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DEVELOPING HIGHER ORDER THINKING THROUGH ASYNCHRONOUS FORUMS IN BLENDED LEARNING DESIGN

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The future of learning.

Approval of Dissertation

The undersigned certify that they have read the dissertation entitled

DEVELOPING HIGHER ORDER THINKING THROUGH ASYNCHRONOUS FORUMS IN BLENDED LEARNING DESIGN

Submitted by:

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In partial fulfillment of the requirements for the degree of

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Dedication

To my mother

Acknowledgement

The many lessons that I learned throughout my life have definitely helped me on this doctoral journey.

Deepest gratitude is extended to my supervisor, Dr. Debra Hoven, for her enduring encouragement and mentorship to make my project more meaningful. I also thankfully acknowledge my committee members and examiners—Dr. Agnieszka Palalas, Dr. Sarah Elaine Eaton, Dr. Sharon Friesen, and Dr. Roswita Dressler—for their professional feedback and guidance to make my draft stronger.

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I now feel that I am standing on the shoulders of giants. Pioneers in the field of online learning desperately tried to introduce technology into education to transform the system, bring about more meaningful educational experiences, and then create a healthier society. I would like to humbly take the baton, heartily appreciating what they have achieved.

Lastly, special thanks go to my family. I could not have completed this dissertation without the tremendous support and patience of my wife, Yuko. My son was still one year old when I embarked on this doctoral journey. Yuito, you are an endless source of joy and inspiration for my work and in my life. Thank you.

Abstract

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 due to the dominant test-oriented practice. The purpose of this action research study is to explore an extracurricular blended learning (BL) program that I created to develop the higher order thinking of EFL learners at a public high school in Japan. This study drew on two theories: ecological constructivism for program design and sociocultural theory for mediation. In this one-month BL program, 16 participants engaged in online synchronous and asynchronous activities with English as a medium of instruction and communication while being supported by in-person face-to-face sessions conducted in Japanese. Qualitative data were collected via three methods: asynchronous forums, a post-survey, and my observation notes. Participants' interactions posted in forums were transformed into quantitative data using three existing content analysis instruments: the Interaction Analysis Model, Cognitive Dimension of Revised Bloom's Taxonomy, and Krathwohl's Affective Domain. Then, the quantitative data were triangulated with qualitative data. To investigate my mediation as an instructor in this project, one original framework was created, employing an inductive approach. Coding results indicated that in forums, in which I used various mediation strategies, participants demonstrated higher order thinking to a certain extent overall; however, learner-learner interaction was not as highly activated as expected mainly due to limited social interaction within the learning environment explored in the study. This study suggests that constructivist asynchronous forums can be utilized to develop the higher order thinking of EFL learners in K-12 settings with appropriate program design, instructor mediation, and content. The recommended design includes a purposeful in-person face-to-face meeting at the beginning, organic mixture of interaction and reflection,

asynchronous interaction followed by synchronous gatherings, and developmental organization of multiple forums. Implementing interventions to develop higher order thinking in successive action research cycles is expected to be a first step to achieve an ultimate goal of building a healthier society by nurturing mature citizens.

Keywords: asynchronous forums, blended learning, constructivism, content analysis, dynamic assessment, English as a foreign language (EFL), higher order thinking, mediation, sociocultural theory

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Glossary

Term	Definition
Affective Domain	Abbreviation for the affective domain of Bloom's taxonomy (Krathwohl et al., 1964). See also Bloom's taxonomy in this list
asynchronous forum	A learning activity where participants interact with written language separately at different times
BL	Acronym for blended learning. In this study, BL is intended to be the purposeful integration of classroom in-person F2F learning experiences and online learning experiences within an intentional course design (Garrison & Vaughan, 2008; Graham, 2006)
Bloom's taxonomy	The taxonomy of educational objectives, which was introduced by Bloom and Krathwohl in 1956 as a framework for classifying statements of what educators should expect students to learn as a result of instruction. The affective domain was introduced by Krathwohl et al. in 1964 as the second domain to be added to the original cognitive domain. In 2001, Anderson et al. introduced a revision of the original framework
Cognitive Dimension	Abbreviation for the revision of the cognitive dimension of original Bloom's taxonomy (Anderson et al., 2001)
constructivism	According to this learning theory, knowledge is created among learners, working together, drawing on their individual perspectives and past experiential learning. Constructivism is not monolithic and has several derivatives including cognitive constructivism, social constructivism (Powell & Kalina, 2009), radical constructivism (Glasersfeld, 1995), holistic constructivism (Scheer et al., 2012), and ecological constructivism (Hoven & Palalas, 2016). This study draws on social constructivism and ecological constructivism
constructivist-informed teaching	Based on constructivism, educators will be able to help learners by understanding the learners' existing structure and providing mediation to adapt the structure to accommodate new learning. Combined with sophistication of instructional design and theories/frameworks related to online learning, technology as a tool has made it possible for constructivist-informed teaching to be widely adopted. In relation to the teaching aspect of this study, social constructivism is relevant due to my focus on students' interaction. Also, ecological constructivism is drawn on to organically interweave reflection with the collaborative aspect
content analysis	A technique to understand the transcript at deeper levels. In general, the goal of content analysis is to reveal information that is not observed at the surface level of the transcripts
DA	Acronym for dynamic assessment. DA 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). DA is closely related to sociocultural theory
EFL	Acronym for English as a foreign language. EFL settings are settings where students living in a non-English speaking country learn English

EAL	Acronym for English as an additional language. EAL settings are settings where students living in an English-speaking region need English proficiency to be well integrated as a citizen of the community
extracurricular	Extracurricular programs are programs that are not part of regular classes that require official grading needed for participants' graduation but are rather an additional course in which only voluntary students participate by no compulsion
F2F	Acronym for face-to-face. In this study, F2F means face-to-face in-person and is not used to refer to technologically-mediated synchronous meetings
G-DA	Acronym for group dynamic assessment. G-DA applies the same principles of mediation as in individualized interactions but broadens the focus to an entire group (Poehner, 2009)
higher order thinking	In this study higher order thinking is defined as cognitive mental functions of understanding, applying, analyzing, evaluating, and creating knowledge that are voluntarily controlled and facilitated through interaction (Anderson et al., 2001; Krathwohl et al., 1964; Vygotsky & Rieber, 1997)
HMFs	Acronym for higher mental functions. It is a term that is used and explained in English translation of Vygotsky's work. HMFs are socially acquired, mediated, voluntarily controlled, and linked to a broader system of other functions (Vygotsky & Rieber, 1997)
IAM	Acronym for the Interaction Analysis Model, a content analysis instrument that was developed by Gunawardena et al. (1997) as a tool to examine knowledge construction in asynchronous forums
linguistic instrumentalism	An ideology that emphasizes the utilitarianism of learning English for sustaining economic development as a society and for mobility obtained by an individual
LMFs	Acronym for lower mental functions. It is a term that is used and explained in English translation of Vygotsky's (1978) work. 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
MEXT	Acronym for Japan's Ministry of Education, Culture, Sports, Science and Technology
neoliberalism	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 (Kubota, 2011)
reflection	"Reflection is what happens in the interstices in our minds and being between stillness, cognition, movement, and affect (feelings, emotions and beliefs). It is where creativity and deep understanding emerges—including creativity of construal, thought, ideas, and insight. It is this embodied emergence of imagination and creativity that propels innovation and brings about transformation" (Hoven, 2019, p. 434)
SCT	Acronym for sociocultural theory. SCT refers to a Vygotsky-inspired theory, the central tenet of which is that human thinking is symbolically

	mediated (Lantolf, 2013)
TESOL	Acronym for teaching of English to speakers of other languages
ZPD	Acronym for the zone of proximal development. Vygotsky (1978) defined ZPD as: "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance, or in collaboration with more capable peers" (p. 86)

Chapter 1. Introduction

Introduction

English as a school subject is a crucial part of university entrance examinations in Japan. Thus, 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. This is due to the test-oriented practice in Japan, which is based upon cognitive-behavioral theory. Although lectures remain a dominant instructional method in EFL classrooms at high schools in Japan, every educational institution is expected to fulfill their responsibility to provide learning environments conducive to the development of capable and creative minds readied for the challenges of this complex world.

The purpose of the action research study was to explore an extracurricular blended learning (BL) program that I created as an intervention to develop the higher order thinking of EFL learners at a public high school in Japan. The design of the BL program was based on the outcomes from a trial version of a program with similar aims that was conducted at the same site in July-August 2020. This study was guided by three research questions: (1) to what extent can higher order thinking be demonstrated among participants in asynchronous online forums?; (2) what factors in students' engagement in asynchronous online forums may contribute to the development of higher order thinking, if any?; and (3) what factors in the blended learning design may contribute to the development of higher order thinking, if any? This study drew on the construct of mediation from sociocultural theory (SCT) and used one existing model, the Interaction Analysis Model (IAM), and two established taxonomies, Cognitive Dimension of Revised Bloom's Taxonomy and Krathwohl's Affective Domain, to explore the development of the higher order thinking of participants.

In this BL program, which was implemented in July-August 2021, the participants engaged in online synchronous and asynchronous activities with English as a medium of instruction and communication while being supported by in-person face-to-face (F2F) sessions conducted in Japanese. This study took a mixed method design (Creswell, 2014). Qualitative data were collected via three methods: (1) asynchronous forums to obtain written texts from participants and the instructors, (2) a post-survey with open-ended questions, and (3) researcher's observations that were recorded in a research journal. Participants' interactions posted in asynchronous forums are transformed into quantitative data by content analysis with one existing model and two established taxonomies. Then, the quantitative data were triangulated with qualitative data derived from closer examination of transcripts of participant interactions, the researcher's observations, and a post-survey.

Research on asynchronous interaction or BL in K-12 settings, especially in Asian countries, has still not been well-developed. Thus, this research was expected to yield findings for teachers and course designers to make use of affordances that both the online and F2F components in BL systems provide to support K-12 students in developing higher order thinking through constructivist learning. In this chapter, I introduce the research problem and the background to the problem. Then, I clarify the purpose of the study and research questions that were pursued. Subsequently, I discuss the scope of the study. At the end, I present an overview of the dissertation.

Background: Online Learning for Collaborative Constructivist Approaches

The term *online learning* can be used depending on the educational context, but with regard to computer-mediated learning, online learning approaches are often associated with collaborative constructivist views of learning capitalizing on the potential of technologies to

connect people (Garrison, 2009). Although course designers and instructors are advised to combine multiple theories to achieve meaningful teaching, flexibly adapting to the needs and goals of each educational setting, if there is one predominant learning theory hailed as foundational to online learning, it is constructivism (Conrad & Openo, 2018). Constructivism is not monolithic; however, from this perspective broadly, knowledge is created among learners, working together as they draw on their individual perspectives and past experiential learning. On the basis of constructivist theory, educators will be able to help learners by understanding the learners' existing structures and providing interventions to adapt the structures to accommodate new learning (Wark, 2018).

Technologies can be a catalyst for educational transformation by increasing the quality of learning experiences (Garrison & Anderson, 2003). The rationale underpinning this belief rests on the assumption that technologies provide the inherent potential to bring learners to higher levels of learning. On the other hand, Kanuka (2008) argued that, although technologies can be a catalyst for instructional innovation, technologies are non-neutral. One example of this is that modern technologies are connected with neoliberalism and creating a capitalistic climate that includes commercialization of education (Campbell & Schwier, 2014; Kanuka, 2008). Attention should be given to the non-neutrality that technologies might entail in and of themselves. Also, it has been established that introducing technology for the sake of technology does not work (Cleveland-Innes & Wilton, 2018). Technology is a tool, and what matters is what we humans can do with the tool (Palalas & Hoven, 2016).

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 following lecture formats (Hodges et al., 2020).

In contrast, mainstream 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 (Conrad & Openo, 2018; Garrison, 2016). In other words, while online learning can be seen as a new form of distance education and an alternative in the context of teaching and learning during a pandemic, quality online learning is less about bridging distances and more about engaging learners in interaction in collaborative learning activities. Collaborative constructivist approaches are crucial to solve or mitigate a problem at the site of the action research study reported here. The details of this problem are described in the next section.

Educators are advised not to overreact to reliance on self-study in distance education or the excess of teacher-centered approaches that often draw on cognitive-behavioral theory at F2F institutions (Halverson et al., 2017). What works is highly context-dependent because teaching and learning occur in various settings and aim to achieve unique goals. To emphasize one over the other may distort the reality that educational contexts are diverse; however, there is a growing consensus that we must provide active, engaged, and collaborative learning experiences if our educational goals are to develop critical and creative thinkers and learners (Garrison, 2016). Bozkurt et al. (2015) explored trends in the field of distance education research during the period of 2009-2013 through an extensive review of articles that appeared in major peer-reviewed scholarly journals. Theories and concepts referenced in these articles were gathered, and the ten most frequently cited ones were presented. It was found that the top four theories were related to collaborative constructivist learning: community of inquiry, collaborative learning, constructivism, and connectivism, respectively. It is evident that theories or concepts that explain

how learning occurs in networks through collaboration in a community were favored by online learning researchers. Wong et al. (2016) analyzed research trends in the field of open and distance learning in 2005 and 2015 and compared the results. Among micro-level research areas, *instructional design* was the most prominent subject in both 2005 and 2015, which suggests that utilizing new technologies to enable better approaches that go beyond lecture formats had remained an important research area for a decade. Among meso-level research areas, a notable increase in percentage was observed for *quality assurance* in the decade, which suggests that practices in online learning environments had shifted from teacher-led to student-centered learning, keeping up with the pace of technological innovation.

The importance of collaborative constructivist approaches was recognized in the context of transition from knowledge transmission to knowledge construction even before technology was introduced in classrooms, but meaningful practice based on constructivism was limited only to practice implemented by a small number of intentional teachers and institutions (Laurillard, 2012). Knowledge construction methods usually demand more sophisticated skills from educators than knowledge transmission methods do, and there are various realistic reasons that prevent educators from adopting constructivist learning, including large class sizes, limited class time, and teachers' excessive workload (Garrison, 2016; Hodges et al., 2020). Combined with sophistication of instructional design and development of theories related to online learning, technology as a tool, with its potential to bring students together and engage them collaboratively through the creation of sustainable communities of learners, has made it possible for constructivist approaches to be widely adopted. Collaborative constructivist approaches to teaching and learning have been central to the development of quality online learning (Conrad & Openo, 2018; Garrison, 2016).

The focus on collaborative constructivist approaches in online learning in the past few decades rest on the belief that these educational 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 (Collins, 2014; Morrison, 2007). Education has been under pressure to transform itself to correspond to various changes in society such as changes in demographics, technology, economics, and sociocultural changes (Keller, 2008). The implication is that educational institutions have the critical responsibility to provide learning environments for students to be independent learners who can function in this complex world, focusing on, for example, critical thinking, problem solving, and learning how to learn (Gabriel, 2007). Neoliberal advocates might insist that education should effectively respond to accelerating global competition. For example, according to "The second basic plan for the promotion of education" (MEXT, 2013), which was drafted by Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) and adopted by the cabinet in 2013, English language education in the country is directed to develop *human resources* because the "increasingly severe economic environment and migration toward a knowledge-based society" (MEXT, 2013, Part 1-1) was one of the "crises facing the country" (MEXT, 2013, Part 1-1). On the other hand, people who are conscious of social reform might see education as a means to nurture critical and democratic citizens. For example, Campbell and Schwier (2014) stated that online constructivist learning can contribute to the development of active and critical citizens who help to shape tolerant, diverse, and inclusive communities. Perspectives being different, the consensus seems to be that education should serve to lead learners to higher order thinking.

Higher order thinking is defined in this study as cognitive mental functions of understanding, applying, analyzing, evaluating, and creating knowledge, which are voluntarily controlled and facilitated through interaction. This definition is based on the revision of the cognitive dimension of Bloom's taxonomy (Anderson et al., 2001), the affective domain of Bloom's taxonomy (Krathwohl et al., 1964), and Vygotsky's concept of lower mental functions (LMFs) and higher mental functions (HMFs; Vygotsky & Rieber, 1997). The affective domain has five categories; the first two are related to community building (receiving and responding) while the last three (valuing, organizing, and characterizing) are related to metacognition. The affective domain and Vygotsky's concept of HMFs are reflected in the latter part of the definition, that is, "voluntarily controlled and facilitated through interaction." In addition, while focusing on the collaborative aspect, I drew on ecological constructivism (Hoven & Palalas, 2016), in which collaborative and individual aspects of learning are expected to be organically interwoven, in the design and implementation phase to develop higher order thinking. The concept of higher order thinking is further explored in Chapter 2.

The Problem

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 the prevalence of 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 and incorporate 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, despite being at the forefront of global technological advancement, the

infrastructure and use of technology in both secondary and post-secondary education is far behind in Japan, which was revealed by the COVID-19 pandemic in 2020 (Aoki, 2010; Kittaka, 2020).

To identify and 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. When described in the field of teaching of 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. EAL settings are those where students living in an English-speaking region need English proficiency to be well integrated as a citizen of the community. In contrast, 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 and do not have many opportunities to practice it.

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 that is administered by an independent administrative institution called the National Center for University Entrance Examinations, which was revised into the Common Test for University Admissions in the academic year 2020 (National Center for University Entrance Examinations, 2020). Striving to succeed in examinations under pressure might generate positive effects, but too much focus on getting high scores on tests might also produce side effects (Guo, 2012). For instance, the English portion of university entrance examinations in Japan tend to focus on reading skills without integrating the other three skills: writing, listening, and speaking. In addition, the reading part often requires students to answer questions as fast as possible using

only decoding skills. Furthermore, students know that they will be required to submit their English proficiency tests scores even after finishing school education. Learning English equals taking tests for most Japanese people (Kubota, 2011). In this reality, it might be more accurate to suggest that, for both students and EFL teachers, the focus should be only on test-taking skills. English is currently a tool for most students in Japan used only to demonstrate their memory and ability to learn effectively. Learning English for tests might be an unavoidable part of reality, but the final goal of learning English at school cannot be aimed solely at getting high scores in tests.

Another reason for EFL classrooms dominated by test-oriented practices based on cognitive-behavioral theory is related to English education policies driven by neoliberalism. *Neoliberalism* 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 (Kubota, 2011). This ideology usually adopts a trickle-down hypothesis in which economic wealth gathered within the upper levels of society later benefits less privileged members of the society by improving the economy as a whole. Neoliberalism has permeated education, especially English language education, in the past few decades. Some researchers call English education driven by neoliberalism linguistic instrumentalism (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 (Kubota, 2011). 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 the existence of fierce competition on the global stage and implies that students should serve the nation as a resource (Barrett & Miyashita, 2016). This discourse tends to encourage students to study English harder to enter a prestigious

university and to be a human resource with a competitive edge. This competency-based learning can be valuable to some populations, but it will not meet all needs, especially for people who are socially and economically disadvantaged.

A growing body of research has reported the negative effects of linguistic instrumentalism in many parts of the world: China (Guo & Guo, 2016), European countries (Grin, 2015), the Greater Mekong Sub-region (Bruthiaux, 2015), India (Sontag, 2015), Japan (Kubota, 2011), Nordic nations (Stensaker et al., 2009), Singapore (Wee, 2010), South Africa (Wright, 2015), South Korea (Park, 2011), and the USA (Chun, 2009). The corporate world often tries to dominate education in an effort to produce consumers to serve the economy (Kubota & Takeda, 2021; Phillipson, 2005; Ricento, 2020). Despite policymakers' emphasis on the merits of English proficiency, Romaine (2015) insisted that few individuals benefit from linguistic instrumentalism; nor does society as a whole. Linguistic instrumentalism seems to be incompatible with learning to develop critical thinking or higher order thinking, considering the ideology's explicit focus on competition to develop the economy.

The ongoing language policies influenced by neoliberalism need to be critically reviewed because "decision making about language policies in education tends to reflect the agendas of the most powerful groups, which includes seeking foreign investment and loans necessary to bolster their ability to maintain power, rather than the soundness and practicability of specific policies" (Ricento, 2015, p. 294). Despite accumulating criticism towards linguistic instrumentalism, solving or alleviating problems caused by the socioeconomic ideology is not an easy task because neoliberalism is now deeply rooted in societies to the extent that the situation can be called paralysis (Pillar & Cho, 2013; Norton, 1997). It might be difficult in such a situation for people, the media, or even language professionals to properly recognize the problems and openly

criticize the causes.

So far, I have suggested that Japan is an EFL setting and that the university entrance examination system and linguistic instrumentalism are reasons why EFL classrooms at high schools in Japan tend to lack learning activities to develop higher order thinking. Closer examination of the reasons might be necessary and profitable, but such an examination is out of the scope of this study. This study is intended to be action research to solve or mitigate problems observed on the ground practically. In addition to the problem that the practice in EFL classrooms heavily relies on cognitive-behavioral theory, Japan is behind in infrastructure and use of technology in education, which was revealed by the COVID-19 pandemic in 2020 (Aoki, 2010; Kittaka, 2020). The transition to emergency remote teaching was delayed in Japan during the pandemic in 2020 due to insufficient technological infrastructure at educational institutions and teachers' lack of experience in teaching online.

Considering that both learners and teachers in Japan are not accustomed to technology-mediated constructivist learning, one area to be explored when thinking about ways to develop the higher order thinking of K-12 students is the use of a blended learning design. Currently, the term, *blended learning* (BL), has various definitions (Palalas, 2019). As for the issue of what is being blended, Graham (2006) argued that BL combining F2F and online instruction reflects the historical emergence of BL accurately and is widely accepted. This type of BL can occur at four levels: (1) activity level, (2) course level, (3) program level, and (4) institutional level. In the intervention created in this study, F2F and online instruction were blended at the course level; namely, in this study BL was intended to be the integration of classroom F2F learning experiences and online learning experiences within a purposeful course design. The issue of the definition of BL is addressed in the literature review section.

Students in secondary education in Japan often struggle with constructivist learning because the learner-centered way of learning requires self-regulation and motivation on the learners' side and careful scaffolding on the instructors' side. K-12 students often lack the ability to manage their learning independently. BL design has been adopted as a possible solution to make online asynchronous forums in K-12 settings effective. While research on online asynchronous forums and blended learning systems in higher education is growing, few attempts have been made to explore the possibility of asynchronous forums embedded in blended learning programs in K-12 settings, especially in Asian countries including Japan. This action research study aimed to fill this gap.

In summary, the problem is that EFL classrooms in high school settings in Japan tend to lack learning activities to develop higher order thinking due to the prevalence of test-oriented practices and that most students in Japan are not accustomed to technology-mediated constructivist learning. In the following sections, the purpose of the study and research questions that guided the study are elaborated.

Purpose of the Study

The purpose of this study is to explore a BL program that I created as an intervention to improve the higher order thinking of EFL learners at a public high school in Japan. Adopting an action research approach with a pragmatic paradigm, I designed the intervention to solve or mitigate problems observed on the ground, drawing on the concept of praxis, a dialectical unity of theory and practice through reflective thought.

Although the implementation of the BL program was comprehensive in that the BL program included in-person F2F meetings, synchronous online sessions, and asynchronous online forums, this study focused on asynchronous forums in the collection and analysis of data.

The term, *asynchronous forum*, which is also 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. Interaction can be synchronous or asynchronous in online learning. In synchronous interaction, participants are doing the same thing at the same time, and they share the same virtual space concurrently (e.g., live chat or live meetings using online conference software such as Zoom or Adobe Connect). In asynchronous interaction, participants are learning together as one group yet separately at different times of their choosing, using discussion board systems in learning management systems such as Moodle or Blackboard. There is increasing consensus in the growing field of online learning that text-based asynchronous forums can provide learners with meaningful educational experiences (Conrad & Openo, 2018; Garrison, 2016). Text-based asynchronous interaction has the potential to lead learners to deeper learning with the power of writing and time for reflection. The characteristics of asynchronous forums are described in more detail in Chapter 2.

Research Questions

Main Research Questions

This study was guided by the following three main questions:

1. To what extent can higher order thinking be demonstrated among participants in asynchronous online forums?
2. What factors in students' engagement in asynchronous online forums may contribute to the development of higher order thinking, if any?
3. What factors in blended learning design may contribute to the development of higher order thinking, if any?

Each of these three main questions was guided in more detail by the following sub-

questions.

Sub-Questions for the First Main Question

1. How much did each participant interact in the asynchronous forums?
2. How does content analysis with the Interaction Analysis Model (IAM; Gunawardena et al., 1997), the cognitive dimension of revised Bloom's taxonomy (Cognitive Dimension; Anderson et al., 2001), and Krathwohl's affective domain (Affective Domain; Krathwohl et al., 1964) describe the asynchronous forums?
3. How does content analysis with the IAM, Cognitive Dimension, and Affective Domain describe each participant in the asynchronous forums?
4. What are the implicit elements of higher order thinking development in the asynchronous forums that may not be observed in content analysis with the IAM, Cognitive Dimension, and Affective Domain if any?

Sub-Questions for the Second Main Question: Process Factors

1. How did the learning tasks in the BL program assist or inhibit higher order thinking development?
2. What instructional techniques performed by the instructors in the asynchronous forums assisted or inhibited higher order thinking development?
3. What features of learner-learner interaction in the asynchronous forums assisted or inhibited higher order thinking development?

Sub-Questions for the Third Main Question: Contextual Factors

1. What design factors of the online component of the BL program facilitated or inhibited the presence of higher order thinking?
2. What design factors of the in-person face-to-face component of the BL program facilitated

or inhibited the presence of higher order thinking?

3. What design factors of the organization of online and in-person face-to-face components in the BL program facilitated or inhibited the presence of higher order thinking?

Research Approach

An action research approach was adopted for this research project. I created a BL program for EFL learners at my workplace as an intervention to see how or whether the program could contribute to the higher order thinking development of the participants. *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). According to Kemmis (1997), there are two approaches in the field of action research: the reflective practitioners and the critical theorists. In this study, I took elements from both sides. Procedurally, action research is a cyclical process, and different scholars have developed different sets of cyclical procedures (Cohen et al., 2018; Stringer, 2014). In each cyclical procedure, the link between action and reflection on action is readily apparent. Also, throughout the cyclical process, theory is called for as an essential tool to provide teachers and researchers with the understanding necessary to take effective action. 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 in-person F2F sessions conducted in Japanese. The online component of the program consisted of four one-week asynchronous forums and two 90-minute synchronous meetings. The in-person F2F meetings were placed at the beginning, in the middle, and at the end of the program. In this study qualitative data were gathered through three methods: asynchronous forums to obtain textual data, a post-survey with

open-ended questions, and my observations recorded in a research journal. Participants' interactions posted in asynchronous forums were transformed into quantitative data through content analysis. Then, the quantitative data were triangulated with qualitative data derived from closer examination of participants' transcripts, a post-survey, and the researcher's observation. The details of the analysis are described in Chapter 3.

Scope of the Study

The site of this study was a public high school in Japan. The number of participants was limited to a maximum of 20 to ensure the quality of the program. I was a full-time EFL teacher working at the site. I took on the role of researcher, program designer, and instructor in this research project. An adjunct professor working at universities in the U.S. joined as a co-instructor. As an instructor, I was mainly in charge of the asynchronous forums while the co-instructor was in charge of synchronous sessions. The analysis focused on asynchronous forums; this study described qualitative and quantitative dimensions of the presence or absence of higher order thinking development in asynchronous forums and analyze what factors contributed to that development, if any. Also, although this BL program was for EFL learners, this study did not examine how or whether participants' language proficiency was improved. The research site, the intervention, and methods for the analysis are described in more detail in Chapter 3.

Chapter Summary

In this chapter, I introduced the research problem and the background to the problem. Then, I clarified the purposes of the study and research questions to be pursued. Subsequently, I described the research approach and discussed the scope of the study. This study was motivated by a desire to improve practice through an action research approach, drawing on the concept of praxis. To be more specific, this study was intended to determine whether or not a BL program

that I created as an intervention at my workplace could be used to improve the higher order thinking of EFL learners.

Overview of the Dissertation

This dissertation is organized into eight chapters. Chapter 1 is an introduction of the study. Chapter 2 is a review of the literature relevant to the purposes of the study. Chapter 3 describes the research approach taken in this study and methods used to collect and analyze the data including the design of the intervention. Chapter 4 provides the findings of the study. Chapters 5 to 7 discuss the results, and Chapter 8 presents the conclusions and discusses the implications of this study for future research and practice.

Chapter 2. Literature Review

Introduction

This literature review is an analysis of the empirical and theoretical research that bears directly on the purpose of this study. The essence of this action research study is represented in the title: *Developing Higher Order Thinking Through Asynchronous Forums in Blended Learning Design*. Adopting an action research approach, I designed the intervention in this study to solve or mitigate problems observed on the ground, drawing on the concept of praxis, a dialectical and ecological unity of theory and practice through reflective thought. The most important concept in this study is higher order thinking; thus, this chapter starts with a review of this concept. Then, the review led me to explore four other areas along with the purpose of this study.

This chapter is divided into five main sections. In the first section, various interpretations of the concept of higher order thinking are described. In the second section, the literature is used to explore the potential of asynchronous forums as a means to develop higher order thinking. In the third section, the literature on dynamic assessment, a pedagogical approach that can be a theoretical basis for teachers' mediation in asynchronous forums, is reviewed. The fourth section is a review of the literature on content analysis, which can be used to mitigate the drawbacks of dynamic assessment. In the last section, the literature is used to identify the possibility of blended learning systems, which may provide solutions to problems that often pertain to constructivist-based asynchronous forums especially in K-12 settings.

Higher Order Thinking

Despite the popularity and the importance of the concept of *higher order thinking* in education, there is no clear definition of the term. In the first section of this literature review, I

explore how the concept has been defined and used, examining its relationships with three major taxonomies: Bloom's taxonomy (Bloom & Krathwohl, 1956), the affective domain of Bloom's taxonomy (Krathwohl et al., 1964), Anderson et al.'s revised taxonomy (2001), and Vygotsky's (1978) concept of higher mental functions.

Although I recognized several other terms that might be interchangeable with higher order thinking, including critical thinking, deep/deeper learning, holistic thinking, knowledge building, and metacognition among others, I focused on the concept of higher order thinking as described below. I see high value in critical thinking, but critical thinking can be considered as a part of higher order thinking. I decided not to choose the term, deep or deeper learning, due to a passive connotation that the word, *learning*, might entail. I wanted to focus on what can be achieved as a result of learning. Furthermore, Morrison (2004) introduced the concept of holistic thinking. This concept seems most relevant to my interest in this study; namely, leading students to deeper and more complex thinking, but the concept has not been fully developed. Scardamalia and Bereiter (2006) introduced the concept of knowledge building, arguing that knowledge exists and emerges in discourse, and thus knowledge building should be facilitated through inquiry in the collaborative communities of learners. This concept is crucial to this study, but while focusing on the collaborative aspect, my intention was to observe how reflection, an element of learning internal to individual learners, can be meaningfully interwoven with the collaborative aspect in this study. Metacognition is included in the discussion that follows as a part of higher order thinking. Thus, the term, higher order thinking, which is widely acknowledged and closely related to my interest in this study, was chosen. In the following section, I start with one of the most important, but controversial, concepts in thinking about higher order thinking: Bloom's taxonomy.

Bloom's Taxonomy

A framework that is often mentioned when higher order thinking is considered is Bloom's taxonomy (Bloom & Krathwohl,1956). The taxonomy of educational objectives, often referred to as Bloom's taxonomy, was introduced by Bloom, Engelhart, Furst, Hill, and Krathwohl in 1956 as a framework for classifying statements of what educators should expect students to learn as a result of instruction. Bloom's taxonomy provided definitions for each of the six major categories in the cognitive domain, each of which was further broken into subcategories. The six major categories were ordered from simple to complex, which means that mastery of each category was prerequisite to mastery of the next, more complex one: (1) Knowledge, (2) Comprehension, (3) Application, (4) Analysis, (5) Synthesis, and (6) Evaluation (Krathwohl, 2002). Tanujaya et al. (2017) defined higher order thinking as the last three aspects of Bloom's taxonomy and low order thinking as the first three.

