knowledge and a positive attitude towards critical thinking. However, it is unclear how many respondents in this study believed this.

Tasaki [31] presents an interesting challenge to Western educators. He concludes that:

"the particular kinds of epistemological beliefs valued in American schools may be biased in favour of students with Western cultural backgrounds and against students with non-Western cultural backgrounds, such as East Asian Americans".

Issues of how students interact with professors differ between cultural milieus. To Tasaki [31, p. 3], when Western professors:

"evaluate the cognitive skills and academic performance of students from non-Western cultural backgrounds based solely on their classroom behaviours without knowing their epistemological orientations, creating an underestimation,"

a danger arises. This viewpoint is reasonable, but it misrepresents the proper evaluative nature of higher education as well as a more complete understanding of higher-order cognition. According to Tasaki's argument, East Asian students may nonetheless produce higher-order cognitions even if they do not show it. Unfortunately, Tasaki does not offer any proof in his Ph.D. paper that East Asian

pupils can or do exhibit higher-order cognitions.

D. Research Question

The importance of epistemic cognition to critical thinking has been well-established [26, 27, 28, 2]. So is the need to develop critical thinking in the Japanese university context [5, 13, 7]. Accordingly, it is imperative to know how Japanese undergraduates conceive epistemic issues and how those conceptions impact their critical thinking. A research project was instigated to investigate epistemic cognition with third-year undergraduates. This was my doctoral project, and it comprised three main parts: the first, an assessment of epistemic cognition in the participant group; the second, a fifteen-week pedagogic intervention that focused extensively and directly on issues in epistemic cognition and academic argumentation; and the third, a final assessment. This paper reports on the first part of that project, the initial assessment of epistemic cognition, concerning issues in critical thinking. This assessment, more than the intervention and final assessment, is likely to have more ecological validity for the majority of educators in Japan. Furthermore, any assessment of early-year undergraduates provides information about high school pedagogy more than that at the university. If critical thinking pedagogy is to be improved, assessing late-year undergraduates makes more sense, as it is university learning that can be assumed to have more effect on such learners.

This paper addresses the question *What is the epistemic cognition in the third-year undergraduate participant group?* Findings are likely to inform the broader question of *How can findings inform critical thinking pedagogy in the Japanese context?*

III. III. METHODOLOGY

The studies in the Japanese context mentioned above [29, 31] suggest that there may be important differences in epistemic factors in the Japanese context. When there may be hidden factors, Gray [32] recommends a qualitative approach that allows for theory building, which may be tested quantitatively later. Accordingly, I selected a descriptive phenomenological psychological approach that could permit the lived experiences of participants to be subject to analysis within a given framework [9, 33]. This approach was used in conjunction with a template framework [8] to retain themes existing in the literature which would allow direct comparisons with studies in other contexts.

A. Data Collection Instruments

In accordance with the bottom-up, qualitative approach to investigate participants' lived experiences with epistemic issues, three methods were selected to frame the investigation; a semi-structured interview protocol, a writing assessment and a set of discussion questions that participants would respond to on an online discussion forum.

The semi-structured interview protocol was structured around Hofer and Pintrich's [10] model of epistemic cognition (see Section II-A). A sample question for

connected knowledge is *When you learn new things, what do you do? Can you describe what you do?* This question aims to identify participants’ techniques regarding, for example, memorisation of facts or schema-building methods during the learning process. That younger Japanese learners often employ rote memorisation techniques is well-established [34, 35], and such methods indicate a naïve view of connected knowledge. Conversely, schema-building methods indicate a position that sees the interconnectivity of knowledge items at a more sophisticated end of the continuum. The full interview protocol is available [36].

A writing assessment was set up to study participants’ academic argumentation abilities based on the Toulmin Argument Pattern [37]. This framework has extensive ecological validity in academic argumentation testing [38] and its relationship to epistemic cognition is actively being investigated [20]. Accordingly, an assessment rubric based on the Toulmin Argument Pattern formed the basis to judge participant essays. Additionally, Hofer and Pintrich’s [10] model was also used to structure the assessment. As participants were English majors with a high degree of English proficiency (see Section III-C), and all had taken classes in second language acquisition, the essay question to which it could be reasonably thought that all could respond. It was *How does age influence language learning?*

Thirdly, participants responded to a closed online discussion forum weekly using questions based on class topics. Data from the first three weeks of the discussion board activity were used to inform the analysis of participants’ epistemic cognition at the start.

