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Enhancing critical thinking through active learning

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Abstract: Today the Framework for 21st Century Learning developed by the Partnership for 21st Century Learning (P21) is widely recognized and has been used in the U.S., Canada and New Zealand. P21 defines and illustrates the skills and knowledge students need and states that critical thinking is fundamental for twenty-first century success and essential for success in an academic context. The Organization for Economic Co-operation and Development (OECD) also values the importance of cultivating critical thinking. However, critical thinking is not a part of the EFL curriculum in Japan, and lessons are not focused on the development of meta-cognitive strategies. How do we help students learn foreign languages and twenty-first Century Skills at the same time? Active learning and content and language integrated learning (CLIL) offer such a learning environment where learners enhance their cognitive skills and gain knowledge while they are learning content and language. This paper reports on a study that explores how active learning with CLIL instruction helps Japanese EFL learners to develop critical thinking skills. In the author's student-centered instruction based class, critical thinking was stimulated with questions based on the revised Bloom's taxonomy to develop lower and higher order thinking skills while various scaffolding activities were provided. Pretest-posttest results from the Critical Thinking Disposition Scale (CTDS) and the Cornell Critical Thinking Test (CCTT) Level Z were compared to determine to what extent, if any, EFL learners developed critical thinking disposition and skills through active learning in CLIL classes. The results of the CTDS and CCTT suggest that active learning has value for increasing critical thinking.

Keywords: active learning, critical thinking disposition, critical thinking skill, CLIL, Bloom's taxonomy

1 Introduction

With the rapid progression of globalization and internationalization, university graduates who are proficient in English and can operate globally are urgently

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needed in Japan. In order to cultivate such “global human resources,” the Japanese government has developed and implemented policies and action plans over the past decade. The Ministry of Education, Culture, Sports, Science and Technology (MEXT) promotes educational reforms aiming to help students become successful world citizens and develop critical thinking skills (MEXT 2008). Generally speaking, Japanese education, especially at the secondary level, focuses on memorization of a large number of facts and rules in a traditional teacher-centered classroom. Teachers give lectures that take up most of the class time, and students have very few opportunities to speak or ask questions. For a long time, critical thinking was not a part of the curriculum in Japan, and students had very few opportunities to develop metacognitive strategies. However, fostering critical thinking skills is one of the main pillars of educational reform. Although the term critical thinking is not used, the idea of critical thinking is stated as one of the objectives of English education in high school: “to develop students’ abilities to evaluate facts, opinions, etc. from multiple perspectives and communicate through reasoning and a range of expressions, while fostering a positive attitude toward communication through the English language” (MEXT 2008: 4). However, in reality, high school English textbooks approved by MEXT do not include exercises that stimulate critical thinking (Mineshima and Chino 2013). Students still have very few opportunities to develop critical thinking.

In higher education, MEXT advocates cultivating four competencies that college graduates should have in order to become more competitive in the world (MEXT n.d.). The four competencies are knowledge, skills, attitudes and creative thinking skills. Competency in skills refers to communication skills, information utilization skills, interpersonal skills, and logical thinking ability. In terms of creative thinking, students are expected to be able to use the other three competencies acquired and apply them to new tasks and solve problems. These competencies are also included in the list of twenty-first century skills developed by the Partnership for 21st Century Learning (P21) and the Programme for International Student Assessment (PISA). P21 defines and illustrates the skills and knowledge students need in the Framework for 21st Century Learning, suggesting critical thinking is fundamental for twenty-first century success and essential for success in an academic context (P21 n.d.). The Organization for Economic Co-operation and Development (OECD) has been conducting the worldwide study PISA which measures literacy and covers most of the twenty-first century skills (Dede 2010). The OECD’s recent currently ongoing study focuses on creativity and critical thinking (OECD 2015).

Although MEXT does not state what level of achievement should be expected for each of the listed competencies, it is expected that students will cultivate them in higher education. Along with cultivating these competencies, recent curriculum reform advocates active learning as an alternative to the traditional teacher-centered classroom which remains the dominant form of instruction in Japan (MEXT 2013a). Moreover, because it is said to promote twenty-first century skills such as leadership, collaboration, communication and thinking skills, more and more universities are introducing project-based learning (MEXT 2013b). For the current study, active learning methodologies and Content and Language Integrated Learning (CLIL) were implemented in a general English course at a small public university in southern Japan. The choice was motivated by the multiple benefits of active learning and CLIL to be highlighted below.

2 Theoretical framework

2.1 Active Learning

Active learning is generally defined as any instructional methods that engage students in the learning process, and is also known as student-centered instruction. Active learning “involves students in doing things and thinking about the things they are doing” (Bonwell and Eison 1991: 2). According to Meyers and Jones (1993), it “involves providing opportunities for students to meaningfully talk and listen, write, read, and reflect on the content, ideas, issues, and concerns of an academic subject” (p. 6). Bonwell and Eison (1991) summarize the literature on active learning and conclude that it leads to better student attitudes and improvements in students’ thinking and writing. A study done by Gauci et al. (2009) shows that active learning increased students’ motivation, engagement, and learning outcomes. Examples of student-centered instruction include group discussion, problem solving, case study, role play, journal writing, and collaborative learning. Students may not necessarily learn actively in a CLIL setting if they just receive information from the instructor and memorize it for exams. To enhance students’ learning, active learning methodologies can be integrated easily into the CLIL approach.