In relation to guiding students to higher order thinking, Bloom's taxonomy has been applied in education for various purposes. For example, Hoven (1997) used Bloom's taxonomy, arranging it by adding one more category, appreciation, to design listening comprehension tasks in an order that allows learners to make their own choices about the level of the difficulty of the tasks, which then can lead learners to be proactive in managing and directing their own learning.

While the cognitive domain has been the primary focus of most traditional education, one of the other domains, the affective domain, might also be valued in the context of online or blended learning. The affective domain was introduced by Krathwohl, Bloom, and Masia in 1964 as the second domain to be added to the previously-introduced cognitive domain. The affective domain has five categories that were ordered from the lowest level to the highest: (1) Receiving, (2) Responding, (3) Valuing, (4) Organizing, and (5) Characterizing. The affective domain is

closely related to community building (Category 1 and 2) and metacognition (Category 3, 4, and 5), both of which are important factors in computer-mediated learning, which is described in the section titled, Asynchronous Forums.

Anderson et al.'s Revised Taxonomy of Educational Objectives

In 2001, 45 years after Bloom's taxonomy was published, Anderson et al. (2001) introduced a revision of the cognitive domain of the original framework. In the revision, Anderson et al. (2001) did not address the affective domain. Krathwohl, who was one of the authors of the original version, was among the authors of the revision. Bloom's taxonomy was widely known and cited, but no theory or framework can avoid a certain amount of criticism. Also, almost a half century of new findings had accumulated. Anderson et al. (2001) tried to revise the original taxonomy to respond to the criticisms and incorporate new findings without changing the aim of the original taxonomy, that is, classifying educational goals, as shown in the title of the original draft published in 1956: *Taxonomy of Educational Objectives: The Classification of Educational Goals*.

There were two explicit changes in the 2001 revision. First, the new version of knowledge dimension contains four subcategories instead of the three included in the original scheme. Although some wording was revised, there were no substantial changes to the original three subcategories. The one added to the new framework is *metacognitive knowledge*, which was not widely recognized at the time of the original version.

The other explicit change is in the overall structure of the cognitive process dimension. The original number of categories, six, was retained, but (1) three categories were renamed but remained substantially the same, (2) the order of two categories was exchanged, and (3) all the names of the categories were changed from noun form to verb form. The six major categories in

the new scheme are: (1) Remember, (2) Understand, (3) Apply, (4) Analyze, (5) Evaluate, and (6) Create.

Krathwohl (2002), an author of both the original and the 2001 revision of the taxonomy, stated that the six major categories in both taxonomies are ordered from simple to complex or from concrete to abstract. Krathwohl (2002) also argued that from Comprehension to Synthesis in the original taxonomy and from Understand through Create in the 2001 revision are usually considered the most important outcomes of education, but Krathwohl did not use the term higher order thinking in explaining the schemes. It was Vygotsky who used the word, *higher,* in explaining the mental functions of human beings.

Vygotsky's Lower and Higher Mental Functions

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 (Subbotsky, 1996; Vygotsky & Rieber, 1997). Vygotsky viewed the development of human mental functions as their transition from the original LMFs into HMFs. LMFs and HMFs can be defined with four major criteria: (1) origins, (2) structure, (3) the way of functioning, and (4) the relation to other mental functions. LMFs are genetically inherited in terms of origin, 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.

I am referring to Vygotsky's concepts through English translation of his works. Gillen (2000) suggested that English translation of Vygotsky's works has deficiencies, which has resulted in distortions in interpretations of his works. This can be a flaw in this study. To mitigate

this problem, I kept referring to new articles on this issue in addition to closely reading the translation version of Vygotsky's works.

Gunawardena et al. (1997), who introduced a content analysis instrument, called the Interaction Analysis Model (IAM), identified close relationship between higher order thinking and HMFs. The IAM is an instrument intended to assess higher order thinking development in constructivist learning. In constructivist learning, learners are expected to show development not in reproduction, but in knowledge construction through interaction. Gunawardena et al. (1997) argued that "Knowledge construction necessitates higher order thinking" (p. 410). The IAM begins with what could be described as LMFs (Phase I) and moves to what HMFs represent (Phase V). The characteristics of the IAM are described in more detail in the section titled, The Interaction Analysis Model.

In this study, higher order thinking is defined using the revision of the cognitive domain (Anderson et al., 2001), Krathwohl's affective domain (Krathwohl et al., 1964), and Vygotsky's concept of LMFs and HMFs (Vygotsky & Rieber, 1997). *Higher order thinking* herein represents the cognitive mental functions of understanding, applying, analyzing, evaluating, and creating knowledge (dimension 2.0 to 6.0 in Anderson et al.'s revision) that are voluntarily controlled and facilitated through interaction. The cognitive domain is reflected in the beginning of the definition, that is, "the cognitive mental functions of understanding, applying, analyzing, evaluating, and creating knowledge." The affective domain has five categories, and the first two, receiving and responding, are related to community building while the last three, valuing, organizing, and characterizing, are related to metacognition. The affective domain and Vygotsky's concept of HMFs are reflected in the latter part of the definition, which is "voluntarily controlled and facilitated through interaction." In the past few decades, developing

students' higher order thinking has become a widely shared goal not only in post-secondary education, but also in secondary education. In fact, recent research shows that even preschool children begin to show signs of higher-level thinking skills (Frausel et al., 2020). Educational institutions have been under pressure to transform themselves to correspond to various changes in a society that has shifted from an industrial economy to a knowledge-based economy. In the next section, I explore how higher order thinking can be developed in formal education.

Asynchronous Forums

Developing students' higher order thinking is a widely shared goal, but it is not an easy task to develop higher order thinking in formal education. One of the venues 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. In asynchronous interaction, participants are learning together separately at different times. There is growing consensus that text-based asynchronous interaction has the potential to lead students to deeper learning. The potential of asynchronous forums as a means of developing higher order thinking is explored next.

Online Learning, Interaction, and Constructivism

The number of institutions adopting online learning has been increasing in secondary and post-secondary education. This trend was evident even before the outbreak of the COVID-19 pandemic. Data from 2015 show that fully online student enrolments had been growing rapidly over the previous five years by approximately 10% per year in universities and 15% in colleges (Bates, 2018). With regard to K-12 institutions, data in 2008 show that 41% of districts in the U.S. were implementing blended learning (Picciano & Seaman, 2008). In the wake of the

COVID-19 pandemic, those numbers must have increased rapidly, but most of the programs might be called emergency remote teaching rather than quality online/blended learning. *Emergency remote teaching* is a temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances (Hodges et al., 2020). Quality online/blended learning, in contrast, is designed purposefully to take full advantage of the affordances of the online format. One of the major advantages of adopting online learning is its potential to increase interaction, which is divided into three categories: learner-content, learner-instructor, and learner-learner (Moore, 1989). Interaction is a driving force in learner-centered learning, which often draws on constructivism as its theoretical foundation.

Four learning theories that are often referred to in the field of online learning are behaviorism, cognitivism, constructivism, and connectivism. In the context of adult education, transformative learning (Mezirow, 2009) is added as a leading theory. Connectivism (Siemens, 2005) is a relatively new theory that is expected to have potential to transform education, although it is still being discussed whether it can be called a learning theory (Goldie, 2016). Alonso et al. (2005) insisted, while emphasizing benefits derived from shifting from teacher-led to learner-centered teaching, that instructors can achieve meaningful teaching by combining multiple theories, flexibly adapting to the needs and goals of each educational setting. In that sense, behaviorist and cognitivist practice should not be underestimated; however, if there is one predominant learning theory hailed as foundational to online learning, it is constructivism (Conrad & Openo, 2018). Constructivist-informed teaching has long been limited only to practice implemented by a small number of intentional teachers because it demands more sophisticated skills from educators than knowledge transmission methods do. Combined with the advancement of instructional design and theories/frameworks related to online learning,

technology, as a tool, has made it possible for constructivist-informed teaching to be widely adopted.

Constructivism is not monolithic. 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). Usually, the word, construct, embedded in constructivism is associated with architecture. In contrast, Hoven and Palalas (2016) indicated that the original French verb, *construire,* in Piaget's writing had been used in the context of biology (Davis & Sumara, 2002; Proulx, 2006) and that constructivism can be interpreted not with an architectural metaphor, but as something biological or "construal" (pp. 126). Close examination of each strand is out of the scope of this study, but in relation to this study, social constructivism is relevant due to my focus on students' interaction. Social constructivism, which has one of its roots in Vygotsky's cultural historical psychology, places emphasis on the interactive nature of learning as a means of knowledge construction (Powell & Kalina, 2009). Also, ecological constructivism, which focuses on the organic relationships between collaborative and individual learning, is drawn upon, due to my focus on students' reflection. In the intervention in this study, I interweaved reflection intentionally with the collaborative aspect of learning. The details of the program design are described in Chapter 3.

Constructivist practices often do not fit well with traditional government-mandated curricula or test-oriented realities (Wark, 2018). This is the case in Japan, where this study took place. Also, constructivist teaching is often difficult to implement in in-person F2F environments due to inherent limitations including a limited amount of time for interaction. Constructivist

practices can be overly demanding on students and instructors in F2F environments; however, with developments in technology, intentional educators are now able to design and implement constructivist teaching programs with increased interaction in fully online or BL systems.

Constructivist learning, especially social constructivist learning, necessitates interaction (Garrison, 2016). Interaction can be synchronous or asynchronous in online learning. In synchronous interaction, participants are doing the same thing at the same time. In asynchronous interaction, participants are learning together separately at different times. Each has its advantages and disadvantages; thus, intentional integration of both aspects is a key to the success of online or blended learning. In the following sub-sections, I focus on asynchronous forums, which have unique characteristics that may help develop higher order thinking as discussed below.

Asynchronous Forums for Developing Higher Order Thinking 1: Power of Writing

It is often said that writing leads us to deeper thinking, not only in the field of online learning, but in many other disciplines. For example, in the field of online learning, Conrad and Openo (2018) stated:

> However, it [writing online] also provides—forces upon—learners a vehicle to encourage them to think more deeply about the issues at hand than they may do in a face-to-face classroom, where a blurt or a nod can suffice for interaction and participation … and an abundance of literature points out the online advantage. (p. 47)

The characters in the novels of Haruki Murakami, a Japanese novelist whose works have been translated into more than 30 languages, and Murakami himself repeatedly state that they write to think (Murakami, 1987/2000). After recognizing the power of writing, Garrison (2016) insisted that understanding the differences in the nature of spoken and written communication is a key to

designing effective online and blended learning programs. The power of writing is one of the most explicit advantages that can be fully exploited in asynchronous forums.

Asynchronous Forums for Developing Higher Order Thinking 2: Power of Reflection

Reflection is another practice that can be incorporated in asynchronous forums to develop higher order thinking. Asynchronous forums provide learners with the ability to critically reflect on their views, which is necessary for higher order thinking (Garrison & Anderson, 2003). Among many definitions of reflection in the field of online learning (Conrad & Openo, 2018; Garrison, 2016; Rose, 2013), Hoven's definition (2019) represents the essence of reflection and its connection to higher order thinking:

> Reflection is what happens in the interstices in our minds and being between stillness, cognition, movement, and affect (feelings, emotions and beliefs). It is where creativity and deep understanding emerges—including creativity of construal, thought, ideas, and insight. It is this embodied emergence of imagination and creativity that propels innovation and brings about transformation. (p. 434)

The time available while engaging in asynchronous forums enables participants to think more deeply. On the other hand, in in-person F2F or online synchronous communication, participants are usually forced either to respond immediately (with no time available for deeper thinking), or they might not be expected to respond if the class is presented in a behaviorist or cognitivist lecture format.

While reflection is an important practice to develop higher order thinking, fostering the reflective practice of learners is not an easy task. Even if we understand the importance of reflection in theory, understanding how to develop the skills and the mindset of learners required for reflective practice is another story. Hoven (2019) suggested intentional incorporation of e-

portfolios in learning programs. One important notion that should be taken into account in trying to develop students' reflective practice is self-regulation. Self-regulation refers to students' ability to understand and control their learning environment (Schunk & Zimmerman, 1998). As I wrote in the previous section exploring higher order thinking, Anderson et al. (2001) added metacognitive knowledge as one of the four subcategories to the new knowledge dimension when they revised Bloom's taxonomy (Bloom & Krathwohl, 1956). In trying to utilize reflective practice in asynchronous forums, course designers or instructors are encouraged to incorporate instruction or activities for learners to become more conscious of the importance of self-regulation and metacognition.

Subsequently, I need to identify a theoretical basis that teachers can draw on to effectively facilitate constructivist-based asynchronous forums to develop higher order thinking. In the next section of this literature review, I examine how sociocultural theory and dynamic assessment, an assessment and teaching approach that derived from sociocultural theory, can be applied to asynchronous forums for more effective facilitation.

Dynamic Assessment as a Pedagogical Approach

In asynchronous forums, instructors are expected to facilitate learners' interaction to make the constructivist-based learning effective. A theoretical basis is called for to keep collectively improving practice. In this section, I explore how dynamic assessment, an assessment and teaching approach that derived from sociocultural theory, can be applied to make facilitation, or "mediation" (Vygotsky's term), in asynchronous forums effective.

Sociocultural Theory of Mind

The term, *sociocultural,* has been widely used in different contexts (Swain & Deters, 2007). For example, the concept of sociocultural competency, the ability to apply multicultural

knowledge in intercultural communication, is one of the communicative competencies that are often addressed in the field of second language acquisition (Ward & Kennedy, 1994). Despite the label, sociocultural, which might be more common in contexts such as sociocultural competency, the sociocultural theory (SCT) that I draw on in this study is a theory of human mental development. To be more specific, SCT refers to a Vygotsky-inspired theory, the central tenet of which 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.

Another possible confusion that pertains to SCT comes from the existence of Cultural-Historical Activity Theory (CHAT), which also has its origins in the writing of Vygotsky. Lantolf et al. (2015) stated that, without trying to distinguish these two theories, he uses the term SCT because most research conducted on second and foreign language learning within the Vygotskyan tradition uses the term, SCT. I chose the term, SCT, because most research using dynamic assessment, which I elaborate in the following sub-sections, adopts the term, SCT, as its theoretical foundation.

Vygotsky's concepts such as private speech, internalization, and regulation are closely related to SCT, but elaborating on each of these concepts is out of the scope of this study. One concept that is crucial to this study is the concept of mediation, that is, the concept that higher forms of thinking are symbolically mediated (Lantolf, 2000; Lantolf et al., 2015; Thorne, 2005). Vygotsky argued that humans do not act directly on the physical world but rely on tools, physical or symbolic, to change the world or establish a mediated relationship between ourselves and the world. Natural properties in the human mind are organized into a higher and culturally-shaped mind through the integration of symbolic artifacts, especially language, into thinking. More

practically, developmental processes take place through participation in cultural, linguistic, and historically-formed settings, such as family life or institutional contexts like schooling, where mediation takes place naturally or intentionally.

A central challenge confronting SCT is that this theory can be understood as a means of assimilation. Some researchers in critical pedagogy, especially in the field of second language acquisition, describe SCT-based practice (or formal schooling in general) as having the potential to maintain the existing socioeconomic class structures and further marginalize already disadvantaged populations (Norton & Toohey, 2004; Pennycook, 2001). That might be true; however, we will be able to overcome this challenge by focusing on the original goal of the theory, that is, developing higher order thinking through SCT. Higher order thinking includes critical thinking, which can lead people to resist inequity and transform their realities.

Theoretical Foundation of Dynamic Assessment

A method for better mediation that emerged in SCT, especially in SCT-based research on additional language acquisition, 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). The idea of leading a learner or a group of learners through learner-instructor interactions is hardly a new pedagogical innovation, but DA can help instructors to make their interactions with learners more systematic and more attuned to learners' emergent abilities. In that sense, DA is a praxis-based approach. *Praxis* is the dialectical unity of theory and practice (Lantolf & Poehner, 2011). DA is a theoretically-grounded framework that instructors who rely on their experiential or intuitive sense of how to support learner development can use to collectively improve their practice.

The theoretical basis for DA is found in works of Vygotsky (Poehner, 2007). Among many concepts that Vygotsky introduced, the zone of proximal development (ZPD) is most important to understand DA. Vygotsky (1978) defined ZPD as: "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance, or in collaboration with more capable peers" (p. 86). Simply put, ZPD is the difference between what a learner can do without help and what the learner can do with help. Vygotsky presented the concept of ZPD and developed cultural historical psychology, both of which are roots of social constructivism. According to the concept of ZPD model, a child follows an adult's example and gradually develops the ability to do certain tasks without help. DA is a pedagogical approach that adopts the concept of ZPD for school education.

Dynamic Assessment as a Pedagogical Approach

ZPD-based teaching is not new, but the concept of ZPD-based assessment makes DA unique. DA challenges the widespread acceptance of independent performance as the primary indicator of learners' abilities (Poehner, 2007). DA calls for assessors to abandon their role as observers of learner behavior in favor of a commitment to joint problem-solving aimed at supporting learner development. In DA, the widespread goal of producing generalization from static snapshots of performance is replaced by ongoing intervention attuned to learners' development. DA focuses not on product but on process. In that sense, DA is grounded in the genetic method, an approach to scientific research proposed by Vygotsky in which the development of learners is traced over time (Lantolf et al., 2015). DA is therefore a formative rather than summative form of assessment.

DA is an approach to assessment as the name shows, but it is also an approach to teaching.

In DA, as mentioned above, teachers are expected to provide learners with ongoing intervention attuned to learner development based on ZPD. In that sense, DA-based programs are focused on developmental education (Lantolf & Poehner, 2004). The basic difference between development in everyday life, where learners are left to their own devices, and developmental education is that the latter must be guided by well-organized and intentional instructions. Rather than waiting for individuals to become developmentally ready to learn, in developmental education, instructions are given intentionally to prepare learners for more complex concepts (Lantolf, 2013). DA links ongoing assessment to the provision of appropriate mediation.

Two Types of Dynamic Assessment

Lantolf and Poehner (2004) introduced two primary approaches to DA: interventionist DA and interactionist DA. Interventionist DA is concerned with quantifying the amount of support required for a learner to efficiently reach a pre-specified goal. Interactionist DA, on the other hand, focuses on the development of learners regardless of the effort required and without concern for a predetermined endpoint.

Gibbons' (2003) research, in which the ZPD was used as a lens for analyzing the interaction between elementary school teachers and their students in a content-based ESL class, is an example of interactionist DA, although the research is not explicitly framed as dynamic assessment (Lantolf, 2013; Lantolf & Poehner, 2004; Poehner, 2009). Gibbons documented how the teacher attempted in a whole-class format to mediate the students into using appropriate scientific jargon instead of everyday terms. Gibbons illustrated the relevance of interactionist DA in a content-based ESL classroom. Gibbons' focus was on a teacher co-constructing a ZPD by mediating the performance of the learners, following a series of small group experiments with magnetism.

Group Dynamic Assessment

Gibbons' (2003) research mentioned above is an example of interactionist DA, but it is also an example of group dynamic assessment (G-DA). Lantolf (2011) mentioned that research that implements 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). The concept of G-DA also resonates with the concept of knowledge building introduced by Scardamalia and Bereiter (2006). This concept of knowledge building views knowledge not as something static that resides within each individual learner, but something dynamic that emerges in discourse in collaborative communities of learners. G-DA applies the same principles of mediation as in individualized interactions but broadens the focus to an entire group (Poehner, 2009). Moving from a one-to-one model of teaching and assessment, which has been dominant in the area of DA, to a group-focused approach requires an understanding of the relationship between development of individuals and development of the group. Poehner (2009) argued that G-DA as a framework sensitizes teachers to learner development and makes it possible for teachers to re-envision groups not only as assemblages of individuals, but as cohesive units, where the development as a group is interrelated with the development of each individual in the group.

Challenges of Dynamic Assessment

In their discussion of the drawbacks of DA, Lantolf and Poehner (2004) pointed out that 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. Formative assessment can enable teachers to guide learners through dialogic interaction toward enhanced performance and learning, especially in what Ellis (2003) refers to as incidental formative assessment, but for DA to be a robust

framework, principles for attuned instruction and instruments to measure the effects are required. In the next section, I review the literature on content analysis, which can be a method to measure the effects produced by asynchronous forums with DA-based mediation.

The Interaction Analysis Model: An Instrument for Content Analysis

Previous sections in this literature review indicated that text-based asynchronous forums based on constructivism can be an effective learning activity in which participants can develop higher order thinking with the power of writing and reflection. In asynchronous forums, a teacher is not someone who gives knowledge to students, but rather someone who facilitates interaction to help participants construct their knowledge. DA, a SCT-based approach for both assessment and teaching, is an approach that can be adopted for asynchronous forums to make teachers' facilitation or mediation effective. DA seems to be a promising approach; however, any form of formative assessment, including DA, tends to be intuitive on the part of teachers (Lantolf & Poehner, 2004). One way to mitigate drawbacks of asynchronous forums facilitated by DA principles is the use of content analysis. Content analysis cannot fully explain educational effects verbally or numerically, but in-depth analysis of what is happening in the whole process of asynchronous forums can provide useful data to revise the course design or teachers' facilitation strategies.

Content Analysis in General

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., 2014). As participants interact in asynchronous forums, a log of the data can be captured, stored, and later analyzed to identify patterns of knowledge construction. The transcripts of online discussions can serve as rich data that can be a source for

informative and actionable feedback to students, teachers, and researchers (Bienkowski et al., 2012). Initially, content analysis was restricted to gathering quantitative data on levels of participation. Later, content analysis was adopted as a technique to understand transcripts at deeper levels (De Wever et al., 2006). In general, the goal of content analysis is to reveal information that is not observed at the surface level of the transcripts. To be able to provide convincing evidence of learning outcomes, in-depth understanding of the online discussions is required.

De Wever et al. (2006) reviewed 15 content analysis instruments designed to analyze transcripts of online asynchronous discussion and presented an overview of those instruments. They chose these 15 instruments based on how many times the instrument was applied, cited, or reflected upon in journals. Content analysis, or in this case. transcript analysis, is a widely used technique, but standards are not yet established. All 15 of the content analysis instruments are used for deeper analysis, but these instruments vary in many aspects. De Wever et al. (2006) reported three essential aspects that should be taken into account when choosing a content analysis instrument: the theoretical background, the choice for the unit of analysis, and the reliability of that analysis. Without a theoretical basis, academic research cannot be valid. Constructivism is a theory that is often adopted in content analysis of asynchronous forums. Concerning the choice for the unit of analysis, De Wever et al. (2006) presented three levels of classification: sentence, theme, and message. In this context, *message* means a complete message that a learner posted at a certain moment in the discussion. As for the reliability, they focused on the inter-rater reliability because, while the reliability of a coding scheme in content analysis can be viewed as a continuum that spans from coder stability to inter-rater reliability, and ultimately to replicability, the inter-rater reliability is a crucial concern and should be explicit. Rourke et al.

(2001) defined inter-rater reliability as "the extent to which different coders, each coding the same content, come to the same coding decisions" (p. 6). The inter-rater reliability is regarded as a primary test of objectivity in content analysis.

The Interaction Analysis Model

One of the 15 content analysis instruments that De Wever et al. (2006) reviewed is the Interaction Analysis Model (IAM), which was developed by Gunawardena et al. (1997). I chose this instrument in this action research study for three reasons. First, creating a new instrument is out of the scope of this study. Rourke and Anderson (2004) recommended that researchers interested in content analysis use an existing and suitable instrument due to its proven validity, rather than developing their own. Second, the IAM is an established instrument. Lucas et al. (2014) and Hall (2014) reviewed studies that used the IAM and stated that the IAM is one of the most frequently used and most coherent and empirically-validated content analysis instruments in the study of knowledge construction. Finally, the IAM is an instrument that fits the purposes of this action research study. Jonassen et al. (1993) stated that the evaluation of constructivist learning should be implemented 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, and then progresses to higher mental functions in Vygotsky's terms.

The IAM was developed using the principles of grounded theory and introduced as a tool to examine knowledge construction in asynchronous forums. Gunawardena et al. (1997) referred to a content analysis model introduced by Henri (1992), a pioneering work in the content analysis field, and stated that Henri's model served as a useful starting point, but the model is not specific regarding how the process of knowledge construction that occurs through social

negotiation can be evaluated. The characteristics of the IAM that relate to the three essential aspects of content analysis instruments that De Wever (2006) identified are as follows.

- The theoretical framework for the IAM is social constructivism. Gunawardena et al. (1997) posit that knowledge construction is the result of interaction, meaning negotiation, and building a shared understanding.
- The unit of analysis is messages because Gunawardena et al. (1997) thought that a message embodies a participant's cognitive activity and contribution to the construction of knowledge.
- The IAM showed high levels of inter-rater reliability in the 22 publications in which the measure was reported (Hall, 2014).

Gunawardena et al. (1997) enumerated five advantages of the IAM: (1) its definition of "interaction in a computer-mediated conferencing context" as the vehicle for the co-construction of knowledge, (2) its focus on the overall pattern of knowledge construction that emerges from a conference, (3) its appropriateness for use in constructivist, collaborative, and student-centered learning contexts, (4) its straightforwardness and simplicity of use, and (5) its adaptability to different evaluation purposes (p 428). They suggested as a future direction that researchers use the IAM in secondary education, where a moderator has greater knowledge and skills than participants. This is one of the reasons why I chose the IAM in this study.

Challenges of Asynchronous Forums That the IAM Has Identified

Research that used the IAM to examine knowledge construction in asynchronous forums revealed several challenges that this learning activity often entails. Wang et al. (2009) reported that most students did not know how to behave in the environment, which suggests that participants need a phase where they learn what is expected in constructivist learning and 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 knowledge and skills required to use the technology adopted in the program. They also noted that interactions among participants were not activated when they had no obligation to participate, which suggests that teachers should be encouraged to help students nurture their curiosity and self-regulation. In a more recent study, Mutiaraningrum and Nugroho (2020) analyzed EFL students' text-based discussion during the COVID-19 pandemic with the IAM and argued that, on instructors' side, instructors should be trained on how to formulate tasks and better arrange instruction focusing on immediate and effective feedback. Some of these challenges might be addressed by adopting a blended learning approach, a purposeful integration of online and F2F instruction in a program. In the next section, which is the last section of this literature review, I explore the possibility of blended learning systems.

Blended Learning Systems

The most common definition of *blended learning* (BL) is the thoughtful integration of online and F2F instruction. When any type of online learning is implemented, the program can be either a fully online or a BL program. BL has been widely adopted in higher education, secondary education, and corporate training (Graham, 2019). BL is expected to emerge as a predominant system and become more common than either fully online or fully F2F instruction in brick and mortal institutions (Graham, 2019; Halverson et al., 2017; Watson, 2008). Masie (2006) predicted that BL would be so ubiquitous that we would come to drop the word *blended* to call it just "learning." Norberg et al. (2011) argued that BL would be the "new normal" (p. 207). If these predictions are not overstatements, what should be considered is not whether to blend but how to blend the online and the F2F components. BL environments can offer different

affordances that allow for meaningful learning experiences to take place. In the context of this study, learners in secondary education often need direct instruction and careful scaffolding. BL design might be a possible solution to making learner-centered online learning more effective in K-12 settings. In the last section of this literature review, I use the literature to explore BL design, paying attention to the difference between higher education and secondary education.

Definition of Blended Learning

Currently, the term, *blended learning*, has various definitions (Halverson et al., 2017; Palalas, 2019). BL might be viewed as a boundary object, which can or should be flexible enough to adapt to any local needs or constraints while maintaining a common identity (Graham, 2019; Norberg et al., 2011; Star & Griesemer, 1989). Although it might be true, certain patterns have emerged across the BL field. In the context of what is being blended, Graham (2006) introduced three ways of blending: (1) combining instructional modalities or delivery media, (2) combining instructional methods, and (3) combining online and F2F instruction. The first two define BL so broadly that they do not get at the essence of what BL is. The third position reflects the historical emergence of BL more accurately and is widely accepted. The third type of BL, blending online and F2F instruction, can occur at four levels: (1) activity level, (2) course level, (3) program level, and (4) institutional level (Graham, 2006). Among the four levels, course level blending is one of the most common ways to blend, where online and F2F activities are combined in a course.

Although many definitions of BL focus primarily on the physical dimensions of the learning environment, some researchers who desire to use BL as a tool for educational transformation included pedagogical quality in their definition. For example, Garrison and Kanuka (2004) defined BL as “the thoughtful integration of classroom face-to-face learning

experiences with online learning experiences" (p. 96). Also, Garrison and Vaughan (2008) stated, "Blended learning is the thoughtful fusion of face-to-face and online learning experiences … fundamentally rethinking the course design to optimize student engagement" (p. 5). Sharpe et al. (2006) used the term "blended e-learning" (p. 24) and argued that it should be used to transform practices by redesigning courses with a holistic view of technology use to support learning. Although these definitions seem to have valid claims, Halverson et al. (2017) introduced another viewpoint referring to Oliver and Trigwell (2005), stating that many definitions focus on "forms of instruction, teaching, or at best, pedagogies," implying that "the term 'learning' should be abandoned" (p. 17). The focus on the term, learning, resonates with a definition of BL from K-12 research. The Christensen Institute, a nonprofit and nonpartisan think tank, wrote that in BL "a student learns at least in part at a supervised brick-and-mortar location away from home and at least in part through online delivery *with some element of student control* [emphasis added] over time, place, path, and/or pace" (Staker et al., 2011, p. 3). K-12 environments usually require teachers to play supervisory roles, which is often an important element in secondary education and can also be included in the definition of BL. In this study, the term, *blended learning* (BL), is intended to be the purposeful integration of classroom F2F learning experiences and online learning experiences within an intentional course design.

Theory and Framework for Blended Learning

The distinction between theory and framework has been a source of debate, but in this section these two terms are used as two ends of a continuum with no clear distinction. BL is still in its adolescent years in definition building. This is also the case with theory development (Graham, 2013). BL has primarily been a grassroots movement with teachers combining F2F and online instruction in their individual classes to improve students' learning (Drysdale et al., 2013).

Research on BL in higher education has been increasing, followed by research in K-12 settings, but publications that combine theory with empirical research are still scarce in the BL field (Halverson, 2017). Heinze and Procter (2006) have identified four theories relevant to BL that focus on learning, which include Vygotsky's (1978) ZPD. Graham (2019) stated that Garrison, Anderson, and Archer's (2001) Community of Inquiry, which was originally created in the field of online learning, is widely used in BL literature. Borup et al. (2014) created the Adolescent Community of Engagement framework by expanding existing frameworks to include characteristics unique to the K-12 level. From the viewpoint of integration of technology, Mishra and Kohler's (2009) framework, called TPACK, which stands for technological, pedagogical, and content knowledge, and Puentedura's (2013) SAMR, which stands for substitution, augmentation, modification, and redefinition, are useful when BL is intended to be a system for educational transformation. Although there are theories that can be applied in BL research, theories that are specific to BL have not yet been developed.

Models of Blended Learning

The term, *model*, is used differently from theory and framework in this section. Theory and framework will contribute to providing a common language in creating and expanding knowledge broadly. In contrast, models will be used for the systematic categorization of different kinds of blends in BL. Halverson (2017) indicated that BL research has focused too much on the amount of online and F2F learning rather than what should be done in each component. From a pedagogical standpoint, designers of BL systems should be seeking best practices for how to combine instructional strategies in online and F2F components that take advantages of the strengths of each environment and avoid weaknesses (Graham, 2006). On the basis of the belief that education is a design-oriented field, Graham et al. (2019) introduced a model for the BL

spectrum. With regard to levels of blending, as introduced in the definition section, blending of online and F2F components can occur at four levels: (1) activity level, (2) course level, (3) program level, and (4) institutional level (Graham, 2006). As for the nature of blending, Graham (2006) introduced three categories: (1) enabling: improvements to access and convenience, (2) enhancing: incremental but not radical pedagogical change, and (3) transforming: radical transformation of pedagogy. Models are expected to help practitioners and researchers make clear the optimal blend in their location and achieve their educational goals.

