AsiaCALL Online Journal
ISSN 1936-9859; https://asiacall.info/acoj
Vol. 12, No.5, 2021
pp. 77-99

Received: 20/09/2021
Revision: 19/10/2021
Accepted: 20/10/2021
Online*:* 21/10/2021

Successive Action Research to Develop the Higher Order Thinking of EFL Learners Through Discussion Forums

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EOI: http://eoi.citefactor.org/10.11251/acoj.12.05.006

Abstract

Classrooms of English as a foreign language (EFL) in Japan tend to lack learning activities to develop higher order thinking due to the test-oriented practices. The purpose of this successive action research is to explore discussion forums embedded in extracurricular blended learning programs created to develop the higher order thinking of EFL learners at a public high school in Japan, drawing on the construct of mediation from sociocultural theory. In the first program, fifteen participants engaged in online synchronous and asynchronous activities with English as a medium of instruction and communication while being supported by face-to-face sessions conducted in Japanese. Data were collected through three methods: discussion forums to obtain written texts from participants, surveys, and the researchers' observations. Participants' interactions posted in discussion forums are transformed into quantitative data using the Interaction Analysis Model. Then, the quantitative data are triangulated with qualitative data derived from surveys and observations. The findings of the trial program showed that participants found collaborative constructivist learning meaningful and exhibited higher order thinking development to varying degrees. However, learner-learner interaction was not so activated as expected. Based on the researcher's reflection, the second intervention was redesigned and implemented in the cyclical process of successive action research. The last section presents the projected benefits of successive action research and suggestions for EFL educators to make informed decisions about how discussion forums can be effectively used in education.

Keywords: discussion forums, blended learning, English as a foreign language (EFL), dynamic assessment, higher order thinking

1. Introduction

One of the major challenges in the field of teaching English as a foreign language (EFL) at high schools in Japan is that English classrooms tend to lack learning activities to develop higher order thinking. I conducted action research in summer 2020 with a co-researcher to explore an extracurricular blended learning (BL) program created as an intervention to develop the higher

CITATION | Miyashita, H. (2021). Successive Action Research to Develop the Higher Order Thinking of EFL Learners Through Discussion Forums. *AsiaCALL Online Journal*, *12*(5), 77-99. EOI: http://eoi.citefactor.org/10.11251/acoj.12.05.006

order thinking of EFL learners at a public high school in Japan. This study was guided by two research questions: (a) to what extent can higher order thinking be improved among EFL learners at a high school in Japan by engaging in online asynchronous forums embedded in the BL program? and (b) what factors of the BL program facilitated or inhibited the presence of higher order thinking? In the BL program, the participants engaged in online synchronous and asynchronous activities with English as a medium of instruction and communication while being supported by face-to-face (F2F) sessions conducted in Japanese. Data were collected through three methods: (a) asynchronous forums to obtain participants' written text, (b) pre- and post-surveys with open-ended questions, and (c) researchers' observations recorded in a research journal. The details of the study will be described in Section 2.

I developed the first action research into my doctoral project. The second intervention, which I designed after reflecting on the findings of the trial program in 2020, was implemented in summer 2021 as part of my doctoral project. I will describe the reflection process in which I redesigned the second action research in Section 3. In the last section, I will present the projected benefits of successive action research and suggestions for EFL educators to make informed decisions about how discussion forums can be effective, making use of both affordances that the in-person face-to-face and online components of the blended learning design provides.

2. The first action research: A trial program in summer 2020

2. 1 Problem and Background

Technologies can be a catalyst for educational transformation to increase the quality of learning experiences (Garrison & Anderson, 2003). While we have to be careful about the non-neutrality that technologies might entail in and of themselves, the rationale underpinning the belief rests on the assumption that technologies provide the inherent potential to facilitate higher levels of learning (Kanuka, 2008). In that sense, technology is only a tool, and what matters is what we can do with the tool. In the wake of the COVID-19 pandemic in 2020, we are still encountering online learning programs that seem to be little more than a direct translation of traditional correspondence courses or traditional F2F classes on lecture formats. In contrast, online learning has developed in the past few decades as a new method of technology-mediated learning to replace the concept of self-study in traditional distance education and knowledge transmission common to F2F institutions with the concept of knowledge construction through interaction in collaborative communities of learners.

The focus on collaborative constructivist approaches in online learning in the past few decades rests on the belief that these approaches can lead learners to higher order thinking. It is said that the educational systems concentrated on providing students with the basic skills for working in an industrial economy in the past and that now the focus has shifted to higher order thinking skills that are needed in the knowledge-based economy (Morrison, 2007). The implication here is that educational institutions have critical responsibilities to provide learning environments conducive to the development of capable and creative minds ready for the challenges of this complex world.

In high school settings (Grade 10 to 12 in the K-12 system) in Japan, EFL classrooms tend to lack learning activities to develop higher order thinking due to test-oriented practices that are based on cognitive-behavioral theory (Nishino & Watanabe, 2008). Despite initiatives led by Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) to promote instructional reform, including its decision to include the goal of realizing proactive, interactive, and authentic learning in the new government course guidelines revised in 2018 (MEXT, 2018), the change on the ground in that direction has been slow and sporadic. Related to this problem, in Japan, where technological advancement has been at the forefront of the world, the infrastructure and use of technology in both secondary and post-secondary education is far behind, as has been revealed by the COVID-19 pandemic in 2020 (Aoki, 2010; Kittaka, 2020).

To better understand the reasons why EFL classrooms in Japan tend to lack learning activities to develop higher order thinking, we need to explore the social and political background of the country. In the field of Teaching English to Speakers of Other Languages (TESOL), Japan is categorized not as an English-as-an-additional-language (EAL) setting but as an English-as-a-foreign-language (EFL) setting. EFL settings are those where students living in a non-English-speaking country learn English as a school subject. In other words, most people in Japan do not have to use English in their everyday lives.

English as a school subject is a crucial part of university entrance examinations in Japan. English is included in almost all university entrance examinations, including the largest-scale national test, which is administered by an independent administrative institution called the National Center for University Entrance Examinations (National Center for University Entrance Examinations, 2020). The English portion of university entrance examinations in Japan tends to require students to answer questions as fast as possible only by using decoding skills. In this reality, it might be more accurate to suggest that the focus only be on test-solving skills in classrooms.