2.2 Content and Language Integrated Learning

The term CLIL (Content and Language Integrated Learning) was coined in 1994 and has become a well-known term among teachers and researchers

in Europe. It is defined as “a dual-focused educational approach in which an additional language is used for the learning and teaching of both content and language” (Coyle et al. 2010: 1). Reflecting the current status of English as a *lingua franca*, this “additional language” is most often English (Dalton-Puffer 2011). CLIL is an umbrella term covering many teaching approaches and methods such as Immersion, Bilingual Education, Content-Based Instruction (CBI), and English Medium Instruction (EMI). All of these are considered varieties of CLIL because they are closely related to each other and share some elements of educational practices (Ikeda 2011). Coyle et al. (2010: 86) also argue that “there is no single CLIL pedagogy,” and flexibility remains one of the features of CLIL. Ikeda (2011) organized the varieties of CLIL using four classifications: purpose, frequency, ratio, and language (Figure 1). *Purpose* refers to whether the lesson is for language education, such as CBI (soft CLIL), or for content education, such as EMI (hard CLIL). *Frequency* refers to whether the CLIL lessons are infrequent (light CLIL) or given throughout the semester/year (heavy CLIL). *Ratio* refers to whether tasks based on CLIL are introduced in parts of the lessons (partial CLIL) or throughout the lessons (total CLIL). *Language* refers to whether lessons are conducted in both the target language and the learners’ mother tongue (bilingual CLIL) or only in the target language with immersion (monolingual CLIL).

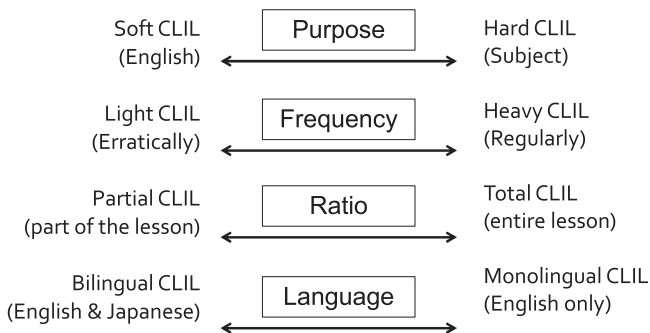


Figure 1: CLIL Variation (adapted from Ikeda 2011).

The most important feature of CLIL is the inclusion of the 4Cs as a core principle: Content, Communication, Culture, and Cognition (Coyle et al. 2010). The third C, *culture*, reflects the multi-ethnic, multicultural, and multilingual situation found in Europe (Coyle et al. 2010), however in countries outside

Europe such as Japan, *community* is often used instead of *culture* to better fit the local context (Ikeda 2011). Mehisto et al. (2008) also use the term “community” as they regard the classroom as a learning community in CLIL settings. They note that students who feel fulfilled as members of the community are more likely to share their interests with other students and will have a clearer understanding of their roles within such an environment. Active learning techniques fit this principle as they involve interaction and sharing. Regarding the cognition principle, “students must be cognitively engaged” (Coyle et al. 2010: 29) for learning to be effective. In order to integrate a range of thinking into CLIL, Coyle et al. (2010) suggest referring to Bloom’s taxonomy as revised by Anderson and Krathwohl (2001). It consists of lower order thinking (remembering, understanding, and applying) and higher order thinking (analyzing, evaluating, and creating), and they are indispensable for effective learning.

2.3 Critical thinking

The importance of critical thinking in education has been extensively researched, and Facione (1998) noted that critical thinking skills correlate with college GPA and reading comprehension. Critical thinking is not an easy concept to define, and it can be understood differently in different contexts and cultures (Long 2003). There are many definitions of critical thinking by different researchers. According to Ennis, critical thinking is “reasonable reflective thinking that is focused on deciding what to believe or do” (1993: 180). Another definition cited often is “the process of purposeful, self-regulatory judgment. This process gives reasoned consideration to evidence, context, conceptualizations, methods, and criteria” (American Philosophical Association 1990: 2). Russell summarized critical thinking as “Attitude + Knowledge + Thinking Skills” (Russell, cited in Halpern 2014: 8). On the other hand, research suggests that being taught to think critically is not enough to become a good critical thinker: individuals who have critical thinking skills might not even try to apply these cognitive skills depending on their circumstances. Thus there is a separate construct called critical thinking disposition, defined as the “consistent internal motivation to engage problems and make decisions by using critical thinking” (Facione 2000: 65). Attitude or disposition is a major factor that determines how critical thinking skills develop and whether such skills are in fact used (Ennis 1993; Hirayama and Kusumi 2004).