Pedagogical Richness in Blended Learning Systems

In their discussion of the benefits of BL, Osguthorpe and Graham (2003) identified six reasons to choose a BL approach: (1) pedagogical richness, (2) access to knowledge, (3) social interaction, (4) personal agency, (5) cost effectiveness, and (6) ease of revision. Cleveland-Innes and Wilton (2018) identified five benefits of BL: (1) opportunity for collaboration at a distance, (2) increased flexibility, (3) increased interaction, (4) enhanced learning, and (5) learning to be virtual citizens. Among various reasons why BL has been adopted, improved pedagogy is one of the most prominent ones.

As in online learning, practice in BL systems has been shifting from transmissive to interactive strategies (Staker & Horn, 2014). For example, unlike in a lecture format, the instructional method of discussion focuses on learner interaction rather than knowledge transmission. The goal of class discussion is often to have learners negotiate and co-construct understanding and knowledge of the discussion topic. The F2F and the online components of BL respectively have complementary strengths and weaknesses in regard to the conduct of discussion (Graham, 2006). Unlike fully online learning or F2F learning in brick-and-mortar schools, interaction can occur in both F2F and online components in BL formats. Interaction in

both of these environments should therefore be purposefully integrated to meet the goals set in the course or the program.

Although the benefits of interaction are widely accepted, interactive strategies are often difficult to implement in secondary education. Learner-centered activities, especially in an online environment, require a large amount of self-discipline on the part of learners. Tucker (2012) argued that teachers should help students build a community of inquiry and suggested ways to nurture effective interaction in BL formats. Special care should be taken when learner-centered activities are implemented with a BL approach in K-12 settings.

Challenges of Blended Learning

While benefits of BL have been identified, challenges of BL have also been reported. Graham (2006) enumerated six challenges: (1) the role of live interaction, (2) the role of learner choice and self-regulation, (3) models for support and training, (4) finding balance between innovation and production, (5) cultural adaption, and (6) dealing with the digital divide. As elaborated at the beginning of this section, BL is like a boundary object with no fixed definition. This being so, solutions to problems in BL systems should also be diverse. Therefore, to overcome these challenges, most of which are highly context-dependent, it is important to identify successful models of BL that suit the particular context while flexibly capitalizing on the unique affordances available in both the F2F and the online environments in each unique setting.

BL practice and research in higher education preceded those in K-12 settings. Drysdale et al. (2013) reported, after reviewing more than 200 theses and dissertations on BL, that K-12 environments were only studied in 8% of them, revealing a significant gap in the BL literature. In the wake of the COVID-19 pandemic in 2020, emergency remote teaching has been prevailing, but the literature on quality BL programs in K-12 settings has not been fully developed.

Considering increasing BL practice and the difficulty of implementing learner-centered activities in secondary education, more research focusing on secondary education is expected. Filling this gap is one of the purposes of this study.

Section Summary

BL has come to be widely adopted and can therefore be expected to emerge as a predominant system in both higher education and secondary education. The definition of BL is not fixed; thus, a working definition of *BL* in this study is introduced, which is: "The purposeful integration of classroom F2F learning experiences and online learning experiences within an intentional course design." Some theories and frameworks that can be applied in BL research exist, but those that are specific to BL have not yet been developed. Models for the systematic categorization of different kinds of blends in BL are expected to help practitioners and researchers make clear the optimal blend of online and F2F at each location. Improved pedagogy is one of the most prominent benefits of BL. BL has been helping the shift from transmissive to interactive strategies on the ground. BL is diverse in its definition; therefore, solutions to challenges in BL systems are also diverse and highly context-dependent. Thoughtful and flexible adaption is a key to success in BL systems. Regarding BL in secondary education, special care should be taken especially when learner-centered activities, which require a large amount of self-discipline on the part of learners, are implemented in a BL approach.

Theoretical Framework in This Study

The theoretical framework for the intervention in this study is rooted in constructivism. Among various branches of the theory, social constructivism is the most relevant to this study due to my focus on students' interaction. Also, ecological constructivism is employed due to my focus on the relationships between collaborative and individual learning and on students'

reflection. I draw on sociocultural theory and dynamic assessment, an approach derived from sociocultural theory, in my mediation during asynchronous forums to lead participants to higher order thinking by making my mediation more systematic and more attuned to learners' emergent abilities. I use the Interaction Analysis Model as a content analysis instrument because it is an established instrument and is an evaluation method designed to be used in constructivist learning. I employ a BL approach because it may provide solutions to problems that often pertain to constructivist-based asynchronous forums especially in K-12 settings. Mainly referring to Graham (2006), and Garrison and Vaughan (2008), BL is intended in this study to be the purposeful integration of classroom in-person F2F learning experiences and online learning experiences within an intentional course design.

Chapter Summary

Several points that have a bearing on this study emerged from this literature review. I first defined the term, higher order thinking. In the second section, I examined the possibility of asynchronous forums as a means of developing higher order thinking, finding that constructivist-based asynchronous forums can develop participants' higher order thinking through the power of writing and reflection. In the third section, the literature on DA indicated that the approach derived from sociocultural theory can help teachers lead a learner or a group of learners to higher order thinking by making their instructional interactions with learners more systematic and more attuned to learners' emergent abilities. In the fourth section, the review on content analysis revealed that in-depth analysis of what is happening in the whole process of asynchronous forums can provide useful data to complement drawbacks of dynamic assessment; namely, any form of formative assessment tends to be intuitive on the part of teachers rather than guided by principles of learning theories. Also, the IAM, among many other content analysis instruments,

was found to be a suitable instrument for the intervention in this action research, that is, asynchronous forums in which instructors' mediation is provided based on dynamic assessment to develop participants' higher order thinking. In the last section, I explored the literature on BL, establishing that BL systems can provide solutions to problems that often pertain to constructivist-based asynchronous forums especially in K-12 settings, where teachers are required to help students develop their self-regulation. At the end, I summarized the findings of this literature review that are applied in this study. One of the several gaps identified in this chapter is that, while emergency remote teaching has been prevailing in the wake of the COVID-19 pandemic in 2020, the literature to explore the possibility of asynchronous forums embedded in BL programs in secondary education has not been fully developed, especially in Asian countries. Using these findings, I designed and implemented an intervention in this action research study, which was a blended learning program for EFL learners at a public high school in Japan. The details of the BL program are described in the next chapter.

Chapter 3. Methodology

Introduction

In this chapter, I first introduce the rationale for the methodology that I adopted for this study. Then I elaborate on the intervention that I designed, providing detailed descriptions of the research site and the participants. In short, I designed and implemented an extracurricular BL program at my workplace as an intervention. In the BL program, participants, who were EFL students at the school where I teach, engaged in online synchronous and asynchronous activities with English as a medium of instruction and communication to develop their higher order thinking while being supported by in-person F2F sessions conducted in Japanese. Subsequently, I describe how I collected and analyzed data. At the end, I discuss how I ensured the validity, reliability, and ethical requirements in this study.

Background to Methodological Approach

I now turn to a discussion of my ontology, epistemology, and axiology, leading into my methodology. I would not insist that there exists a single truth in the field of education, which is a diverse, complex, and thus highly context-dependent field. There are useful theories that can be utilized in this field; however, there may never be any theories that can be applied in every educational setting. Specific social, cultural, and political contexts should be taken into account when issues around education are considered. In addition to broader contexts, attention should be paid to issues that pertain to the individual learner. In regard to my epistemology, therefore, I usually try to interpret, understand, and describe reality instead of trying to measure reality. Behavior is socially situated and context-dependent. My axiology has been established while working as a teacher at a public high school for more than two decades. I would like to extend knowledge in the field of education by research, but at the same time, I am eager to improve

practice by applying the findings of research to practice.

My ontology, epistemology, and axiology led me to interpretivism and pragmatism as my methodological perspective. Cohen et al. (2018) described the essence of these two terms, stating that "interpretive approaches … focus on action. This may be thought of as behaviour-with meaning; it is intentional behaviour, and as such, future oriented" (p. 19) and that "pragmatism is essentially practical rather than idealist … It prefers utility, practical consequences, outcomes and heurism over the pursuit of a single, particular kind of accuracy in representing 'reality'" (p. 36). Cohen et al. (2018) stated that the danger of an interpretive approach is its "relative neglect of the power of external—structural—forces to shape behaviour and events" (p. 24). The same danger pertains to pragmatism. I always need to incorporate some viewpoints of critical theory to overcome weaknesses that interpretivism and pragmatism might pose. The three paradigms that I uphold, which are interpretivism, pragmatism, and critical theory, led me to take an action research approach for this study. I discuss this approach in detail in the section below.

Action Research

Action Research in General

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). Greenwood and Levin (2007) described action research, focusing on its collaborative feature, as "a set of self-consciously collaborative and democratic strategies for generating knowledge and designing action in which trained experts in social and other forms of research and local stakeholders work together" (p. 1). On the other hand, Cohen et al. (2018) stated that "it is possible for action research to be an individualistic matter as well, relating action

research to the ‘teacher-as-researcher’ movement” (p. 444). Action research, the method itself, fosters professional development of teachers.

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 between them. Nevertheless, for the former, action research is conducted for 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 philosophies from both ends of this continuum. As a reflective practitioner, I designed the BL program as an alternative or supplemental way of teaching to the current test-oriented practices. As a critical theorist, I designed and implemented a BL program that could be inspirational to my colleagues and could later be disseminated, along with my findings, to encourage instructional diversification in broader contexts.

While different scholars have introduced different sets of principles, the consensus is that action research is a cyclical process (Bargal, 2006; Kemmis et al., 2014; McNiff, 2013). Different scholars have developed different sets of cyclical procedures (Cohen et al., 2018; Stringer, 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 an essential tool to provide teachers and researchers with the understanding necessary to take effective action. Action researchers are encouraged to find a set of principles and procedures that fit the planned action research while making needed modifications. In this study, I adopted the eight-step process of action research that Cohen et al. (2018) developed. This ranges from Step 1, where researchers identify, evaluate, and formulate the problem, which should be within the action researcher’s control to change, to Step 8, where researchers interpret the data, draw inferences,

and evaluate the whole project. At every step, action researchers are encouraged to actively reflect on and evaluate their procedure while teaching. Also, Cohen et al. (2018) stated that this eight-step process does not necessarily follow a linear sequence. All the crucial aspects including the purpose, design of the intervention, implementation, modification, data collection, and data analysis are described in the following sections in this chapter.

One limitation of this action research study is that conclusions derived were not generalizable, because this action research study was implemented in a particular context with a limited number of participants; namely, a public high school in Tokyo with a total of 16 participants. However, I provide a thick description of the research site, course design, and procedures in this chapter so that the conclusions can be transferable to different settings.

Purpose of This Action Research Study

The purpose of this study was to investigate a BL program that I created as an intervention to improve higher order thinking of EFL students at my workplace, a public high school in Japan. By adopting an action research approach with a pragmatic paradigm, I designed the intervention to solve or mitigate a problem observed in the classroom, drawing on the concept of praxis. As I described in Chapter 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 at my workplace or in other Japanese high school settings in general.

Although the implementation of the BL program was comprehensive in that the BL program included in-person F2F meetings, synchronous online sessions, and asynchronous online forums, this study focused on asynchronous forums for data collection and analysis. As I wrote in Chapter 2, there is increasing consensus in the growing field of online learning that text-

based asynchronous forums can provide learners with meaningful educational experiences (Conrad & Openo, 2018; Garrison, 2016). Text-based asynchronous interaction has the potential to lead learners to deeper learning with the power of writing and reflection. Below are three research questions and their related sub-questions that guided this study.

Main Research Questions

I established three research questions below to guide this study. Each of these questions has sub-questions that are listed in the following paragraphs.

1. To what extent can higher order thinking be demonstrated among participants in asynchronous online forums?
2. What factors in students' engagement in asynchronous online forums may contribute to the development of higher order thinking, if any?
3. What factors in blended learning design may contribute to the development of higher order thinking, if any?

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 triangulated the results with data derived from a post-survey and my observations, which I recorded in a research journal, to examine the second and third questions.

I describe the process of data collection and analysis in more detail in the sections titled "Data Collection Procedure" and "Data Analysis and Interpretation" respectively.

Sub-Questions for the First Main Question.

1. How much did each participant interact in the asynchronous forums?
2. How does content analysis with the IAM, Cognitive Dimension, and Affective Domain describe the asynchronous forums?

3. How does content analysis with the IAM, Cognitive Dimension, and Affective Domain describe each participant in the asynchronous forums?
4. What are the implicit elements of higher order thinking development in the asynchronous forums that may not be observed in content analysis with the IAM, if any?

Sub-Questions for the Second Main Question: Process Factors.

1. How did the learning tasks in the BL program assist or inhibit higher order thinking development?
2. What instructional techniques performed by the instructors in the asynchronous forums assisted or inhibited higher order thinking development?
3. What features of learner-learner interaction in the asynchronous forums assisted or inhibited higher order thinking development?

Sub-Questions for the Third Main Question: Contextual Factors.

1. What design factors of the online component of the BL program facilitated or inhibited the presence of higher order thinking?
2. What design factors of the in-person face-to-face component of the BL program facilitated or inhibited the presence of higher order thinking?
3. What design factors of the organization of online and in-person face-to-face components in the BL program facilitated or inhibited the presence of higher order thinking?

Intervention

Overview

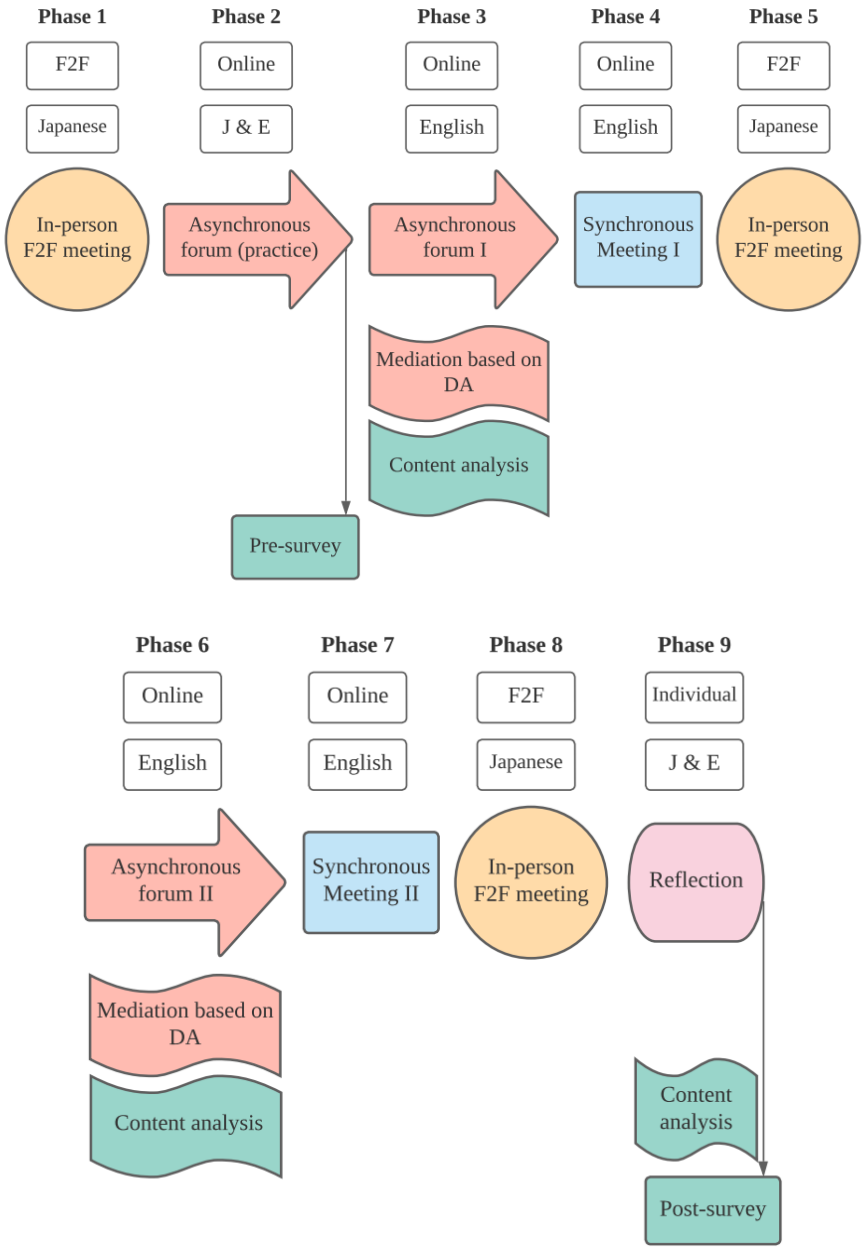
I designed a BL program to be used as an intervention in this action research study using

the outcomes from a trial program that was conducted at the same high school in July-August 2020. The BL program was an extracurricular program. Extracurricular means that the program was not part of regular classes that require official grading needed for participants' graduation, but was rather a supplementary course in which students participated voluntarily. In other words, this program was a value-added option for higher achieving students. In this BL program, EFL students engaged in online synchronous and asynchronous activities with English as a medium of instruction and communication while being supported by in-person F2F sessions conducted in Japanese. The online component consisted of five asynchronous forums (two forums for practice, two main forums, and one for reflection) and two 90-minute synchronous meetings. The in-person F2F component originally consisted of three 90-minute meetings at the beginning, middle, and end of the program, but only the first one was conducted for reasons that are described in Chapter 7. Figure 1 illustrates the flow of the intervention.

The aim of this program was to develop students' higher order thinking as defined in Chapter 2. On the basis of constructivism and SCT, educators can help learners by understanding the learners' current developmental level and providing mediation to prepare them for more complex tasks or concepts. In the design and implementation phases of the intervention, I drew on social constructivism to develop participants' higher order thinking through their interactions with resources, other members of the participants, and the instructors. At the same time, I also drew on ecological constructivism (Hoven & Palalas, 2016). The phase 9 in Figure 1, an explicit phase for reflection, is one manifestation of this intention.

Figure 1

The Flow of the Blended Learning Program



Goals of the Online and the F2F Components

I designed the synchronous and asynchronous activities in the online component as places where students engage in constructivist learning. English was a medium of instruction and communication in the online component. At the same time, Japanese was used for instruction and

communication in the in-person F2F component. I prepared in-person F2F meetings to provide students with direct instruction in Japanese about the procedure, contents, and technologies that we would be using. K-12 students tend to need direct instruction due to their lack of independent learning abilities. Also, in Japan, constructivist-based online learning has rarely been implemented in regular classes in secondary and post-secondary education. Thus, a BL design was adopted in this study so that the instructors could provide participants with the needed direct instruction in the in-person F2F component to guide them in the online component.

Roles of Researchers

I was a full-time EFL teacher working at the site. I took on the roles of researcher, program designer, and instructor in the BL program. As I assumed multiple responsibilities, I listened carefully to stakeholders' feedback in the design and implementation phases. As an investigator in action research, I tried to be not simply an objective observer of reality, but rather a self-critical practitioner, reflecting at every step in the cyclical process of this study (McNiff, 2013).

An adjunct professor working at two universities in the United States of America joined in the synchronous meetings and the asynchronous forums in this BL program as a co-instructor. The co-instructor was in charge of facilitating the synchronous meetings while contributing a few posts in the asynchronous forums. I asked him to participate in this program as a co-instructor because I expected him to provide specialist knowledge in English with high cognitive demand to stretch participants' higher order thinking. Also, I thought that having an experienced external instructor could be a motivational hook. I had enough time to explain the purposes of this program to the co-instructor.

Description of the Teaching Context

The site of this study was my workplace, S High School, a public high school in Tokyo, Japan. This school was one of 186 public senior high schools in Tokyo. Tokyo is the capital city of Japan with a population of more than 13 million people. S High School was designated by the Tokyo Metropolitan Board of Education as an *Advanced School*, which was expected to show high achievement in university entrance examinations. S High School was also designated by the Tokyo Metropolitan Board of Education as a *School to Promote English Education*. The curriculum was not different from other high schools, but schools in this category were given some advantages, including having two native English-speaking teachers, while the other schools have one. S High School had a total of about 960 students, with approximately 320 students in each grade.

Participants

Participants were students at Tokyo Metropolitan S High School. The BL program that I created was an extracurricular program at S High School. Student participation in the BL program was totally voluntary. I advertised the BL program to all the students at S High School with a poster that described the outline of the program (Appendix C: Recruitment Poster) to recruit participants. Then, I had a meeting with all applicants, where I described the program in more detail and answered their questions.

The number of participants was limited to 20 to ensure the quality of the program. The learner-centered intervention requires a great amount of instructor involvement; thus, the number of participants had to be restricted. I implemented a trial program with a co-researcher in summer 2020. From that experience, I found 20 to be the most balanced number. There were no exclusion criteria, but if the number of applicants had been over 20, I would have chosen students in higher grades, that is, the third- and the second-year students, because students in lower grades, such as

the first-year students, would have a chance to join the program the next year. If the grade criteria had not been enough, then I would have decided by drawing lots and tried to implement another blended learning program during the winter in the same academic year.

Large discussion forums often have their limitations in promoting higher level of interactivity among participants (Kim, 2013), but the BL program in this study required participants to interact; thus, I needed at least ten participants to ensure enough interaction among participants to lead them to higher order thinking. Parks-Stamm et al. (2017) suggested that instructors' participation is particularly needed in small classes, which mean having less than 15 students in their definition, to foster discussion. In summer 2020, 11 students applied to the trial program. I further recruited four more students whom EFL teachers at my workplace suggested due to their high motivation. If the number of applicants to the BL program had been below ten, I would have recruited students following EFL teachers' advice as I did in the trial program. In the trial program in summer 2020, no participant withdrew during the program. Even if a few participants had withdrawn during the implementation of the BL program, I would not have tried to recruit students to fill the vacancy as long as the number of participants was over ten. In the end, 16 participants attended. Ethical considerations around participants are described in the section titled "Ethical Requirements" in more detail.

Instructional Design

This program adopted inquiry-based instruction as the main instructional method. Inquiry-based instruction is one form of learner-centered instruction that tries to go beyond acquisition-oriented teacher-led learning. Laurillard (2012) noted that 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).

Reigeluth and Carr-Chellman (2009) defined inquiry learning, stating that inquiry-based instruction is "a method in which instruction is organized by the interests of the students. Students are encouraged to ask questions, and the learning is centered upon answering those questions" (p. 36).

Seen from the perspective of TESOL, the teaching method used in this program is categorized as content-based instruction (CBI) and cooperative language learning (CLL) (Richards & Rodgers, 2001). Richards and Rodgers (2001) defined CBI as "an approach to second language teaching in which teaching is organized around the content or information that students will acquire, rather than around a linguistic or other type of syllabus" (p. 204). Concerning the objectives of CLL, Richards and Rodgers (2001) stated that "since CLL is an approach designed to foster cooperation rather than competition, to develop critical thinking skills, and to develop communicative competence through socially structured interaction activities, these can be regarded as the overall objectives of CLL" (p. 195). Also, this learner-centered, group-based learning method is expected to "enhance learner motivation and reduce learner stress and to create a positive affective classroom climate" (p. 193).

Another TESOL-related instructional strategy that was utilized in the asynchronous forums is modeled writing. Essentially, modeled writing is a process in which students are encouraged to write independently upon being presented with teacher demonstrations of writing (Graves et al., 1994). Mohr (2017) suggested that instructors can decrease the cognitive demand of writing by modeling forms of linguistic competence. Forms of linguistic competence may refer to the ability to understand grammar and vocabulary well enough to identify the main idea and supporting details of a text and the ability to make inferences and interpret vocabulary (Celce-Murcia et al., 1995). In the asynchronous forums in this study, instructors' posts were

intended to facilitate discussion, and at the same time, to model writing. Instructors refrained from giving immediate grammatical feedback to the participants during the asynchronous forums.

Design of the BL Program

Findings From the Trial Program in 2020. The design of the BL program in this study was based on the outcomes from a trial version of a program with similar aims that was conducted at the same high school in July-August 2020, though with a different cohort of participants. The trial program formed the groundwork for this study, informing the modifications needed for the design used in my doctoral work. However, the trial could not be included as an integral part of the action research cycle in this study, because this doctoral project had not yet been approved by the Research Ethics Board at Athabasca University as of Summer 2020 when I implemented the trial. I designed and implemented the trial program with a co-researcher who joined the intervention of this study as a co-instructor. The number of participants was 15. The aim for that trial program was the same as for the intervention of this study: to develop higher order thinking. The only difference is that the trial program was shorter than the intervention of this study. The online component consisted of two five-day asynchronous forums, instead of five in the BL program of this study. The in-person F2F component consisted of two 90-minute meetings, instead of three in the original design of the BL program of this study. The trial program consisted of a total of six phases below:

1. In-person F2F Meeting I (1.5 hours)
2. Asynchronous Forum I (5 days)
3. Synchronous Meeting I (1.5 hours)
4. Asynchronous Forum II (5 days)
5. Synchronous Meeting II (1.5 hours)

6. In-person F2F Meeting II (1.5 hours)

After finishing the trial program, I analyzed the interactions posted in the asynchronous forums using the IAM and triangulated the results with observational data and data derived from a post-survey (Miyashita, 2021). Table 1 and 2 below are part of the findings.

Table 1

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

	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

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%)

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 as highly 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 after analyzing the trial program. 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 provide. In the case of the intervention of this study, 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 decided to give them more careful direct instruction, answering their questions, so that the students would be able to understand the purposes and procedures of collaborative constructivist learning more clearly. Secondly, to increase learner-learner interaction in asynchronous forums, I decided to provide 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 intervention.

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 results 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: (1) What did you learn in this BL program? and (2) How was the virtual classroom experience? Thus, I decided to add an explicit reflection phase at the end of the BL program, where participants were asked to reflect on what they learned, guided by open-ended questions in a post-survey, and share their reflections within the cohort. On the basis of my reflection on the trial program described above, I created the following design for the intervention in my doctoral project.

Structure of the Intervention of This Study. The following is the structure of the BL program in the reported study. 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 final reflection at the end of the program. This intervention consisted of nine phases instead of six in the trial program.

1. In-person F2F Meeting I (1.5 hours)

I explained the aims of the program, the procedure, and how to operate the employed technologies in Japanese, emphasizing how and why constructivist learning can be a meaningful educational experience. In addition, participants practiced interacting in asynchronous forums with a self-introduction activity using the employed platform (Forum 1). I provided direct instruction in this in-person F2F meeting.

2. Asynchronous Forum for Practice (5 days)

This phase was added to the trial program implemented in 2020. Learning in asynchronous forums was a new experience for participants; thus, I created a warm-up forum (Forum 2), where the participants engaged in online discussion with a topic with low cognitive demand so that they would become accustomed to the technology and the new way of learning.

3. Asynchronous Forum I (5 days)

This forum (Forum 3) was one of two main asynchronous forums in this program. Participants read an article and discussed a given theme, which was chosen to build a foundation for the next asynchronous forum.

4. Synchronous Meeting I (1.5 hours)

I focused on the asynchronous portion of the program, but two synchronous meetings were prepared so that the four skills for English proficiency (i.e., reading, writing, listening, and speaking) would be integrated. The main goal of Synchronous Meeting I was to break the ice, with no cognitively demanding topics.

5. In-person F2F Meeting II

This phase was added to the trial program implemented in 2020. Attendance to this F2F Meeting was voluntary. It was to assist participants who might still be struggling with the

program at this stage. In the end, however, no participant attended this meeting.

6. Asynchronous Forum II (5 days)

This forum (Forum 4) was one of two main asynchronous forums in this program. Here, participants read an article, watched two short video clips, and discussed more complicated issues on a given theme based on the foundation that they built in Forum 3.

7. 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 Forum 3 and 4.

8. In-person F2F Meeting III (1.5 hours)

This meeting was canceled due to the COVID-19 pandemic. Originally, participants were expected to share what they learned in the whole process of this program, and I was planning to give them feedback in person.

9. Final Reflection (5 days)

This phase was added to the format of the earlier trial program in 2020. In this final phase, participants were guided to reflect on what they discussed in the program and their experiences in constructivist online learning. Open-ended questions in the post survey were designed to lead them to deeper reflection. In the trial program in 2020, participants demonstrated deep reflection in their answers to the questions listed in the post survey; thus, in this intervention, I requested participants to submit their reflection to an online forum (Forum 5) so that they could share their reflection with the instructors and each other.

Subsequent Actions

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

After the Trial Program in 2020. As I described in the previous sections, I made modifications to the trial program in 2020 based on my findings and reflection on the trial program. Also, I re-designed the learning resources and learning tasks in the intervention to fit the aims of the intervention, carefully considering the skills and abilities of the expected participants.

During the Implementation of the Intervention in This Study. This study drew on the construct of mediation from sociocultural theory (SCT), especially dynamic assessment (DA), a method for better mediation that emerged in SCT. DA is an approach to not only assessment, but also to teaching. 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 intervention, I diligently reflected on the process and students' achievements at each stage to make modifications for the next phase.

After the Implementation of the Intervention in This Study. I am going to implement a similar BL program again in the future. The findings of this study and my reflection on the intervention will be utilized in the design and the implementation phases of the next BL program. In addition, the findings of this study 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.

Course Topic for the BL Program

In the individual presentation that the participants were required to give 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 the participants to deepen their thoughts 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 participants to think about why they learn English from broader perspectives in a metacognitive way.

Data Collection Procedure

Three data collection procedures were adopted in this study: online discussion forums, the researcher's observations, and a post-survey. The first data collection occurred during three asynchronous discussion forums (Forum 3, 4, and 5) embedded in the BL program, in which I collected participants' and the instructor's written text. The second data collection used a post-survey that I distributed after finishing Forum 4. In addition, I recorded my observations in a research journal throughout the program. Hendricks (2013) classified data collection strategies in action research into three categories: artifacts, observational data, and inquiry data. In this study, data were taken from all three of these categories. Artifacts in this study refers to the transcripts, or record of participants' contributions and interactions, posted in the asynchronous forums. Observational data were collected through my taking of field notes during the whole process of the BL program including the preparation phase, the in-person F2F component, and the online component. Inquiry data were collected through a post-survey with open-ended questions that asked about (1) the content (i.e., what they learned in the subject area), and (2) their experiences in the BL program (i.e., what they learned by engaging in the constructivist blended learning; Appendix J: Post-Survey Questions).

In the discussion of how to ensure the quality of data, Punch (2009) stated that there are four principles that researchers should follow to maximize the quality of data collected in any

method: (a) think through the rationale and logistics of the data collection and plan carefully for data collection, (b) anticipate and simulate the data collection procedures, (c) when approaching people for data collection, ensure that the approach is both ethical and professional, and (d) appreciate the role of training in preparing for data collection. I strove to follow all of these principles.

Data Analysis and Interpretation

The following two data analysis procedures were adopted in this study: (1) content analysis, or coding, for analyzing the participants' and the instructor's transcripts and a post-survey, and (2) qualitative interpretive analysis for closer examination of the participants' and the instructor's transcripts, the observational data, and the data taken from a post-survey with open-ended questions. Participants' messages posted in asynchronous forums were transformed into quantitative data through coding using three tested instruments: the Interaction Analysis Model (Gunawardena et al., 1997), Cognitive Dimension of Revised Bloom's Taxonomy (Anderson et al., 2001), and Krathwohl's Affective Domain (Krathwohl et al., 1964). I used NVivo 1.5 qualitative data analysis software for this part of the analysis. While I used pre-existing instruments to analyze participants' transcripts, I also created two original frameworks, employing an inductive approach. One framework was for analyzing my mediation strategies as an instructor. I created this framework inductively with categories that arose from raw data. The other one was for analyzing a post-survey. Categories for this framework were determined based upon 15 open-ended questions included in the post-survey. After finishing content analysis with coding, the quantitative data were triangulated with qualitative data derived from closer examination of the participants' and the instructor's transcripts, the researcher's observations, and a post-survey. In that sense, this study took a convergent parallel mixed method design

(Creswell, 2014).