Another reason for EFL classrooms dominated by test-oriented practices is related to English education policies driven by neoliberalism, which is generally defined as a revisionist approach to transform the welfare state into a post-welfare state that relegates every aspect of society to the wisdom of the market. Neoliberalism has permeated into the area of education, especially English education, in the past few decades. Some researchers call English education driven by neoliberalism *linguistic instrumentalism* (Barrett & Miyashita, 2015; Guo, 2012; Kubota, 2011; Wee, 2010). Linguistic instrumentalism can be defined as an ideology that emphasizes the utilitarianism of learning English for sustaining economic development as a society and for mobility obtained by an individual. Linguistic instrumentalism tends to promote competition rather than cooperation. The discourse of *developing human resources,* which is often observed in English education policies in Japan, emphasizes fierce competition on the global stage and implies that students should serve the nation as a resource. This discourse tends to encourage students to study English harder to enter prestigious universities.

A closer examination of the reasons might be necessary and profitable, but such an examination is out of the scope of this study. This action research was intended to mitigate problems observed on the ground practically.

2. 2 Purpose of the Study

The purpose of this study was to investigate a BL program created as an intervention to improve higher order thinking of EFL learners at a public high school in Japan. By adopting an action research approach with a pragmatic paradigm, the intervention was designed to mitigate problems observed in the classroom while drawing on the concept of praxis, a dialectical unity of theory and practice with reflective thought (Lantolf & Poehner, 2011).

2. 3 Background Literature

This literature review is an analysis of the empirical and theoretical research that bears directly on the purposes of this study.

2. 3. 1 Higher Order Thinking

Despite the popularity and importance of the concept of *higher order thinking* in education, there is no clear definition of the term. A framework that is often mentioned when higher order thinking is defined or considered is Bloom's taxonomy (1956). Forty-five years after Bloom's taxonomy was published, Anderson et al. (2001) introduced the revision of the original framework. There were two explicit changes in the revision. First, the new knowledge dimension contains four subcategories instead of three in the original scheme. The one added to the new framework is *Metacognitive Knowledge*, which was not widely recognized at the time the original version was developed. The other explicit change is in the overall structure of the cognitive process dimension. The six major categories in the new scheme are: (1) Remember, (2) Understand, (3) Apply, (4) Analyze, (5), Evaluate, and (6) Create.

The Russian psychologist L. S. Vygotsky introduced the concept of lower mental functions (LMFs) and higher mental functions (HMFs) to reconcile his claim that human mental functions are social in origin with the other contradicting fact that newborn infants already possess certain mental functions (Vygotsky & Rieber, 1997). Vygotsky viewed the development of human mental functions as their transition from the original LMFs into HMFs. LMFs are genetically inherited in terms of origins, unmediated in terms of structure, involuntary in terms of the way of functioning, and isolated in terms of the relation to other mental functioning. HMFs are socially acquired, mediated, voluntarily controlled, and linked to a broader system of other functions.

In this study, higher order thinking is defined using Anderson et al.'s (2001) revised taxonomy of educational objectives and Vygotsky's concept of LMFs and HMFs (Vygotsky & Rieber, 1997); Higher order thinking represents the cognitive mental functions of understanding, applying, analyzing, evaluating, and creating knowledge that is voluntarily controlled and facilitated through interaction. Recently, developing students' higher order thinking has been a widely shared goal in both secondary and post-secondary education. In the next section, I explore how higher order thinking can be developed in formal education.

2. 3. 2 Online Asynchronous Forums

One way of developing higher order thinking that has been adopted in many institutions is online learning, or to be more specific, asynchronous forums. The term *asynchronous forums*, which is sometimes referred to as computer-mediated conferencing or discussion boards, is defined in this

study as a learning activity where participants interact with written language asynchronously.

The focus on collaborative constructivist approaches in online learning in the past few decades rests on the belief that these educational approaches can lead learners to higher order thinking (Morrison, 2007**).** Different scholars have introduced different perspectives on constructivism. Two major strands are cognitive constructivism and social constructivism (Powell & Kalina, 2009). Others include radical constructivism (Glasersfeld, 1995), holistic constructivism (Scheer et al., 2012), and ecological constructivism (Hoven & Palalas, 2016). In asynchronous forums, which is one major form of collaborative constructivist approach, the act of *writing* leads students to deeper thinking (Conrad and Openo, 2018; Garrison, 2016). *Reflection* is another practice that can be incorporated in asynchronous forums to develop higher order thinking (Conrad & Openo, 2018; Garrison, 2016; Hoven, 2019; Rose, 2013). Time available in engaging in asynchronous forums enables participants to reflect, while in F2F or synchronous communication, participants are usually forced to respond immediately with no time available for deeper thinking.

A theoretical basis is needed for teachers' effective facilitation in constructivist-based asynchronous forums to develop students' higher order thinking. In the next section, I will examine how sociocultural theory and dynamic assessment, an assessment and teaching approach derived from sociocultural theory, can be applied to asynchronous forums for more effective facilitation.

2. 3. 3 Dynamic Assessment as a Pedagogical Approach

In this study, sociocultural theory (SCT) refers to a Vygotsky-inspired theory. The central tenet of the theory is that human thinking is symbolically mediated (Lantolf, 2013). Sociocultural in this context means that language, by which thinking is mediated, is a social, cultural, and historical artifact. A method that is emerging in SCT, especially in SCT-based second-language research, is dynamic assessment (DA). DA, where mediation is given intentionally, is a procedure that unites the goals of better understanding a learner's potential through structured sets of interactions and fostering development through those interactions (Lantolf, 2011).

As the name shows, DA is an approach to assessment, but it is also an approach to teaching. In DA, teachers are expected to provide learners with ongoing intervention attuned to learner development based on Vygotsky's concept of the zone of proximal development (ZPD). Rather than waiting for individuals to become developmentally ready to learn, in DA, instructions are given intentionally to prepare learners for more complex concepts (Lantolf, 2013). DA links ongoing assessment to the provision of instructions that are appropriate mediation for development. Lantolf (2011) noted that research on DA within group-wide ZPDs is an important area for future research. As a group develops, the individuals comprising the group also develop, which is an important notion with regard to ZPDs in education (Lantolf & Poehner, 2011).

DA or any other form of formative assessment tends to be intuitive on the part of teachers rather than guided by principles of learning theories (Lantolf & Poehner, 2004). In the next section, I review the literature on content analysis, which is expected to measure the effects produced by asynchronous forums with DA-based mediation.