The Watson-Glaser Critical Thinking Appraisal (Watson and Glaser 1980), the California Critical Thinking Skills Test (Facione 1990), and The Cornell

Critical Thinking Test (Ennis et al. 2005) are widely used to measure students' critical thinking skills, and the California Critical Thinking Disposition Inventory (Facione and Facione 1992) is widely used to measure students' disposition towards critical thinking. The assessment tool used in the current study is the Cornell Critical Thinking Test (Ennis et al. 2005) and the working definition of critical thinking is that of Ennis (1993: 180), quoted above.

3 Method

This study attempts to investigate how active learning with CLIL instruction contributes to students' critical thinking skills, and the main purpose of this research paper is to report on an exploratory study. There has been an increasing amount of research evidence that the outcomes of many CLIL programs are positive. Dalton-Puffer (2007) cites a 2006 study by Vollmer et al. as showing that CLIL learners possess the same amount of content knowledge as their peers who were taught in their first language. CLIL students work harder on tasks and have higher tolerance of frustration; therefore, they acquire a higher degree of practical skill in the subject (Vollmer et al. 2006, cited in Dalton-Puffer 2007). As for language competence, studies show that students in CLIL can reach significantly higher levels of L2 than students in foreign language classes (Wesche 2002; Klieme 2006 cited in Dalton-Puffer 2008). Moreover, the literature suggests that CLIL helps students enhance their critical thinking skills. However, there do not appear to be many studies that have focused on learners' critical thinking ability in CLIL. This study seeks to examine whether students improve their critical thinking through active learning in CLIL. Accordingly, the following research questions were posed:

- (1) To what extent, if any, do first-year university EFL students participating in a student-centered soft CLIL course develop critical thinking *disposition*?
- (2) To what extent, if any, do first-year university EFL students participating in a student-centered soft CLIL course develop critical thinking *skills*?

3.1 Context of the study

The study was conducted at a small public university in southern Japan. The participants of the study were first-year university students and were enrolled in mandatory, one-year English for general purpose courses (a reading class, a grammar class, and a communication class) at the time of data collection.

Students were enrolled in the classes automatically and had a 90-minute lesson once a week for two semesters (30 weeks) for each class. Although these classes were taught by different teachers, teaching styles were very similar except for the reading class. According to the students, classes other than English that they were taking were all teacher-centered lecture classes. There were two types of reading classes. One type was a teacher-centered *yakudoku* class with general topics such as sport, food, culture, and so on. *Yakudoku* is a method used commonly in EFL classes in Japan. In *yakudoku* class, the students read the textbook, translate the texts into Japanese, and sometimes answer comprehension questions. The teacher's job is to explain the word-by-word translation technique, provide a model translation, and correct the student's translation (Hino 1988). The other type was a student-centered class with content-based reading materials where the students were encouraged to think critically and participate actively in the class activities. In this class, reading materials were not translated into Japanese. Students discussed the topic based on their understanding of the reading materials. Active learning and the content and language integrated learning (CLIL) approach were adopted in this English for general purpose course to help students develop the competencies advocated by MEXT (i.e., knowledge, skills, attitude, creative thinking) as well as other twenty-first century skills, and to motivate students to learn English. Although CLIL is certainly becoming more popular in Japan, Japan has fallen far behind European countries in the implementation of CLIL, and it remains an experimental approach at the grassroots level in the EFL context. Based on Ikeda's (2011) categories, the CLIL course the author developed for economics major students was a soft, heavy, total, and bilingual CLIL course.

3.1.1 Scaffolding in student-centered instruction

For most of the students in the student-centered group in this study, it was their first time to be in an active learning environment. At the beginning of the first semester, some students were uncomfortable shifting from teacher-centered to student-centered instruction. Therefore, as scaffolding, solo-work, pair-work, and group-work activities were designed to help students feel safe and comfortable shifting to an active learning environment. Also, since students mainly studied for exams using the bottom two of the lower order thinking skills in Bloom's taxonomy (remembering and understanding) and they did not have many opportunities to use higher order thinking skills in the primary and secondary level, they needed a lot of scaffolding. For example,

very basic awareness-raising exercises and practices to recognize different points of view were given. The hierarchy of levels in Bloom's taxonomy, with "remembering" at the bottom and "creating" at the top, was referred to when designing tasks and when selecting keywords to encourage critical thinking when crafting questions. Some examples are: "Which statement supports ... ?" for understanding, "How would you use ... ?" for applying, "What statement is relevant?" for analyzing, and so on. Also, students were given enough time to think about their ideas and opinions before they shared in groups, and feedback was provided. In addition, as students' English proficiency was quite low, their mother tongue, Japanese, was used in scaffolding whenever it seemed necessary.

3.1.2 Examples of activities

In order for students to be actively involved, the following activities were planned and practiced.

- Think-Pair-Share: students consider questions posed alone and then discuss with a partner before sharing their ideas and opinions with a bigger group or a whole class.
- Jigsaw reading: students of a "home" group read the material together and become specialists on the topic. Then students meet with members from other groups who read different materials and complete the *jigsaw puzzle* working cooperatively.
- Compare and contrast group discussion: students are encouraged to generate as many ideas on a topic as possible through brainstorming and to then discuss different points of view and become aware of different perspectives.
- Role-play: students play roles based on a scenario provided. Role-play allows students to apply content in a relevant, real-world context.
- Project-based learning: students do research to solve a real-life problem and produce a tangible product.
- Fact and opinion: students practice distinguishing facts and opinions.