The IAM, a model that was used to analyze transcripts of participant interactions, was developed by Gunawardena et al. (1997) as a content analysis instrument (see Table 3). The background of this instrument was described in the section titled "The Interaction Analysis Model" in Chapter 2. 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, I used the IAM for four reasons. First, the aim of the IAM fits to the purposes of this action research. The theoretical background of the IAM is social-constructivism and knowledge construction. 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. Second, the IAM uses messages as a unit of analysis instead of thematic units or other units of analysis. Gunawardena et al. (1997) stated that cutting up a message into smaller units did not capture the essence of meaning expressed in the message. Third, the IAM is an established instrument (Lucas et al., 2013; Hall, 2014). De Wever et al. (2006) argued that researchers are encouraged to use an existing instrument rather than develop a new scheme because, by applying existing instruments, researchers can contribute to fostering replicability and validity of the instrument. Finally, I analyzed transcript data taken from the trial program that I implemented in summer 2020 using the IAM and found that the IAM is applicable to asynchronous forums in this action research study. I scrupulously read the transcript, divided the transcript into messages, and assigned each message to one or more phases according to the phases and operations described

in the IAM for examining social construction of knowledge in the asynchronous forums.

Table 3

Interaction Analysis Model for Examining Social Construction of Knowledge in Computer Conferencing (Gunawardena et al., 1997)

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 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 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

In addition to the IAM, two established taxonomies, the Affective Domain and the Cognitive Dimension, were adopted to increase the validity of results, both of which are closely related to the focus of this study; that is, the exploration of higher order thinking development. The IAM was developed as an instrument to examine social construction of knowledge in forums. While social interaction is an important factor to develop higher order thinking in forums, individual engagement in thinking, or reflection, is also crucial for the purpose. These two taxonomies were adopted to explore aspects that cannot be covered by the IAM. I described the backgrounds of these two taxonomies in the section titled "Higher Order Thinking" in Chapter 2. Krathwohl (2002) stated that the six major categories in Cognitive Dimension are ordered from simple to complex: (1) Remember, (2) Understand, (3) Apply, (4) Analyze, (5) Evaluate, and (6) Create. The affective domain also forms a hierarchical structure, arranged from simpler to more complex: (1) Receiving, (2) Responding, (3) Valuing, (4) Organizing, and (5) Characterizing. Receiving and Responding, are related to social construction of knowledge while Valuing, Organizing, and Characterizing, are related to metacognition.

I took a qualitative interpretive approach for closer examination of participants' and instructor's transcripts, observational data, and data taken from a post-survey. I did not take a quantitative approach to investigate these data because the number of participants and collected qualitative data were not large enough to produce valid statistical results (Cohen et al., 2018). Instead, I closely read all these qualitative data to identify factors that might have enabled or constrained higher order thinking development. Also, I described the details of the context. Researchers choose a qualitative approach when they want to explore or understand the meaning that individuals or groups create in a certain setting (Punch, 2009). Creswell and Creswell (2018)

enumerated eight aspects of qualitative research: (1) natural setting, (2) researcher as key instrument, (3) multiple sources of data, (4) inductive and deductive data analysis, (5) participants' meanings, (6) emergent design, (7) reflexivity, and (8) holistic account, all of which applied to this study.

Validity and Reliability

Reflexivity is called for to ensure validity in action research because action research is a cyclical process that requires reflexivity in every step. Also, as stated in the previous section, in analyzing the participants' transcripts, I used three tested content analysis instruments, instead of one, to increase the validity of results. Related to validity, action researchers need to set success criteria before implementing an intervention. Cohen et al. (2018) stated that "without success criteria, it is impossible for the researcher to know whether, or how far, the action research has been successful" (p. 452). The focus of this study was on higher order thinking; thus, success of the program is partly measured by the IAM, which was created to measure social construction of knowledge. Gunawardena et al. (1997), who created the instrument, argued that the more phases the asynchronous forum illustrates and the greater variety of resources the participants show in the process of negotiation of meaning or construction of knowledge, the higher the quality of the forum is. The same principle should be applied to the other two instruments, Cognitive Dimension and Affective domain, which were adopted in this study.

Anderson et al. (2014) outlined five validity criteria for action research that I strove to uphold in this study: (1) process, (2) democratic, (3) dialogic, (4) catalytic, and (5) outcome. Process validity compels the researcher to frame the problem in a way that promotes ongoing learning and triangulates findings with multiple perspectives and data sources. Democratic validity requires that the research take multiple perspectives and interests into account. The

research aims for dialogic validity by engaging in critical and reflective discussion with participants and other stakeholders. Catalytic validity requires that the research energize participants and leave them with a sense of having been transformed. Outcome validity is concerned with whether the research found a solution to reframing the problem in a more complex way that leads to a new set of questions to be addressed.

In her discussion of reliability in content analysis, Gunawardena et al. (1997) stated that when researchers conduct qualitative content analysis, participation analysis and participant reports of satisfaction can further enrich the information that is obtained from qualitative content analysis. I used the post survey to gain data about participants' satisfaction and their feedback. Hendricks (2013) stated that multiple data collection strategies should be employed to establish reliability in action research because reliability can be established through triangulation, a process in which multiple forms of data are collected and analyzed. In this study, three types of data were collected. In addition, I employed a second coder to help establish high reliability in the coding process, which is described in more detail in Chapter 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 ethical treatment of human participants. Before this action research study was carried out, I completed "Student Application for Ethical Approval" that was required at Athabasca University, and it was reviewed and approved by the Research Ethics Board at Athabasca University (Appendix L).

I gained permission from the principal of S High School, the site of this study, in a written form before starting this project. The form was written in English and Japanese

(Appendices A and B). I advertised the BL program to all the students at S High School with a poster that described the outline of the program (Appendix C) to recruit participants. Then, I had a meeting with all applicants, where I described the program in more detail and answered their questions. In addition to oral description, I distributed a Letter of Information and Informed Consent Form to each applicant in a written form (Appendices D, E, F, and G). The age of the participants ranged from 16 to 17 years; thus, I created those forms for both the participants and their parents/caregivers. When research is conducted with human participants in languages other than English, extra attention should be paid (Eaton, 2020). All of these forms were written in Japanese and English. Students, their parents, and their caregivers could ask me in Japanese if they had any questions or concerns after reading the documents. I took enough time for them to understand the aims, risks, and benefits of the program before they signed the consent form.

Participation was totally voluntary. Participants had the right to opt out from participating in the program anytime without any penalty. Confidentiality of participants were rigorously protected. With regard to anonymity, participants engaged in online and in-person F2F interactions with other participants and instructors in the BL program in this study; thus, any data in these interactions were open to all the participants and instructors during the implementation of the program. Before starting this program, I told participants that they could not share any personal information that they would gain in the program with those who were not participating in the program. In the dissemination phase, any identifying information of participants will be removed.

This study included high school age students, requiring extra attention to ethical consideration. Punch (2009) introduced four ethical challenges to be considered in the conduct of research on children: welfare, protection, provision, and choice and participation. In regard to

welfare, the purpose of the research should contribute to children's well-being, either directly or indirectly. Protection means that research should be designed to avoid stress and distress. As for provision, children should, whenever possible, feel good about having contributed to research as a service which can inform society, individuals, policy, and practice. The challenge for choice and participation indicates that children should make informed choices about the following: (1) agreement or refusal to taking part, (2) opting out at any stage, (3) determining the boundaries of public, network, and third-party confidentiality, and (4) contributing ideas to research agendas and processes. I strove to uphold all these principles throughout the whole process of this study.

Chapter Summary

My ontology and epistemology led me to interpretivism and pragmatism as my methodological perspectives, which then guided me to take an action research approach in this study. I designed and implemented an extracurricular BL program at my workplace, using outcomes from a trial version of a program with similar aims that was conducted at the same high school in July-August 2020. In the BL program, EFL students engaged in online synchronous and asynchronous activities with English as a medium of instruction and communication to develop their higher order thinking while being supported by in-person F2F sessions conducted in Japanese. Three types of data were collected and analyzed in this study: (1) the participants' and the instructor's written text recorded in the asynchronous forums, (2) my field notes for the observational data, and (3) inquiry data collected through a post-survey using open-ended questions. The transcripts were transformed into quantitative data through coding with one tested model and two established taxonomies: the Interaction Analysis Model, Cognitive Dimension of Revised Bloom's Taxonomy, and Krathwohl's Affective Domain. The quantitative results were triangulated with qualitative data derived from closer examination of

the participants' and the instructor's transcripts, the researcher's observation, and a post-survey. Reflexivity was called for to ensure validity because action research is a cyclical process that requires reflexivity in every step to make modifications for the next stage. Participation analysis and participant reports of satisfaction were included to further enrich the information obtained from content analysis and to increase reliability. Also, a second coder was employed to help establish high reliability in the coding process. This study included students aged 16 to 17. Therefore, extra care to ethical consideration was taken in addition to obtaining consent forms from participants and their parents. In the next chapter, I present the coding results.

Chapter 4. Result

Introduction

In this chapter, I explain the coding process adopted in this study and then present results gathered from (1) the participants' and the instructor's transcripts that were recorded in asynchronous forums and (2) a post-survey with open-ended questions. Results from Forum 3 are presented first, followed by results from Forum 4, Forum 5, and the post-survey. All names of participants used in this study are pseudonyms. All statistical data shown in percentage are rounded off to the nearest tenth of a percent. Coding frameworks are arranged in a hierarchical manner. The highest-level categories in each framework are called parent codes. Subsequent levels of codes are known as child, grandchild, and great-grandchild codes. Given the large volume of data collected, only the most salient results are presented in this chapter. Other results are available upon request. Before describing the coding process and results, I begin this chapter by reviewing the intervention implemented in summer 2021 and the participants' backgrounds.

Intervention Context and Implementation

Action research demands that careful attention be paid to the context in which the intervention is conducted, because the intervention is highly context-dependent (McNiff, 2013). Therefore, I begin this chapter with additional descriptions of the intervention and the context that supplement those presented in detail in Chapter 3. First, I clarify revisions that I made for the BL program after the planning stage. The original structure of the BL program was provided in a form of a diagram in Chapter 3 (see Figure 1).

Most parts were implemented as planned, but I made some revisions, based upon careful observations during each phase. First, I decided not to conduct a pre-survey (see Appendix I) toward the end of the first in-person F2F meeting because the F2F meeting, where I was

planning to distribute the pre-survey, became intense. I did not want to place too much burden on participants and felt that I could gain the necessary information from a post-survey. Second, two in-person F2F meetings, Phase 5 (in the middle of the study) and Phase 8 (at the end), were canceled. No participant attended the voluntary in-person F2F meeting in the middle of the study. Furthermore, the F2F meeting at the end was canceled due to the COVID-19 pandemic. The in-person F2F component is described in more detail in Chapter 7. The third revision regarded the content analysis instruments. Originally, only the IAM was planned to be adopted as a coding instrument to analyze participants' transcripts, but I decided to adopt two additional taxonomies, Cognitive Dimension (Anderson et al., 2001) and Affective Domain (Krathwohl et al., 1964), to increase the validity of the results. The IAM was developed as an instrument to examine social construction of knowledge in forums. While social interaction is an important factor to develop higher order thinking, individual engagement in thinking, or reflection, is also crucial for the purpose. The two established taxonomies were adopted to explore aspects that cannot be covered by the IAM.

The focus of my study was on asynchronous forums; a total of five asynchronous forums were conducted in this program. Forum 1 was a self-introduction activity that was conducted in Phase 1. In Phase 2, a practice forum, Forum 2, introduced participants to a topic with low cognitive demand. Forum 3 and 4 were the two main forums in this program. The former was conducted in Phase 3 and the latter in Phase 6. Forum 5 was a forum in which participants were not expected to interact, but rather to submit one reflectional post. This final forum was conducted in Phase 9.

The number of participants was restricted to twenty to ensure the quality of the program. In the end, 18 students applied, and all of them were accepted. Two participants attended only the

synchronous portion of the program; thus, 16 participants attended the asynchronous forums. In addition to students who attended two main asynchronous forums, those who attended either one and submitted the post-survey were counted as participants in this study. All participants were in the second year of high school, Grade 11 in the K-12 system.

Student participants were given a large volume of assignments from their regular classes in summer. In addition, most of them belonged to an extracurricular club, such as track and field, basketball, dance, or chorus; thus, they were busy although the intervention was implemented during the summer vacation in the year 2021. The high school where this intervention was implemented was located in Tokyo, and the Tokyo Olympic Games were held while the BL program was implemented. Therefore, some participants might have had difficulty in finding a balance between enjoying the games and learning in this program. Lastly, participants had gained some online learning experience after the COVID-19 pandemic hit the world in 2020, but this experience was restricted to watching recorded lectures or attending synchronous classes in lecture formats; thus, they had no learning experience in constructivist-based asynchronous forums.

Table 4 provides basic information on the forums: the number of posts, messages, and total words that each of the 16 participants contributed to Forum 3, 4, and 5. The individual posted message is the unit of analysis adopted for coding in this study. Each message embodies one set of a participant's cognitive activity and contributions to a forum. The coding process, including the choice of the unit of analysis, is described in more detail in the next section. Three participants in Forum 3 and two participants in Forum 4 did not make any contribution, but no student withdrew during the program. Only seven students made a post in Forum 5, in which participants were required not to interact, but to share one reflection post. Inst-1 in the table is

the main instructor, me, and Inst-2 is a co-instructor.

Table 4

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

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	Totals	Inst-2	Inst-1
Forum III																			
Posts	1	1	5	3	1	3	1	4	2	10	2	3	1	0	0	0	37	1	22
Messages	3	3	8	5	3	6	3	9	3	23	4	6	3	0	0	0	79		
Total Words	154	181	450	339	252	384	151	491	125	1210	170	426	175	0	0	0	4508	110	3738
Forum IV																			
Posts	0	1	5	1	0	2	1	2	2	2	1	2	1	3	1	1	25	2	24
Messages	0	1	6	1	0	3	1	2	3	3	1	2	1	3	1	1	29		
Total Words	0	96	472	115	0	378	191	169	177	457	74	179	96	334	194	104	3036	918	4159
Forum V																			
Posts	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	7	0	0
Messages	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	7		
Total Words	0	0	167	72	112	127	94	92	0	158	0	0	0	0	0	0	822	0	0

In this section, I have provided additional descriptions of the intervention and the context that can supplement the detailed descriptions of the planned intervention and the teaching context presented in Chapter 3. In the following sections, I present results gathered from (1) the participants' and the instructor's transcripts that were recorded in asynchronous forums and (2) a post-survey with open-ended questions. Results from Forum 3 are presented first, followed by results from Forum 4, Forum 5, and the post-survey. Before presenting the results, I explain the coding process adopted in this study in the next section.

Coding Process

Data Collection Instruments

I gathered raw data through three data collection instruments: asynchronous forums, a post-survey, and my observation. As described in Chapter 3 and the previous section, participants worked together in two main five-day asynchronous forums (Forum 3 and 4) and one reflection forum (Forum 5) after joining forums created for self-introduction and practice in the intervention. The platform adopted was Google Classroom. I actively participated in Forum 3 and 4 as the instructor/facilitator. Participants were given reading materials, movie clips, and

discussion questions in Forum 3 and 4 (see Appendix H). Forum 5 was created for participants, not to interact, but to share their reflections on the BL program by submitting one original post; thus, the instructor made no mediation there. Participants and the instructor wrote all their posts in English in all of the asynchronous forums.

I distributed a post-survey with open-ended questions to each participant as an attachment through email and in paper format through postal mail. Participants could choose whichever version of the survey they preferred. I included fifteen open-ended questions in the survey, all of which were aimed to encourage participants to reflect on the intervention (see Appendix J). Participants could choose whether they would write their answers in English or in Japanese. In the end, all participants replied in Japanese; thus, I translated all the answers into English before coding. All original data in Japanese are available for perusal, if requested.

I collected observational data through taking field notes during the whole process of the BL program, including the preparation phase, the in-person F2F component, and the online component. I recorded all the field notes in a research journal.

Coding Reliability

Rationale for Coding. I analyzed qualitative data gathered from asynchronous forums (Forum 3 to 5) and the post-survey by a process known as coding. Coding means the ascription of a category label to a piece of data (Cohen et al., 2018). I chose coding from among other qualitative data analysis methods because it is an established method and fits the purpose of this study: the exploration of higher order thinking development. Originally, I planned to use only one model to analyze participants' transcripts, but I later decided to use two additional established taxonomies to increase the validity of results. To analyze my mediation strategies and the post-survey, I created two frameworks inductively with categories that arose from raw data.

Data reduction is inevitable in qualitative analysis, but by combining multiple instruments that fit the purposes of this study, I tried to mitigate the risk of too much reduction that might generate only superficial findings.

After translating the post-survey from Japanese into English, I coded all of the qualitative data gathered from Forums 3 to 5 and the post-survey following the procedure described by Creswell (2014): (1) gather raw data, (2) organize the data, (3) read all of the data to get the big picture, and (4) start coding the data. Also, this study strove to uphold the following two principles while coding to respect the richness of the qualitative data collected: (1) recognition that the coding procedure is not a linear process; all stages are interrelated (Creswell & Creswell, 2018) and (2) understanding that coders are expected to reread transcripts with "a mental ear ready to detect the shifts in tone" if it is content analysis (Gunawardena et al., 1997, p. 417). Qualitative data coding was done with data analysis software called NVivo 1.5.

Deciding the unit of analysis that fits the purpose of the study is crucial in coding (Rourke et al., 2001). De Wever et al. (2006) presented three levels of classification: sentence, theme, and message. I chose the message as the unit of analysis in this study following the instrument instructions of the IAM. In the model, a message is thought to embody a participant's cognitive activity and contribution to the construction of knowledge in a forum (Gunawardena et al., 1997). In this context, a message usually means one post or a complete message that a learner posted at a certain moment in the discussion. If a post that a participant or an instructor made included two or more completely different topics, the post was divided according to how many topics it had. For example, in Forum 3, participants were first required to answer three questions that I posed; thus, most of their initial posts were divided into three messages. To be consistent, the message was also adopted as the unit of analysis for Cognitive Dimension and Affective

Domain when analyzing participants' transcripts. A message was assigned to one code in many cases, but in several cases, one message was assigned to two or more codes.

Co-coding Process. Coding, or content analysis in general, cannot be perfectly objective and might involve some subjective or arbitrary divisions. As for the reliability of coding, De Wever et al. (2006) focused on the inter-rater reliability because, while the reliability of a coding scheme can be established from various viewpoints, such as coder stability, inter-rater reliability, and ultimately, replicability, inter-rater reliability is a crucial concern and should be explicit. Rourke et al. (2001) defined inter-rater reliability as "the extent to which different coders, each coding the same content, come to the same coding decisions" (p. 6).

I employed a second coder to help establish high reliability in the coding process in this study. Nevertheless, inter- or intra-rater reliability is not shown, because the second coder and I coded all of the data together. The second coder holds a Doctor of Education degree and has ample experience in qualitative data analysis. When the second coder and I used the existing model and taxonomies, we first read the literature on each of them to better understand the rationale underlying them before we began coding. When we used the two frameworks that I created, I first explained what each category meant to the second coder, and then we began coding slowly together, while taking time to discuss and record detailed descriptions depicting the meaning underlying each code. Throughout the coding process, we read each message together and coded it together. We often discussed what should be the most appropriate category while coding, and we reached an agreement in all of the cases.

Coding Frameworks

I adopted one pre-existing model and two established taxonomies to examine participants' transcripts: (1) the Interaction Analysis Model, (2) the Cognitive Dimension of Revised Bloom's

Taxonomy, and (3) Krathwohl's Taxonomy of the Affective Domain. I created two original frameworks from the raw data: one for analyzing instructor's mediation strategies and the other one for analyzing a post-survey.

Interaction Analysis Model. The Interaction Analysis Model (IAM), an empirically validated content analysis instrument, was chosen to analyze Forum 3 and 4. The IAM fits the purposes of this study because the IAM was originally developed to examine social construction of knowledge in the asynchronous forums. The IAM consists of five phases, each of which has smaller sub-categories, and begins with what could be described as lower mental functions progressing to higher mental functions in Vygotsky's terms (Gunawardena et al., 1997). Further details on this model are described in the section titled "The Interaction Analysis Model" in Chapter 2.

Cognitive Dimension of Revised Bloom's Taxonomy. The cognitive process dimension of the revised Blooms's Taxonomy (Cognitive Dimension; Anderson et al., 2001) was used to analyze Forum 3, 4, and 5. The six major categories in the scheme were: (1) Remember, (2) Understand, (3) Apply, (4) Analyze, (5) Evaluate, and (6) Create. As discussed in detail in the section titled "Anderson et al.'s Revised Taxonomy of Educational Objectives" in Chapter 2, Krathwohl (2002) stated that the six major categories were ordered from simple to complex or from concrete to abstract and that categories from Understand through Create were usually considered to be the most important outcomes of education.

Krathwohl's Affective Domain. The affective domain taxonomy (Affective Domain; Krathwohl et al., 1964) was adopted to analyze Forum 3, 4, and 5. As discussed in the section titled "Bloom's Taxonomy" in Chapter 2, the affective domain forms a hierarchical structure, arranged from simpler to more complex: (1) Receiving, (2) Responding, (3) Valuing, (4)

Organizing, and (5) Characterizing. The affective domain might not be directly related to higher order thinking, but it is closely related to the concept because the first two, Receiving and Responding, are related to social construction of knowledge, while the last three, Valuing, Organizing, and Characterizing, are related to metacognition.

Instructor's Mediation Framework. While I used pre-existing instruments to analyze transcripts of participant interactions, I developed an original coding framework for analyzing my mediation strategies as an instructor in Forum 3 and 4 inductively with categories that arose from raw data. The first step to develop the framework was a procedure called open coding (Cohen et al., 2018). I diligently reread all my posts submitted to Forum 3 and 4, and then identified and categorized what I did to facilitate the on-going discussion and mediate participants' development. Therefore, the unit of analysis adopted in this framework was a set of facilitation or mediation strategies that I employed in the forums. In the end, twenty strategy-based codes were created. The next step to develop the framework was a procedure called axial coding (Cohen, et al., 2018), by which those twenty codes were grouped into four broader categories: (1) Cognitive-related, (2) Affective-related, (3) IAM-related, and (4) Overarching. Overarching in this framework means providing my personal perspectives, which spanned across all of the other three categories. The definition and one example of each code are provided in Table 5.

Vaughan et al. (2013) classified facilitation strategies into two groups on the basis of the Community of Inquiry framework: facilitating social presence and cognitive presence. IAM-related and Cognitive-related strategies in this study were closely related to the facilitation strategies of Vaughan et al. for social and cognitive presence respectively. Strategies for facilitating affective presence were not explicit in Vaughan et al.'s classification, but strategies

related to affect were included in both of Vaughan et al.'s categories of facilitating social presence and cognitive presence. Affective Domain was adopted to analyze participants' transcripts in this study; thus, I made strategies related to affect explicit in my framework. In addition, some strategies in these categories spanned two or more categories. For example, Questioning was sorted into IAM-related because it was mainly used for social construction of knowledge in this study, but Questioning might also be related to affect and cognition. Therefore, four broader categories, or parent codes, in this framework, do not indicate clear distinctions; they have overlaps.

Table 5

Framework to Analyze the Instructor's Mediation Strategies: Codes, Definition, and Examples

Code	Definition and Examples
Affective-related	
A: Encouraging Opinions	I encouraged participants to express their thoughts. e.g., "Hey boys and girls, don't be shy. The discussion will naturally develop later, so your first post can be a brief one.
B: Praise	I praised participants' posts. e.g., "It is nicely done."
C: Agreement	I expressed my agreement with participants. e.g., "I agree with you when you say not everyone needs English."
D: Gratitude	I expressed my gratitude to participants. e.g., "Thank you for the post and also questions to your friends."
E: Sympathy	I expressed my sympathy to participants. e.g., "I am sorry to hear that you have had a technical problem. It is always annoying."
F: Interaction	I provided social interaction that is not task-oriented. e.g., "Also, as a teacher in charge of T&F team, I happen to know what you did yesterday."
G: Stress Reduction	I attempted to reduce participants' stress. e.g., "I have posed several questions to you. I appreciate it if you could try to answer one of them."
H: Feedback	I provided feedback on participants' personal development. e.g., "Now you realize both the advantages and disadvantages."

Code	Definition and Examples
Cognitive-related	
A: Examples	I provided examples. e.g., "Here is one example that is observed in our everyday life: *omotenashi*."
B: Perspectives	
Different Perspectives	I provided different perspectives. e.g., "Interestingly, however, not a few people study English hard just for tests without trying to use it in authentic situations."
Restating Perspectives	I restated participants' post from broader perspectives to help participants see what they wrote from a meta level. e.g., "Games are used for various reasons including to improve English proficiency. It is called gamification. It must be a good starting point."
C: New Knowledge	I provided new knowledge.
Basic	e.g., "Learning and using must be "the two wheels of the car" when we learn a foreign language."
Intermediate	e.g., "One of the biggest reasons why a particular language is used in a particular region is power."
Advanced	e.g., "Culture is not static. Any culture is transformed into a different one."
D: Supplementary Explanation	I provided supplementary explanation. e.g., "He used the word "power" in his post. Let me explain what the word means when it is used in the context of English as a global language, describing how it is going in Japan as an example."
E: Additional Resources	I provided additional resources. e.g., "Here is an interesting TED talk (about 14 minutes) for us to think about what our native language means to us."
IAM-related	
A: Connecting	I attempted to connect participants. e.g., "The 'feeling' part resonates with XX's latest post."
B: Questioning	I asked participants questions.
Basic	e.g., "Imagine you have to stay in a foreign country for a year. What would you miss? Two or three possible examples?"
Intermediate	e.g., "Do you think the world would be a better place if all the people on this planet used only one language? Why or why not?"
Advanced	e.g., "XX used the word 'freedom' when he talked about this issue in Zoom Meeting 1. Freedom! Do we have freedom? What does freedom exactly mean?"
C: Objecting	I indirectly objected to participants opinions. e.g., "ELF has possibilities to make the world a better place as

Code	Definition and Examples
	stated above, but it might be a double-edged sword. For example…"
D: Summarizing	I restated or summarized participants' posts to show that I understood what they wrote. e.g., "You stated there are English words that cannot be literally translated into Japanese (and vice versa) and you can learn the culture by learning the language."
E: Changing Topics	I attempted to change topics. e.g., "Here, however, I would like to direct your attention to the second paragraph of XX's."
F: Summarizing Discussion	I summarized ongoing discussions. e.g., "Hi all, so far, we have been focusing on XX's post and the first paragraph of YY's. The topic is mainly about world Englishes or lingua franca."
Overarching	
A: Personal Perspectives	I provided personal opinions, experiences, or suggestions for various purposes including building social relationship, stretching participants' cognition/metacognition, and providing different perspectives.
Basic	e.g., "My iPhone froze yesterday, and it took long for me to solve the problem. I see the great possibilities in online learning, but technological problems are always with us, and it is annoying."
Intermediate	e.g., "This is not a black-or-while problem. Each of us are encouraged to find a fine balance. To see things from various perspectives must be a key for us to be a mature citizen."
Advanced	e.g., "I agree that we can learn a lot by learning English (or any other languages), but one thing that I would like you all to learn by learning English is what a (native) language means to you."

Framework to Analyze a Post-Survey. I also developed an original framework to analyze a post-survey from gathered data, but it was generated by a different method from the one adopted to develop a framework to analyze my mediation strategies, which was described in the previous section. Categories for the framework to analyze a post-survey were determined based upon fifteen open-ended questions included in the post-survey. All these questions were created to encourage participants to reflect on crucial aspects of the intervention in this study, all

of which were categorized into groups. There were three largest categories: (1) BL design, (2) Technology, and (3) Final comment. While the latter two had no child codes, the first one, BL design, had four child codes: (1) Course, (2) F2F, (3) Online, and (4) Online vs. Traditional.

In this section, I have described the coding process adopted in this study, including data collection instruments, coding reliability, and frameworks used for coding. In the following sections, I present results gathered from (1) transcripts of participants and instructors recorded in asynchronous forums and (2) a post-survey with open-ended questions. Results from Forum 3 are presented first, followed by results from Forum 4, Forum 5, and the post-survey.

Results in Forum 3

I used one existing model and two established taxonomies to analyze participants' transcripts in Forum 3: the IAM, Cognitive Dimension, and Affective Domain. The IAM had five parent codes, Phase I to IV (see Table 3). There were six parent codes in the Cognitive Dimension: (1) Remember, (2) Understand, (3) Apply, (4) Analyze, (5) Evaluate, and (6) Create. There were five parent codes in Affective Domain: (1) Receiving, (2) Responding, (3) Valuing, (4) Organizing, and (5) Characterizing. I used an original framework to analyze my mediation as an instructor, which I developed inductively with categories that arose from raw data. This original framework had four parent codes: (1) IAM-related, (2) Cognitive-related, (3) Affective-related, and (4) Overarching. In the following four subsections, I present the coding results in this order: IAM, Cognitive Dimension, Affective Domain, and then Instructor's Mediation Framework.

IAM

As shown in Table 3, Phase I of the IAM, "Sharing/comparing of information," has five sub-sections. Phase II, "The discovery and exploration of dissonance or inconsistency among

ideas, concepts or statements," is divided into three sub-sections. Phase III, "Negotiation of meaning/co-construction of knowledge," includes five sub-sections. Phase IV, "Testing and modification of proposed synthesis or co-construction," is separated into five sub-sections. Phase V, "Agreement statements(s)/application of newly-constructed meaning," is broken into three sub-sections.

Participants posted a total of 79 messages in Forum 3, eight of which were double coded, and one of which was un-coded, because it was a non-task-oriented post created to indicate that the participant made a grammatical mistake in his previous post. Thus, there was a total of 86 units coded to IAM in this forum. Of these, 72 (or 83.7% of all units coded to IAM) belonged to Phase I: 51 to the subsection A titled "Statement of observation or opinion," nine to B "Statement of agreement from one or more other participants," four to C "Corroborating examples provided by one or more participants," and eight to D "Asking and answering questions to clarify details of statements." Two units (2.3%) were sorted into Phase II subsection A, which was called "Identifying and stating areas of disagreement." Eleven units (12.8%) were categorized into Phase III: two into the subsection C titled "Identification of areas of agreement or overlap among conflicting concepts" and nine to subsection D, "Proposal and negotiation of new statements embodying compromise, co-construction." One unit (1.2%) was put into the Phase IV subsection B, which was entitled "Testing against existing cognitive schema."

Cognitive Dimension

The cognitive dimension had six parent codes, none of which had any child codes. Out of 79 messages participants contributed to Forum 3, none were double coded, and one was un-coded; thus, there was a total of 78 units coded with Cognitive Dimension in this forum. Of these,

47 (or 60.3% of all units coded to Cognitive Dimension) belonged to (A) Understand, nine (11.5%) to (C) Analyze, and 22 (28.2%) to (D) Evaluate.

Affective Domain

The affective domain had five parent codes with no child codes. Like the Cognitive Dimension, the Affective Domain had a total number of 78 units. Of these, 58 (or 74.4% of all units coded to Affective Domain) were categorized into (B) Responding and 20 (25.6%) into (C) Valuing.

Table 6 shows all the parent codes used in each instrument and the number of units counted into each code. To show the percentage, the number of units counted in each code was divided by the total number of the units assigned to the corresponding instrument. The names of the codes in the table are abbreviated ones. Figure 2 graphically displays the results from Table 6.