2. 3. 4 The Interaction Analysis Model: An Instrument for Content Analysis

Content analysis has been established as an effective method for analyzing asynchronous communication and is widely used in the field of online and blended learning (De Wever et al., 2006; Hall, 2014; Lucas et al., 2013). In general, the goal of content analysis is to reveal information that is not observed at the surface level of the transcripts. Among many content analysis instruments, the Interaction Analysis Model (IAM), which was developed by Gunawardena et al. (1997), was chosen for this study. The IAM is an established instrument (Lucas et al., 2013; Hall, 2014), and it is an instrument that fits the purposes of this action research. Jonassen et al. (1994) stated that constructivist learning outcomes should be evaluated using evaluation methods that are sensitive to the goals of constructivist learning. Gunawardena et al. (1997) noted that knowledge construction necessitates higher order thinking and that the IAM begins with what could be described as lower mental functions to higher mental functions in Vygotsky's terms.

Research that used the IAM to examine the knowledge construction in asynchronous forums revealed several challenges that this learning activity often entails. Wang et al. (2009) reported that many students did not know how to behave in the environment, which suggests that participants need a phase where they practice the unfamiliar way of learning before entering the program. Hou et al. (2009) reported that knowledge construction was inhibited due to participants' lack of skills to use the technology adopted in the program and that interaction among participants was not activated when they had no obligation to participate. Some of these challenges might be addressed by adopting a blended learning (BL) approach. BL environments can offer different affordances that allow for meaningful learning experiences to take place (Graham, 2006). In the next section, I will explore blended learning systems.

2. 3. 5 Blended Learning Systems

BL is expected to emerge as a predominant system and become more common in secondary and post-secondary education than either fully online or fully F2F instruction in brick and mortal institutions (Graham, 2019; Halverson et al., 2017; Watson, 2008). Despite the increasing popularity, theories that are specific to BL have not yet developed (Graham, 2019; Halverson, 2017). While the definition of BL is not fixed, I define BL in this study as the integration of classroom F2F learning experiences and online learning experiences within a thoughtful course design.

In the wake of the COVID-19 pandemic in 2020, BL practice and research not only in higher education but also secondary education have been increasing (Ndoricimpa & Barad, 2021; Thi Thanh Tran, 2021), but BL research in K-12 settings focusing on constructivist learning is still scarce especially in Japan. Learners in secondary education often need direct instruction and careful scaffolding. Considering increasing BL practice and the difficulty of implementing learner-centered activities in secondary education, more BL research focusing on secondary education is expected. BL design might be a possible solution to make constructivist online learning more effective in K-12 settings.

2. 4 Methodological Approach

This research used an action research approach. Action research can take many forms, but typically it is "a small-scale intervention in the functioning of the 'real' world and a systematic, close examination, monitoring and review of the effects of such an intervention, combining action and reflection to improve practice" (Cohen et al., 2018, p. 441). While different scholars have introduced different sets of principles, the consensus is that action research is a cyclical process (Bargal, 2006; Kemmis & McTaggart, 2014). In each cyclical procedure, the link between action and reflection on action is readily apparent. At the same time, throughout the procedure, theories are as an essential tool to provide teachers and researchers with the understanding necessary to take effective action.

2. 4. 1 Overview of the Intervention

The BL program created as an intervention for this action research is an extracurricular program, which means that the program is not part of regular classes that require official grading needed for participants' graduation but is rather a supplemental course in which students participated voluntarily. In the BL program, fifteen EFL students engaged in online synchronous and asynchronous activities with English as a medium of instruction and communication while being supported by face-to-face sessions conducted in Japanese (see Figure 1). The online component of the program consists of two five-day asynchronous forums and two ninety-minute synchronous meetings. Concerning the F2F component, two ninety-minute meetings are placed: at the beginning and at the end of the program. This study focused on online asynchronous forums, where instructors draw on the construct of mediation from SCT, or especially from DA, to lead the participants to higher order thinking by engaging them in student-teacher and student-student interaction in the content-based EFL learning program.

Figure 1.

The Structure of the Trial Program

Phase 1: Face-to-Face Meeting I (1.5 hours)
The aims of the program and how to operate technology in use were explained in Japanese, emphasizing how and why student-student interaction can be a meaningful educational experience. Also, participants were asked to submit a pre-survey by the following day.
Phase 2: Asynchronous Forum I (5 days)
This is one of the two main asynchronous forums in this program. Participants read materials and discussed a given theme, which was chosen to build a foundation for the next asynchronous forum.
Phase 3: Synchronous Meeting I (1.5 hours)
Two synchronous meetings are prepared to integrate the four skills for English proficiency (i.e., reading, writing, listening, and speaking). The main goal of Synchronous Meeting I is to

break the ice with no cognitively demanding topics.
Phase 4: Asynchronous Forum II (5 days)
In Asynchronous Forum II, participants read materials, watched two short video clips, and discussed more complicated issues on a given theme based on their foundation in the previous forum.
Phase 5: Synchronous Meeting II (1.5 hours)
In Synchronous Meeting II, participants were required to give a three-minute individual presentation on a given topic. The topic was related to what they discussed in the previous two asynchronous forums.
Phase 6: Face-to-face Meeting II (1.5 hours)
Participants shared what they learned in the whole process of the program. Also, participants were asked to submit a post-survey within five days.

2. 4. 2 Goals of Online and F2F Components

Both synchronous and asynchronous activities in the online component were designed to be places where students engage in constructivist learning. Two meetings in the F2F component were opportunities to provide students with direct instructions about the procedure, contents, and technologies in use. K-12 students tend to need direct instruction due to a lack of independent learning abilities. That is why a BL design was adopted in this study so that the instructor can provide participants with the needed direct instruction in the F2F component to guide them in the online component.

2. 4. 3 Roles of Researchers

I am a full-time EFL teacher working at a public high school in Tokyo. I invited one external researcher, an adjunct professor working at two universities in the United States of America. Both of us took on the roles of researcher, program designer, and instructor in the BL program. I focused on higher order thinking while the external researcher focused on language development in his study.

2. 4. 4 Description of the Teaching Context

The site of this study, S High School, is one of 186 public senior high schools in Tokyo. S High School is designated by the Tokyo Metropolitan Board of Education as an "Advanced School," which is expected to show high achievement in university entrance examinations. S High School has about 960 students, with approximately 320 students in each grade.

2. 4. 5 Participants

Student participation in the BL program was totally voluntary. The program was advertised to all the students at the school. Students who were interested in the program applied to the program. The number of participants was limited to a maximum of fifteen to ensure the quality of the program. Eleven students first applied, and later four more students were recruited. They were all advanced EFL learners who had already acquired the basics of English grammar and vocabulary. In that sense, this BL program was a value-added option for higher achieving students.