3.2 Participants

The original participants of this study were 163 economics major students attending a public university in southern Japan. Those who were absent from class on a test day and did not take either the pretest, posttest 1 or posttest

2 were excluded from the results. Therefore, the results of 134 students were examined. Of those 72 students (26 females and 46 males) were in a student-centered class and 62 students (23 females and 39 males) were in a teacher-centered class. The participants' language proficiency levels in English based on TOEIC Bridge test scores varied, ranging from 80 to 156, which falls into CEFR A1 and A2 (English Test Service n.d.).

3.3 Instrument

The Critical Thinking Disposition Scale (CTDS) developed by Hirayama and Kusumi (2004) and the 5th Edition of Cornell Critical Thinking Test (CCT) Level Z developed by Ennis et al. (2005) were administered to measure students' critical thinking disposition and skill. Because of the availability of the tests in Japanese, the participants' native language, the CTDS and CCTT were chosen as the instruments for the current study. The CTDS was developed in Japanese based on previous studies that used the California Critical Thinking Disposition Inventory (Facione and Facione 1992), the Active Open-minded Thinking Scale (Stanovich and West 1997), and other instruments for Japanese university students. It consists of 33 five-point Likert scale items (1 = never, 5 = always) evaluating four categories of critical thinking disposition: awareness of logical thinking, inquisitiveness, objectiveness, and evidence-based judgment. Awareness of logical thinking includes statements related to planning, summarizing and explaining ideas clearly. Inquisitiveness is the willingness to learn and to ask questions. Objectiveness deals with looking at things from different perspectives and self-monitoring. Finally, evidence-based judgment comprises statements about the importance of evidence for making correct decisions. The CTDS is a widely used and validated instrument in Japan (Fujiki and Okibayashi 2008; Hayashi and Yamada 2012; Mikuni and Ichinohe 2012). The Japanese version of the CCTT was translated into Japanese by Hirayama and her colleagues (Hirayama et al. 2010) who developed CTDS, and they confirmed that the difficulty level of the Japanese version was appropriate. The CCTT consists of 52 items with three alternative responses. It evaluates six skills: induction, deduction, observation, credibility, assumptions, and meaning. These two instruments were administered three times; at the beginning of the 1st semester as a pretest, and at the end of the 1st and 2nd semesters as posttest 1 and posttest 2 respectively. In addition, a brief questionnaire was administered at the end of the year to collect feedback on active learning from the student-centered class students.

The research design is summarised in Table 1.

Table 1: Summary of the methods and participants.

	Student-centered class	Teacher-centered class
Participants	72 economics major students	62 economics major students
Curriculum	Soft, heavy, total, bilingual CLIL	<i>Yakudoku</i> English for general purpose reading
Classroom activity	Jigsaw reading Pair work/group discussion Role-play Project-based learning Presentation	Translating English texts into Japanese Comprehension check
Instruments	Critical Thinking Disposition Scale Cornell Critical Thinking Test Level Z	
Procedure	Pretest at the beginning of the first semester Posttest 1 at the end of the first semester Posttest 2 at the end of the second semester	

4 Results

The pretest was administered at the beginning of the 1st semester and posttest 1 was administered at the end of the 1st semester. Participants were asked to self-assess their critical thinking disposition on a 5-point Likert scale (1 = never, 5 = always) for 33 CTDS items with the maximum score of 5 for each item. For CCTT with a maximum score of 52, one point per item was given when answered correctly. Table 2 below shows the CTDS and CCTT results of the pretest and posttest 1. As can be seen in Table 2, results on the t-test indicate that there was a significant improvement between the pretest and posttest 1 of CTDS scores ($t(71) = 4.56, p < 0.001$) in the student-centered class while no significant improvement was found in the pretest-posttest 1 CTDS scores in the teacher-centered class ($t(61) = 0.15, ns$). Further, Cohen's effect size value ($d = 0.42$) suggested moderate practical significance. Moreover, the differences in the scores of all four subscales of the CTDS in the student-centered class were statistically significant; awareness of logical thinking ($t(71) = 2.74, p < 0.01; d = 0.29$), inquisitiveness ($t(71) = 2.35, p < 0.05; d = 0.25$), objectiveness ($t(71) = 4.07, p < 0.001; d = 0.45$), and evidence-based judgment ($t(71) = 2.23, p < 0.05; d = 0.31$). On the other hand, a significant difference was not found in the pretest-posttest 1 CCTT average scores of either the student-centered class ($t(71) = 0.72, ns; d = 0.09$) or the teacher-centered class ($t(61) = 0.61, ns; d = 0.08$).

Table 2: Summary of CTDS and CCTT scores (Pretest-Posttest 1) of the student-centered class and teacher-centered class.