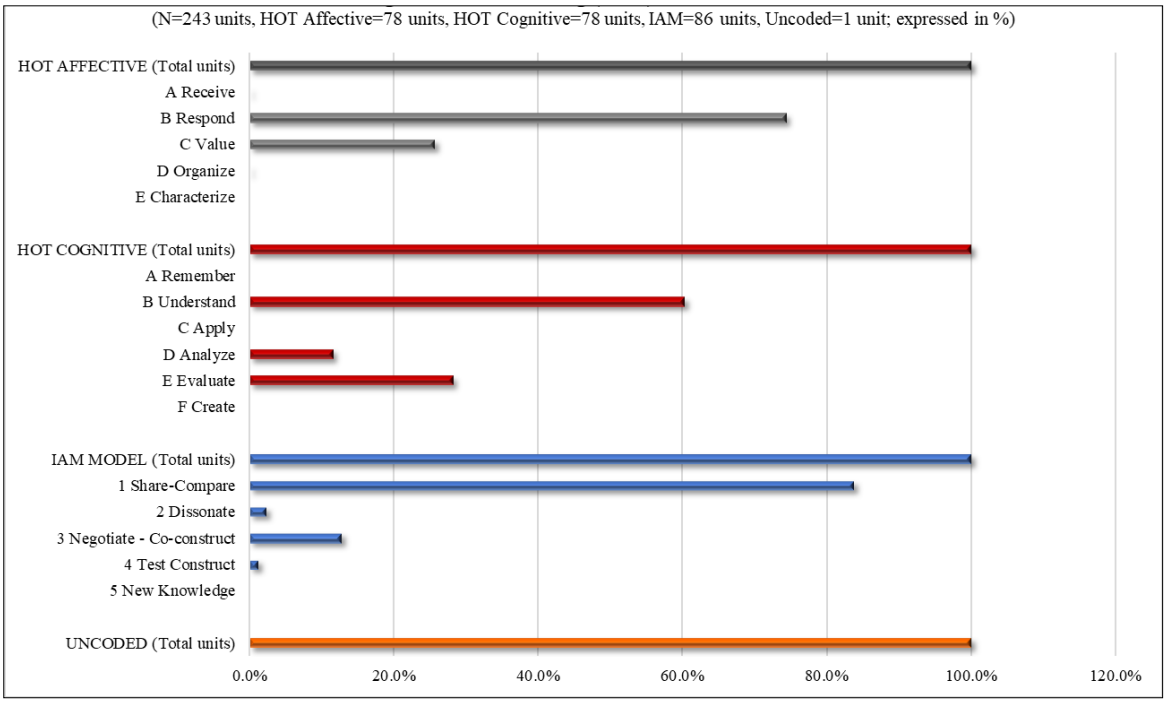
Table 6

The Number and Percentage of Coded Units in Forum 3: Participants

Name	# Coded Units	% Coded Units
HOT Affective (total units)	78	100.0%
A Receive	0	0.0%
B Respond	58	74.4%
C Value	20	25.6%
D Organize	0	0.0%
E Characterize	0	0.0%
HOT Cognitive (total units)	78	100.0%
A Remember	0	0.0%
B Understand	47	60.3%
C Apply	0	0.0%
D Analyze	9	11.5%
E Evaluate	22	28.2%
F Create	0	0.0%
IAM model (total units)	86	100.0%
1 Share-Compare	72	83.7%
2 Dissonate	2	2.3%
3 Negotiate - Co-construct	11	12.8%
4 Test Construct	1	1.2%
5 New Knowledge	0	0.0%
Uncoded	1	100.0%

Figure 2

The Proportion of Coded Units in Forum 3: Participants



Instructor's Mediation Strategies

The framework developed to analyze my mediation as an instructor had four parent codes: (1) IAM-related, (2) Cognitive-related, (3) Affective-related, and (4) Overarching. IAM-related included six child codes: (A) Connecting, (B) Questioning, (C) Objecting, (D) Summarizing, (E) Changing Topics, and (F) Summarizing Discussion. Only Questioning was further divided into Basic, Intermediate, and Advanced. Cognitive-related included five child codes: (A) Examples, (B) Perspectives, which was further divided into Different Perspectives and Restating Perspectives, (C) New Knowledge, which was further divided into Basic, Intermediate, and Advanced, (D) Supplementary Explanation, and (E) Additional Resources. Affective-related included eight child codes: (A) Encouraging Opinions, (B) Praise, (C) Agreement, (D) Gratitude, (E) Sympathy, (F) Interaction, (G) Stress Reduction, and (H)

Feedback. Overarching had only one category, Personal Perspectives, which was divided into Basic, Intermediate, and Advanced.

The co-instructor, who played a role as the main instructor in synchronous meetings, contributed few posts to forums. Even the mere presence of an observer can affect the environment of online/blended learning (Sterna et al., 2019); thus, in Chapters 6 and 7, I explore how the co-instructor's presence and messages affected discussions in forums. In coding, however, I excluded his messages because I was heavily involved in all the forums as the main instructor (22 posts in Forum 3 and 24 in Forum 4), and the number of posts submitted by the co-instructor was small (one in Forums 3 and two in Forum 4).

There was a total of 68 units sorted into Affective-related categories. Of these, four (or 5.9% of all units coded to Affective-related) belonged to (A) Encouraging Opinions, 26 (38.2%) to (B) Praise, 15 (22.0%) to (C) Agreement, 13 (19.1%) to (D) Gratitude, one (1.5%) to (E) Sympathy, five (7.4%) to (F) Interaction, three (4.4%) to (G) Stress Reduction, and one (1.5%) to (H) Feedback.

The total number of Cognitive-related units was 34. Out of these 34 units, three (or 8.8% of all units coded to Cognitive-related) were categorized into (A) Examples. Fifteen units (44.1%) were sorted into (B) Perspective: five into Different Perspectives and 10 into Restating Perspectives. Thirteen units (38.2%) belonged to (C) New Knowledge, two to Basic, two to Intermediate, and nine to Advanced. Two units (5.9%) were categorized into (D) Supplementary Explanation, and one (2.9%) into (E) Additional Resources.

There was a total of 29 IAM-related units. Of these, nine (or 31.0% of all units coded to IAM-related) were categorized into (A) Connecting, 13 (44.8%) were sorted into (B) Questioning, four into Basic, six into Intermediate, and two into Advanced. Three units (10.3%)

belonged to (C) Objecting, and four units (13.8%) belonged to (D) Summarizing. Overarching had only one category, Personal Perspectives. Nineteen were included in this category: 11 were Basic, six were Intermediate, and two were Advanced.

Table 7 shows all the parent and child codes in the framework and the number of units sorted into each code. Figure 3 graphically illustrates the numerical results in Table 7.

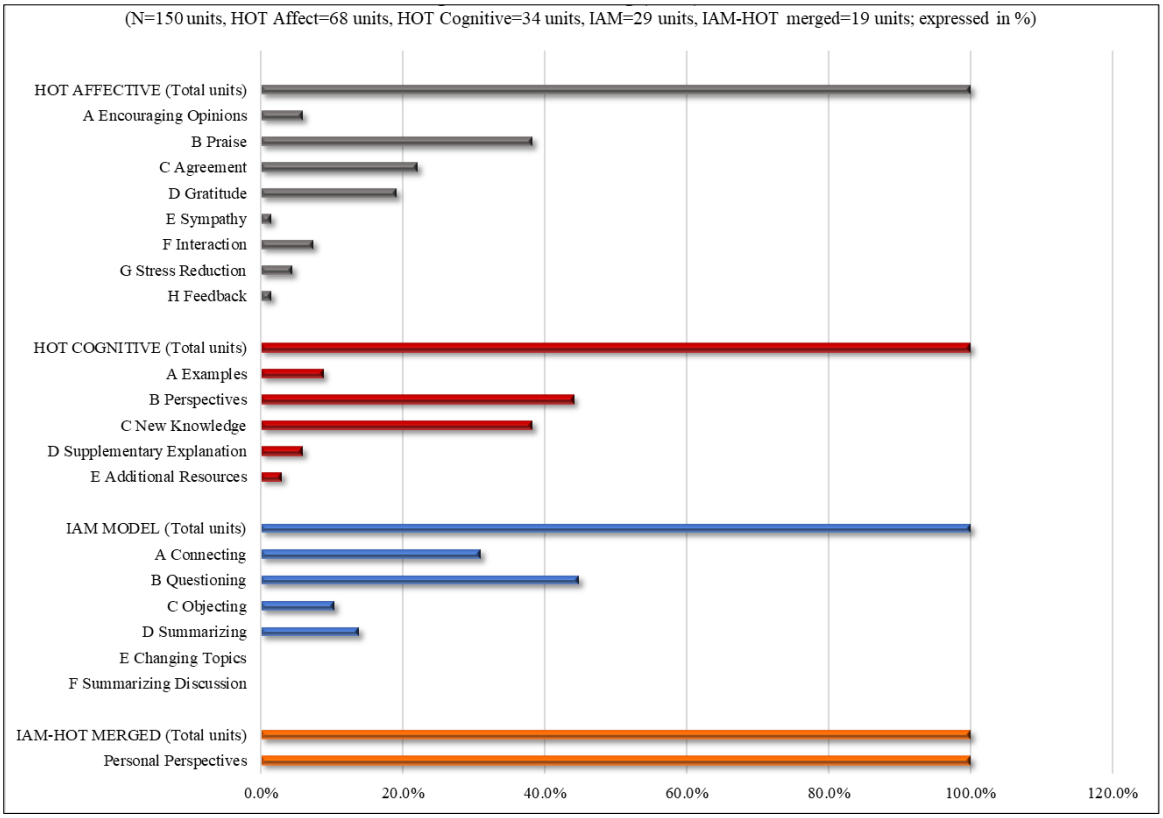
Table 7

The Number and Percentage of Coded Units in Forum 3: Instructor

Name	# Coded Units	% Coded Units
HOT Affective	68	100.0%
A Encouraging Opinions	4	5.9%
B Praise	26	38.2%
C Agreement	15	22.1%
D Gratitude	13	19.1%
E Sympathy	1	1.5%
F Interaction	5	7.4%
G Stress Reduction	3	4.4%
H Feedback	1	1.5%
HOT Cognitive	34	100.0%
A Examples	3	8.8%
B Perspectives	15	44.1%
C New Knowledge	13	38.2%
D Supplementary Explanation	2	5.9%
E Additional Resources	1	2.9%
IAM	29	100.0%
A Connecting	9	31.0%
B Questioning	13	44.8%
C Objecting	3	10.3%
D Summarizing	4	13.8%
E Changing Topics	0	0.0%
F Summarizing Discussion	0	0.0%
IAM-HOT Merged	19	100.0%
Personal Perspectives	19	100.0%

Figure 3

The Proportion of Coded Units in Forum 3: Instructor



Results in Forum 4

I used the same coding instruments to analyze the participants' and the instructor's transcripts in this forum as the ones that were adopted in Forum 3. In the following four subsections, I present the coding results in this order: IAM, Cognitive Dimension, Affective Domain, and then Instructor's Mediation Framework.

IAM

Participants posted a total of 29 messages in Forum 4, none of which were double coded, and none were un-coded; thus, there was a total of 29 units coded to IAM in this forum. Of these, 22 units (or 75.9% of all units coded to IAM) belonged to Phase I: 18 to the subsection A titled "Statement of observation or opinion," two to B "Statement of agreement from one or more other

participants," and two to E "Definition, description, or identification of a problem." Six units (20.7%) were categorized into Phase III, all of which were coded to the subsection D "Proposal and negotiation of new statements embodying compromise, co-construction." One unit (3.4%) belonged to subcategory C of Phase V, which was titled "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."

Cognitive Dimension

Out of 29 messages that participants contributed to Forum 4, none were double coded, and none were un-coded; thus, there was a total of 29 units coded to Cognitive Dimension in this forum. Out of the 29 units, 13 (or 44.8% of all units coded to Cognitive Dimension) belonged to (A) Understand, 10 (34.5%) to (C) Analyze, and six (20.7%) to (D) Evaluate.

Affective Domain

Like the Cognitive Dimension, the total number of units coded to the Affective Domain was 29; none were double coded. Out of these 29 units, 15 (or 51.7% of all units coded to Affective Domain) were categorized into (B) Responding, and 14 (48.3%) into (C) Valuing.

Table 8 shows all the parent codes used in each area of the coding framework and the number of units sorted into each code in Forum 4. Figure 4 graphically illustrates the results included in Table 8.

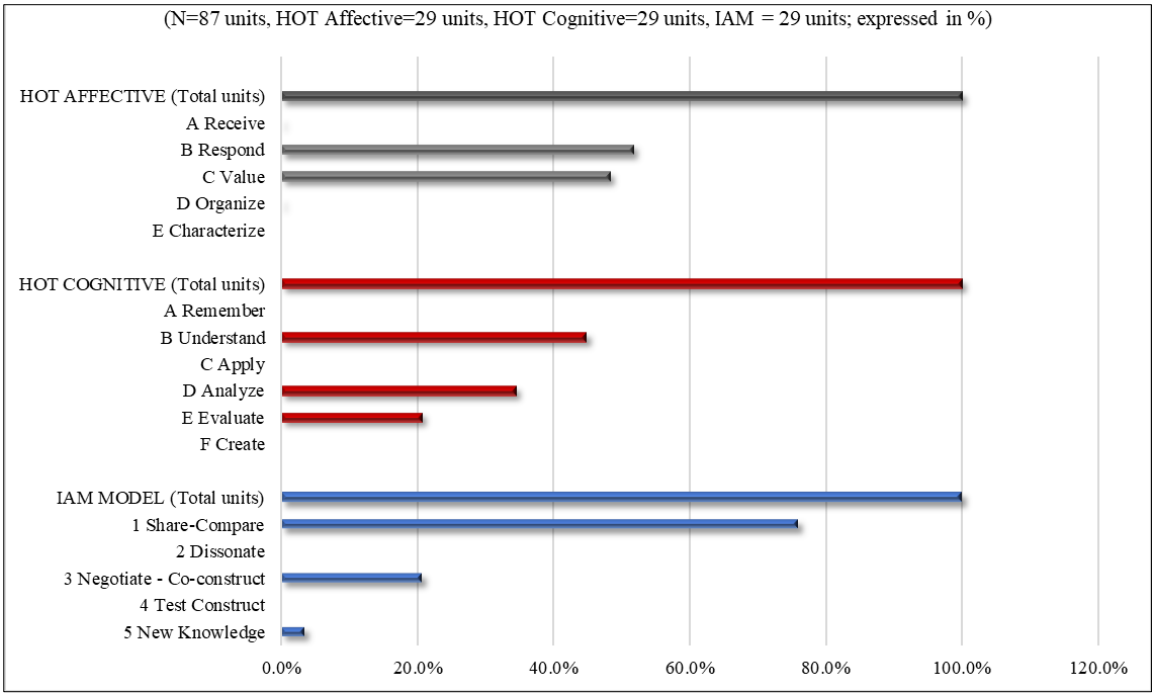
Table 8

The Number and Percentage of Coded Units in Forum 4: Participants

Name	# Coded Units	% Coded Units
HOT Affective	29	100.0%
A Receive	0	0.0%
B Respond	15	51.7%
C Value	14	48.3%
D Organize	0	0.0%
E Characterize	0	0.0%
HOT Cognitive	29	100.0%
A Remember	0	0.0%
B Understand	13	44.8%
C Apply	0	0.0%
D Analyze	10	34.5%
E Evaluate	6	20.7%
F Create	0	0.0%
IAM model	29	100.0%
1 Share-Compare	22	75.9%
2 Dissonate	0	0.0%
3 Negotiate - Co-construct	6	20.7%
4 Test Construct	0	0.0%
5 State New Knowledge	1	3.4%

Figure 4

The Proportion of Coded Units in Forum 4: Participants



Instructor's Mediation Strategies

The same framework as the one used in Forum 3 was adopted to analyze the Instructor's Mediation Strategies in Forum 4. This framework had four parent codes: (1) IAM-related, (2) Cognitive-related, (3) Affective-related, and (4) Overarching. There was a total of 76 Instructor's Mediation Strategies units coded to the category, Affective-related. Of these, five (or 6.6% of all units coded to Affective-related) belonged to (A) Encouraging Opinions, 20 (26.3%) to (B) Praise, 18 (23.7%) to (C) Agreement, 14 (18.4%) to (D) Gratitude, two (2.6%) to (E) Sympathy, five (6.6%) to (F) Interaction, five (6.6%) to (G) Stress Reduction, and seven (9.2%) to (H) Feedback.

The total number of Cognitive-related units was 27. Out of these 27 units, three units (or 11.1% of all units coded to Cognitive-related) were categorized as (A) Examples. Nine units

(33.3%) were sorted into (B) Perspective: four into Different Perspectives and five into Restating Perspectives. Eleven units (40.7%) belonged to (C) New Knowledge: three to Intermediate, and eight to Advanced. Two units (7.4%) were categorized into (D) Supplementary Explanation, and two units (7.4%) into (E) Additional Resources.

A total of 35 units were assigned to the IAM-related category. Of these, eight units (or 22.9% of all units coded to IAM-related) were categorized into the child code (A) Connecting. 19 units (54.3%) were sorted into (B) Questioning: two into Basic, five into Intermediate, and 12 into Advanced. Three units (8.6%) belonged to (C) Objecting, and one unit (2.9%) to (D) Summarizing. One unit (2.9%) was sorted into (E) Changing Topics, and three units (8.6%) into (F) Summarizing Discussion. Twenty-two units were counted into the only child code in Overarching, Personal Perspectives. Three were sorted into Basic, nine into Intermediate, and 10 into Advanced.

Table 9 shows all the parent- and child codes in the framework and the number of units for each code. Figure 5 graphically represents the data from Table 9. These results, combined with those from Forum 3, are used in Chapter 6 to discuss the second sub-question for the second research question: What instructional techniques performed by the instructors in the asynchronous forums assisted or inhibited higher order thinking development?

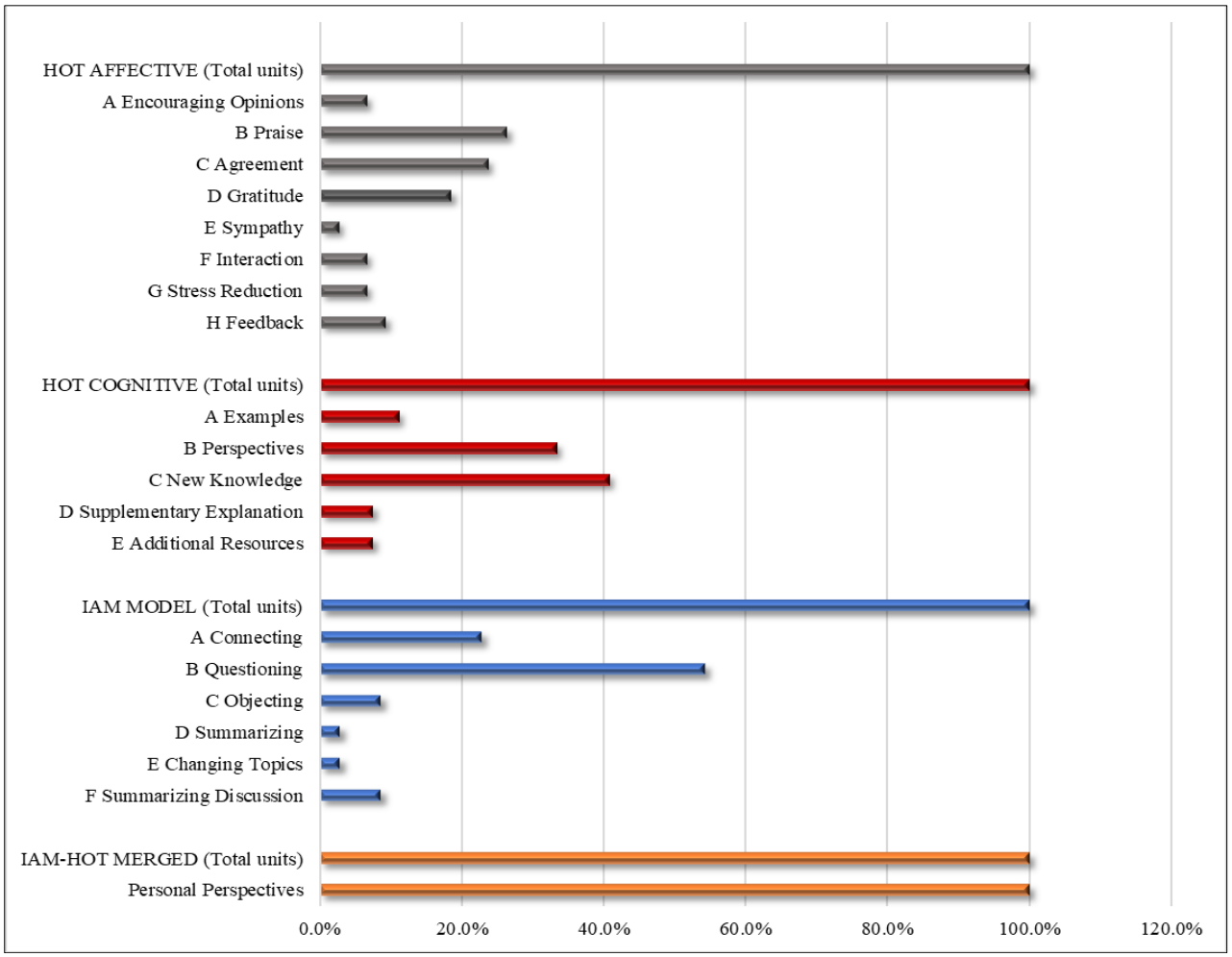
Table 9

The Number and Percentage of Coded Units in Forum 4: Instructor

Name	# Coded Units	% Coded Units
HOT Affective	76	100.0%
A Encouraging Opinions	5	6.6%
B Praise	20	26.3%
C Agreement	18	23.7%
D Gratitude	14	18.4%
E Sympathy	2	2.6%
F Interaction	5	6.6%
G Stress Reduction	5	6.6%
H Feedback	7	9.2%
HOT Cognitive	27	100.0%
A Examples	3	11.1%
B Perspectives	9	33.3%
C New Knowledge	11	40.7%
D Supplementary Explanation	2	7.4%
E Additional Resources	2	7.4%
IAM	35	100.0%
A Connecting	8	22.9%
B Questioning	19	54.3%
C Objecting	3	8.6%
D Summarizing	1	2.9%
E Changing Topics	1	2.9%
F Summarizing Discussion	3	8.6%
IAM-HOT Merged	22	100.0%
Personal Perspectives	22	100.0%

Figure 5

The Proportion of Coded Units in Forum 4: Instructor



Results in Forum 5

In Forum 5, participants were not expected to interact with each other, but rather to submit one reflectional post. Thus, the IAM was not used in this forum. Two existing taxonomies, Cognitive Dimension and Affective Domain, were adopted to analyze participants' transcripts. Also, the framework to analyze the instructor's mediation was not used in this forum, because I, as the instructor, made no post in this forum.

Cognitive Dimension

Out of seven messages participants contributed to Forum 5, none were double coded, and none were un-coded, so there was a total of seven units coded to the Cognitive Dimension in this forum. Out of these seven units, one (or 14.3% of all units coded to Cognitive Dimension) belonged to (D) Analyze and six (85.7%) to (E) Evaluate.

Affective Domain

As with the Cognitive Dimension, there was a total of seven units coded to the Affective Domain. Out of these seven units, five units (or 71.4% of all units coded to Affective Domain) were categorized as (C) Value, and two units (28.6%) belonged to (D) Organize.

Table 10 shows all the parent codes used in each instrument and the number of units for each code in Forum 5. Figure 6 graphically illustrates the data in Table 10.

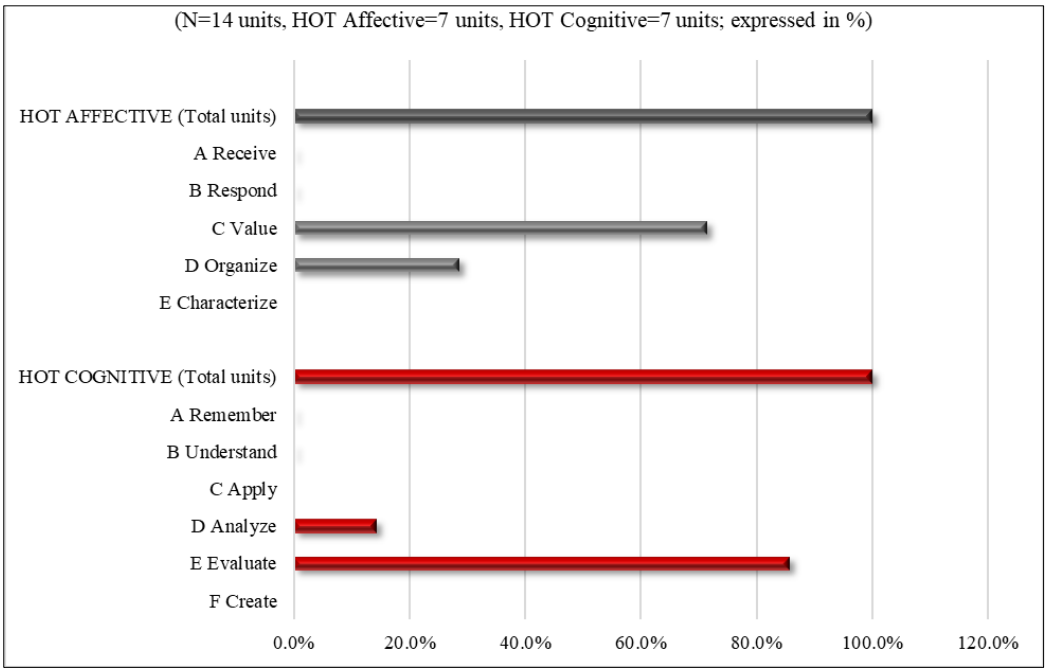
Table 10

The Number and Percentage of Coded Units in Forum 5: Participants

Name	# Coded Units	% Coded Units
HOT Affective	7	100.0%
A Receive	0	0.0%
B Respond	0	0.0%
C Value	5	71.4%
D Organize	2	28.6%
E Characterize	0	0.0%
HOT Cognitive	7	100.0%
A Remember	0	0.0%
B Understand	0	0.0%
C Apply	0	0.0%
D Analyze	1	14.3%
E Evaluate	6	85.7%
F Create	0	0.0%

Figure 6

The Proportion of Coded Units in Forum 5: Participants



In the three sections above (Results from Forum 3, 4, and 5), I presented results gathered from the participants' and the instructor's transcripts taken from the asynchronous forums. All of the results are used in Chapters 5 to 7 to discuss the three research questions that guided this study. In the following section, I report results gathered from a post-survey with open-ended questions.

Post-Survey Results

The coding framework categories developed to analyze the post-survey for this study were determined based upon fifteen open-ended questions included in the post-survey. These questions were created to encourage participants to reflect on crucial elements of the BL program. This framework has three parent codes. Two of them, Technology and Final Comments, had no child codes. The other parent code, BL design, included four child codes: (1) Course, (2) F2F, (3) Online, and (4) Online vs. Traditional. Course was separated into two grandchild codes, "Tasks"

and “Theme,” and Tasks was further divided into two great-grandchild codes, “Meaningful” and “Uncomfortable.” F2F was separated into two grandchild codes, “General” and “Suggestions for Improvement.” Online was separated into two grandchild codes, “Asynchronous” and “General.” Asynchronous included three great-grandchild codes: “Instructor,” “Other Students,” and “Suggestions for Improvement.” Instructor and Other Students were further divided into “Helpful Comments” and “Uncomfortable Comments.” Suggestions for Improvement was further divided into “Instructor” and “Students.” Online vs. Traditional had no sub-sections.

Twelve out of 16 participants submitted the post-survey. Table 11 shows the number of units coded to each parent- and child code category. Table 12 shows the number of units coded to each grandchild code, and Table 13 shows the number of units coded to each great-grandchild code. Figure 7 graphically illustrates the results in Table 11. In Chapters 5 to 7, I examine these results, in addition to coding results from the participants’ and the instructor’s transcripts, to answer the research questions that guided this study.

Table 11

The Number and Percentage of Coded Units in Post-Survey: Parent and Child Codes

Name	# Coded Units	% Coded Units
TOTAL UNITS	178	100.0%
BLENDED LEARNING DESIGN (parent code; # & % of all coded units)	154	86.5%
Online (child code; # & % of parent code)	84	54.5%
Course (child code; # & % of parent code)	34	22.1%
Face-to-face (child code; # & % of parent code)	24	15.6%
Online vs Traditional (child code; # & % of parent code)	12	7.8%
FINAL COMMENTS (parent code; # & % of all coded units)	12	6.7%
TECHNOLOGY (parent code; # & % of all coded units)	12	6.7%

Table 12

The Number and Percentage of Coded Units in Post-Survey: Grandchild Codes

Name	# Coded Units	% Coded Units
BLENDED LEARNING DESIGN (parent code; # & % of all coded units)	154	86.5%
Online (child code; # & % of parent code)	84	54.5%
Asynch Forums (grandchild code; # & % of child code)	72	85.7%
General (grandchild code; # & % of child code)	12	14.3%
Course (child code; # & % of parent code)	34	22.1%
Tasks (grandchild code; # & % of child code)	24	70.6%
Theme (grandchild code; # & % of child code)	10	29.4%
Face-to-face (child code; # & % of parent code)	24	15.6%
General (grandchild code; # & % of child code)	12	50.0%
Suggestions for Improvement (grandchild code; # & % of child code)	12	50.0%
Online vs Traditional (child code; # & % of parent code)	12	7.8%

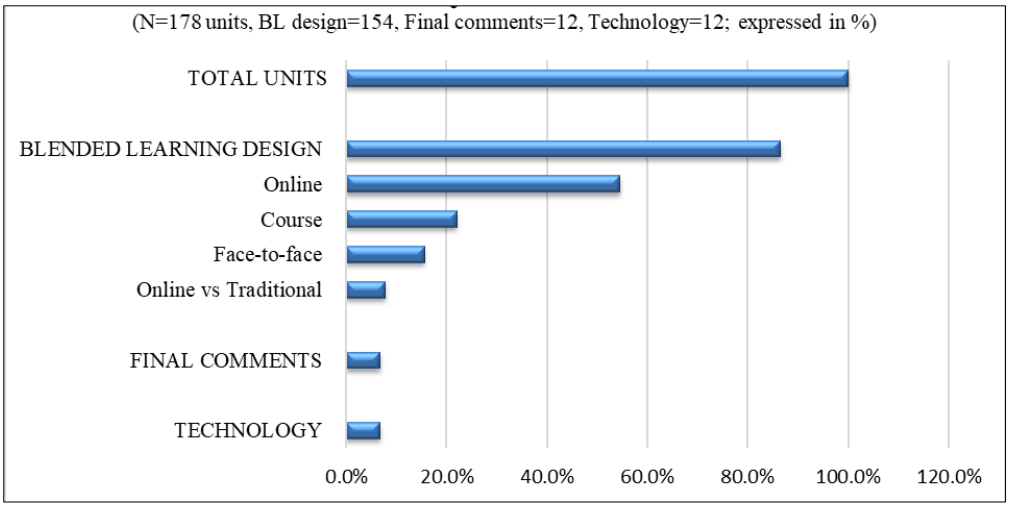
Table 13

The Number and Percentage of Coded Units in Post-Survey: Great-Grandchild Codes

Name	# Coded Units	% Coded Units
BLENDED LEARNING DESIGN (parent code; # & % of all coded units)	154	86.5%
Online (child code; # & % of parent code)	84	54.5%
Asynch Forums (grandchild code; # & % of child code)	72	85.7%
Instructor	24	33.3%
Other Students	24	33.3%
Suggestions for Improvement	24	33.3%
General (grandchild code; # & % of child code)	12	14.3%
Course (child code; # & % of parent code)	34	22.1%
Tasks (grandchild code; # & % of child code)	24	70.6%
Meaningful	12	50.0%
Uncomfortable	12	50.0%

Figure 7

The Proportion of Coded Units: Post-Survey



Chapter Summary

I adopted coding as a method to analyze the qualitative data gathered in this study because it is an established method and fits the purpose of this study. I employed a second coder to help establish high reliability in the coding process, but inter- or intra-rater reliability was not shown because the two coders coded all of the data together. I chose to explore participants' transcripts by using established frames of reference. These included the IAM (Gunawardena et al., 1997), as well as two taxonomies, Bloom's Cognitive Dimension (Anderson et al., 2001) and Krathwohl's Affective Domain (Krathwohl et al., 1964). The message was chosen as the unit of analysis since it is thought to embody a set of participant's cognitive activities and contributions to a forum. To be consistent, the message was also adopted as the unit of analysis for the two taxonomies to analyze transcripts of participant interactions. Employing an inductive approach, I also created two original coding frameworks from raw data; one framework was for analyzing the instructor's mediation strategies and the other one was for analyzing a post-survey.