2. 4. 6 Instructional Design

This program took inquiry-based instruction as the main instructional method. According to Laurillard (2012), the inquiry "is a term that expresses the value to the learner of being in control of their own knowledge and skills development, in contrast with the teacher-led form of learning through acquisition" (p. 140). Seen from the perspective of TESOL, the teaching method used in this program is categorized as content-based instruction and cooperative language learning (Richards and Rodgers, 2001). Instructors refrained from giving immediate grammatical feedback due to our focus on facilitating students' thinking.

2. 4. 7 Course Topic

In the individual presentation required in Synchronous Meeting II, participants tried to answer this question: How can learning English be meaningful to me and to the world? Two asynchronous forums were designed for participants to deepen their thought to answer this question. Many Japanese students are made to believe that English is necessary for their future success under the social and political climate; thus, the topic was chosen to lead the participants to think about why they learn English from broader perspectives in a metacognitive way.

2. 5 Data Collection and Analysis

In this study, qualitative data were gathered through three methods: (1) asynchronous forums to obtain textual data, (2) researchers' observation during the whole process of the program recorded in a research journal, and (3) pre- and post-surveys to obtain qualitative data through the open-ended questions. Participants' transcripts stored in asynchronous forums were converted into quantitative data through the IAM. Then, the quantitative data were triangulated with qualitative data derived from the researcher's observation and surveys.

2. 6 Findings and Discussions

2. 6. 1 Findings from the IAM

I used the IAM to explore the first research question: to what extent can higher order thinking be improved among EFL learners at a high school in Japan by engaging in online asynchronous forums embedded in the BL program? I scrupulously read the transcript, divided the transcript into messages, and assigned each message to one or multiple phases according to the phases described in the IAM (see Figure 2).

Figure 2.

Interaction Analysis Model for Examining Social Construction of Knowledge in Computer Conferencing

Phase I: Sharing/comparing of information

A. Statement of observation or opinion

B. Statement of agreement from one or more other participants

C. Corroborating examples provided by one or more participants

D. Asking and answering questions to clarify details of statements

E. Definition, description, or identification of a problem

Phase II: The discovery and exploration of dissonance or inconsistency among ideas, concepts, or statements

A. Identifying and stating areas of disagreement

B. Asking and answering questions to clarify the source and extent of disagreement

C. Restating the participant's position and possibly advancing arguments or considerations in its support by references to the participant's experience, literature, formal data collected, or proposal of relevant metaphor or analogy to illustrate the point of view

Phase III: Negotiation of meaning/co-construction of knowledge

A. Negotiation or clarification of the meaning of terms

B. Negotiation of the relative weight to be assigned to types of arguments

C. Identification of areas of agreement or overlap among conflicting concepts

D. Proposal and negotiation of new statements embodying compromise, co-construction

E. Proposal of integrating or accommodating metaphors or analogies

Phase IV: Testing and modification of proposed synthesis or co-construction

A. Testing the proposed synthesis against ‘received fact’ as shared by the participants and/or their culture

B. Testing against the existing cognitive schema

C. Testing against personal experience

D. Testing against formal data collected

E. Testing against contradictory testimony in the literature

Phase V: Agreement statements(s)/application of newly-constructed meaning

A. Summarization of agreement(s)

B. Applications of new knowledge

C. Metacognitive statements by the participants illustrating their understanding that their knowledge or ways of thinking (cognitive schema) have changed as a result of the conference interaction

Table 1 provides the number of posts, messages, and total words that each student submitted. The total number of posts was 45 in Forum I and 43 in Forum II. Comparing Asynchronous Forum I and II, while the number of posts is close, the number of messages in Forum I is larger than in Forum II. The reason is that in Forum I, participants were asked to answer three questions listed in the Prompt I that the I created; thus, most of the students' first responses were divided into three messages.

Table 1.

The Number of Posts, Messages, and Total Words in Asynchronous Forums

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	Totals
Forum I														
Posts	3	3	2	1	4	1	1	1	1	1	1	1	0	45
Messages	6	5	3	3	7	1	2	3	3	4	3	3	0	43
Total Words	341	328	228	200	442	96	110	168	90	222	143	94	0	2462
Forum II														
Posts	3	2	1	1	2	1	1	2	1	1	1	0	1	43
Messages	3	2	3	2	4	1	1	2	1	2	2	0	1	24
Total Words	262	212	192	105	340	74	54	187	109	220	145	0	77	1977

Table 2 provides the total numbers of messages coded at each phase in the IAM. According to Gunawardena et al. (1997), Phase I and II are considered to represent the lower mental functions while Phase III to V represent the higher mental functions. Comparing Forum I and II, the ratio of Phase III in Forum II is larger than in Forum I, and this is because the question in Prompt II that the I created was the one that encouraged participants to think about both advantages and disadvantages of English as a global language. In the pre-survey, no student identified negative aspects of English as a global language; thus, many of the students had to interact with the reading material and video clips provided by the instructors before presenting their statements,

many of which were products derived from negotiation with these materials. Findings from the IAM provide evidence to suggest that the participants were capable of the co-construction of knowledge, although to a limited extent.

Table 2.

IAM Coding Results for Asynchronous Forums

IAM Phase	Phase I	Phase II	Phase III	Phase IV	Phase V	Totals
Forum I	91 (85.0%)	5 (4.7%)	11 (10.3%)	0 (0%)	0 (0%)	107 (100%)
Forum II	22 (56.4%)	0 (0%)	16 (41.0%)	0 (0%))	1 (2.6%)	39 (100%)

2. 6. 2 Closer Examination of Knowledge Co-Construction in Asynchronous Forum I

Although almost all the participants replied to questions described in the prompts and instructors' postings in both forums, learner-learner interactions were scarce. The number of posts that were directed to other participants was 1 in Forum I and 4 in Forum II. Table 3 provides a string that drew learner-learner interaction at the end (Turn 6) in Forum I, which also illustrates the instructors' DA-based mediation.

Table 3.