	Student-centered class (N = 72)				Teacher-centered class (N = 62)			
	Pretest (SD)	Posttest 1 (SD)	Diff.	t	Pretest (SD)	Posttest 1 (SD)	Diff.	t
Critical Thinking Disposition Scale Total	3.34 (0.46)	3.54 (0.49)	0.20	4.56***	3.44 (0.41)	3.43 (0.49)	0.00	0.15
Awareness of logical thinking	2.95 (0.53)	3.11 (0.59)	0.16	2.74**	2.89 (0.51)	3.00 (0.61)	0.11	2.13*
Inquisitiveness	3.68 (0.76)	3.86 (0.68)	0.18	2.35*	3.85 (0.60)	3.79 (0.67)	-0.06	0.91
Objectiveness	3.50 (0.62)	3.79 (0.68)	0.29	4.07***	3.74 (0.59)	3.68 (0.66)	-0.06	1.14
Evidence-based judgment	3.53 (0.77)	3.73 (0.59)	0.20	2.23*	3.72 (0.67)	3.54 (0.74)	-0.18	2.43*
Cornell Critical Thinking Test	23.65 (3.85)	24.00 (3.95)	0.35	0.72	24.40 (4.76)	24.74 (4.00)	0.34	0.61

CTDS MAX = 5; CCTT MAX = 52 * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3: Summary of CTDS and CCTT scores (Posttest 1-Posttest 2) of the student-centered class and teacher-centered class.

	Student-centered class (N = 72)				Teacher-centered class (N = 62)			
	Posttest 1 (SD)	Posttest 2 (SD)	Diff.	t	Posttest 1 (SD)	Posttest 2 (SD)	Diff.	t
Critical Thinking Disposition Scale Total	3.54 (0.49)	3.56 (0.45)	0.03	0.17	3.43 (0.49)	3.56 (0.49)	0.13	4.07***
Awareness of logical thinking	3.11 (0.59)	3.17 (0.54)	0.07	0.14	3.00 (0.61)	3.12 (0.57)	0.12	2.73**
Inquisitiveness	3.86 (0.68)	3.91 (0.64)	0.05	0.96	3.79 (0.67)	3.95 (0.65)	0.16	2.39*
Objectiveness	3.79 (0.68)	3.72 (0.68)	0.29	1.05	3.68 (0.66)	3.78 (0.66)	0.10	1.61
Evidence-based judgment	3.73 (0.59)	3.74 (0.68)	-0.08	0.06	3.54 (0.74)	3.65 (0.84)	0.11	1.48
Cornell Critical Thinking Test	24.00 (3.95)	25.39 (3.77)	1.39	2.64*	24.74 (4.00)	25.26 (3.92)	0.34	1.09

CTDS MAX = 5; CCTT MAX = 52 * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

Posttest 2 was administered at the end of the 2nd semester, and the results of posttest 1 and posttest 2 were examined. At the end of the 1st semester, students in the student-centered class showed improvement on the CTDS ($t(71) = 4.56$, $p < 0.001$; $d = 0.42$). As shown in Table 3, at the end of the 2nd semester, comparing posttest 1 and posttest 2 results, there was no further significant improvement in CTDS scores ($t(71) = 0.17$, ns; $d = 0.04$). In terms of CCTT, there was no significant improvement in the pretest-posttest 1 CCTT, however, the posttest 1-posttest 2 CCTT scores showed a statistically significant improvement ($t(71) = 2.64$, $p < 0.05$; $d = 0.36$). For the teacher-centered class, CTDS scores showed a statistically significant improvement ($t(61) = 4.07$, $p < 0.001$; $d = 0.27$) whereas the CCTT scores did not ($t(61) = 1.09$, ns; $d = 0.13$) comparing posttest 1 and posttest 2 results.

Table 4 summarizes students' improvement in CCTT and CTDS over the one-year course. The student-centered class showed statistically significant improvements on both the CTDS ($t(71) = 4.61$, $p < 0.001$; $d = 0.48$) and the CCTT ($t(71) = 3.63$, $p < 0.001$; $d = 0.46$) scores. Students in the teacher-centered class improved their CTDS ($t(61) = 2.99$, $p < 0.01$; $d = 0.27$) over one-year.

Table 4: Summary of CTDS and CCTT scores (Pretest-Posttest 2) of the student-centered class and teacher-centered class.

	Student-centered class (N = 72)				Teacher-centered class (N = 62)			
	Pretest (SD)	Posttest 2 (SD)	Diff.	t	Pretest (SD)	Posttest 2 (SD)	Diff.	t
Critical Thinking Disposition Scale Total	3.34 (0.46)	3.56 (0.45)	0.22	4.61***	3.44 (0.41)	3.56 (0.49)	0.12	2.99**
Awareness of logical thinking	2.95 (0.53)	3.17 (0.54)	0.23	3.72***	2.89 (0.51)	3.12 (0.57)	0.23	4.30***
Inquisitiveness	3.68 (0.76)	3.91 (0.64)	0.24	2.97**	3.85 (0.60)	3.95 (0.65)	0.10	1.67
Objectiveness	3.50 (0.62)	3.72 (0.68)	0.22	2.86**	3.74 (0.59)	3.78 (0.66)	0.04	0.64
Evidence-based judgment	3.53 (0.77)	3.74 (0.68)	0.20	1.96*	3.72 (0.67)	3.65 (0.84)	-0.07	0.75
Cornell Critical Thinking Test	23.65 (3.85)	25.39 (3.77)	1.39	3.63***	24.40 (4.76)	25.26 (3.92)	0.85	1.59