Sixteen participants attended the asynchronous forums. All participants were in the second year of high school, Grade 11 in the K-12 system. I created the intervention as a value-added option for higher achieving students. All participants were considered to be advanced EFL students who had already acquired the basics of English grammar and vocabulary, although most of them had not had enough opportunity to use English in authentic situations.

Three salient findings can be drawn from the results presented in this chapter, all of which are closely related to the discussion in the following discussion chapters. First, participants demonstrated higher order thinking to a certain extent overall, although individual differences were identified. More messages were coded into higher categories in Forum 4 than in Forum 3. Forum 5 was a place in which participants were not expected to interact, but rather to submit one reflection post. Although the number of participants who contributed to Forum 5 was limited (n=7), all of these messages belonged to higher categories in both the Cognitive Dimension and the Affective Domain. Secondly, despite the higher order thinking development of participants, learner-learner interaction, which was the most important element in asynchronous forums in this study, was not highly activated as a whole. Finally, I actively joined Forum 3 and 4 as the main instructor and used various mediation strategies in both forums. A total of twenty mediation strategies were identified, which were grouped into four broader categories: (1) Cognitive-related, (2) Affective-related, (3) IAM-related, and (4) Overarching.

This chapter has reported on coding results gathered from two sources of qualitative data: (1) the participants' and the instructor's transcripts drawn from three asynchronous forums and (2) a post-survey with open-ended questions. The following three chapters merge findings from these results with reviewed literature to address three research questions.

Chapter 5. Research Question 1 Discussion

Introduction to Discussion Chapters

Coding results gathered from collected qualitative data were shown in the previous chapter. In Chapters 5 to 7, I address the research questions presented in Chapter 1, using the coding results, closer examination of participants' transcripts, the post-survey, my observations, and related literature. Discussion chapters are organized by three research questions that were created to pursue the goal; namely, Chapter 5 is for discussing the first research question, Chapter 6 for the second research question, and Chapter 7 for the third research question.

The first research question was: To what extent can higher order thinking be demonstrated among participants in asynchronous online forums? Findings in Chapter 4 suggested that participants demonstrated the development of higher order thinking to a certain extent overall; however, learner-learner interaction was not highly activated. In this chapter this research question is discussed in more detail. The second and the third research questions were created to investigate the possible reasons for the answers to the first research question. The second research question was to explore the process factors: What factors in students' engagement in asynchronous online forums may contribute to the development of higher order thinking, if any? The third research question was to explore the contextual factors: What factors in blended learning design may contribute to the development of higher order thinking, if any? These two research questions are discussed, using the post-survey, closer examination of participants' transcripts, and my observations.

Sub-Question 1 for the First Research Question

The first sub-question for the first research question was: How much did each participant interact in the asynchronous forums? I used demographics and coding results, most of which

were shown in the previous chapter, to answer this sub-question.

Table 4, which was presented in the section titled “Intervention Context and Implementation” in Chapter 4, shows the number of posts, messages, and total words that each participant and instructor contributed to Forum 3, 4, and 5. The average number of posts per participant was 2.3 in Forum 3 and 1.6 in Forum 4. The average number of total words in one post was 121.8 words in Forum 3 and 121.4 in Forum 4. In contrast, I as the main instructor of asynchronous forums (Inst-1 in Table 4), who is represented as Hiroshi hereafter, actively participated in both the forums: 22 posts in Forum 3 and 24 in Forum 4. The average number of total words in one post was 169.9 words in Forum 3 and 173.3 in Forum 4.

Table 14 shows where participants’ posts were directed: to prompts, to instructors, to other participants, or others. Thirteen posts in Forum 3 and 14 in Forum 4 were responses to prompts. These numbers, combined with the small number of participants’ posts in both the forums, indicate that learner-learner and learner-instructor interactions in both forums were limited. Bullen (1997) divided messages in forums into two categories: independent and interactive. Independent messages are those that deal with the discussion topic but have no reference to any other messages, while interactive messages are those that refer to other messages to develop the discussion. In Bullen’s terms, the number of participants who submitted interactive messages directed to other participants was small (n=7 in Forum 3 and n=4 in Forum 4), while most participants submitted independent messages when replying to the prompt (n=13 in Forum 3 and 14 in Forum 4).

Table 14

The Number of Posts and Their Direction in Forum 3 and 4

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	Totals
Forum III																	
Total	1	1	5	3	1	3	1	4	2	10	2	3	1	0	0	0	37
To the prompt	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	13
To instructors	0	0	3	1	0	0	0	1	1	2	0	1	0	0	0	0	9
To participants	0	0	1	1	0	2	0	2	0	6	1	1	0	0	0	0	14
Others	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Forum IV																	
Total	0	1	5	1	0	2	1	2	2	2	1	2	1	3	1	1	25
To the prompt	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	14
To instructors	0	0	2	0	0	0	0	0	1	1	0	1	0	1	0	0	6
To participants	0	0	2	0	0	1	0	1	0	0	0	0	0	1	0	0	5
Others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

When participants submit their posts during a course is an element to analyze forums (Bullen, 1997). Table 15 shows the day of the week when participants' first posts, all of which were responses to prompts, arrived in Forum 3 and 4. Both forums began on Monday and continued for five days until Friday. Nevertheless, 11 out of 13 original posts in Forum 3 and 11 out of 14 in Forum 4 were submitted on Wednesday or later. Slow start was a common characteristic of both forums.

Table 15

The Day of the Week When Participants' First Post Arrived in Forum 3 and 4

	Monday or earlier	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
Forum 3	0	2	2	4	5	0	13
Forum 4	2	1	4	3	3	1	14

This section described the overall trend of students' participation with statistical data. The

average number of posts per participant was 2.3 in Forum 3 and 1.6 in Forum 4. More than half of the posts were replies to the original prompt or to instructors. Most of the first posts from each participant came after the third day in the five-day forums. One conclusion that can be drawn from these findings is that although participants successfully responded to the prompts and questions from the instructors, learner-learner interaction was not highly activated overall. The possible reasons for this finding are investigated in Chapter 6 and 7. In the next section, differences among Forum 3, 4, and 5 are explored.

Sub-Question 2 for the First Research Question

The second sub-question for the first research question was: How does content analysis with the IAM, Cognitive Dimension, and Affective Domain describe the asynchronous forums? This section is divided into two sub-sections: comparisons focusing on participants and the instructor. I begin this section with the former: differences among forums shown by content analysis focusing on participants.

Comparison of the Results Among Forums 3, 4, and 5: Participants

In Chapter 4, the results of each forum were presented individually. In this section, the results gathered from participants' transcripts in each forum are compared to the average of all forums to make sure of salient characteristics of participants' higher order thinking development in each forum.

Figure 8 is a chart to compare Forum 3 with the average of all forums. In Affective Domain, the proportion of (B) Responding was larger than the average of all forums while (C) Valuing was smaller than the average of all forums. In the prompt, participants were asked to answer three questions; most of them answered all of the questions. That is why the number of messages coded into (B) Responding was large in Forum 3. In Cognitive Dimension, the

proportion of (B) Understand was larger than the average of all forums while (D) Analyze is smaller than the average of all forums. In the IAM, the proportion of Phase I was smaller than the average of all forums although Phase I accounted for 83.7% in Forum 3. 2 units were coded into Phase II, and 1 unit was sorted into Phase IV while no units were coded into those phases in Forum 4.

Figure 8

All Forums vs. Forum 3: Parent Codes in Each Instrument: Participants

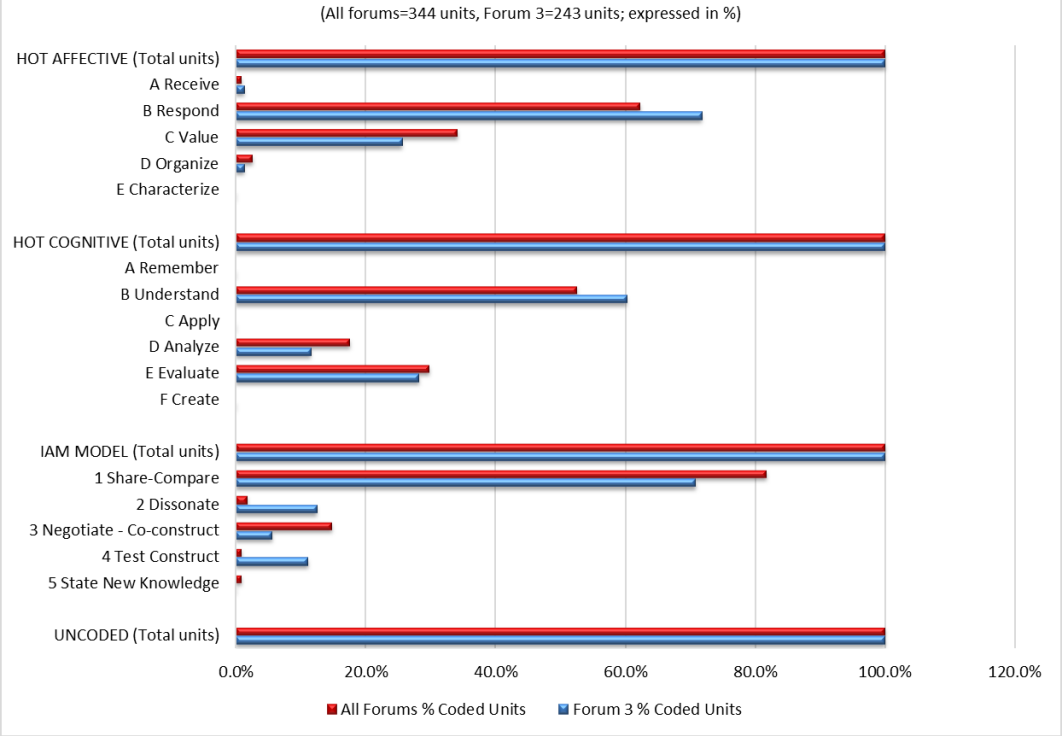


Figure 9 is a chart to compare Forum 4 with the average of all forums. In Affective Domain, the proportion of (C) Valuing was larger than the average of all forums while (B) Responding was smaller than the average of all forums. In Cognitive Dimension, the proportion of (D) Analyze was larger than the average of all forums while (B) Understand and (E) Evaluate was smaller than the average of all forums. In the IAM, the proportion of Phase III was larger than the average of all forums while the proportion of Phase I was smaller than the average of all

forums, although Phase I accounted for 75.9% in Forum 4. One unit was coded into Phase V while no units were coded into this phase in Forum 3.

Figure 9

All Forums vs. Forum 4: Parent Codes in Each Instrument: Participants

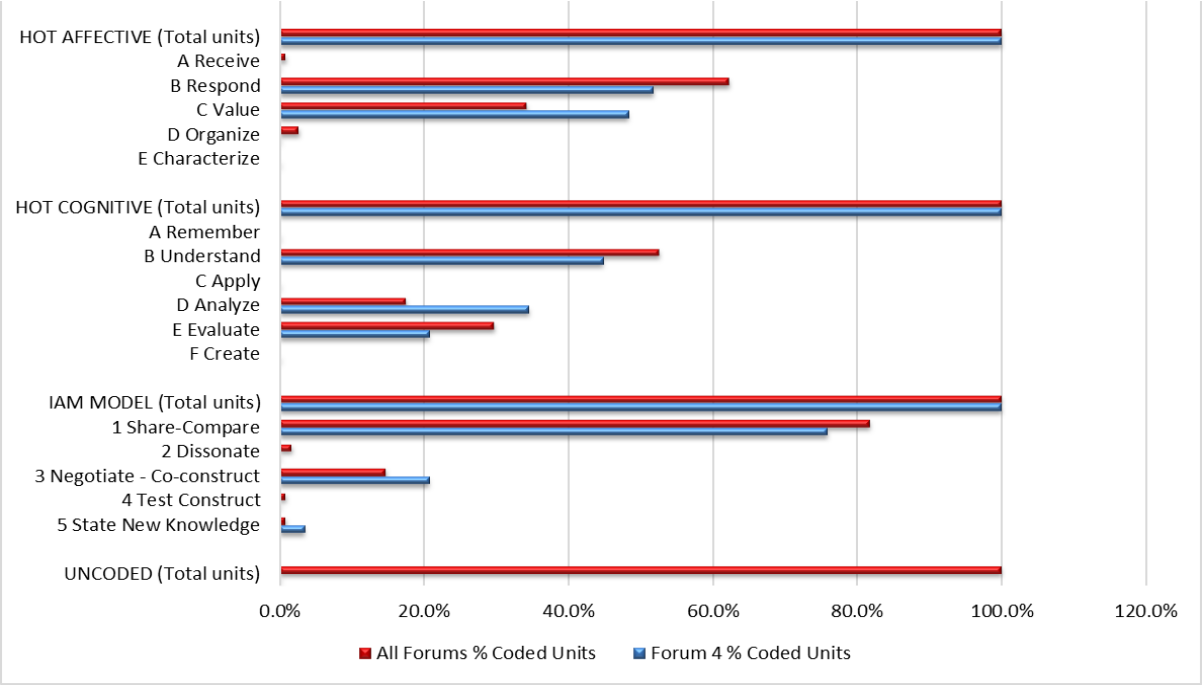
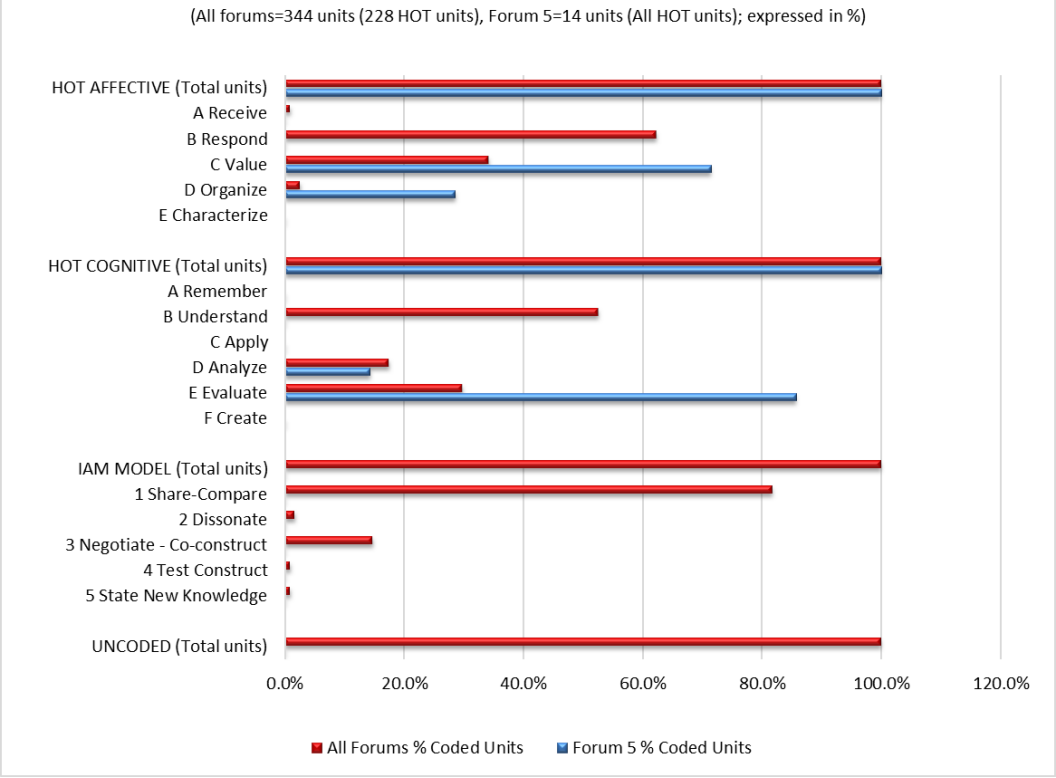


Figure 10 is a chart to compare Forum 5 with the average of all forums. Forum 5 was a forum in which participants were not expected to interact, but rather to submit one reflectional post. Thus, the IAM was not used to analyze this forum. In Affective Domain, the proportion of (C) Valuing and (D) Organizing is larger than the average of all forums. No units were coded into the other categories in Forum 5. In Cognitive Dimension, the proportion of (E) Evaluate, which accounted for 85.7% in Forum 5, was larger than the average of all forums while (D) Analyze was smaller than the average of all forums. No units were sorted into the other categories.

Figure 10

All Forums vs. Forum 5: Parent Codes in Each Instrument: Participants



Comparison of the Results Between Forums 3 and 4: Instructor

In this section, the results gathered from instructor's mediation strategies in each forum are compared to the average of Forum 3 and 4 to identify salient characteristics of instructor's strategies in each forum.

Figure 11 shows the proportion of parent codes in the framework used to analyze instructor's mediation strategies. No significant differences between Forum 3 and 4 were recognized. In both the forums, mediation strategies related to Affective Domain accounted for the largest proportion, nearly a half in both the forums, followed by Cognitive-related, IAM-related, and Overarching.

Figure 11

The Proportion of Parent Codes: Instructor

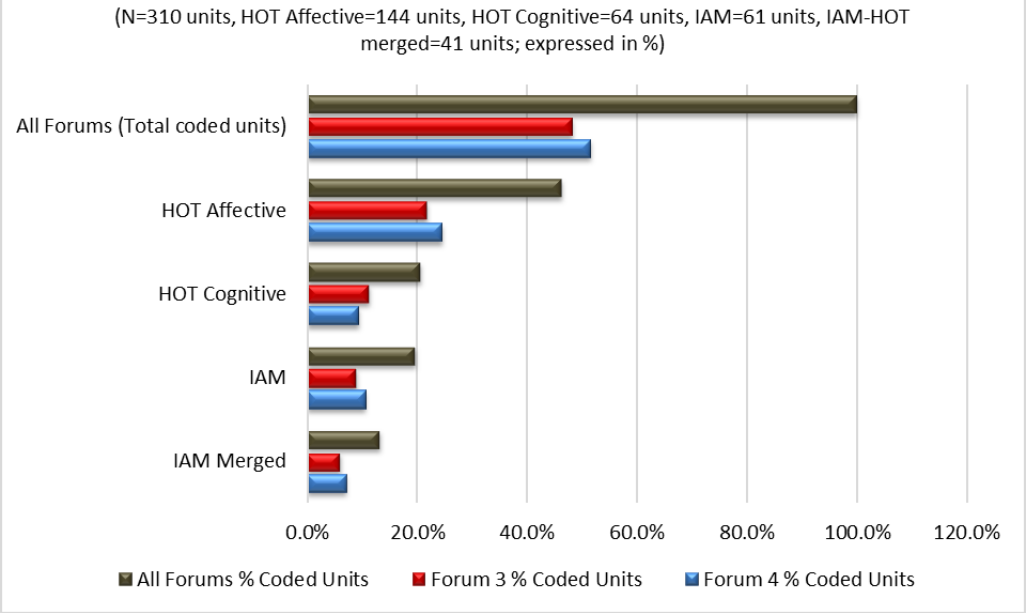


Figure 12 is a chart that compares child codes in Forum 3 to the average of both forums, and Figure 13 is a chart comparing child codes in Forum 4 with the average of both forums. No significant differences were recognized in both of the charts. In Affective-related, the proportion of (B) Praise was larger than the average of both the forums in Forum 3 while it was smaller in Forum 4, although it still accounted for the largest proportion in Forum 4. In Cognitive-related, the proportion of (B) Perspectives was larger than the average of both the forums in Forum 3 while it was smaller in Forum 4. In the IAM-related, (A) Connecting was slightly larger and (B) Questioning was slightly smaller than the average of both forums in Forums 3 while the opposite trends were observed in Forum 4. One unit was coded into (E) Changing Topics and 3 were sorted into (F) Summarizing Discussion in Forum 4 while no units were categorized into these two categories in Forum 3.

Figure 12

All Forums vs. Forum 3: The Proportion of Parent and Child Codes: Instructor

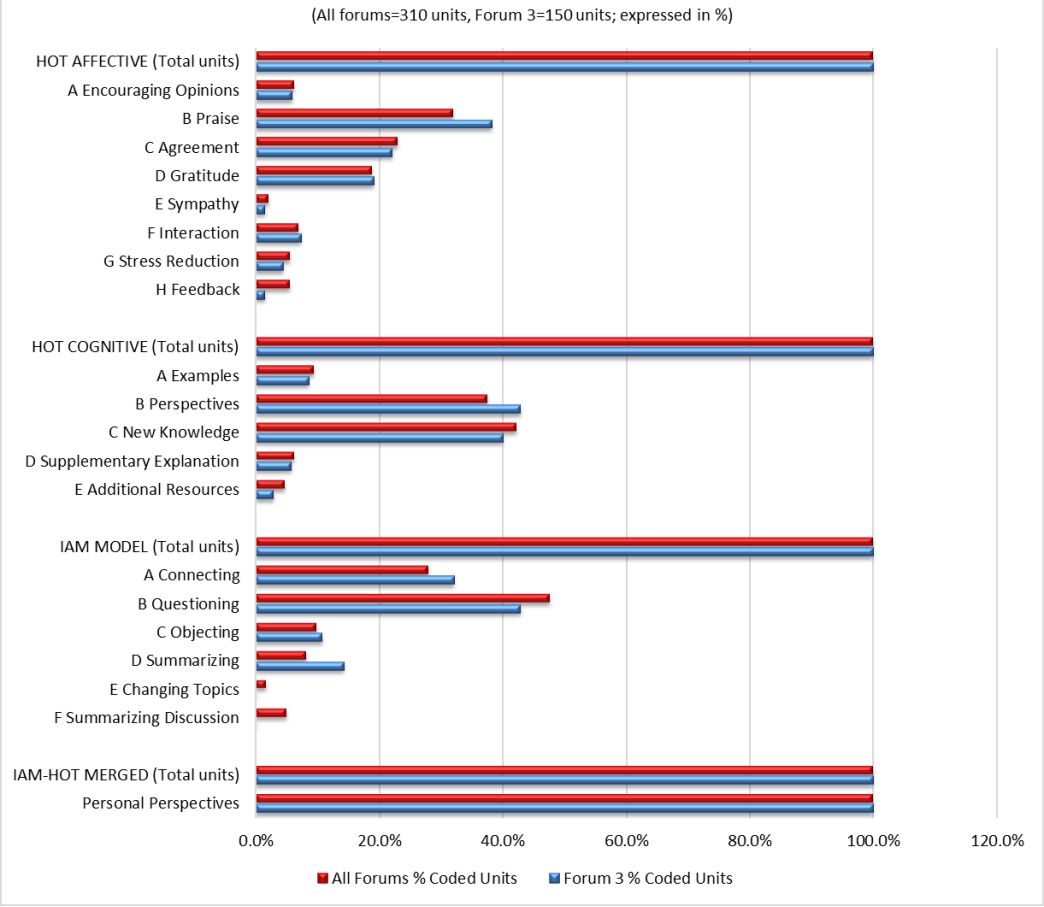
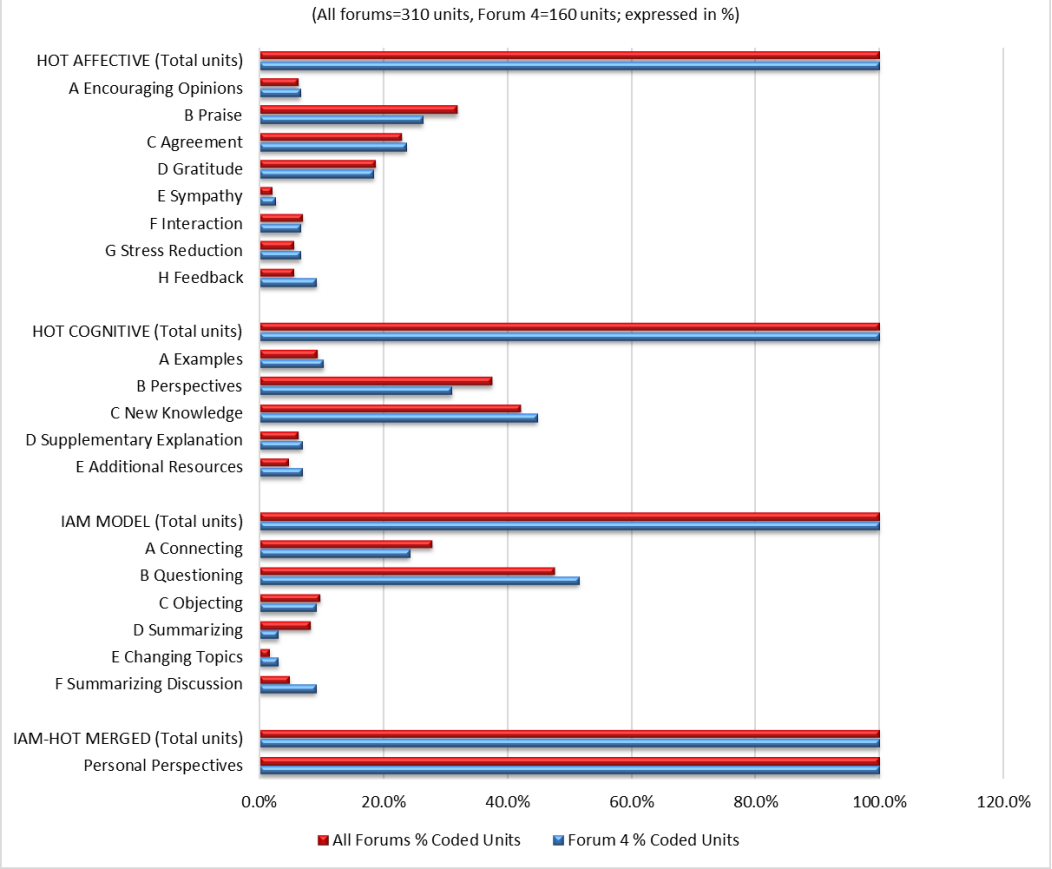


Figure 13

All Forums vs. Forum 4: The Proportion of Parent and Child Codes: Instructor



In this section to answer the second sub-question for the first research question, the results gathered from participants' transcripts and instructor's mediation strategies in each forum were compared to the average of all forums to identify salient characteristics of each forum. As for participants, more messages were coded into higher categories in Forum 4 than in Forum 3. Although the number of participants who contributed to Forum 5 was limited (n=7), the coding results indicated that they demonstrated higher order thinking in this forum. In short, more messages were coded into higher categories in latter forums. This trend is discussed in the section that answers the third sub-question for the third research question in Chapter 7.

With regard to instructor's mediation strategies, mediation strategies related to Affective

Domain accounted for the largest proportion in both forums, nearly a half in both the forums, followed by Cognitive-related, IAM-related, and Overarching. The instructor used various mediation strategies in each category, and no significant differences between Forum 3 and 4 were recognized. Instructor's mediation strategies are discussed in more detail in the section addressing the second sub-question for the second research question in Chapter 6. In the next section, individual differences among participants are explored.

Sub-Question 3 for the First Research Question

The third sub-question for the first research question was: How does content analysis with the IAM, Cognitive Dimension, and Affective Domain describe each participant in the asynchronous forums? In addition to the overall trend, analyzing individual differences is a necessary step to capture a more nuanced picture of discussion forums (Gunawardena et al., 1997). In this section, I discuss this by providing three tables that show the number of coded units of each participant in each content analysis instrument: Affective Domain, Cognitive Dimension, and the IAM.

Table 16 shows the number of coded units of each participant in each category in Affective Domain. In Forum 3, (B) Responding was dominant because participants were asked to answer three questions listed in the prompt. Those who contributed many messages coded into (C) Valuing were P10 (n=7), P3 (n=5), and P8 (n=3). P7 contributed only three messages, but two of them were sorted into (C) Valuing. Only one message, which was submitted by P3, was coded into (D) Organizing. In Forum 4, 15 were coded into (B) Responding and 14 into (C) Valuing. Those who contributed many messages coded into (C) Valuing were P3 (n=4), P10 (n=2), and P8 (n=2). In Forum 5, five were coded into (C) Valuing and two into (D) Organizing. It was P10 and P3 who contributed messages coded into (D) Organizing.

Table 16

The Number of Coded Units in Affective Domain in All Forums: Individual

Framework	Categories	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	Totals
Affective	**B. Responding**																	
	Forum 3	3	3	2	4	2	6	1	6	2	15	4	6	3	0	0	0	57
	Forum 4	0	0	2	1	0	2	0	1	1	1	1	2	1	2	0	1	15
	Forum 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C. Valuing																	
	Forum 3	0	0	5	1	1	0	2	3	1	7	0	0	0	0	0	0	20
	Forum 4	0	1	4	0	0	1	1	1	2	2	0	0	0	1	1	0	14
	Forum 5	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	5
	D. Organizing																	
	Forum 3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Forum 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Forum 5	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2

Table 17 shows the number of coded units from each participant in each category in Cognitive Dimension. In Forum 3, (B) Understand was dominant. P10 produced the largest number of messages coded into (D) Analyze (n=4). Those who contributed many messages sorted into (E) Evaluate were P3 (n=4), P8 (n=3), and P10 (n=3). P7 contributed only three messages, but two of them were sorted into (E) Evaluate. In Forum 4, 13 units were coded into (B) Understand, 10 into (D) Analyze, and six into (E) Evaluate. Two messages from P3 and P9 were coded into (D) Analyze respectively. Three units from P10, two from P3, and one from P15 were sorted into (E) Evaluate. In Forum 5, one unit was coded into (D) Analyze and six into (E) Evaluate. The six units categorized in (E) Evaluate came from P3, P4, P5, P6, P8, and P10.

Table 17

The Number of Coded Units in Cognitive Dimension in All Forums: Individual

Framework	Categories	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	Totals
Cognitive	**B. Understand**																	
	Forum 3	2	1	3	3	2	3	1	6	2	15	3	5	1	0	0	0	47
	Forum 4	0	0	2	1	0	2	0	0	1	0	1	2	1	2	0	1	13
	Forum 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	D. Analyze																	
	Forum 3	1	1	1	0	0	1	0	0	0	4	0	0	1	0	0	0	9
	Forum 4	0	1	2	0	0	1	1	2	2	0	0	0	0	1	0	0	10
	Forum 5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	E. Evaluate																	
	Forum 3	0	1	4	2	1	2	2	3	1	3	1	1	1	0	0	0	22
	Forum 4	0	0	2	0	0	0	0	0	0	3	0	0	0	0	1	0	6
	Forum 5	0	0	1	1	1	1	0	1	0	1	0	0	0	0	0	0	6

Table 18 shows the number of coded units of each participant in each category in the IAM. In Forum 3, Phase I was dominant: 68 in Phase I, two in Phase II, 11 in Phase III, and one in Phase IV. Two messages from P7 were coded into Phase II. Four units from P3, three from P10, and one from P4, P7, P8 and P9 were sorted into Phase III. Only one message was sorted into Phase IV, which was submitted by P8. In Forum 4, Phase I was dominant again: 22 in Phase I, six in Phase III, and one in Phase V. Two units from P3 and one from P7, P8, P9, and P10 were coded into Phase III. Only one message was sorted into Phase V, which was submitted by P3.