An Example of Knowledge Co-Construction in Asynchronous Forum I

Turn		Post
1	S2	… Certainly, English is necessary to make connections with people and countries. But, we must not forget "respect of native languages," which is one of the great features of each country. People also should use native language positively … [Phase III/D]
2	T1	[To S2] You have brought up a very important topic: our mother tongue. Our mother tongue is important in many way … First, our mother tongue is important to develop our thinking system … Second, language is a culture as you wrote. This is a popular example, but other languages do not have a word for *mottainai* in Japanese. Japanese have the word *mottainai*, so Japanese people have the feeling.
3	S2	… But I now find it is only "feeling" and also that I have the feeling when I speak Japanese. "Feeling" is so vague thing, and words are so clear thing. However, I think they have deep relations. What do you think about this, everybody? [Phase III/D]
4	T2	[To S2] Yes language allows us to experience 'deep' feelings, and it is part of our personal 'existential' experience. On the one hand, my language, the words I

		speak are mine from my soul, and on the other hand, my words are the words I learned from others because they shared their language with me and language was given to me … Bakhtin suggested, language is half mine and half yours and when we communicate we meet in the middle.
5	S2	… Needless to say, culture and language vary from country to country. I think it is better than not. If countries all over the world had the same culture and language, we would not have Interests each other. Not knowing each other, we will mutually try to know. So, these differences are what we should focus on every time … [Phase III/D]
6	S5	[To S2] I agree with you. They will have deep relation. I think that it's our experience, *nare* in Japanese. At first, our feeling for a language is almost nothing because we don't have any experiences. However, If we get many experiences by talking with foreigners or writing sentences, we will be able to get the feeling and English skills, too. Certainly, the feeling is vague. However, our experience can improve it … [Phase I/B and III/D]

Turn 1 is part of S2's first post in this forum. S2 negotiated with the reading material in Prompt I and presented an idea of "respect of [*sic*] native languages" while thinking about why people learn English. Turn 2 is Instructor 1's response to Turn 1. Complimenting S2's statement, Instructor 1 provided two specific reasons why our mother tongue is important. Throughout the forums, the instructors refrained from pushing participants to reply to instructors; thus, Instructor 1 ended the post without adding further questions. Turn 3 is S2's reply to Turn 2. S2 presented his thought about relationships or differences between feelings and words. S2 is thought to have further considered why our mother tongue is important after reading Turn 2. Turn 4 is Instructor 2's response to Turn 3. Instructor 2 extended the discussion about relationships or differences between feelings and words by providing a philosophical discourse, which was intended to further stretch S2's thought. Turn 5 is S2's reply to Turn 4. This message is close to Phase V of the IAM in that S2 pondered not only about himself but about relationships among different cultures from a broader perspective. In the end, however, the I coded this message as Phase III/D because the metacognitive aspect is not so explicit in this message. Nevertheless, it is evident throughout this string that S2's cognitive functions developed from Turn 1 to Turn 3 and 5. Turn 6 is the sole post in this forum that is categorized as learner-learner interaction. S5 replied to Turn 3, S2's post. After showing her agreement to S2's statement, S5 presented a related concept, experience, through which she thinks feelings can be connected to words.

2. 6. 3 Challenges Identified in the Analysis of the Trial Program

I triangulated data derived from the IAM with observational data and qualitative data obtained from pre- and post-surveys to answer the second research question: what factors of the BL program facilitated or inhibited the presence of higher order thinking? While almost every participant found collaborative constructivist learning to be meaningful, the most explicit challenge was the lack of learner-learner interaction, which resulted in the lack of messages coded as Phase III to V in the IAM, representing higher mental functions (Gunawardena et al.,

1997). Interaction is divided into three categories: learner-content, learner-instructor, and learner-learner, each of which should be facilitated for effective knowledge co-construction (Anderson, 2003; Moore, 1989).

I identified four reasons why learner-learner interaction was not activated. First, to students who are usually given direct face-to-face instruction, online instruction might have been unclear. Although instructors provided guidance for participants' online participation, it might not have been enough. Secondly, the participants needed more time to get accustomed to the new learning environment. Several students wrote in the post-survey that they hesitated to express their own opinions and reply to other participants. Thirdly, some participants had difficulty using the online platform adopted for the asynchronous forums. Most of them found no technical problems, but the instructors should have provided more guidance, especially to those who were not familiar with the technology. Finally, English proficiency was a factor to inhibit interaction for some participants. Although all the participants were thought to be advanced EFL students, some of them wrote in the post-survey that they needed more time to decode messages from other students and the instructors and to write their own posts in English.

3. The second action research: A doctoral project in summer 2021

Based on the outcomes from the trial program described in the previous section, I designed a new BL program by making modifications to the trial program. I implemented it at the same high school in summer 2021. This BL program was conducted as an intervention in my doctoral project. The purpose and the methodological approach are the same as the ones established in the trial program. In this section, I will describe the modifications, introduce revised research questions, and briefly discuss the ethical requirements.

3. 1 Modifications

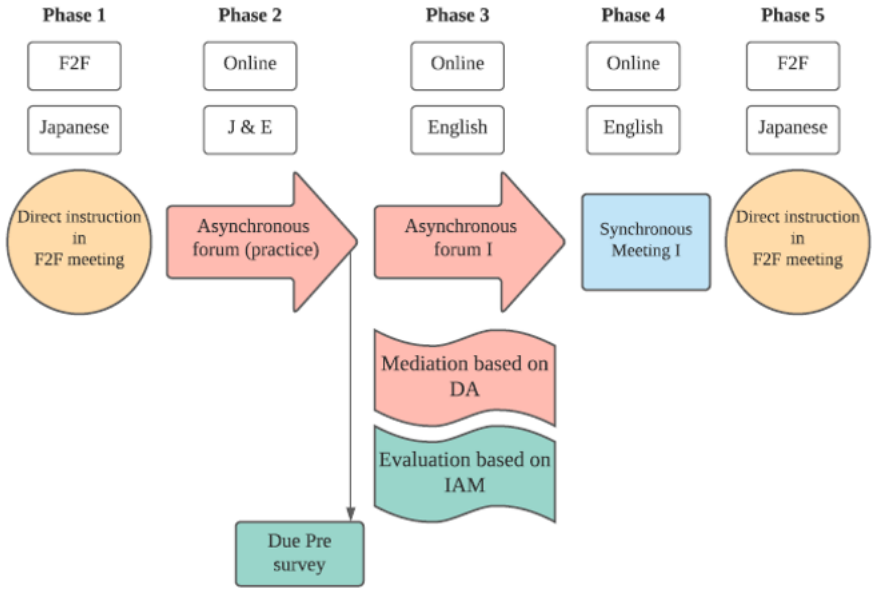
After analyzing the data taken from the trial program, I concluded that the participants found collaborative constructivist learning meaningful and exhibited higher order thinking development to varying degrees. However, learner-learner interaction in asynchronous forums was not so activated as I expected, which might have contributed to the limited development of higher order thinking identified in the analysis of participant interactions. I identified two possible ways to overcome this challenge. To increase learner-learner interaction in asynchronous forums, I first decided to make use of affordances that the in-person F2F component of the BL programs provides. In the case of the intervention, the participants were high school students who were not familiar with computer-mediated collaborative constructivist learning. Also, most of them still lacked the ability to manage their learning independently. Therefore, I gave them more careful direct instruction, answering their questions so that the students could understand the purposes and procedures of collaborative constructivist learning more clearly. Secondly, to increase learner-learner interaction in asynchronous forums, I provided participants with more opportunities to practice this new way of learning with easier tasks in order for them to get accustomed to the new way of learning and technology employed in the proposed program.

