

Incorporating Critical Thinking in Language Education: Correlation Analysis

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Abstract— The present study attempts to test the hypothesis of compromised learner autonomy hinders students' ability to demonstrate critical thinking in oral communication activities in Japanese University EFL classes. Two surveys were administered to advanced-level L2 learners (N=173). The results showed a correlation between teacher dependence and the inability to demonstrate critical thinking skills in the majority of the students (N=173). Furthermore, twenty students, who represented the remaining minority, perceived themselves as independent/autonomous learners in the initial survey and identified as the ad hoc group. In the second survey, the ad hoc group checked all the affirmative statements of critical thinking skills. Despite being a small sample, the positive correlation between self-directed learning and critical thinking warrants further investigation into the link between learner self-directed learning and critical thinking in English language education.

Keywords— self-directed learning, critical thinking, demonstrate, teacher dependence, L2

CRITICAL THINKING IN LANGUAGE EDUCATION

The role of education in fostering critical thinking in students has been widely stressed. Traditionally, the role of universities has been to enhance learners' independent learning skills while also fostering critical thinking (Carter et al., 2017). Ideally, students develop the ability to assess the trustworthiness of evidence and separate facts from presumptions or opinions (Kim, 2004).

Even though CT is critical, teachers may need to provide pedagogical strategies to promote CT skills. Many studies mentioned the use of strategies in developing one's CT skills in a classroom context. Paul and Elder (2019) investigated the use of problem-based learning. Their findings showed that using pedagogical strategies taught in the class helped students enhance their CT skills. Consistent with their study, Yan (2021) presented science students' performance through using problem-based learning and Socratic questions. The result reported that these strategies were effective in developing students' CT skills.

Critical thinking has also been promoted in Asia Pacific education systems, yet its use in teaching and learning has so far been limited.

The potential reasons include not understanding how to be critical thinkers and how to demonstrate critical thinking skills (Egitim, 2022; Kato & Matsuoka, 2021; Rezaei et al., 2011). Therefore, to develop critical thinking in students, teachers have to prepare themselves as critical thinkers.

In a recent study, Yan (2021) investigated the association between English as a foreign language (EFL) teachers' critical thinking ability and students' classroom engagement. The study found that critical thinking has a positive impact on students' success in the Asia Pacific region and that EFL teachers should focus on enhancing critical thinking, encouraging creativity, and promoting independent learning. Another article by Brinton (2017) outlines the role of critical thinking in postsecondary education and describes the benefits of critical thinking to foreign language learners. The article suggests future research directions for integrating critical thinking into the foreign language curriculum in Japan.

Students' perceptions of critical thinking practice were compared across four types of courses offered at an English-immersion liberal arts university in Japan (Murguia et al., 2011). Upper-class students identified third and fourth-year content courses taught in English by a single instructor as the type of course in which critical thinking practice was significantly more prevalent compared to both English and Japanese language courses taught by a single instructor, as well as to 1st/2nd-year team-taught content courses taught in English. First-year students identified single-instructor English language courses as the type of course for which they perceived critical thinking practice to be most prevalent.

The relationship between critical thinking disposition and academic achievement among Japanese university students has also been a hot topic. A recent study by

Kato and Matsuoka (2021) found that critical thinking disposition was positively correlated with academic achievement and that critical thinking education should be incorporated into the curriculum to improve students' critical thinking skills.

The relationship between critical thinking and learner autonomy has recently been emphasized in studies. In a study by Egitim (2017), the link between learner autonomy and critical thinking was explored, and a practical approach was proposed to promote both skills in English classes at Japanese universities. The study concluded that autonomous learning skills play an essential role in developing critical thinking skills among university students, and more emphasis needs to be placed on the role of the teacher as a facilitator to enhance the quality of English education at Japanese universities (Egitim, 2017; 2022).

Another study by Gandhimathi and Anitha Devi (2016) explored the works of various researchers on learner autonomy and its relevance to the practice of language education. The article critically analyzed the relationship between learner autonomy and motivation in second language learning. Kusuma and Sari (2021) also investigated the effect of learner autonomy on critical thinking skills among Indonesian EFL learners. The study found that learner autonomy had a significant positive effect on critical thinking skills and that teachers should encourage students to develop their autonomy to improve their critical thinking skills.

Critical thinking is a fundamental skill for both language and literacy success. As children engage in critical thinking, their language skills expand because they're encouraged to develop and use more complex language with words like "because", phrases with "if" and "then" and different verb tenses. Conversely, as children's language development progresses, their ability to think critically grows as well.