Table 18

The Number of Coded Units in the IAM in Forum 3 and 4: Individual

Framework	Categories	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	Totals
	Phase 1																	
	Forum 3	3	3	6	4	3	6	1	7	3	19	4	6	3	0	0	0	68
	Forum 4	0	1	3	1	0	3	0	1	2	2	1	2	1	3	1	1	22
	Phase 2																	
	Forum 3	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
	Forum 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Phase 3																	
IAM	Forum 3	0	0	4	1	0	0	1	1	1	3	0	0	0	0	0	0	11
	Forum 4	0	0	2	0	0	0	1	1	1	1	0	0	0	0	0	0	6
	Phase 4																	
	Forum 3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	Forum 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Phase 5																	
	Forum 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Forum 4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1

In this section so far, I have focused on participants who contributed messages that belong to higher categories. Here, I shift my attention to those who contributed smaller number of messages and/or messages that belonged to lower categories. Three participants made no post in Forum 3: P14 (n=0 in Forum 3 and n=3 in Forum 4), P15 (n=0 in Forum 3 and 1 in Forum 4), and P16 (n=0 in Forum 3 and 1 in Forum 4). Two participants contributed no post in Forum 4: P1 (1 in Forum 3 and 0 in Forum 4) and P5 (1 in Forum 3 and 0 in Forum 4). Forum 5 was a different type of forum, in which participants were guided to contribute one reflectional post without interacting with each other. Only seven participants contributed to Forum 5 while nine

made no post. P6 (n=6 in Forum 3 and 3 in Forum 2) and P12 (n=6 in Forum 3 and 2 in Forum 4) contributed a relatively large number of messages throughout forums, but most messages submitted by these two participants stayed at lower categories in every instrument. In contrast, P7 posted only three messages in Forum 3 and one in Forum 4, but messages from this student were found in higher categories in every instrument.

In summary, there existed individual differences among participants in the number of coding units that were sorted into higher categories in each coding instrument. P10 and P3 were two participants who created more units that were categorized into higher categories in every instrument than other participants did, interacting actively with instructors and other participants. Asynchronous interaction between these two participants is analyzed in more detail in Chapter 6. Furthermore, it was revealed that some participants who did not actively interact in forums also created units that were sorted into higher categories.

In the above three sections to answer the first, second and third sub-questions for the first research question, I used demographics and coding results. In the next section, I explore implicit elements of higher order thinking development that might not have been observed in the quantitative data that were derived from content analysis. The discussion for the fourth sub-question includes the post-survey, my observations, and my inferences.

Sub-Question 4 for the First Research Question

The fourth sub-question for the first research question was: What are the implicit elements of higher order thinking development in the asynchronous forums that may not be observed in content analysis with the IAM, Cognitive Dimension, and Affective Domain, if any? This sub-question is discussed, using the post-survey, closer examination of participants' transcripts, and my observations.

In general, the goal of content analysis is to reveal information that is not observed at the surface level of the transcripts (De Wever et al., 2006). This study was intended to provide convincing evidence of learning outcomes through in-depth understanding of what happened in asynchronous forums by conducting content analysis with three tested instruments. However, content analysis cannot capture all the aspects and processes of human thoughts and cannot avoid involving subjective or arbitrary divisions to a certain extent (Gunawardena et al., 1997). In this study not one, but three, tested instruments were adopted for conducting content analysis, which appears to have increased validity of the results. One example of the increased validity can be shown by comparing messages submitted by P15 and P16. P15 and P16 contributed no message to Forum 3 and only one message to Forum 4. In the IAM, both of the messages were categorized into Phase I, the lowest category of the model. However, in Affective Domain, P15's were sorted into (C) Value while P16's into (B) Responding, and in Cognitive Dimension, P15's belonged to (E) Evaluate while P16's was (B) Understand. If I had adopted only the IAM for the analysis, the coding results would have shown that both the messages were the same; both would have been categorized into the lowest category of the model. This example shows that the use of multiple content analysis instruments succeeded in capturing a more nuanced picture of the participants' higher order thinking development.

Nevertheless, content analysis cannot capture the whole picture of participants' thoughts even if multiple coding instruments are adopted. For example, as shown in the section around the first sub-question for the first research question, the total number of posts was small, and learner-learner interaction was limited. However, it seems that fewer posts or units coded into lower categories might not necessarily mean that the participant did not exercise their higher order thinking. For example, P5 made only one post in Forum 3 and no post in Forum 4, but he wrote

in the post-survey, “After I made a post, the instructor sent me an article that was related to what I said in my post. By reading the article, I was pushed to think the matter more deeply. It was an interesting experience,” and that “It was interesting to think why we learn English, using English. It was a good topic because I was very motivated to learn English.” In Forum 3 and 4, the instructor provided participants with a large amount of feedback, including new knowledge, different perspectives, and related learning resources. P5’s reply to the post-survey suggested that participants might have exercised or developed their higher order thinking even if they were not actively involved in the discussions in forums.

In addition, even if participants submitted many posts categorized into higher categories, it might not necessarily mean that they fully exercised their potential. Conversely, even if participants submitted fewer posts with messages categorized into lower categories, it might mean that they fully exercised their potential. For example, P10 was actively involved in the discussions especially in Forum 3, and most messages that he contributed were coded into higher categories in every instrument. He highly valued this program in Forum 5 and in the post-survey; however, considering P10’s prominent English proficiency, communication skills, and motivation to learn, it might be possible that he did not fully exercise his potential in this program. On the other hand, P12 contributed six messages in Forum 3 and two in Forum 4, most of which belonged to lower categories. P12 wrote in the post-survey, “When I saw a full screen of English, which seemed to be difficult to read, I had to hesitate to start reading,” and that “Reading opinions and questions from different perspectives than mine helped me think further.” Considering P12’s struggle to read English and express her thoughts in English, combined with her limited experiences in publicly expressing her opinions even in her native language, it might be possible that although her coding results stayed at lower levels, she fully exercised her

potential in this program, which might lead her to a breakthrough later.

In summary, closer examination of participants' transcripts revealed that content analysis with three instruments in this study succeeded in capturing a more nuanced picture of the participants' higher order thinking development than content analysis with one instrument, although content analysis cannot capture the whole picture of participants' thoughts even if multiple frameworks are adopted. It is possible that participants who did not actively interact and whose messages were sorted into lower categories might have demonstrated or developed their higher order thinking without contributing to the forums. Also, from the coding results alone, I was not able to determine whether a particular participant fully exercised their potential or not. These issues are related to limitations of this study, which is described in more detail in Chapter 8.

Chapter Summary

The first research question was: To what extent can higher order thinking be demonstrated among participants in asynchronous online forums? In this chapter, this research question was addressed by answering the four sub-questions. Learner-learner interaction in forums was not highly activated as a whole; however, participants demonstrated the development of higher order thinking by engaging themselves in this program. More messages were coded into higher categories in Forum 4 than in Forum 3. Although the number of participants who contributed to Forum 5 was limited (n=7), all of the messages in this forum, which was created to encourage participants to reflect on their learning in this program, belonged to higher categories in both the Cognitive Dimension and the Affective Domain. Individually, two participants (P10 and P3) created more units that were categorized into higher categories in every coding instrument than other participants did. These two students interacted actively with

instructors and other participants, using various facilitation strategies. In addition, the post-survey, closer examination of participants' transcripts, and my observations suggested that even participants who submitted only a few posts to forums might have thought more deeply than appeared from just their number of posts to the forums.

In the following two chapters, Chapter 6 and 7, I move on to the second and the third research questions to explore the possible reasons for the findings described in this chapter.

Chapter 6. Research Question 2 Discussion

The second research question was: What factors in students' engagement in asynchronous online forums may contribute to the development of higher order thinking, if any? Three sub-questions for this research question were created around the three types of interaction, because one of the major advantages of online learning is its potential to increase interaction. These types of interaction are learner-content, learner-instructor, and learner-learner (Moore, 1989). The first sub-question is related to learner-content interaction: How did the learning tasks in the BL program assist or inhibit higher order thinking development? The second sub-question is related to learner-instructor interaction: What instructional techniques performed by the instructors in the asynchronous forums assisted or inhibited higher order thinking development? The third sub-question is related to learner-learner interaction: What features of learner-learner interaction in the asynchronous forums assisted or inhibited higher order thinking development? In this chapter, I discuss these sub-questions, using the post-survey, closer examination of participants' transcripts, and my observations.

Sub-Question 1 for the Second Research Question

The first sub-question for the second research question was: How did the learning tasks in the BL program assist or inhibit higher order thinking development? How to formulate tasks is one crucial element in designing BL programs to guide learners into meaningful learning (Graham, 2019; Mutiaraningrum & Nugroho, 2020). Tasks in this program were broken into three categories: (1) learning resources, (2) discussion topics, and (3) guiding questions.

Learning Resources

In the prompts for Forum 3 and 4, I posted short articles and video clips as learning resources. Also, I added video clips during the ongoing discussion: once in Forum 3 and twice in

Forum 4. These articles and video clips were selected to provide participants with different perspectives rather than teacher-directed content knowledge on the discussion topic of this program. I chose articles and video clips that were not overwhelming to participants but had appropriate cognitive demand by examining the vocabulary, grammatical complexity, the length, and the relevance to the topic (Lantolf & Poehner, 2004; Roessingh, 2005).

Most participants (n=13 in Forum 3 and n=14 in Forum 4) replied to the prompts. These replies included messages that were coded into higher categories in Affective Domain and Cognitive Dimension; thus, I regarded these resources as appropriate to facilitate participants' thinking. For example, P8 wrote in her reply to the prompt in Forum 4, "[I found] through [watching] two clips, in this globalized world, there are differences that we have to remove [and] also differences that we have to respect and protect" [grammatical supplements added]. The message including this sentence was coded into (C) Valuing in Affective Domain and (D) Analyze in Cognitive Dimension. Without those resources, it would probably have been difficult for participants to develop their opinions on the given topic.

In the post survey, eight participants stated that video clips of TED.com, a nonprofit organization that provides presentation movies on its website for free, were useful among resources that I provided. For example, P3 wrote, "TED presentations about English language gave me opportunities to think why we learn English. I had not been thinking of it intentionally. TED was good because I could learn ideas of people around the world and also matters that are close to our everyday lives." P13 wrote, "Video 1 in Forum 4 was useful to me because I could broaden my perspectives." Participants found TED clips valuable because not only do these videos provide different perspectives, but they can also be good resources to develop students' English proficiency. For example, P8 wrote, "I found TED fascinating. I found new perspectives.

In addition, they help us improve our English listening skills. At first, I could not understand the English, but after watching it with English subscription several times, I could gradually come to understand what the speaker is talking about." P8 and some other participants used TED to gain different perspectives and to develop their English proficiency.

Discussion Topic

Broadly, the discussion topic was: Why do we learn English? To be more specific, participants discussed around several guiding questions in Forum 3 and 4 to answer this question at the end: How can learning English be meaningful to me and to the world? I chose the topic. It can be a motivational hook for each student to choose a topic in inquiry learning (Reigeluth & Carr-Chellman, 2009), yet it can be chaotic in K-12 settings. Many Japanese students are made to believe that English is necessary for their future success due to the prevalent social and political climate (Kubota & Takeda, 2021); thus, this topic was chosen to encourage participants to think about why they learn English from broader perspectives, thus exercising their metacognition.

When answering the first research question, learner-learner interaction in Forum 3 and 4 was limited as mentioned, but the post-survey indicated that it was not because the discussion topic was not engaging. Ten participants provided favorable comments on the discussion topic in the post-survey. For example, P2 wrote, "I had never thought of the topic, but I could find many reasons why we should learn English. I found a lot of new perspectives from peers' post[s], which was a great experience for me." P3 wrote, "It was a good opportunity for me to get back to my original state of mind because I had been learning English, feeling as if I was forced to do it."

Although most participants found the topic engaging, three participants stated that the topic was difficult to think over. For example, P12 wrote, "It was a difficult topic that we usually

don't think about" and "It might have worked for me if we have a forum with easier topics between forums with difficult topics." Even those participants who felt that the topic was challenging found the topic meaningful. Therefore, I regarded my choice of this topic as appropriate, given that the goal of this program was to develop higher order thinking.

Guiding Questions

In Forum 3, participants were asked to answer the following three questions in 200 and 300 words, respectively, after reading an article: (1) Do you agree with the author? Why? Why not?; (2) Why do you study English?; and (3) What are your strategies to improve your English? In Forum 4, participants were asked to answer the following two questions in 200 and 300 words, respectively, after reading an article and watching two video clips: (1) Do you agree with the 'pros and cons' presented by the author? Why? Why not?; and (2) Are there any other pros or cons of English as a global language that should have been mentioned? The third question in Forum 3 was a descriptive question, but it was intended to motivate participants to exercise metacognition to observe themselves. All the other questions were designed to encourage participants to think and express their opinions.

As I wrote in my discussion of learning resources above, 13 participants in Forum 3 and 14 in Forum 4 replied to the prompts, and these replies included messages that were coded into higher categories in Affective Domain and Cognitive Dimension; thus, I can conclude that the guiding questions in both forums were appropriate to encourage participants' thinking. For example, P10 wrote in reply to the second question in Forum 3, "I've been using English for many years since I was a child. At first, I was just finding it interesting to communicate with people in English, but actually, the reason for studying English changed when I started to think about my future career." The message including this excerpt was coded into (C) Valuing in

Affective Domain and (D) Analyze in Cognitive Dimension. Here, P10 was encouraged to reflect on why he learns English and found that these reasons were shifting. In replying to the first question in Forum 4, P15 wrote, “I do agree with most of the pros and cons described in those two videos. However, I don't 100% agree with one of the cons. Many people spend hours, days, or even years pronouncing words and sentences trying to sound like ‘native speakers’ which I think is useless since as Jay Walker [a speaker of TED presentation provided] said, English is a global language and is not a language that belongs to a particular region or country.” The message including this excerpt was sorted into (C) Valuing in Affective Domain and (E) Evaluate in Cognitive Dimension. Here, P15 was encouraged to elaborate on one aspect that he felt uncomfortable with in the article while agreeing with the author in general.

Forum 5 was a different type of forum from Forum 3 and 4. In Forum 5, participants were asked to submit one reflectional post and not asked to interact with each other. The guiding question was: What is the most important lesson you learned in this program? Seven participants replied to this question, and all of them were coded into higher categories in both Affective Domain and Cognitive Dimension: five into (C) Valuing and two into (D) Organizing in Affective Domain and one in (D) Analyze and six in (E) Evaluate in Cognitive Dimension. For example, P5 wrote, “If I continued to only study to get a good grade, I wouldn't be able to use English actually. I felt that I need special practice like this program to get used to use English. So, I'm glad to have been able to join this program.” The message including this excerpt was coded into (C) Valuing in Affective Domain and (E) Evaluate in Cognitive Dimension. This reply seems to be simple, but here, P5 was encouraged to reflect on his ways and motivations to learn English and gained a new perspective.

In this section, I described how learning tasks, which were divided into (1) learning

resources, (2) discussion topics, and (3) guiding questions, might have worked in forums to answer the first sub-question for the second research question. The coding results and the post-survey suggested that all the three elements of tasks worked in this study to encourage participants to think more deeply. Learners need resources, engaging topics, and guiding questions to think further. These elements are included in the teaching presence in the community of inquiry framework (Garrison, 2016). From the viewpoint of sociocultural theory, these elements should be designed developmentally (Lantolf & Poehner, 2004). The developmental aspect is further discussed in the next section and the section to answer the third sub-question for the third research question.

I focused on learner-content interaction in this section. In the next section, my focus shifts to learner-instructor interaction, discussing findings related to the second sub-question for the second research question.

Sub-Question 2 for the Second Research Question

The second sub-question for the second research question was: What instructional techniques performed by the instructors in the asynchronous forums assisted or inhibited higher order thinking development? A co-instructor was invited as the main instructor in synchronous meetings and contributed only one post in Forums 3 and two in Forum 4. I was the main instructor of forums, and I was heavily involved in both forums. Thus, in this section, the focus is on my mediation strategies used in forums.

As the main instructor in the forums, I provided mediation based on the concept of dynamic assessment, which was explored in Chapter 2. DA focuses not on product but on process; it is an approach to assessment and also to teaching. In that sense, DA-based programs are representative of developmental education (Lantolf & Poehner, 2004). DA links ongoing

assessment to the provision of mediation that is appropriate and contingent (Gibbons, 2003; Poehner & Leontjev, 2018).

I presented the framework created through inductive thematic analysis to analyze my mediation strategies in Chapter 4 (see Table 5). Mediation strategies identified were sorted into four broad categories: Affective-related, Cognitive-related, IAM-related, and Overarching. Throughout all the mediations in forums, I provided learners with ongoing intervention attuned to learner development based on ZPD (Lantolf, 2011), controlling the cognitive demand, closely examining participants' abilities and motivation in the moment.

I did not conduct quantitative analysis to examine the effects of these strategies in this study because the number of participants and their posts was not large enough to produce valid statistical results. The small sample precluded the use of statistical tests of association between my mediation strategies and the development of higher order thinking (Cohen et al., 2018). In this chapter, I first present inferences derived from the post-survey, followed by examples of each strategy with the context and my intention there. Subsequently, I describe how learner-instructor interaction developed, using two strings in forums.

Inferences From the Post-Survey

The post-survey revealed that most participants found value in my mediation. One of the 15 questions in the post-survey asked, "Did instructors' comments assist you to learn in online discussion forums? If yes, please elaborate." Eleven respondents gave favorable replies to this question. Another question in the post-survey was, "Did you find something uncomfortable in instructors' comments in online discussion forums? If any, please elaborate." No participant responded by saying yes to this question.

Teaching presence is one important factor in the Community of Inquiry framework,

which was introduced to facilitate collaborative constructivist learning (Garrison, 2016). As Table 4 in Chapter 4 shows, I was heavily involved in Forum 3 and 4 as the main instructor: 22 posts in Forum 3 and 24 in Forum 4. I replied to all of the original posts from participants and to most of their further contributions. Three respondents commented on this aspect. For example, P9 wrote, “The instructor replied to every post I made, so even if I had no reply from peers, I could enjoy the forums. I felt I was learning actively.” P16 wrote, “I struggled at first because I was not sure how I should reply to others, but seeing Hiroshi replying to every post, I could understand what we were expected.” In regular classes, students rarely receive direct individual written feedback from teachers; thus, P9 might have found that interaction with teachers in written forms can be a source of motivation to learn. Although I gave them direct instruction about how to interact in forums in the first in-person F2F meeting and opportunities to practice with easier tasks, some participants might still have had difficulty in interacting in forums. P16’s comment implies that my comments to forums might have worked as a model for them to be better involved in forums.

I intentionally provided participants with different perspectives for them to be able to develop their metacognition. Comments that explicitly valued this aspect came from three respondents. For example, P16 wrote, “Hiroshi's comments, which had different perspectives from mine, led me to think more deeply.” P10 wrote, “Hiroshi and X [the co-instructor] have different backgrounds from ours. By being exposed to their ways of thinking and their knowledge, I often found different perspectives and was led to deeper thinking.” Gaining broader perspectives while working together and transforming cognitive schema is one prominent advantage of collaborative constructivist learning (Conrad & Openo, 2018; Gunawardena et al., 1997). These replies suggest that this strategy seems to have worked. Related to gaining broader

perspectives, three respondents stated that my posts encouraged them to think more deeply. For example, P13 wrote, “I wrote in a post in Forum 3 that English will be necessary in the world of sports too because top Japanese athletes speak English in interviews. Instructors gave us an example of Otani [a prominent Japanese baseball player who plays in the Major League in the U.S.]. I didn't know Otani is replying in Japanese in interviews. The example led me to think why.” Gaining broader perspectives can be the first step for learners to think further.

P8 wrote, “Hiroshi's replies helped me reorganize my thinking when I was beginning to be confused.” Supporting participants to be on the right track in forums is also what I intentionally did in my mediation. Two strategies were involved here. Firstly, I often rephrased what participants wrote when I replied to them to show that I understood what they meant and to make their contributions easier for other participants to understand. English is a foreign language for participants; thus, their English writing often had grammatical mistakes, which might have confused other participants. The strategy that I employed was not giving them direct grammatical feedback, but rephrasing what they wrote in correct and more concise wording in my posts. Secondly, I summarized ongoing discussions when participants seemed to need it. On this point, P7 wrote, “The instructor's advice at the end of each forum was appropriate.” My summary might have helped participants to gain the whole picture of the ongoing discussion.

No respondents wrote negative comments on my contributions to forums, but a possible area for improvement that the post-survey suggested might be to control the volume of instructors’ contributions and display them in a more reader-friendly manner. One question in the post-survey was: What do you think instructors should do to improve online discussion forums in the next program? In reply to this question, P6 wrote, “I had no time to read all the posts students made. If participants had used bold letters or underlines in their posts, it might have helped me.”

Although P6 wrote “the posts students made,” there were only a few participants who contributed long posts. It was instructors who wrote extensively. It might have been discouraging for participants to be forced to read long posts, especially if they were busy or had lower English proficiency. It was evident that some students struggled in this program due to their inadequate English language skills. I employed no strategy such as highlighting to make my posts visually readable. P6’s suggestion might be a possible solution to address this.

Examples of Mediation Strategies with the Context and Intention

As mentioned in Chapter 4, while a pre-existing model and taxonomies were chosen to analyze participants’ transcripts, I developed a framework to analyze mediation strategies of mine as an instructor from the collected data, using inductive thematic analysis. A total of 150 units of strategies were identified in Forum 3 and 160 in Forum 4. The number of units counted into each code was shown in Tables 7 and 9 in Chapter 4. In the following sections, I show examples from each strategy to describe the context and my intention there. Subsequently, I present two strings of learner-instructor interaction in which my mediation seems to have worked.

Mediation Strategies in Affective-Related. First, I present examples from the group of Affective-related to describe the context and my intention. Asynchronous forums do not thrive without a sense of personal connection, which instructors can help build by modeling and encouraging affective expression (Garrison, 2016; Vaughan et al., 2013). I divided affective expressions that I used in this study into eight strategies: Encouraging Opinions, Praise, Agreement, Gratitude, Sympathy, Social Interaction, Stress Reduction, and Feedback. I now discuss and provide examples of each of these below.

Encouraging Opinions. I wrote in Forum 4:

First, try to think simply about one topic. For example, what is the possible disadvantage

> of English as a global language if any? Also, you can jump in the discussion if you find an interesting topic. For example, do we get another 'me' by learning a foreign language? Don't try to write a long post. If you have two topics that you are interested in, write about one topic first and post it. Later, you can write about the other topic. Don't be afraid. Take it easy. Try to write a short post about one topic.

I created this post on the second day of Forum 4. This forum opened with two long posts from two participants, P10 and P15, and long replies followed from two instructors, the co-instructor first and me second. P10 and P15 had experience of living and studying abroad; thus, it was evident that these two participants were ahead in English proficiency among the 16 participants. It was highly likely that the other participants were overwhelmed by the volume of English writing and the cognitive demand to understand the discussion. In consideration of these factors, I encouraged participants to make their first posts, suggesting that they should be short and simple.

Praise. I wrote in Forum 4:

> P10, your writing is so clear as always, answering directly to my question. It is not often an easy task even in our native language. Great job!

I used this strategy many times: 26 times in Forum 3 and 20 in Forum 4. Rather than writing only good or great, I briefly described what was good when I used this strategy.

Agreement. I wrote in Forum 4:

> I agree with you that we can improve our society by "active exchanges" (P12).

When I used this strategy, I described what I agree with rather than just saying that I agree. In this example, I used a direct citation from the post that I was replying to. I used direct quotations when I found key words/phrases or unique expressions.

Gratitude. I wrote in Forum 3:

Thank you for taking time to answer my question, P8.

I often started my replies to participants with Praise or Gratitude. In Forum 3, I asked P8 to interview her parents and share the answers in the forum, and she replied to my request. Thus, I opened my reply to her by explicitly expressing my gratitude.

Sympathy. I wrote in Forum 3:

I am sorry to hear that you have had a technical problem. It is always annoying. Hope it will be solved soon.

Participants had few technical problems in this program; however, this participant had difficulty in logging into the employed online learning platform. Technical problems and how to help solve them are one major challenge in the field of online learning. It is annoying and can be discouraging to have technical problems; thus, I expressed my sympathy to mitigate the stress.

Social Interaction. I wrote in Forum F4:

Running seems to be an extremely personal matter, but I don't think it is. In what ways? Why do you run? Any answers? It is hot, it is tough, it is sometimes even dangerous. What do you gain from running? Trying to answer this question might lead you to think more deeply in any areas.

Social interaction is one important factor in asynchronous forums (Garrison, 2016). It is off topic and not task-oriented, but social interaction is required to build a community of inquiry. The participant to whom this reply of mine was directed submitted his first post in Forum 4 one day after Forum 4 officially ended, and I replied to him the next day. It seemed that this participant avoided to think deeply throughout the two forums although he has the ability. Thus, I encouraged him to think further in the area where his strong interest resides. I might have been

able to use this strategy for this participant earlier.

Stress Reduction. I wrote in Forum 4:

> Hi all, Forum 4 will be open till August 12. I don' t push you, but feel free to add any ideas or questions you come up with while preparing for your presentation in Zoom Meeting 2.

In regular classes, participants are often forced to do something without being given opportunities to think whether or what to do. Throughout this program, I refrained from using instructions that might have obligatory connotations to mitigate pressure that they might feel. In addition, I encouraged participants throughout the program to inform me of any tensions or anxiety that they might have as a method to reduce their stress (Garrison, 2016). I used these strategies to draw on participants' internal motivation.

Feedback. I wrote in Forum 4:

> At the same time, you found a negative aspect of English as a universal language: "unequal chances" among non-native-English speakers. Now you see the issue from broader perspectives.

Here, feedback means my comments not on their arguments but on their personal development. Thus, this strategy is not task-oriented but important to help participants to develop their metacognition. This strategy was intended to give participants opportunities to observe themselves from a meta-level. Participants should be provided opportunities to manage and monitor their learning in context if they are to continue to learn independently (Garrison, 2016).

Mediation Strategies in Cognitive-Related. Secondly, I present examples from the group of Cognitive-related to describe the context and my intention. There were five strategies in this group: Examples, Perspectives, New Knowledge, Supplementary Explanation, and

Additional Resources. I now discuss and provide examples of each of these below.

Examples. I wrote in Forum 3:

> Try to dig in your interest in science deeper and deeper. Hideki Shirakawa, a Japanese chemist who won the Nobel Prize in Chemistry in 2000, was once asked why there are so many Japanese scientists who won the Nobel Prize, and said that's because Japanese scientists learn and think about science in Japanese. The answer is suggestive when we consider the relationship between language and thought.

In his first post in Forum 3, the participant to whom this response was directed stated that he needs English to learn science. Mother tongue was another topic discussed in the forum. Thus, in my response in this area, I provided an example for the participant to think further about the relationship among English, mother tongue, and science.

Perspectives. The strategy, Perspectives, includes two sub-categories: Different Perspectives and Restating Perspectives. The aim of the former is giving participants different perspectives, while the aim of the latter is restating what participants wrote to put it in broader perspectives to help participants see what they wrote from a meta level.

I wrote in Forum 3 (Different Perspective):

> It is true that English might give us some opportunities, but it is every one of us who choose what we do with the tool. In addition, we have a right not to use the tool.

Many Japanese students are made to believe that English is necessary for their future success under the social and political climate (Kubota & Takeda, 2021). Thus, I reminded them that they need their own purposes to learn English and that they do not necessarily have to learn it.

I wrote in Forum 4 (Restating Perspectives):

> You wrote, "Today, many TV show(s) is (are) saying that…" We are often led to believe something by the media, so we should be careful of it. We are advised to always have a critical eye on the media, textbook, or anything to make a healthy judgement.

K-12 students often take what the media says as something valid without exercising any critical thinking. This participant used a piece of information from the media, not as a source to discuss, but evidence of validity. Here, I placed this participant's comment in a broader context to provide a different attitude toward the media.

New Knowledge. Throughout both the forums, I provided learners with ongoing intervention attuned to learner development based on ZPD. In providing mediation using the strategy New Knowledge, I controlled the cognitive demand, closely examining participants' abilities and motivation. New Knowledge was divided into three sub-categories: Basic, Intermediate, and Advanced.

I wrote in Forum 3 (Basic):

> We do so not only with languages but also with our gestures, facial expressions, and some other strategies. We do so unconsciously in many cases but sometimes consciously.

My response above was to address the topic of a hand gesture that one participant posted. Here, I provided a basic knowledge about paralanguage.

I wrote in Forum 4 (Intermediate):

> In the past, English spoken with Japanese (or Chinese or whatever) accents was not accepted as a 'right' English, but now it is accepted as one of the 'world Englishes' (notice the plural -es), but it must be better that we speak English that can be easily and correctly understood.

My response above was to address the topic of different variations of English. The

participant to whom this response was directed argued that non-native English speakers do not have to speak English like native English speakers. Showing my agreement, I provided the concept of world Englishes.

I wrote in Forum 4 (Advanced):

> Now variations of English have come to be widely accepted. English as a global language is often called English as a lingua franca (ELF). Namely, the term describes the current position of English and refers to a language used by people who do not speak the same native language to communicate with each other.

The discussion of world Englishes developed further. I judged that the participants involved in this discussion had capacities to discuss more complicated issues. Thus, I provided them with the concept of lingua franca, which might have been difficult for some other participants to discuss.

Supplementary Explanation. I wrote in Forum 4:

> He [the co-instructor] used the word "power" in his post. Let me explain what the word means when it is used in the context of English as a global language. In Forum 3, we discussed why we learn English. Many of us wrote, for example, we learn English to make friends all over the world. This is OUR goal. Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) wrote that they need to improve English education in Japan "in order to develop HUMAN RESOURCES." The former Governor of Tokyo stated that they need to improve English education in Tokyo so that "we will win the international competition among cities." To them, each of us is a human resource to serve the city or the country. In addition, businesses want to make money by

> creating a big industry of English education (Notice that the article we read in Forum 3 comes from the web page of a big English conversation school). This is THEIR goal. Simply said, this is POWER.

The co-instructor, who is a sociolinguist, used the word, power, in his post. He intentionally provided specialist knowledge with high cognitive demand to stretch participants' higher order thinking, but I judged that most participants needed supplementary explanation to understand his post. Here, I explained the word by placing it within the context of the ongoing discussion.

Additional Resources. I wrote in Forum 4:

> It reminded me that we read a lesson about androids created by Hiroshi Ishiguro in English classes last year. Ishiguro said developing androids makes him think who "we" are. Fascinating. This clip is my favorite one.

A participant brought in AI to discuss why we need to learn English, and another participant reacted to the topic. All the participants read a chapter about androids in an English textbook the year before. Here, therefore, I provided a URL of a video clip in which the professor who appeared in the textbook argues that he creates androids to think about human beings.

Mediation Strategies in IAM-Related. Thirdly, I present examples from the group of IAM-related to describe the context and my intention. There were six strategies in this group: Connecting, Questioning, Objecting, Summarizing, Changing Topics, and Summarizing Discussion, all of which are related to social construction of knowledge. I now discuss and provide examples of each of these below.

Connecting. I wrote in Forum 4:

> One question to P9: Please read P7's post on August 4. He brought up Soseki [a Japanese

novelist] to talk about why he values his mother tongue: Japanese. Would you give us one example of why you value our native language?

In Forum 4, P7 stated that people should respect their native language while learning English. Later, P9 wrote that people should value their native language without mentioning P7's idea. I used the strategy Connecting more implicitly in other places, but here I explicitly tried to connect P9 to P7.