CTDS MAX = 5; CCTT MAX = 52 * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Figure 2 below shows detailed analysis of the improvement in each skill in the CCTT over a year. The CCTT evaluates six aspects of critical thinking (induction, deduction, observation, credibility, assumptions, and meaning) with 52 items. According to Ennis et al. (2005), some items test multiple aspects of critical thinking. For example, the test items 22 to 25 test both observation and credibility. Based on the assignment of aspects and the test items by Ennis et al. (2005), the six aspects were sorted into six categories by the researcher: 1. deduction, 2. meaning and induction, 3. observation and credibility, 4. induction, 5. induction and deduction, and 6. deduction, assumptions, and meaning. As can be seen in Figure 2, individual deduction and induction scores are relatively high on both the pretest and posttest 2. Students achieved over 50 percent accuracy for these items. Although this may seem to suggest that these two aspects are the students' stronger thinking skills, on the items that test both induction and deduction in combination, students scored lower than for the items which test the aspect individually. Also, students scored quite low on other mixed items such as meaning and induction items and observation and credibility items. At the same time, though, students improved 5.1 percentage points in meaning and induction and 9.9 percentage points in observation and credibility.

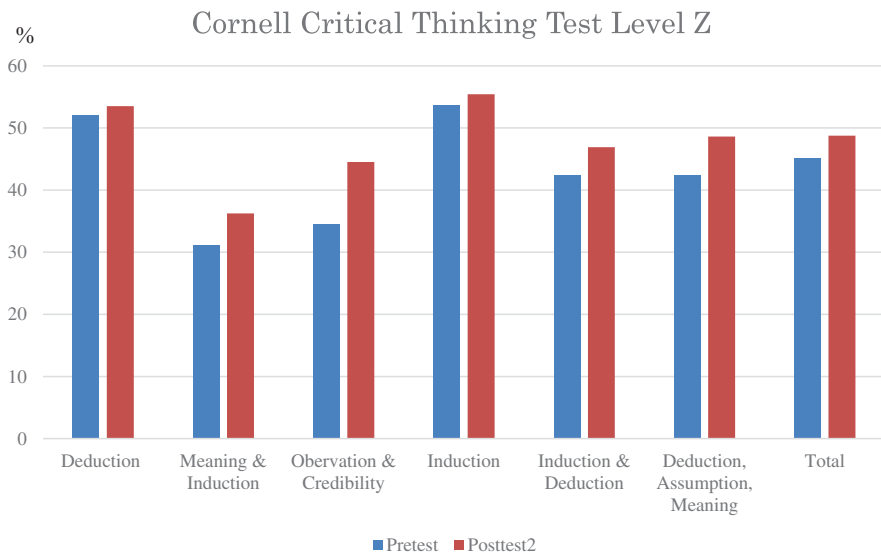


Figure 2: Improvement of six categories of CCTT of students in the student-centered class.

5 Discussion

5.1 Summary

The main goal of this study was to explore how first-year university EFL learners develop critical thinking disposition and skills in an active learning based class. Critical thinking was stimulated with questions based on the revised Bloom's taxonomy (Anderson and Krathwohl 2001) to develop lower and higher order thinking skills, and various scaffolding interventions were provided. In answer to the first research question, as the CTDS results show in Table 2, a statistically significant increase of critical thinking disposition was observed in the CTDS after one semester in the student-centered class. The results suggest the active learning approach substantially helps Japanese EFL learners to improve their critical thinking disposition. Participants further appeared to have improved their critical thinking disposition (crucial in developing critical thinking skills) relatively quickly. In answer to the second research question, the results of the CCTT also showed significant development in learners' critical thinking skills at the end of one-year of student-centered classes. More specifically, participants' critical thinking skills in "meaning and induction" and "observation and credibility" were low at the beginning of the study, but improved notably as shown in Figure 2. The results suggest that it takes a longer time for students to develop critical thinking skills than disposition.

It is also interesting to note that, although it was considered as a non-active learning class, the students in the teacher-centered class also showed a statistically significant increase of disposition in the pretest-posttest 2 CTDS score of "awareness of logical thinking" ($t(61) = 4.30$, $p < 0.001$; $d = 0.43$) as shown in Table 4. Translating English texts into Japanese might have contributed to the improvement of this subscale of the CTDS.

5.2 Implications

The study provides two important pedagogical implications. First, the results of the current study suggest that student-centered instruction seems to help enhance students' critical thinking. It also suggests that sharing opinions in group discussions and other active learning techniques appear to help enhance critical thinking disposition which is crucial in developing critical thinking skills, and there are indications here that this disposition could be improved relatively quickly. However, this might be due to the current Japanese education

system. Students did not have much chance to develop their higher order and critical thinking skills in primary and secondary education; therefore, students had room for growth when they entered university and were exposed to an active learning environment. Some students were so accustomed to the teacher-centered style that they were reluctant and hesitated to participate in activities at the beginning. However, they gradually started participating in the group discussions and other activities more actively, and even reported that group discussions were their favorite activity in the end-of-semester survey. Stronger students helped weaker students, and they deepened their understanding by teaching others. Many students said that this class was the only class where they spoke during the lesson as other classes were teacher-centered, and they enjoyed finding out what other students thought through group discussion. Moreover, students were initially not clear about the difference between fact and opinion. Once they had exercises that helped them distinguish fact from opinion and to recognize different viewpoints, they started thinking more deeply and logically.