Furthermore, critical thinking allows a learner to "process" a language, and perceive it in his/her own way. Therefore, language learning becomes easier, more efficient, and applicable. As critical thinking affects language learning, language learning affects critical thinking too. In summary, critical thinking is an essential skill for language learners as it helps them to develop their language skills, understand the meaning of texts, and process language more efficiently.

METHOD

The present study investigates the link between Japanese university EFL students' autonomous language learning experience and their ability to demonstrate CT skills. A quantitative research design was employed to test the following hypothesis: Prior language learning experiences influence students' ability to demonstrate critical thinking in oral communication activities in English.

Participants

173 first-year Japanese university EFL students aged between 18 and 19 participated in this study. To participate in this study, the following conditions were set:

1. The students studied English in the Japanese public school system.
2. The students perceived their communicative language competence as adequate to participate in oral communication activities in English.

The estimated sample size was determined via Structural Equation Modeling (Westland, 2010). The anticipated effect size was set to a default of 0.03, as suggested by Fisher (1992) and power was set to 0.8, as suggested by Cohen (2013). The computed minimum and maximum sample sizes indicated that the values in between may be deemed as an appropriate sample size for this study.

Instrument

Two surveys were performed in sequence. The first survey aimed to determine TD and LA through students' LLE during their high school English language education. The instrument was informed by Grow's (1991) fourth stage of the SSDL model, and it was named the LLE scale. The SSDL model considers language learning habits and the medium of instruction as the primary tools to assess their self-directed learning stages. These language learning habits include self-directed knowledge attainment, decision-making, goal setting, progress monitoring, and self-assessment.

In the next phase, a second survey was administered following an academic discussion task in the classroom. The activity was designed based on the CTM to allow the students to demonstrate the elements of CT in their discussions. The CTM suggests that students' CT skills are assessed based on their ability to engage in critical analysis, self-reflection, self-assessment, problem-solving, and reasoning (Paul & Elder, 2019, p.21).

The discussion activity was designed to have students think of three key concepts they learned since they started their college education and explain why these concepts mattered for their self-growth, and future career pursuits. Thus, the students were expected to elaborate on the reasons for choosing their major, and its connection to the three concepts they had chosen and reflect on their self-growth through the concepts by making convincing arguments and drawing on personal experiences and stories. Finally, students were asked to discuss how learning these three concepts would help them beyond university education.

The LLE scale was designed to predict the students' TD based on the observed variables of instruction, knowledge attainment, progress monitoring, learning goals, and learning decisions. To analyze the data from the LLE scale, descriptive statistics were performed. Each factor was assigned a value to predict the students' perception of variables based on the following three categories: Teacher-Dependent (TD) = 1, Somewhat Teacher-Dependent (STD) = 2, and Independent/Autonomous (I/A) = 3 (See Table 4). After completing the initial analysis, a fraction of the students (n=20) consistently appeared to select I/A for each variable (see Table 4). This was also verified through their pseudonyms. As a result, these students were identified as the ad hoc group for the CTSA survey.

During the second phase, the same group (N=173) was given the Critical Thinking Skills Assessment (CTSA) survey to understand whether they were able to demonstrate the elements of CT in their discussions according to the CTA model (Paul & Elder, 2019). The ad hoc group (n=20) was also examined to verify whether there was a correlation between the students' autonomous language learning experiences and their ability to demonstrate CT skills through an academic discussion task (See Table 1).

The study employed a 4-point Likert scale omitting the neutral option to ensure the students were forced to avoid the safe option. Each item on the Likert scale was given a value from one to four (See Table 5). The higher values of three and four represented disagreed and strongly disagreed, and the lowest values of one and two represented strongly agreed and agreed. Descriptive statistics were also employed during the second phase to determine the central tendency and the measure of dispersion through organized and systematic results. The scores were used

to interpret how each statement reflected students' perceptions of their own ability to demonstrate CT skills.

Cronbach's Alpha (CA) values were measured to ensure the instrument's internal consistency. According to CA, reliability scores are measured between 0 and 1. Since CA values greater than 0.7 are considered to be acceptable, the average value of 0.802 was obtained from the first survey while the second survey produced 0.751. Hence, the internal consistency of all items was ensured before the data collection phase (see Table 4). The final step involved piloting the instruments with a small group of first-year high intermediate-level students from a different university (n=24). The convenience sampling technique was used based on the respondents' availability and convenience (Sedgwick, 2013).