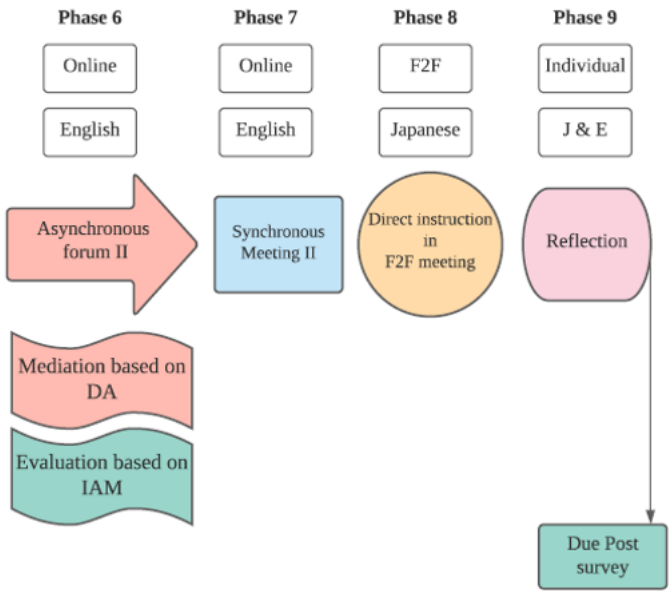
Although there are certainly various ways to increase the presence of higher order thinking in asynchronous forums, and the need to carefully and purposefully design materials to fit the program may seem obvious, the data underscored the importance of carefully designing materials and tasks in the program. Also, many participants illustrated metacognitive aspects in their responses to two questions listed in the post-survey: what did you learn in this BL program?; and how was the virtual classroom experience? Thus, I added an explicit reflection phase at the end of the proposed program, where participants were encouraged to reflect more deeply on what they learned, guided by the questions in a post-survey, and share their reflections within the cohort.

Based on my reflection on the trial program, I added three phases to the trial program: (1) one asynchronous forum for practice before the main program, (2) one in-person F2F meeting in the middle, and (3) a phase for the final reflection at the end of the program. The intervention consists of nine phases instead of six in the trial program. Figure 3 illustrates the flow of the intervention.

Figure 3.

The flow of the Blended Learning Program





3. 2 Subsequent Actions

Action research is a cyclical process, and therefore modification is always necessary. I will describe the procedure for these modifications in the following three stages.

3. 2. 1 After the Trial Program in 2020

As described above, I added three phases to the trial program. Also, I re-designed the learning materials and learning tasks in the intervention to fit the aims of the intervention, carefully considering the skills and abilities of the expected participants.

3. 2. 2 During the Implementation of the Proposed Intervention Scheduled in 2021

This study drew on the construct of mediation from sociocultural theory (SCT), especially dynamic assessment (DA), a method for better mediation that is emerging in SCT. In DA, teachers are expected to provide learners with ongoing intervention attuned to learner development based on ZPD (Lantolf & Poehner, 2004). In that sense, I made constant modifications in my mediation throughout the program. Also, after each phase in the proposed intervention, I reflected on the process and students' achievements at each stage to make modifications diligently for the next phase.

3. 2. 3 After the Implementation of the Doctoral Project in Summer 2021

I have plans to implement a similar BL program again in summer 2022. The findings of the proposed study and my reflection on the intervention will be utilized in both the design and the implementation phase of the next BL program. In addition, the findings of the successive action research may be used to improve not only extracurricular programs but also regular classes by partly applying constructivist and/or blended learning perspectives into regular classes that are currently dominated by test-oriented practices based on cognitive-behavioral theory. Figure 4 illustrates the development of the cyclical process in this action research study in a longer term.

Figure 4.

The Development of This Action Research in a Longer Term

1. A problem in the classroom
In Japan, EFL classrooms tend to lack learning activities to develop higher order thinking due to test-oriented practices based on cognitive-behavioral theory.
2. The trial program in summer 2020
A BL program that consists of six phases, including two asynchronous forums and two in-person F2F meetings.
3. Findings of the trial program
The participants exhibited higher order thinking development to some extent, but learner-learner interaction was not so activated as I expected.
4. Modifications to the trial program
One asynchronous forum for practice, one in-person F2F meeting in the middle, and a phase for reflection at the end of the program were added.
5. The doctral project in summer 2021
A BL program that consists of nine phases, including three asynchronous forums, three F2F meetings, and a phase for reflection at the end of the program.
6. Modifications to the doctoral project
Modifications will be added for the third BL program in summer 2022. In addition, the findings of the proposed intervention may be used to improve regular EFL classes by partly applying the findings of this doctoral study.

3. 3 Main Research Questions

I established three main questions below to guide this doctoral project.

a) To what extent can higher order thinking be improved among participants in asynchronous online forums?

b) What factors in students' engagement in asynchronous online forums may contribute to the development of higher order thinking, if any?

c) What factors in blended learning design may contribute to the development of higher order

thinking, if any?

I used the same data collection and analysis procedures as the ones adopted in the trial program. In brief, I used the record of participants' interactions posted in the two asynchronous forums as data to examine the first main research question. I will triangulate the results with data derived from pre- and post-surveys and my observation recorded in a research journal to examine the second and third questions.

3. 4 Ethical Requirements

Ethical considerations are critical in research (Cohen et al., 2018). In preparation for this doctoral project, I completed the required TCPS2 CORE tutorial to develop my understanding of the ethical treatment of human participants. Before this action research study was carried out, my proposal was approved by the Research Ethics Board at Athabasca University.