B. Data Analysis Method

1) *The A Priori Template:* Template analysis is a phenomenological approach that provides a method of collecting potential themes in a field of study before data collection [8]. Mass data can be analysed “in the middle ground between top-down and bottom-up styles of analysis” [39, p. 430], allowing for a more efficient process that retains connectivity with the prior literature. This is achieved through the creation of an *a priori* template which is superimposed on the emerging data. However, this method risks deductive rigidity, and the analyst must remain sensitive to potential themes in the data that may subvert or reject any item in the *a priori* template [8].

The *a priori* template is shown in Table II. The first three categories derive from Hofer and Pintrich’s [10] model: *certain knowledge*, *fixed knowledge* and the *source of knowledge*. Their fourth category, *knowledge justification* is better served by the tripartite division of justification by Bråten and his° colleagues [40] into *justification by authority*, *by multiple sources* and *by personal experiences*. Each of these categories may be evidenced at various levels; sophisticated, medium, or naïve, following a standard division in the literature. Finally, Britt and Aglinskas [41] identify three possible techniques to evaluate a source: *source evaluation*, *corroboration* and *contextualisation*.

These overlap with Bråten’s and his colleagues’° but are included as they present a finer-grained approach.

Bendixen and Rule [42] offer three categories when *epistemic doubt* is encountered, exploring how participants may experience the *volition* to change their beliefs and which *doubt resolution strategies* they employ.

2) *Establishing Themes:* Langdridge’s [33] method of descriptive psychological phenomenology is consistent with Giorgi’s [9] methodology. Accordingly, it is used in exploring the data set to establish themes connected to epistemic cognition and critical thinking. The steps are listed below.

- 1) Transcript reading. During reading and re-reading of the first interview transcript, the data was summarised into descriptions consisting of meaning groups that touched on relevant epistemic issues. Care was taken to maintain horizontalisation, that is, the principle of non-prioritising any section of the data until clear hierarchies can be identified.

TABLE II. INITIAL *a priori* TEMPLATE FOR DATA ANALYSIS

<i>A priori</i> Theme	Definition
Certain knowledge	To which degree is knowledge certain?
Fixed knowledge	To which degree is knowledge fixed?
Source of knowledge	Where is the source of knowledge
Justification by authority	Relying on authority sources without critical analysis of content.
Justification by multiple sources	Comparing how different sources treat the same topic.
Justification by personal experiences	Believing claims because they match the person’s experience.
Source evaluation	Where does the source come from? Who authored the source?
Source corroboration	Finding differences between two or more sources.
Source contextualisation	Understanding how a text has a historical and localised context.
Epistemic doubt	How do people experience doubt concerning a truth claim?
Epistemic volition	How do people want to change their beliefs?
Epistemic doubt resolution strategy	How do people experience doubt concerning a truth claim?

- 2) From meaning groups to theory. The meaning groups were rephrased to create descriptive summaries without changing their propositional meaning, aiming to “reflect broader, perhaps more theoretically significant, concerns” [33, p. 111].
- 3) First theme set. Over nine hundred meaning units were located. Utilising TAMS (Text Analysis Markup System) [43] qualitative data analysis software, the

meaning units were ordered hierarchically into three types: primary meaning units, sub-themes and major themes. This becomes the first thematic template which was used as the working template for the following interviews.

- 4) Iterations. These steps were repeated until the interview and discussion board data had been analysed.
- 5) Final thematic template. This template becomes the data with which the research question may be addressed.

3) *Analysing the Essay Data*: Participants' essay data was analysed using a holistic assessment instrument constructed on Hofer and Pintrich's [10] model. For each category, a *high*, *medium*, or *low* score was awarded according to the following: 1) For *Fluid knowledge*, does this essay demonstrate:

- a) an overt recognition that knowledge is contingent on the lens or assumptions used and the way that the writer has interpreted the source (scores high, 2 points);
 - b) or, is there some indication that the knowledge presented is not fixed but that is done without overt awareness (scores mid, 1 point);
 - c) or, is knowledge presented as being certain and fixed (scores low, 0 points)?
- 2) For *Connected knowledge*, in this essay:
- a) reasons are presented whose inferences link directly to the main claim. Conceptually, these reasons are non-problematic to an expert reader;
 - b) or, do the reasons selected contain problematic assumptions that are not discussed;
 - c) or, are lists of reasons presented haphazardly (to the expert reader) without linking those reasons explicitly (either conceptually or linguistically)?