Before the students were engaged in the discussions, they were allowed ten minutes to take notes. Note-taking is deemed useful to organize thoughts before engaging in a discussion (Siegel, 2016). After the academic discussion task, the CTSA survey was administered to determine whether the students were able to apply the five elements of CT (critical analysis, self-reflection, self-assessment, problem-solving, and reasoning) to their discussions through their own perspectives.

The CTSA survey involved five affirmative statements, which were tested against a 4-point Likert scale, with 1/4strongly disagree, 2/4disagree, 4/4agree, and 5/4strongly agree. The 4-point Likert scale is a forced Likert scale with the aim of receiving specific responses (Creswell & Creswell, 2017). The affirmative statements in the survey were also informed by the CTM (Paul & Elder, 2019). The survey also provided students with another opportunity to engage in self-assessment and determine whether they were able to demonstrate the five elements of CT in their discussions.

Protocol

The study employed Google Forms as an online survey tool. The data was collected in the classroom by the researcher. The online survey tool allowed the collection of numerical data with less time and more efficiency. Before delivering the surveys, students' permission was obtained to participate in the study with a written consent form. Both surveys were written in Japanese and English to ensure the survey questions and the affirmative statements were understood by the students.

The two surveys were given two weeks apart from each other to ensure that they were treated independently and that the students' perceptions were not influenced. During the surveys, the students were allowed to ask for clarifications. The study employed a strict anonymity policy as part of the human subject protection protocol.

Therefore, all students were assured that no personal information would be used in this study and beyond. Ethical review was waived by the institution after the following conditions were met:

1. Informed consent was obtained from all students at the time of original data collection.
2. The researcher completed the universities' ethics code training.
3. The data involves no personal information.

However, the students were requested to use pseudonyms to compare the results of the two surveys

and determine whether individual responses showed correlations.

Analysis and Results

A two-step validation process was employed. After the instruments were designed, they were sent to two experts, who knew the SSDL and CTM models for their validation. Revisions were made according to their feedback. Potential issues with the items on both scales were identified before performing the surveys. Based on the experts' comments, certain items from both LLE and CTSA were either deemed repetitive or outside the scope of the study and thus, removed from the instruments. The study employed a single-factor model for the LLE scale to measure the extent to which the single domain, TD influenced the five observed variables of Instruction, Knowledge Attainment, Progress Monitoring, Goals, and Learning Decisions (See Figure 1). The factor loadings for the observed variables were tested greater than 0.7 indicating a positive linear relationship between the items.