Participation was totally voluntary. The principal of S High School, the site of this study, gave me permission in a written form. The age of the participants ranged from sixteen to seventeen years; thus, I created an informed consent form for both the participants and their parents/caregivers. I took enough time for them to understand the aims, risks, and benefits of the program before they signed the form.

4. Conclusion and recommendations

4. 1 Cyclical Process of Action Research as Socially Engaged Applied Research

These successive interventions in summer 2020 and 2021 are motivated by a desire to improve practice through a cyclical action research process. As I described in Section 1, the problem that I identified is that EFL classrooms tend to lack learning activities to develop higher order thinking due to test-oriented practices that are based on cognitive-behavioral theory in high school settings in Japan. Adopting an action research approach with a pragmatic paradigm, I designed interventions to mitigate problems observed on the ground, drawing on the concept of praxis, a dialectical and ecological unity of theory and practice that is realized through reflective thought (Sanchez Vasquez, 1977).

According to Kemmis (1997), there are two camps in the field of action research: the reflective practitioners and the critical theorists. These two camps are two ends of a continuum with no clear distinction, but for the former, action research is an improvement in professional practice at the local level, and for the latter, action research is part of a broader agenda of changing education and changing society. In this study, I took elements from both sides. As a reflective practitioner, I designed the BL program as an alternative or a supplemental way of teaching to the current test-oriented practices. As a critical theorist, I designed a BL program that can be inspirational to our colleagues and try to disseminate the findings to encourage instructional diversification in society.

4. 2 Delimitations and Limitations

The focus of this successive action research was to describe qualitative and quantitative dimensions of the presence or absence of higher order thinking development only in asynchronous forums embedded in the BL program and analyzed what factors were responsible for the development. This study was not designed to examine whether or how participants' EFL proficiency was improved.

Four main limitations are identified. First, this study used an action research approach in a particular context with a limited number of participants; thus, the conclusions derived are not generalizable. However, efforts were made to make the conclusions transferable by providing a thick description of the research site, course design, and procedures. Secondly, while the content analysis instrument that was adopted in this study is widely recognized, what can be captured by any instrument is only a part of the participants' actual thoughts. I used observational data and data taken from surveys in addition to the transcript analysis to describe a more nuanced picture of the participants' higher order thinking development. Thirdly, while the focus of this study is on the development of higher order thinking, the language used in the online components of the intervention was English, which is the target language for the participants. Participants' development of higher order thinking might have been restricted by the language in use. Finally, the BL program was designed and implemented targeting advanced EFL students who already acquired the basics of English grammar and vocabulary; thus, for students struggling with learning EFL, another type of intervention will have to be considered.

4. 3 Future Directions

In this paper, I described how a trial program in 2020 was developed into a doctoral project in 2021. Findings from the trial program showed that collaborative constructivist learning using discussion forums could be effective for EFL learners in high school settings to develop higher order thinking. Also, the results suggest that blended learning design can help learners attending online discussion forums by providing needed direct instruction in the face-to-face component when participants are not accustomed to online constructivist learning and are lacking the ability to manage their learning independently. The most explicit challenge identified in the trial program was the lack of learner-learner interaction. To overcome the challenge, the second intervention, a doctoral project in summer 2021, was redesigned and implemented. The findings from the second intervention will be used to further refine the cyclical process of this successive action research.

Broadly, this study was intended to enable educators to make informed decisions about how technologies can be effectively used in education. To be more specific, the findings of this study might inform EFL instructors, course designers, and policymakers in Japan and possibly in other countries about an alternative or supplementary way of teaching EFL. Furthermore, the knowledge and insights gained in this study may help uncover an effective model of BL.

References

Anderson, T. (2003). Getting the mix right again: An updated and theoretical rationale for interaction. *International Review of Research in Open and Distance Learning*, *4*(2). https://doi.org/10.19173/irrodl.v4i2.149

Anderson, L. W., Krathwohl, D. R., & Bloom, B. S. (2001). *A Taxonomy for Learning, Teaching, and Assessing*. New York Longman.

Aoki, K. (2010). The use of ICT and e-learning in higher education in Japan. *World Academy of Science, Engineering and Technology, 42*, 854-858.

Bargal, D. (2006). Personal and intellectual influences leading to Lewin's paradigm of action research: Towards the 60th anniversary of Lewin's 'Action research and minority problems' (1946). *Action Research, 4*(4), 367–388. https://doi.org/10.1177/1476750306070101

Barrett, T., & Miyashita, H. (2016). The pervasiveness of the neoliberal agenda and linguistic instrumentalism in Japan's English education policy "English Reform Plan corresponding to Globalization." *Journal of English as an International Language. 11*(1), 50-70.

Bloom, B. S., & Krathwohl, D. R. (1956). Taxonomy of educational objectives: The classification of educational goals. In *Handbook I: Cognitive domain*.

Cohen, L., Lawrence, M., & Morrison, K. (2018). *Research methods in education*. (8th ed.). Routledge

Conrad, D., & Openo, J. (2018). *Assessment strategies for online learning: Engagement and authenticity*. AU Press.

De Wever, B., Schellens, T., Valcke, M., & Van Keer, H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers and Education*. https://doi.org/10.1016/j.compedu.2005.04.005

Drysdale, J. S., Graham, C. R., Spring, K. J., & Halverson, L. R. (2013). An analysis of research trends in dissertations and theses studying blended learning. *Internet and Higher Education.* https://doi.org/10.1016/j.iheduc.2012.11.003

Garrison, D. R. (2016). *E-learning in the 21st century: A community of inquiry framework for research and practice* (3rd ed.). Routledge.

Garrison, D. R., & Anderson, T. (2003). *E-Learning in the 21st century: A framework for research and practice*. Routledge.

Glasersfeld, E. V. (1995). *Radical constructivism: A way of knowing and learning*. Routledge.

Graham, C. R. (2006). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.), *Handbook of blended learning: Global perspectives, local designs* (pp. 3-21). Pfeiffer Publishing.

Graham, C. R. (2019). Current research in blended learning. In M. G. Moore & W. C. Diehl (Eds.), *Handbook of distance education* (4th ed., pp. 173-188). Routledge.

Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research*. https://doi.org/10.2190/7MQV-X9UJ-C7Q3-NRAG

Guo, Y. (2012). Teaching English for economic competitiveness: Emerging issues and challenges in English education in China. *Canadian and International Education, 41*(2), 28-50.