Second, as content related to the students' major field of study can motivate them to study English and to participate in discussions actively, a CLIL approach seems reasonable to enhance students' critical thinking disposition. By including cultural aspects and information about other countries in the course, students' interest in learning more about other countries was stimulated, and this might have helped improve their inquisitiveness score for the CTDS which measures their willingness to learn. Many students commented on the end of semester survey that they always tried to learn more than the assigned vocabulary so that they could express their opinions in group discussions.

5.3 Limitations

One of the limitations of the study is the lack of control and information on the teaching and learning style in other classes the students were taking. All students were taking mandatory English language classes in either English or Japanese and subject classes in Japanese. It is difficult to identify whether professors posed questions that also stimulated critical thinking even in the teacher-centered lecture classes. Students in the teacher-centered class also improved CTDS scores from posttest 1 to posttest 2. This implies that the teacher-centered classes that students were taking might have also contributed to enhancing their critical thinking disposition. Thus, it is not possible to say that active learning enhances students' critical thinking disposition better than teacher-centered learning. Another limitation is the categorization of the six

aspects of CCTT. The aspects of critical thinking partially overlap between categories. For example, *induction* appears in three categories and *deduction* also appears in three categories. This made it hard to understand in which of these thinking skills students were stronger and in which they were weaker. Also, this study does not have qualitative data to examine whether participants demonstrated critical thinking during the class activities. It is important to give students the opportunity to reflect on themselves to fully engage in the thinking process (Browne et al. 2009). Thus, a journal or reflection paper might be helpful for both students and teachers to support further development of critical thinking ability and to examine participants' developmental paths.

6 Conclusion

This study attempted to investigate the impact of active learning on the enhancement of learners' critical thinking ability through student-centered CLIL in a Japanese EFL context. Although generalizability of the study is limited, the results suggest that active learning and CLIL increase critical thinking disposition as well as critical thinking skills. The results also suggest that critical thinking disposition can be developed relatively quickly.

Future studies will require many refinements in the research design. First, the types of scaffolding for enhancing critical thinking should be identified and classified to ensure that they are effective, appropriate, and necessary. This identification process should also assist data collection and increase opportunities for comparison. In addition, future research is needed regarding activities that can foster students' critical thinking ability. Further investigation using qualitative research methodologies such as think-aloud and grounded theory to triangulate the improvement in critical thinking disposition and skills is necessary. Findings of such investigations would be potentially beneficial to teachers who aim to help students develop critical thinking.

References

- American Philosophical Association. 1990. *Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction, recommendations prepared for the committee on pre-college philosophy*. Millbrae, CA: The California Academic Press. ERIC Doc. No. ED 315-423.

- Anderson, Lorin W. & David Krathwohl. 2001. *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York, NY: Longman.
- Bonwell, Charles C. & James A. Eison. 1991. Active learning: Creating excitement in the classroom. ASHE-ERIC Higher Education Report. Retrieved from: files.eric.ed.gov/fulltext/ED336049.pdf
- Browne, Laurie, Melissa Hough & Keri Schwab. 2009. Scaffolding: A promising approach to fostering critical thinking. *Scholé* 24. 114–119.
- Coyle, Do, Philip Hood & David Marsh. 2010. *CLIL: Content and Language Integrated Learning*. Cambridge, England: Cambridge University Press.
- Dalton-Puffer, Christiane. 2007. *Discourse in Content And Language Integrated Learning (CLIL) classrooms*. Amsterdam, The Netherlands: John Benjamins.
- Dalton-Puffer, Christiane. 2008. Outcomes and processes in Content and Language Integrated Learning (CLIL): Current research from Europe. In Werner Delanoy & Laurenz Wolkman (eds.), *Future perspectives for English language teaching*. Heidelberg: Carl Winter.
- Dalton-Puffer, Christiane. 2011. Content-and-Language Integrated Learning: From practice to principles? *Annual Review of Applied Linguistics* 31. 182–204.
- Dede, Chris. 2010. Comparing Frameworks for 21st Century Skills. In James Bellanca James & Ron Brandt (eds.), *21st century skills*, 51–76. Bloomington, IN: Solution Tree Press.
- English Testing Service. n.d.. *Mapping the TOEIC® and TOEIC Bridge™ Tests on the Common European Framework Reference (CEFR)*. https://www.ets.org/toeic/research/mapping_toeic (accessed 26 December 2016).
- Ennis, Robert H. 1993. Critical thinking assessment. *Theory into Practice* 32(3). 179–186.
- Ennis, Robert H., Jason Millman & Thomas N. Tomko. 2005. *Cornell critical thinking tests level X and Z Manual*, 5th edn. Seaside, CA: The Critical Thinking Company.
- Facione, Peter. 1990. *The California critical thinking skills test: College level*. Millbrae, CA: California Academic Press.
- Facione, Peter. 1998. *Critical thinking: What it is and why it counts*. <http://www.insightassessment.com>. (accessed 8 January 2016).
- Facione, Peter. 2000. The disposition toward critical thinking: Its character, measurement, and relationship to critical thinking skills. *Informal Logic* 20(1). 61–84.
- Facione, Peter & Noreen Facione. 1992. *The California critical thinking dispositions inventory (CCTDI): and the CCTDI test manual*. Millbrae, CA: California Academic Press.
- Fujiki, Daisuke & Yohei Okibayashi. 2008. The change of critical thinking dispositions through 4 months university education. *Japan Society for Educational Technology* 32. 37–40.
- Gauci, Sally, Arianne Dantas, David Williams & Robert Kemm. 2009. Promoting student-centered active learning in lectures with a personal response system. *Advances in Physiology Education* 33(1). 60–71.
- Halpern, Diane. 2014. *Thought and knowledge: An introduction to critical thinking*, 5th edn. New York, NY: Psychology Press.
- Hayashi, Hajimu & Tsuyoshi Yamada. 2012. Improving critical thinking disposition by teaching research literacy: Focusing on academic writing and data analysis abilities. *Kyoto University Higher Education Journal* 18. 41–51.
- Hino, Nobuyuki. 1988. Yakudoku: Japan's Dominant Tradition in Foreign Language Learning. *JALT Journal* 10. 45–55.
- Hirayama, Rumi & Takashi Kusumi. 2004. Effect of critical thinking disposition on interpretation of controversial issues: Evaluating evidence and drawing conclusions. *The Japanese Association of Educational Psychology Journal* 52. 186–198.