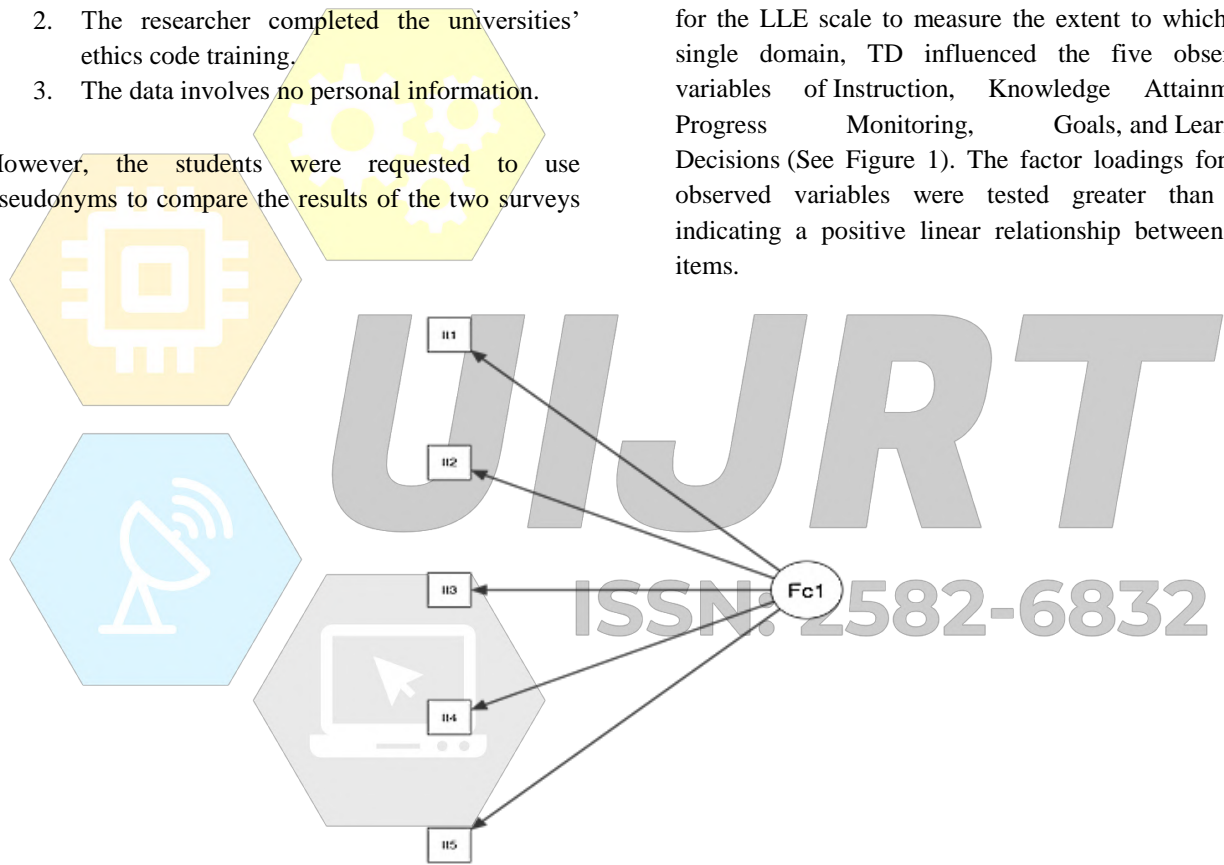


Figure 1: Path Diagram

Table 1: Factor Loadings

Factor	Indicator	Estimate	SE	95% Confidence Interval		Z	p
				Lower	Upper		
Factor 1	Item 1	1.062	0.0977	0.870	1.253	10.87	< .001
	Item 2	0.719	0.0930	0.537	0.901	7.73	< .001
	Item 3	1.124	0.1053	0.917	1.330	10.67	< .001
	Item 4	0.722	0.0909	0.543	0.900	7.93	< .001
	Item 5	0.591	0.0648	0.464	0.718	9.13	< .001

Note. p < 0.01

Table 2: Model Fit

Test for Exact Fit			
χ^2	df	p	
66.4	5	< .001	

For the CTSA scale, confirmatory factor analysis (CFA) was used to determine the structural relationship between the observed variables and latent variables for the validation of the scale.

The five elements from the CTM were represented as two latent constructs Reasoning and Analytical Thinking according to their conceptual relevance to the observed variables (See Figure 2). The hierarchical linear regression model was adopted to illustrate the correlations between the latent variables and the

observed variables through their factor loadings (See Figure 2). The interdependence of the two latent variables and their relation to the observed variables was predicted through their factor loading scores.

The intervariable correlation results showed that all items were correlated with each other ($r \geq 0.7$). Furthermore, the latent variable scores showed a moderate positive correlation ($r \geq 0.4$) as all scores were above the minimum acceptable value of 0.3.

Table 3: Residual Covariances – Modification Indices

	Item 1	Item 2	Item 3	Item 4	Item 5
Item 1		31.5	0.431	13.7	4.942
Item 2			13.178	18.9	0.399
Item 3				12.6	0.409
Item 4					13.424
Item 5					

Note. $p < 0.01$

Table 3 shows the residual covariances between the five-item pairs. As the scores indicate, the degree to which the observed variables are significantly correlated with each other.

Descriptive Statistics

The results of the LLE scale indicated high TD on Instruction, Knowledge Attainment, Progress Monitoring, Learning goals, and Learning Decisions. The SD scores for all the variables recorded a low dispersion rate.

The mean scores (1.32-1.63) also pointed towards a central tendency towards TD and STD for all items (see Table 4). Instruction appears to be closest to the minimum value of one ($M=1.32$) suggesting that the

majority of the students perceived the medium of instruction as Teacher Dependent.

The results for Knowledge Attainment and Progress Monitoring also suggested TD ($M=1.38$, $M=1.39$). The mean and SD scores for Learning Decisions and Learning Goals pointed towards less TD yet remained below the value of two.

These results suggested an association between LLE and TD in Japanese public high school English language education settings. However, the average mean scores ($M=3$) for the ad hoc group ($n=20$) indicated that Independent/Autonomous was selected for all the observed variables.