- 3) For *Source of knowledge*, in this essay:
- a) are sources referenced, multiple documents utilised and personal rationality expressed with awareness;
 - b) or, is knowledge presented that, if it has an outside source, it is not given;
 - c) or, is no source given?
- 4) For *Justification of knowledge*, does this essay demonstrate:
- a) a link to theory and/or explicit reference to justification method (e.g. correspondence, coherence);
 - b) a correspondence approach; e.g. This is how things are;
 - c) no justification?

C. Participants

A purposive sample [44] of participants was recruited from English major undergraduate third-year students from my *Oyo English* class in an English department of a Japanese national university. Given the nature of the dual teacher-researcher responsibility and the potential ethical

issues of conducting research with members of my own class, strict ethics protocols were instigated and enforced. In particular, students were informed repeatedly of their withdrawal rights, and all participants read a detailed Participant Information Sheet and signed a Participant Consent Form.

This class was selected because its purpose was to prepare students to write their graduation thesis in English in the following year on advanced topics in English language study. As such, these participants are towards the upper level of English ability in the Japanese university context and are ideal for investigating epistemic cognition issues in English. Participants' English levels ranged between TOEIC 700 and 950, and most stated that they were comfortable with expressing their ideas in English. In the few occasions where Japanese was used, I negotiated the English phrasing with the participant until we were content.

Nine students elected to become participants in this study, six women and three men. Participants were aged 20 or 21 at the time of the study. All names used in this report are pseudonyms which were selected according to Saunders, Kitzinger and Kitzinger's [45] criteria for anonymity.

IV. FINDINGS

The interviews, discussion board posts and essays returned one hundred and two meaning units that had direct relevance to epistemic cognition. From these, three themes emerged that form the final template: *the gatekeeper as critical proxy*, *the subject/object divide* and *rikai as the target of learning*. In all cases, participants discussed these issues directly or they were evident in their writing samples. Table III shows the final themes and their definitions.

TABLE III. FINAL THEMES

Theme	Definition
The gatekeeper	Various criteria and beliefs relating to what kind of information can be presented by Authority.
Subject/Object divide	Beliefs and stated reasoning for beliefs that define personal knowledge as subjective.
<i>Rikai as the target of learning</i>	The extent to which participants engage with gatekeeper information in terms of <i>rikai</i> (comprehension). This delimits participants' scope for reading.

In this section, the themes are described and participants' excerpts are provided to illustrate the themes. The participants' English has not been altered except to add clarifications. The initial definitions are the researcher's synthesis of the theme which are based on but are not direct statements by the participants.

A. The Gatekeeper as a Proxy for Critical Engagement

This theme refers to the lack of critical engagement with informational sources provided by Authority on the basis that the Authority selects information that is 'true'. A synthetic

definition is:

Published authors' and professors' statements are unquestionably true. Therefore, we, the student, do not need to engage with the truth value of any statement that has passed through these gatekeepers.

The vast majority of the text consisted of declarative statements that presented informational claims without modality and only two participants of the nine used references in their essay assignment. When references were utilised, no critical engagement was evidenced. Sources are primarily selected based on being provided by the class teacher. I asked about her method of collecting relevant information for academic reports. Moe reported that she does not choose relevant sources, "the teacher gives us handouts". When she reads these, she added that:

"other people [on the handouts] are experts, specialists. [Their] saying is so deep and there is a thing I cannot find, so I start to believe it".

Moe's task is to comprehend (or *rikai*, which will be discussed in Section IV-C) the material and through the comprehension process, she believes the information. At no point does she attempt to question the veracity of the information nor to understand it in the wider context of her academic study. She noted that her main method of learning was to accumulate isolated facts because when she had tried to memorise larger factual schemas, they "fall out of my mind".

An excerpt from Ayano illustrates the *gatekeeper* well. She reported that:

"I rarely question what the professor said because I know that I know less than the professor, so I rarely question".

Aoi demonstrated a similar attitude but further distanced herself from the source "because it's not my expertise or anything". She did not trust Wikipedia, and would not use that as a source of information for academic reports. However, *gatekeeper* information needed to be comprehended but there was no need to "really go deep into it".

Misaki presented a belief that articulated the *gatekeeper* role succinctly. The text in square brackets is my follow-up question:

"website or association cannot be allowed to tell lies. They're not allowed to tell lies. [Who makes that rule?] Government. Government makes".

It was unclear from the participant data if all shared this belief. However, Sakura added an elaboration of the supposed mechanics:

"The reason why I think the publisher is important is if they review their text, they will have more responsibility to their information because they will care if they make mistakes or if they tell fake information, they will lose their job, they might lost their job or they must, might lost their reputation".