- Hirayama, Rumi, Yuko Tanaka, Miho Kawasaki & Takashi Kusumi. 2010. Development and evaluation of a critical thinking ability scale from Cornell Critical Thinking Test Level Z. *The Japan Society for Educational Technology* 33(4). 441–448.
- Ikeda, Makoto. 2011. The basic principles of CLIL. In Yoshinori Watanabe, Makoto Ikeda & Shinichi Izumi (eds.), *CLIL (Content and Language Integrated Learning): New challenges in foreign language education at Sophia University, Volume 1: Principles and Methodologies*, 1–12. Tokyo: Sophia University Press.
- Long, Christopher. 2003. Critical thinking and English education. *Pan-Pacific Association of Applied Linguistics* 7. 215–224.
- Mehisto, Peter, David Marsh & Maria J. Frigols. 2008. *Uncovering CLIL: Content and language integrated learning in bilingual and multilingual education*. London: Macmillan Education.
- Meyers, Chet & Thomas B. Jones. 1993. *Promoting active learning: Strategies for the college classroom*. San Francisco: Jossey-Bass.
- Mikuni, Yuko & Tomoko Ichinohe. 2012. A study on the critical thinking disposition of nursing students: Characteristics in nursing students and nursing education institutions. *Journal of Japan Society of Nursing Research* 35. 79–88.
- Mineshima, Michio & Junichiro Chino. 2013. Comparative analysis of questions and tasks in English textbooks in Japan, Korea, and Finland: How textbooks teach critical thinking. *Journal of the Chubu English Language Education Society* 42. 91–98.
- Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT). 2008. *The Course of Study: Foreign languages*. http://www.mext.go.jp/a_menu/shotou/new-cs/youryou/eiyaku/1298353.htm (accessed 8 January 2015).
- Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT). 2013a. *The Second Basic Plan for the Promotion of Education*. <http://www.mext.go.jp/english/lawandplan/1355330.htm> (accessed 8 January 2015).
- Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT). 2013b. *Daigaku niokeru kyouikunaiyo no kaikakujokyo ni tsuite* [A report on educational reform on university level]. http://www.mext.go.jp/b_menu/shingi/chukyo/chukyo3/047/siryo/_icsFiles/afieldfile/2012/02/14/1316067_01.pdf. (accessed 8 January 2015).
- Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT). n.d. *Gakushikatei kyoiiku no kouchiku ni mukete* [Restructuring curriculum of bachelors degree education] http://www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu4/siryo/attach/1247211.htm (accessed 8 January 2015).
- Organization for Economic Co-operation and Development (OECD). 2015. *Intervention and research protocol for OECD project on assessing progression in creative and creative and critical thinking skills in education*. <http://www.oecd.org/edu/cei/EDU-CERI-CD-2015-12-REV1.pdf> (accessed 13 March 2017).
- P21 Partnership for 21st century learning. n.d. *Framework for 21st century learning*. <http://www.p21.org/index.php> (accessed 26 December 2016).
- Stanovich, Keith E. & Richard F. West. 1997. Reasoning independently of prior belief and individual differences in actively open-minded thinking: the argument evaluation task. *Journal of Educational Psychology* 89. 342–357.
- Watson, Goodwin & Edward M. Glaser. 1980. *Watson-Glaser Critical Thinking Appraisal*. San Antonio, TX: Harcourt Assessment Inc.

Bionote

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