Table 4: Descriptives

	N	Missing	Mean	SD	Minimum	Maximum	Skewness		Kurtosis	
							Skewness	SE	Kurtosis	SE
Item 1	73	0	2.27	1.121	1	4	0.345	0.281	-1.24	0.555
Item 2	73	0	1.56	0.928	1	4	1.532	0.281	1.19	0.555
Item 3	73	0	2.68	1.200	1	4	-0.104	0.281	-1.58	0.555
Item 4	73	0	3.34	0.916	1	4	-1.412	0.281	1.19	0.555
Item 5	73	0	3.22	0.692	1	4	-0.838	0.281	1.41	0.555

The SD score range from the CTSA survey also recorded a low dispersion rate for each point on the Likert scale indicating a central tendency. The mean scores ranged between 1.56 and 3.34 and remained closer to the upper value of 4. This indicated a tendency towards disagree or strongly disagree with the affirmative statements. However, the ad hoc group (n=20) identified through their pseudonyms, appeared to have either agreed or strongly agreed with the affirmative statements in the survey.

Despite being a small sample, the students who perceived themselves as Independent/Autonomous in the initial survey results also perceived themselves as being able to demonstrate the essential elements of CT in the discussion tasks, hence, indicating a positive correlation between LA and the ability to demonstrate CT in the L2.

DISCUSSION

A direct association was found between pre-tertiary LLE and TD which is a predictor for passive language learning habits which appears to be a factor for compromised autonomous language learning skills in Japanese university students. When LA is compromised, learners are deprived of opportunities to “observe, predict, explain, and make decisions” about their learning (Wang & Lu, 2021, p. 2). In a teacher-controlled classroom environment, learners don't get to engage in interactions with others. As a result, they develop passive learning habits and remain deprived of opportunities to engage in self-examination and self-reflection, which are considered the two key components of CT (Paul & Elder, 2019).

The findings also indicated that passive language learning habits due to TD posed a hindrance to students' ability to demonstrate CT skills in the academic discussion activity, which associates the absence of LA with the inability to demonstrate CT. Unfortunately, it was not possible to measure to what extent each student's autonomous language learning experience was compromised during their pre-tertiary English education. However, these results provided clues about the role of LLE in the expression of CT through the academic discussion task.

The results of the CTSA survey offer a new direction for our understanding of the relationship between LA and CT. The positive association between the ad hoc group's autonomous LLE and their ability to demonstrate CT

skills during the academic discussion activity in the L2 showed that autonomous learning skills can help students think beyond the deep-rooted sociocultural values when they are to apply CT to oral communication activities. Hence, promoting LA from an early age in pre-tertiary English education should be the primary focus of school administrators and policymakers when they design their English language curricula. Furthermore, pre-tertiary English teachers should act as facilitators and encourage students to take ownership of their learning in a psychologically safe learning environment to help them gain autonomous language learning skills from the elementary level (Benson & Voller, 2014; Dörnyei, 2014; Little, 2022). Then, favorable circumstances would be established for teachers and students to cultivate LA to express CT in the L2 (Egitim, 2022a; 2022b; 2022c).

Especially, when learner engagement and motivation are enhanced through learner-centered instruction in the L2, meaningful interactions between learners can also take place (Dörnyei, 2014; Little, 2017). As a result of these interactions, learners can have the opportunity to look inward and engage in self-examination and self-reflection which can help them recognize the limitations of their past learning habits. This metacognitive process can raise learners' awareness of what they are learning and why they are learning it. They can abandon the old learning habits and develop new ones. Learners' active presence in their own learning is what stimulates a “disciplined, self-directed and purposeful” thinking process (Carter et al., 2017, p. 1).

As the previous studies indicated, the students' self-perceived inability to demonstrate CT in oral communication tasks could also be attributed to the structural limitations in the L1, combined with their inadequate language proficiency in the L2 (Manalo & Sheppard, 2016). It is warranted that a future study looking at the two variables in relation to LA and CT could contribute new insights into our understanding of the association. Furthermore, interviews with students and language teachers could reveal deeper insights and bring more effective pedagogical methods to promote LA in the application of CT in EFL classrooms. Finally, these results should raise educators' awareness of students' ability to demonstrate CT in the L2 so that they can avoid developing unconscious biases toward students. The study relied on the level placement test results during the selection process. University English-level placement process tends to be based on English

proficiency tests or multiple-choice-based exams, which are not primarily designed to assess students' oral or verbal proficiency. Therefore, some students may have been placed at higher levels than their actual levels. Furthermore, some students may have downplayed their L2 competence due to cultural reasons such as humility which is highly emphasized in Japanese culture. Finally, it was not possible to have a larger ad hoc group in the initial phase due to the experimental design of the study. Thus, the data that emerged after the LLE scale analysis remains the only indicator of the positive association between LA and CT skills, and hence, warrants further research.

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