Hall, B. M. (2014). In support of the Interaction Analysis Model (IAM) for evaluating discourse in a virtual learning community. https://www.researchgate.net/publication/261161448_In_support_of_the_Interaction_Analysis_Model_for_evaluating_discourse_in_a_virtual_learning_community

Halverson, L. R., Spring, K. J., Huyett, S., Henrie, C. R., & Graham, C. R. (2017). Blended learning rearch in higher education and k-12 settings. In J. M. Spector, B. B. Lockee, & M. D. Childress (Eds.), *Learning, design, and technology: An international compendium of theory, research, practice, and policy* (pp. 1-30). Springer International Publishing.

Hou, H. T., Chang, K. E., & Sung, Y. T. (2009). Using blogs as a professional development tool for teachers: Analysis of interaction behavioral patterns. *Interactive Learning Environments*. https://doi.org/10.1080/10494820903195215

Hoven, D. (2019). ePortfolios: The role of reflection in graduate online learning and pedagogy. *ICDE/WCOL 2019 Proceedings Volume 1* (pp. 431-442). Dublin City University.

Hoven, D., & Palalas, A. (2016). Ecological constructivism as a new learning theory for MALL: An open system of beliefs, observations, and informed explanations. In A. Palalas & M. Ally (Eds.), *The international handbook of mobile-assisted language learning* (pp. 113-137). Beijing, China: China Central Radio & TV University Press.

Jonassen, D. H. (1994). Thinking Technology: Toward a Constructivist Design Model. *Educational Technology*.

Kanuka, H. (2008). Understanding e-learning technologies-in-practice through philosophies-in-practice. In T. Anderson (Ed.), *The theory and practice of online learning* (2nd ed., pp. 91-114). AU Press.

Kemmis, S. (1997). Action research. In J. P. Keeves (ed.) *Educational research, methodology, and measurement: An international handbook* (2nd ed., pp. 173-179). Elsevier Science Ltd.

Kemmis, S., McTaggart, R., & Nixon, R. (2014). *The action research planner.* Springer. https://doi.org/10.1007/978-981-4560-67-2

Kittaka, L. G. (2020, April 20). Coronavirus crisis offers chance to update Japanese schools. The Japan Times. https://www.japantimes.co.jp/community/2020/04/20/issues/coronavirus-crisis-japanese-schools-online/

Kubota, R. (2011). Questioning linguistic instrumentalism: English, neoliberalism, and language tests in Japan. *Linguistics and Education, 22*, 248-260.

Lantolf, J. P. (2011). The sociocultural approach to second language acquisition. In D. Atkinson

(Ed.), *Alternative approaches to second language acquisition* (pp. 24-47). Routledge.

Lantolf, J. P. (2013). Sociocultural theory: A dialectical approach to L2 research. In S. M. Gass & A. Mackey (Eds.), *The Routledge handbook of second language acquisition* (pp. 57-72). Routledge.

Lantolf, J. P., & Poehner, M. E. (2004). Dynamic assessment of L2 development: Bringing the past into the future. *Journal of Applied Linguistics*. https://doi.org/10.1558/japl.v1i1.647

Lantolf, J. P., & Poehner, M. E. (2011). Dynamic assessment in the classroom: Vygotskian praxis for second language development. *Language Teaching Research*. https://doi.org/10.1177/1362168810383328

Laurillard, D. (2012). *Teaching as a design science: Building pedagogical patterns for learning and technology*. Routledge.

Lucas, M., Gunawardena, C., & Moreira, A. (2014). Assessing social construction of knowledge online: A critique of the interaction analysis model. *Computers in Human Behavior*. https://doi.org/10.1016/j.chb.2013.07.050

Ministry of Education, Culture, Sports, Science and Technology (MEXT). (2018). 高等学校学習指導要領 [The government course guidelines for high schools]. https://www.mext.go.jp/sports/content/1384661_6_1_2.pdf

Moore, M. G. (1989). Editorial: Three types of interaction. *American Journal of Distance Education*. https://doi.org/10.1080/08923648909526659

Morrison, D. (2007). E-learning in higher education: The need for a new pedagogy. In M. Bullen & D. Janes (Eds.), Making the transition to e-learning: Strategies and issues (pp. 104-120). Idea Group Inc.

National Center for University Entrance Examinations. (2020). 大学入学共通テスト [The Common Test for University Admissions]. https://www.dnc.ac.jp/kyotsu/index.html

Ndoricimpa, C., & Barad, D. P. (2021). Does online instruction in discourse conventions of literary analysis affect L2 students' critical stance in academic writing? A longitudinal study. *AsiaCALL Online Journal, 12*(4), 66 - 87. https://asiacall.info/acoj/index.php/journal/article/view/66

Nishino, T., & Watanabe, M. (2008). Communication-Oriented Policies versus Classroom Realities in Japan. *TESOL Quarterly, 42*(1), 133-138.

Powell, K. C., & Kalina, C. J. (2009). Cognitive and social constructivism: developing tools for an effective classroom. *Education, 130*(2), 241-250.

Richards, J. C., & Rodgers, T. S. (2001). *Approaches and methods in language teaching.* Cambridge University Press. https://doi.org/10.1017/cbo9780511667305

Rose, E. (2013). *On reflection: An essay on technology, education & the status of thought in the twenty-first century*. Brown Bear Press.

Sanchez Vasquez, A. (1997). *The philosophy of praxis*. Merlin Press.

Scheer, A., Noweski, C., & Meinel, C. (2012). Transforming constructivist learning into action: Design thinking in education. *Design And Technology Education: An International Journal, 17*(3). 8-19.

Thi Thanh Tran, M. (2021). Microsoft Teams in the context of freshmen ELF learning. *AsiaCALL Online Journal, 12*(2), 12-23. https://asiacall.info/acoj/index.php/journal/article/view/22

Vygotsky, L. S., & Rieber, R. W. (Ed.). (1997). *The collected works of L. S. Vygotsky, Vol. 4. The history of the development of higher mental functions.* (M. J. Hall, Trans.). Plenum Press.

Wang, Q., Woo, H. L., & Zhao, J. (2009). Investigating critical thinking and knowledge construction in an interactive learning environment. *Interactive Learning Environments*. https://doi.org/10.1080/10494820701706320

Watson, J. (2008). Blended Learning: The Convergence of Online and Face-to-Face Education. *North American Council for Online Learning*.

Wee, L. (2010). Linguistic instrumentalism in Singapore. *Journal of Multilingual and Multicultural Development, 24*(3), 211-224.

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