The timing of publication is also important to Sakura; more recent information is better. On the discussion board,

she and Taiki debated the issue of recency. Taiki summarised his version of the *gatekeeper* by prioritising the reputation of the source over recency:

"To me, looking at author's history and achievement is a way to assess the source is trustworthy or not. If the author is a specialist of his field and has won some prizes, it can be said that his study is reliable because he is admitted a lot".

In no case is the informational content itself debated, only aspects of the *gatekeeper*.

In summary, *gatekeepers* provide a filter between facts and falsehoods. Participants do not critically examine information that has passed through the gate: they accept it at face value. A composite view of *gatekeeping* emerges as a function of social responsibility, enacted by experts through a system of checks and balances between publishers, governments and academics. Participants believe that experts are incapable of publishing fake information in a system that allows specific access to publication. To maintain transparency, the use of proper names is crucial, and anonymity cannot be considered trustworthy or credible. Consequences are in place for violating these regulations ("lost their job"), including job loss for individuals and damage to a publishing house's reputation ("lost their reputation") Note that the precise details of the *gatekeeper* are not uniform within the participant group. The invariant structure [9] is the *gatekeeper* itself.

B. Subject/Object Divide

A synthesised definition of this theme, the *subject/object divide* is:

Information from outside the individual is *objective*. Ideas, opinions and experiences from within the individual are *subjective*.

Sakura summarised this basic position, which was expressed in similar ways by all participants:

"Objective knowledge comes from the scientist and research. Many researches by many people and wrote in words. It's not my experience".

I explored the participants' perceptions of different forms of knowledge, focusing on their beliefs about subjective and objective knowledge and understanding. Ayano and Shota differentiated between objectivity and subjectivity, linking objectivity to universal agreement and subjectivity to personal bias. According to Ayano, "the difference is if my own feelings are included or not". This idea of objectivity being inclusive of others' perspectives is reinforced by Misaki, who stated that it is based on "subjective means only my feeling. Objective means everybody says the same thing". Moe expressed a similar belief, saying that "subjective contains person's experience and emotions". These beliefs were summarised by Aoi:

"Objective is more like, oh, like fact based, evidence based, like, other than just a subjective perspective. I mean, subjective is the people's ideas or personal preference".

Participants displayed a distinct set of assumptions towards subjective and objective information. While

objective knowledge is real, supported by data, and widely acknowledged, subjective knowledge is built on personal factors. This division reinforces the *gatekeeper's* function as a trustworthy source of factual information for use in academic writing.

C. Rikai 理解 as the Target of Learning

The Japanese word, *rikai* generally maps onto its English counterpart *comprehension*. However, in student belief statements, it is used synonymously with *understanding*. I retain the Japanese *rikai* 理解 instead of using *comprehension* because, at this moment, it is unclear how much overlap exists between these two terms. Anderson and his colleagues [46] define *comprehension* as follows:

“This represents the lowest level of understanding. It refers to a type of understanding or apprehension such that the individual knows what is being communicated and can make use of the material or idea being communicated without necessarily relating it to other material or seeing its fullest implications” (p. 274).

Anderson *et al.*'s “can make use of...” and “seeing its fullest implications” are imprecise, yet they point to an ability to connect the content of informational input to its use outside of the context of the input. Where *comprehension* becomes *understanding* is, therefore, also vague. Participant essays necessarily utilised previously comprehended information in a novel context (the assignment), so their action displays an understanding of the information. However, in no case was information critiqued; it was presented as a matter-of-fact. This suggests that the level of *understanding* is low and that *comprehended* information is used almost as-is. Comprehension and understanding, rather than being dichotomous, represent a continuum with repetition and paraphrase at one end and fully integrated and performative utilisation at the other. Participants' *rikai* was a stable entity and, as such, needs to be recognised as perhaps being a unique mode of pedagogic target in the Japanese context.

The synthetic definition of *rikai as the target of learning* is:

Education is the process of *rikai*-ing and demonstrating one's *rikai*. To *rikai* something well, I can either use it directly or paraphrase it for my own academic purposes outside of the original context. To be a successful student, I need only demonstrate my *rikai* of information.

Sakura's statement:

“if I can explain or summarise the content, I think I can understand the book”

demonstrated both the nature of the theme and the overall participant groups' beliefs.

At one point in the interview with Aoi, the exact status of *understand* as possibly either *comprehend* or *connected knowledge* was not obvious. I questioned her in order to learn how she determines whether she has mastered an idea. She said she completed the multiple-choice tests in the textbook, “and when I actually was able to answer those questions, I got

to know that I understood about it”. When probed, the questions were of the recall type.

Asuka used the term *understand*. She said, “The more I read, the more I feel to understand the content”; to which I questioned, “Understanding means?”. She replied, “I can say it in my own words”. Moe presented a purely *rikai-as-comprehension* view when she reported that her reading is successful when “I know [what] the author says”. Shota was in agreement and repeated an oft-used expression by students as a typical learning routine [47], “remember and read, and remember and read” (*maru-anki, maru-anki* 丸暗記、丸暗記).

To summarise, the participants regarded *rikai* as a key aspect of the learning process. Their definition of *rikai* was limited to the capacity to repeat texts. The extent to which they engaged with information from the *gatekeeper* involved memorisation, recall, and summarisation. This set of cognitive processes corresponds with the participants' beliefs regarding the role of the *gatekeeper*, the generation of knowledge, who has the right to disseminate knowledge, and how knowledge should be dealt with.

D. Themes and Assignments

Participants' essays were analysed according to the method described above (Section III-B3). Table IV shows the total scores per category. The maximum score for each category was twenty-seven (nine participants × three points).

TABLE IV. ESSAY SCORES BY EPISTEMIC COGNITION CATEGORY

Max Score: 27 (per category)	Fluid	Connected	Source	Justification
	3	11	7	9

The *fluid* knowledge scores are low. Most participants did not receive any points. An example from Sakura illustrates this. She writes:

“The relationship between age and language learning has been discussed for a long period. It is beneficial to learn language from young age because language learning will [be] success[ful]”

In Sakura's excerpt and in the remainder of her essay, there is no demonstration of any problematic assumptions in her statements. To support her claim (“It is beneficial...”), she provides a reason (“because...”) without mentioning any potential challenges or limitations to the claim. It is presented as a matter-of-fact. Sakura received no points for this sentence. Kenta presented information about brain lateralisation to support his argument that learning a language early is better:

“Another is that human brain would have plasticity between two-year-old and adolescence, so L1 acquisition would be available during it. However, after the brain's laterization, it would be difficult to access the crucial brain parts of L1 acquisition. *If this hypothesis is true*, it would be

natural to say that people strive to acquiring L2 as soon as possible” (italics added).

Kenta shows a degree of equivocality by not presenting the (critical period) hypothesis as a given fact. Instead, he phrases the statement as a conditional, suggesting that he is aware of the limitations and debate surrounding the topic. For this, he received a point. If he had proceeded to explain why the hypothesis may not be true, give the counter-argument, or show any constraint on the scope of the hypothesis, he would have received a second point for *fluid* knowledge. We may note that the use of a conditional expression may also be a cultural or personal preference to avoid direct statements, a well-recognised facet of Japanese communication [48, 49] rather than a genuine attempt to indicate a stance regarding the fluidity of knowledge.

Considering the three themes described above, if they have construct validity, we should see evidence in the participants’ essays. This was the case. The *gatekeeper* is a proxy for critical engagement, and the absence of any rigorous appraisal of the supporting evidence is expected. If the distinction between subjective and objective knowledge is indeed a fundamental aspect of participants’ approach to epistemic cognition, it would be expected that facts would be presented as objectively true without question, while subjective opinions would be clearly identified as such. This would be reflected in the *source* scores. As previously discussed, information from the *gatekeeper* was considered to be the truth by all participants. The participants employed three main methods to indicate their subjective position regarding their claim. Two of them framed their main argument as their personal opinion but did not directly explain why they held this view. Others used “I think” when expressing their stance. The third method involved using a thesis statement at the start of the essay and providing a rationale in the body of the essay, which was done by Aoi, Sakura, and Kenta, who, not incidentally, received the highest scores overall. No participant made any explicit acknowledgement of their subjectivity, either in the claim they presented or in the choice of evidence to support their claim. The lack of exploration of propositional statements is also indicative of a *rikai* approach to learning.

The three themes comprise a logical and coherent set of epistemic cognition beliefs. A synthesis of participants’ epistemic cognition is:

I accept information that has passed through the *gatekeeper* without question as it is unquestionably true. I am aware of my *subjective* opinions about academic topics, and I write without recourse to them. In my academic writing, I use *objective* information that is accepted by everyone. I am a successful student when I can remember and use (that is, *rikai*) the propositional statements that I have read in gatekept sources.

Therefore, in terms of epistemic cognition, the participant group are characterised as being at the upper end of naïvety.

V. DISCUSSION

The research question investigated epistemic cognition in the participant group with a view of exploring how it interacted with critical thinking in the Japanese university context. The main finding is that the participant group demonstrated an upper level of naïve epistemic cognition. That is, they held beliefs about the nature of the source of knowledge that derived from Authority figures (the *gatekeeper*) and maintained the strict division between *objective* knowledge as emanating from Authority, which they maintained separately from their *subjective* views, which were personal. They asserted that their reason for learning was to *rikai* external information and that the demonstration of *rikai* was the target of their university learning. This characterisation of this participant group as naïve suggests that they hold psychological barriers to critical thinking. Moon [2] and Kember [3] argue that at least a multiplist level of epistemic cognition is required. The findings support Moon and Kember’s assertion.

A. Summary of Participants’ Epistemic Cognition

The mechanisms of the *gatekeeper* and *rikai* are consistent with what is learned when studying facts. When the majority of learning consists of memorisation which is tested by fixed-answer questions [7], the outcome is an attitude that does not critique information. Students are taught to assume that learning equals memorisation and that the ability to paraphrase information is the mark of knowledge. This idea is further supported by the fact that the National Licensing exams, which the majority of participants will take the following year, are also primarily memory-based tests with fixed-answer questions, reinforcing the nature of the *gatekeeper*. This partially explains why Bloomian-style higher-order thinking activity [46] is largely absent from the school history of the current participant set.

Participants stated that neither analysis nor assessment was part of their prior education. When trying to analyse argument assertions during the intervention, they encountered major problems. My current belief is that although participants claimed to have no difficulty *understanding* English as a second language, they were unaware that the main goal of their work was primarily *comprehension*. Furthermore, none of the participants was able to grasp the concept of *understanding* clearly.

The emergence of sophisticated epistemic reasoning is centred on the idea of subjective and objective knowing [19]. Piaget [50], who established that children thought categorically differently from adults, served as the foundation for Kegan’s work. Several epistemic cognitive characteristics, including *fluid knowledge* and *knowledge source* in particular, are explained by Kegan’s thesis. Kegan contends that naïve knowers believe knowledge comes from the outside. The awareness of the self in the process, however, emerges as their comprehension of the co-constructive processes of knowledge grows. Subjective knowledge

components that were previously unavailable for introspection are now thought of as distinct from the knowledge item itself. Participants, however, asserted that knowledge, or “facts,” is *objective* while failing to realise the significance of human agency in knowledge generation, whether it be their own or that of the knowledge item’s initiator. They could not overcome the *subjective/objective divide* and see themselves as knowledge producers.

B. Barriers to Critical Thinking

Naïve epistemic beliefs pose a significant challenge to educators. To better understand these difficulties, let’s consider a hypothetical example of a naïve thinker, who shares many characteristics with the participants at the start of this educational intervention. For *fluid knowledge*, the naïve thinker views knowledge as fixed, as prescribed by authority and fails to appreciate the nuances between different authors’ perspectives. In their view, a single, absolute truth exists and the student’s role is to memorise it. When it comes to *connected knowledge*, the naïve thinker disregards the connections between pieces of information and assumes that it is the Authority’s role to create and connect knowledge. In terms of the *source of knowledge*, the naïve thinker believes that objective knowledge comes from external sources and must be memorised, whereas internal thoughts are subjective and do not qualify as knowledge. Finally, in terms of *knowledge justification*, the naïve thinker accepts or rejects statements based on the person making them, accepting claims from Authority while viewing personal claims as mere opinions.

C. Limitations

The nine participants in this present study were third-year undergraduates at a National university in Japan majoring in English. The tasks they performed for this study were conducted in English. Two limitations may be drawn: participants wrote in their second language and the demonstration of their epistemic cognition may have been impacted. I invited participants to use Japanese whenever they felt that they could not express themselves in English. Some elected to do so in the interview, after which, we collaborated on an acceptable English version. Those who only utilised English were asked if using Japanese would lead to different answers. They replied in the negative. The second limitation is the inability of a small-scale qualitative study to generalise. However, I believe that many of the issues discussed above do have ecological validity in the Japanese undergraduate context, especially in lower-echelon institutions. Readers may judge the findings in relation to their own experience.

This study relied on data that was collected for the first part of a three-part investigation into the development of epistemic cognition in the Japanese university context. The analysis presented here responded to the novel issue of critical thinking.

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