Questioning. In providing mediation using the strategy Questioning, I controlled the cognitive demand, closely examining participants' abilities and motivation. As with the strategy New Knowledge, Questioning was divided into three sub-categories: Basic, Intermediate, and Advanced.

I wrote in Forum 4 (Basic):

One question to P14: Imagine you have to stay in a foreign country for a year. What would you miss? Two or three possible examples?

P14 wrote in her post that there are several aspects that Japanese people should be proud of in Japanese culture. I tried to help her develop her metacognition by leading her to observe her subconscious, i.e., in this case, what she values unconsciously. P14 made no post in Forum 3, and this was the first post that she made in Forum 4, which demonstrated few elements of higher order thinking. Therefore, I chose a question at the basic level.

I wrote in Forum 4 (Intermediate):

One question to P12: You have been required to think and express your thought in English in this program. How do you think you can develop this skill after finishing this program? Any strategies?

P12 struggled to express her opinions in English throughout this program, but it was

evident to me that she was trying hard to improve herself. Thus, I tried to connect her experience in this program to her everyday life after finishing the program. This question was intended to encourage her to be an independent learner.

I wrote in Forum 4 (Advanced):

> Two questions to P10: 1) Would you elaborate on this topic, a different me, a little bit more? 2) You wrote that to see things in a different way could help us think critically. I think critical thinking is one of the most important skills for all of us to acquire (including adults). Why do you think it important? Did you have any opportunities where you found we need it?

This is my reply to P10's first post in Forum 4. P10 wrote that he brings out a "hidden self" within himself when he uses English, and by doing so, he can see things in a different way, which can help him think critically. He also stated, "… more importantly, it is just interesting to have two different types of 'me.'" P10 was heavily involved in the discussion in Forum 3, and it was evident that he had a good command of English and was cognitively advanced. Therefore, I chose to ask him cognitively demanding questions.

Objecting. I wrote in Forum 4:

> Games are used for various reasons including to improve English proficiency. It is called gamification. It must be a good starting point.

Throughout both the forums, I did not deny participants' opinions but sometimes implied my objection mildly. I used this strategy three times in Forum 3 and three times in Forum 4. This participant wrote that he chats with people in different countries in English while playing games. The last sentence in the example above includes an implication that chatting while gaming can be a good starting point but might not be enough to improve his English.

Summarizing. I wrote in Forum 3:

You talked about athletes. Yes, a lot of top athletes choose to go abroad.

I used this strategy to show that I understood what they meant and to make their argument easier for other participants to understand. English was a foreign language for participants; thus, their English writing often had grammatical mistakes, which sometimes seemed to confuse other participants. The strategy that I employed was not giving them direct grammatical feedback but summarizing or rephrasing what they wrote in more concise wording in my posts.

Changing Topics. I wrote in Forum 4:

Here, however, I would like to direct your attention to the second paragraph of P10's.

At the beginning of Forum 4, P10 and P15 opened the thread with a topic of world Englishes or lingua franca. It was an interesting topic that was closely related to the discussion topic, but it seemed to be too complicated for other participants to discuss further. P10 brought another interesting topic, a different identity while using English, which was also related to the discussion topic; thus, I tried to change the topic to activate the discussion in the forum.

Summarizing Discussion. I wrote in Forum 4:

Hi all, so far, we have been focusing on P15's post and the first paragraph of P10's. The topic is mainly about world Englishes or lingua franca. It is an interesting topic that might develop in this forum.

As I wrote above, Forum 4 started with the topic of world Englishes or lingua franca. It seemed to be a complicated topic for most participants; thus, I briefly summarized the discussion before proceeding to a different topic.

Mediation Strategies in Overarching. Finally, I present examples from the group of

Overarching to describe the context and my intention. This category had only one strategy, Personal Perspectives. I provided personal opinions, experiences, or suggestions for various purposes including building social relationships, stretching participants' cognition/metacognition, and providing different perspectives. As with the strategy New Knowledge and Questioning, Personal Perspectives was divided into Basics, Intermediate, and Advanced, based on the observed abilities and motivation of each participant.

Personal Perspectives. I wrote in Forum 3 (Basic):

> To read an original novel was the first and the most important reason to learn English for me too.

This statement was intended to be a social interaction. This participant wrote in her post that she learns English because she wants to enjoy the original novel written in English rather than the translation. It was off topic, but this kind of social interaction needed to be introduced to build a learning community.

I wrote in Forum 4 (Intermediate):

> Doing what you are told to do at school is the first step, but remember that you need to find your own challenges and try to find strategies to overcome the challenges yourself to go further in any areas.

As I wrote in the section that described the strategy, Questioning, P12 struggled to express her opinions in English throughout this program, but it was evident to me that she was trying hard to improve herself. Here, I explicitly expressed the importance to be an independent learner as my personal view to support her development as a learner.

I wrote in Forum 4 (Advanced):

> However, we know that there exist inequalities in many areas. In the case of English as a

> global language, we are advised to realize it is creating inequalities that are often hidden by discourses that praise it. In other words, we are easily controlled by power in any areas. We cannot solve the problem as an individual, but we are always encouraged to see an issue from broader perspectives, which is one important form of critical thinking.

Learning English was the topic of the discussion, but a larger purpose of this program was for participants to gain broader perspectives by engaging in collaborative constructivist learning. Thus, I wrote this message one day before the end of Forum 4 to make the purpose explicit using the discussion topic. My argument in this example was rather complicated, but I judged that the participant who I was replying to here could understand the intention after observing her contributions to both the forums.

Closer Examination of Learner-Instructor Interaction

In this chapter so far, inferences derived from the post-survey and examples of each strategy were presented. Toward the end of this chapter, I describe two strings of learner-instructor interaction, one in Forum 3 and the other in Forum 4, in which my mediation might have worked. I did not conduct quantitative analysis to examine the effects of these strategies in this study because the number of participants and their posts was not large enough to draw valid statistical results. Instead, I describe the context, my intention in the use of the mediation strategies, and possible effects of those strategies that I inferred after close examination of the exchanges including the larger context that the exchanges belong to.

A String of Learner-Instructor Interaction in Forum 3. Table 19 is a string of interaction between P3 and me in Forum 3. In P3's posts, the coding results were inserted in bold after each unit of analysis. In my posts, strategies identified were inserted in bold after each unit of analysis.

Table 19

Interaction between P3 and the Instructor in Forum 3

Turn	Contributor	Post
1	P3	"I agree with the author because I also think many jobs require English speaking skills not only journalist and pilot. because of globalization is advancing worldwide now. So If you want to see official treatise for studying, it will be written in English. And many people around the world speaking English as a first language. Therefore English will become more important in the near future. **[(B) Responding in Affective Domain / (B) Understand in Cognitive Dimension / Phase I in IAM]** I have two reasons for answering ""why do you study English?"" First, If you learn English, you can also learn culture and other interesting things. When we learn English, we sometimes find that there are some English words do not correspond to Japanese words. For example, Japanese people distinguish rice for eating from rice growing in the field. But English speakers do not distinguish them. From this, we can learn the difference English and Japanese. Second, I want to enjoy books, movies and music in English. We will understand more by enjoyment. **[(C) Valuing in Affective Domain / (E) Evaluate in Cognitive Dimension / Phase I in IAM]** My secret strategies to improve my English is asking people immediately If I have questions. And I try to think in English even If it is not English question." **[(B) Responding in Affective Domain / (B) Understand in Cognitive Dimension / Phase I in IAM]**
2	Hiroshi	You are the first penguin (a brave person to do something first), P3. **[Praise in Affective-related]** Also, as a teacher in charge of T&F team at XX [the name of the school], I happen to know what you did yesterday (and also in the past few days), so I highly appreciate your effort to make the post at night yesterday. **[Social Interaction in Affective related]** You stated there are English words that cannot be literally translated into Japanese (and vice versa) and you can learn the culture by learning the language. **[Summarizing in IAM-related]** It must be a wonderful reason to learn a foreign language. **[Praise in Affective-related]** Have you heard of the ‘mottainai’ campaign? About a decade ago, Wangari Maathai, an environmentalist who won the Novel Peace Prize, was impressed to find the word and started the campaign. It is only natural for Japanese-speaking people to have a feeling of mottainai, but those who don’t speak Japanese didn’t have the feeling of mottainai. It is interesting. We human beings find a word, and then find a feeling. Without the word, we don’t have the feeling… We can enrich our feelings by learning foreign languages.

Turn	Contributor	Post
		[New Knowledge (Advanced) in Cognitive-related] As for your strategies to improve your English, you wrote that you try to think in English even if it is not an English question. **[Summarizing in IAM-related]** What a great way! **[Praise in Affective-related]** In a sense, you are trying not only to learn but USE English yourself. **[Perspectives in Cognitive-related]** It is close to what P10 is doing. This camp is a place designed for you to use English. First, try to answer the questions form Inst-2 and P10! **[Connecting in IAM-related]**
3	P3	Hi, Hiroshi. Thank you for your reply. You said we human beings find a word, and then find a feeling. This idea is very interesting and I have never thought like that. I have heard of the "mottainai" campaign and known Wangari Maathai. It was very impressed. But by a difference of language, the real meaning of "mottainai" is not understand. I shocked at this. So I want to come the day that those who don't speak Japanese will understand Japanese word's meaning. **[(C) Value in Affective Domain / (E) Evaluate in Cognitive Dimension / Phase III in IAM]**
4	Hiroshi	Thank you for the reply, P3. **[Gratitude in Affective-related]** I was also surprised to hear that "we can recognize the mountain as a mountain because we have the word, mountain. **[Agreement in Affective-related]** If we did not have the word, we could not see the mountain." Do you believe it? It might seem to be ridiculous, but it is true. **[New Knowledge (advanced) in Cognitive-related]** And, yes, words like mottainai might not be precisely understood by those from different cultures. **[Agreement in Affective-related]** That's why I think linguistic and cultural diversity should be kept. If Japanese language should disappear, the concept of mottainai will also disappear from the world. **[Personal perspectives in Overarching]** In reality, many languages have disappeared in the past few decades partly due to the spread of a global language: English. **[New Knowledge (advanced) in Cognitive-related]**

Turn 1 was P3's first post in Forum 3, in which she answered three questions in the prompt created by the instructor. In the first and third messages in the post, P3 did not exhibit higher order thinking, but the second message was coded into higher categories: (C) Valuing in Affective Domain and (E) Evaluate in Cognitive Dimension. Responding to the question on why she learns English, she stated that she can learn different cultures by learning English, providing

an example using the word *rice*, which is divided in Japanese into *kome*, precooked rice, and *gohan*, cooked rice.

Turn 2 is my reply to Turn 1: P3's first post in Forum 3. No participant made their first post on the first day of Forum 3; thus, on the second day, I mildly encouraged them to make a post as soon as possible. P3 was the first contributor to this forum. Therefore, I opened this post by explicitly praising her for jumping in the discussion first. Then, before going into topic-related discussion, I inserted a comment for social interaction to establish a rapport with her. She was training hard as a member of the track and field team while attending this program.

Then, I moved into the topic-related discussion. I responded to two arguments that P3 developed in her post. First, I summarized her argument that she learns English to understand different cultures. It was well-written with a unique example; thus, I praised her argument first. Then, I provided new knowledge related to her argument. Bringing Wangari Maathai to this discussion is straightforward, but the relationship between language and feelings is a highly abstract concept. At this moment, I was not sure whether P3 is capable of dealing with this concept. I provided this concept as a trial topic to stretch her thought and to test her capability to think about abstract concepts. Second, I summarized her argument that she learns English by thinking in English. This is a unique way of learning English among Japanese high school students; thus, I praised her strategy first. Then, I recontextualized what she wrote in terms of the principles of language acquisition so that P3 could recognize that what she is doing is legitimate.

At the end of this post, I used another strategy, Connecting. Asynchronous forums in this program were designed as a site where participants interact for the co-construction of knowledge (Gunawardena et al., 1997); thus, in addition to learner-instructor interaction in which I tried to stretch participants' thoughts by providing mediation attuned to their emergent abilities, I

directed P3's attention toward questions posted by P10, another participant, and the co-instructor. While I used this strategy more implicitly at other places, my intention is explicit here. This strategy worked because P3 later replied to both P10 and the co-instructor and demonstrated higher order thinking although the posts are not included in Table 19.

Turn 3 is P3's reply to Turn 2. She began her post by expressing her gratitude. To my surprise, she reacted first to the abstract concept, the relationship between language and feelings, stating that the idea is "very interesting." It seems that the strategy, providing a challenging concept as new knowledge, helped her extend her initial response. In addition, she argued that certain words cannot be fully understood by those who do not belong to the culture in which the language is used. This argument was abstract and exhibited her careful observation, which might have been created as a result of my mediation.

Turn 4 is my reply to Turn 3. I began this post by expressing my gratitude. Then, I responded to two portions in the previous post from P3. First, I expressed my agreement with her stating that a mother tongue playing unknown roles is surprising. Subsequently, I added one more example for this topic: People cannot see mountains if they do not have the word *mountain*. We discussed the relationship between language and feelings in our previous interaction, and here I broadened the scope to include not only feelings but everything that we can see. Here, I increased the demand on P3 because I found out that P3 had abilities to think about abstract concepts and express what she thought. Second, I expressed my agreement with her stating that certain words might not be fully understood by those who do not belong to the culture in which the language is used. Then, I developed the idea into the topic of linguistic diversity and presented it as my personal view. Subsequently, at the end of this post, I provided new knowledge, which was categorized into Advanced, that minority languages have disappeared

partly due to English as a global language, connecting the topic to the overall theme of this program. In both the portions in this post, my mediation included New Knowledge that was categorized into Advanced. I chose to do this based on my judgement on P3's abilities after observing her interaction with other participants and me.

A String of Learner-Instructor Interaction in Forum 4. Table 20 is a string of interaction between P3 and me in Forum 4. As with the example in the previous section, the coding results were inserted in bold after each unit of analysis in P3's posts. In my posts, strategies identified were inserted in bold after each unit of analysis.

Table 20

Interaction between P3 and the Instructor in Forum 4

Turn	Contributor	Post
1	P3	I agree with the author because I think we should consider using and learning English now. I think English is more and more important on the world by globalization is advancing. So we should consider it. I also think having a universal language brings everyone together and people can overcome language barriers. For example, If we go to the trip, we can communicate easily and enjoy more by using English. Using English connect the world. So it brings us big discovery on various study or good solution of world problem like Covid-19 and global warming. But there are negative side in learning English. **[(B) Responding in Affective Domain / (B) Understand in Cognitive Dimension / Phase I in AIM]** I was shocked at unequal chances to learn English and there are many people do not take any tests even if they want to take because expensive. Like this, considering using and learning English means focus on the world. My idea of pros of English as a global language can share the way of thinking. Now, SNS is developing. So everyone of the world can share the various idea on the internet easily. **[(C) Valuing in Affective Domain / (D) Analyze in Cognitive Dimension / Phase I in IAM]**
2	Hiroshi	P3, I can see you have thought of the issue widely. **[Praise in Affective-related]** Thank you. **[Gratitude in Affective-related]** You wrote, "having a universal language brings everyone together and people can overcome language barriers." I agree with you.

Turn	Contributor	Post
		[Agreement in Affective-related] P10 wrote, "Despite globalization, Japan is an island nation and its culture tends to be a bit exclusive. In Australia, on the other hand, there are so many different people from so many different countries, and so many different values." Yes, our society is still exclusive in many ways, and one way for us to be more inclusive is having a universal language so that we "share the various ideas" (P3). **[Connecting in IAM-related / Perspectives in Cognitive-related]** At the same time, you found a negative aspect of English as a universal language: "unequal chances" among non-native-English speakers. Now you see the issue from broader perspectives. **[Feedback in Affective-related]** We might not be able to solve the problem as an individual, but it must be extremely important for us to see an issue from broader perspectives. I believe we become an adult or a mature citizen in that way. **[Personal Perspectives (advanced) in Overarching]** One question to P3: As you said, we will be able to grow as an individual or as a community by sharing ideas. Have you found any inspiring views that your friends shared in this program so far? One example? **[Agreement in Affective-related / Connecting & Questioning (intermediate) in IAM-related]**
3	P3	Hi, Hiroshi. Thank you for your reply. I inspired by P10 on the Forum 3. He said Some people might say that English is just a language and people won't need it anymore because of the development of AI. I have never thought it from perspective of AI. But I agree with him. AI has positive aspects. (advance science and computer is useful during the Covid-19) But it has also bad aspects like this. I thought his idea is very wonderful because he connected AI that will be more important thing with this issue. So this idea changed my mind. **[(C) Valuing in Affective Domain / (E) Evaluate in Cognitive Dimension / Phase V in IAM]**
4	Hiroshi	Thank you for taking time to answer my question, P3. **[Gratitude in Affective-related]** Yes, AI, which P10 brought up into the discussion, is a very interesting topic to think about language or human beings. I am glad you could gain new perspectives in this program! **[Agreement & Praise & Feedback in Affective-related]** It reminded me that we read a lesson about androids created by Hiroshi Ishiguro in English classes last year. Ishiguro said developing androids makes him think who "we" are. Fascinating. This clip [URL added here] is my favorite one. **[Additional Resources in Cognitive-related]** He is a fluent English speaker, but he is speaking in Japanese in this presentation. His Japanese makes me think about the power of a dialect, or in his case kansai-ben. **[Perspectives in Cognitive-related]** This should be my last question to you: You used a word "barrier" in your previous post. It caught

Turn	Contributor	Post
		my eye. Koji Murofushi, a former hammer thrower, used the word when he was young in this way: “Many of us have unconscious barriers WITHIN us. For example, we unconsciously think that ‘They can do that, but We Japanese cannot do that.’ We should throw away such barriers.” Cool. Do you have any barriers to get over within or outside of yourself? **[Questioning (Advanced) in IAM-related]**
5	P3	Hi, Hiroshi. Thank you for your reply. I have already watched Ishiguro's video that similar to your recommendation in Mr.Nakamura's class last year. But I will try it. I reply your question. I think it is my prejudice because by my prejudice, I can make a mistake in my judgment. For example, If I have a bad image to someone, I will not mixed up with his or her. And my preconceived idea of modern Japanese is also come from this reason. I unconsciously think such and make barrier in my mind. So I should throw away this barrier. **[(C) Valuing in Affective Domain / (E) Evaluate in Cognitive Dimension / Phase III in IAM]**
6	Hiroshi	Your sincere dedication to this program is much appreciated, P3. **[Praise & Gratitude in Affective-related]** Throughout this program, you have tried to answer my questions DIRECTLY. **[Feedback in Affective-related]** While doing so, you bravely tried to see what might be uncomfortable to you. Many of us tend to avoid seeing what is uncomfortable to us, unconsciously. **[Feedback in Affective-related]** Be proud of yourself. **[Praise in Affective-related]** Your attitude pushed me to think further what “think” means. Thank you. **[Praise & Gratitude in Affective-related]**

Turn 1 is P3’s first post in Forum 4, in which she answered two questions in the prompt created by the instructor. The first message in the post was not coded into higher categories in any coding instruments. The second message, in contrast, was coded into higher categories: (C) Valuing in Affective Domain and (D) Analyze in Cognitive Dimension. Here, she identified a negative aspect of English as a global language: unequal chances. Identifying and articulating negative aspects of English is not an easy task for Japanese high school students, especially for those who are studying English earnestly, because many of them are made to believe that English is necessary for their future success through discourses rampant in the society.

Turn 2 is my reply to P3's first post. I began this post by praising her for her thinking widely and by expressing my gratitude. The remaining part was divided into two portions. First, I agreed with her stating that people can share ideas with a common language to solve problems. Then, I tried to expand this discussion to include the topic of inclusive/exclusive societies by providing the topic as a different perspective. At the same time, I used the strategy, Connecting, here. I used P10's discussion in his first post in this forum to expand P3's idea. P10's post included not only the topic, inclusive/exclusive, but also a viewpoint to see Japanese culture from a meta level. Second, I provided feedback on P3's personal development; namely, she had come to think about English from broader perspectives. Then, I shifted my focus from the discussion topic to a different broader topic, metacognition. I presented the idea as my personal perspective. At the end of this post, showing my agreement with her again, I posed a question to P3, which was categorized into Intermediate. This question was intended to connect P3 to other participants and provide a chance for her to observe herself from a meta level.

Turn 3 is P3's reply to Turn 2. Here, P3 directly responded to the question that I posed in Turn 2. Only one message was included in this post, which was coded into higher categories in all the three coding instruments used in this study: (C) Valuing in Affective Domain, (E) Evaluate in Cognitive Dimension, and Phase V in IAM. This is the only message in both Forum 3 and 4 that was coded into Phase V in the IAM: Agreement statements(s)/application of newly-constructed meaning. Phase V in the IAM is further divided into three sub-categories, and this message was coded into (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. Here, P3 was encouraged to think about the relationship between English learning and artificial intelligence (AI), which P10 brought into the discussion,

and saw both the advantages and disadvantages of AI. The co-constructed nature is significant. In addition, she mentioned her cognitive schema transformed. Without my using the strategy Connecting at the end of Turn 2, P3 would probably not have developed her argument in Turn 3 in this way.

Turn 4 is my reply to Turn 3. I began this post by expressing my gratitude. Then, agreeing with her argument, I provided feedback on her personal development; namely, P3 gained broader perspectives, interacting with other participants. Gaining broader perspectives was one of the most important purposes of this program; thus, I made her accomplishment explicit. Subsequently, I provided an additional resource. It was a video clip in which a prominent Japanese professor, who creates Androids, talks about why he creates androids and how creating androids led him to deeper reflection on the nature of human beings. The talk included philosophical discussions, but at this moment, I was sure that the cognitive demand of the video clip was appropriate for P3. In addition, I mentioned the professor's use of a dialect spoken in a western part of Japan. It might have been rather off topic, but I thought it might bring a different viewpoint into the ongoing discussion. At the end of this post, I decided to bring in a completely different topic that was not task-oriented. This interaction occurred toward the end of Forum 4; thus, it was my last question to P3. The question, which was categorized into Advanced, was intended to encourage her to reflect on herself, including negative aspects that she might possess within herself. Mediation here was focused not on providing support for P3 to stretch her thought on the content matter but to stretch her metacognition directed toward herself.

Turn 5 is P3's reply to Turn 4. P3 began this post by expressing her gratitude and by briefly mentioning the additional resource that I provided in the previous post. Then, to my surprise, P3 directly answered my trial question placed at the end of the previous post. This

message was coded into higher categories in all the three content analysis instruments: (C) Valuing in Affective Domain / (E) Evaluate in Cognitive Dimension / Phase III in IAM. Three phrases I spotted in this message were “my prejudice,” “my preconceived idea,” and “unconsciously think.” Here, P3’s metacognition toward herself was clearly being stretched. She observed herself, not avoiding seeing her own “prejudice,” found a *barrier* that she “unconsciously” possessed, and openly expressed her challenge to overcome. Without my trial question, she most likely would not have done this, but if I posed the trial question at the beginning of this program, she would probably not have responded. I argue that my decision to pose this question toward the end of the program was appropriate in terms of DA-based mediation. Also, without rapport that I had built with P3 throughout Forum 3 and 4, she would not have replied to my trial question.

Turn 6 is my reply to Turn 5: my last response to P3 in this forum. I began my post by expressing my gratitude. Then, I provided two pieces of feedback on her personal development: first on her facing and answering my questions directly and secondly on her seeing and articulating negative aspects that she possessed. At the end of the post, I wrote, “Your attitude pushed me to think further what ‘think’ means.” This exactly represents how I felt at that moment. This program was designed to encourage participants to think deeply, but it was I who was led to think further about what *think* means.

In this section, I explored learner-instructor interaction and described mediation strategies, the contexts, and my intention of the use of the mediation strategies. Mediation strategies that I used were sorted into four categories: Affective-related, Cognitive-related, IAM-related, and Overarching. Not explicit but possible effects of those strategies were identified after close examination of interaction, including the larger context that the interaction belongs to. Two

examples of learner-instructor interaction illustrated the contingent nature of my mediation strategies and how those strategies might have extended the participant's thought and metacognition.

Following is what seems to be significant in the discussion around the second sub-question for the second research question. First, DA (Poehner, 2007) worked in both forums and seems to be a promising method to be used to develop the higher order thinking of EFL or any other additional language learners in K-12 settings. I controlled the cognitive demand in my mediation, closely examining the current developmental level of each participant. I used trial topics and trial questions to test and stretch participants' capability to think. Secondly, while I provided mediation based on DA, most of which were categorized into Cognitive-related, I used more strategies that were categorized into Affective-related. Without building rapport or trust relationships, it can be difficult for instructors to guide participants into more demanding tasks or encourage them to think more deeply (Murphy & Rodríguez-Manzanares, 2012). Without this effort, P3 might not have responded to my last trial question at the end of Forum 4 in this program. Thirdly, this program was designed to develop higher order thinking mainly through social interaction; thus, I also used mediation strategies to facilitate social interaction. It might have worked to a certain extent; however, it might often take longer for participants to become accustomed to constructivist learning and to get to know each other enough to interact actively in this type of programs.

Originally, my focus in providing mediation was only on DA, which was represented by Cognitive-related, to develop participants' cognition. Vaughan et al. (2013) classified facilitation strategies into two groups based on the Community of Inquiry framework: facilitating social presence and cognitive presence. Following this model, I provided mediation for social

interaction, which was represented by IAM-related, to facilitate social construction of knowledge. Strategies for facilitating affective presence were included in Vaughan et al.'s (2013) model, although they were not explicit. I explicitly provided mediation focusing on participants' affect, which was represented by Affective-related, to build rapport. This study suggests that contingent and purposeful mixture of DA-based mediation strategies focusing on the cognitive dimension, those focusing on affect to build rapport, and those to facilitate social interaction, seems indeed to work to stretch participants' thought in forums.

In the next section, my focus shifts to learner-learner interaction, discussing results of the third sub-question for the second research question.

Sub-Question 3 for the Second Research Question

The third sub-question for the second research question was: What features of learner-learner interaction in the asynchronous forums assisted or inhibited higher order thinking development? I presented the coding results to show to what extent higher order thinking was demonstrated among participants in asynchronous forums in Chapter 5. In this section, I first present inferences derived from the post-survey. Subsequently, I describe two strings of learner-learner interaction, examining what the participants intended, and whether or how the intentions might have worked.

Inferences From the Post-Survey

As I wrote in the section to answer the first research question, learner-learner interaction in Forum 3 and 4 was not highly activated. The post-survey revealed reasons why participants hesitated to interact with each other. The most prominent reason was their feeling that they were not socially close enough to do so. Other factors that might have inhibited learner-learner interaction include (1) technological inconvenience, (2) too much thinking before expressing

opinions, (3) not enough English proficiency, (4) few experiences with constructivist learning in regular classes, and (5) not having enough time. These are considered in Chapter 7, in the section that discusses the first sub-question for the third research question.

Although participants did not actively interact with other participants in forums, the post-survey revealed that participants found the limited learner-learner interaction meaningful. All the 12 respondents made favorable comments on the aspect of collaborative constructivist learning. For example, P8 wrote, “Questions from P10 led me to think about different aspects of the issue.” P10 wrote, “Especially when the posts included their experiences and when those students replied to my comment, I could learn their experiences more. It was always interesting.” These remarks collected from the post-survey suggested that participants might have thought more deeply than the results gathered from content analysis implied.

Another notable finding is that no participant reported that they felt uncomfortable while interacting among participants in forums. I asked in the post-survey whether participants found something uncomfortable in students’ comments in asynchronous forums, and no participants answered that they did. In general, learners in asynchronous forums can make other participants feel uncomfortable by, for example, being aggressive, rude, or overly polite (Garrison, 2016; Halverson et al., 2017). I gave instructions about how to make forums constructive in the first in-person F2F meeting and posted basic rules on the online learning platform (see Appendix K). These instructions and basic rules that I made explicit play an important role especially for K-12 students and those who are not accustomed to constructivist learning. This strategy seems to have worked in this program.

Inferences around learner-learner interaction derived from the post-survey are discussed in more detail in Chapter 7 to discuss around the first sub-question for the third research

question: What design factors of the online component of the BL program facilitated or inhibited the presence of higher order thinking?

Closer Examination of Learner-Learner Interaction

Transcripts of participant interactions were analyzed with one model and two taxonomies, and the results were shown in Chapter 4. Here, two examples of learner-learner interaction are further explored to infer what aspects of learner-learner interaction assisted or inhibited participants to develop their higher order thinking. Table 21 is the first example, which shows a short interaction between P8 and P4 in Forum 3. The coding results were inserted in bold after each unit of analysis in their posts.

Table 21

Example of Learner-Learner Interaction A

Turn	Participant	Post
1	P8	Hi, P4. I enjoyed your post. I thought your pronunciation is so good from before. And it is wonderful for you to have confidence while speaking English aloud. I will try your way to improve your English!! Also I thought your reason why you learn English is so nice. The feeling of loving something is the strongest at last. **[(B) Responding in Affective Domain / (B) Understand in Cognitive Dimension / Phase I in IAM]**
2	P4	Hi, P8. Thank you for your reply. I was so glad!! You wrote you sing the song in English. I recommend you "Love Myself." Its lyrics is simple to understand what to say, and it will cheer up you. I'd like you to listen to it once! **[(B) Responding in Affective Domain / (B) Understand in Cognitive Dimension / Phase I in IAM]**

The interaction stopped at Turn 2 without developing further. Both the posts stayed in the low categories in each coding instrument in content analysis. P8's main purpose in Turn 1 seemed to be giving a compliment to P4. P4, accepting P8's compliment, commented on P8's original post and provided a suggestion: a song to be used for English learning. This interaction

was not off topic but task-oriented; however, the overall purpose of this interaction seemed to be social interaction, which is an important aspect in asynchronous forums (Garrison, 2016). In that sense, although higher order thinking development was not observed here, this interaction was not meaningless. In the long run, this interaction to build a social relationship could have played a role as a foundation to develop higher order thinking.

The second example of learner-learner interaction is the one between P10 and P3 in Forum 3, which is shown in Table 22. As with Table 21, the coding results were inserted in bold after each unit of analysis.

Table 22

Example of Learner-Learner Interaction B

Turn	Participant	Post
1	P10	Hi P3, I have read your post and I totally agree with you. I have a Japanese friend who works as a journalist. She travels all over the world to know what's happening in each of the countries she goes to, but it seems like she has never had a problem with not being able to communicate with people, even when she went to a small village in Africa. **[(B) Responding in Affective Domain / (B) Understand in Cognitive Dimension / Phase I in IAM]** I think it'll be really nice if you can enjoy books, movies and music in English, too! **[(B) Responding in Affective Domain / (B) Understand in Cognitive Dimension / Phase I in IAM]** Lastly, since you've mentioned that you can learn cultures when studying English, can you think of any other examples about this? **[(B) Responding in Affective Domain / (B) Understand in Cognitive Dimension / Phase I in IAM]**
2	P3	Hi, P10. Thank you for your reply. I read your Japanese friend's experience. And I felt your idea is also true. I think we can communicate with foreigners even if we do not have enough English speaking skills because we can communicate with strong will. **[(C) Valuing in Affective Domain / (D) Analyze in Cognitive Dimension / Phase III in AIM]** I think words are influenced by cultures or customs. So If we learn word's origin, we can naturally know cultures or customs of the country. **[(B) Responding in Affective Domain / (B) Understand in Cognitive Dimension / Phase I in IAM]**

Turn	Participant	Post
3	P10	Interesting, P3. Strong will is very important when you communicate with people, but what do you think is important as well as your strong will when communicating? **[(B) Responding in Affective Domain / (B) Understand in Cognitive Dimension / and Phase I in IAM]** Yes. That's right. A lot of words came from other countries such as France. Likewise, I think learning Japanese will also be a good opportunity to know different cultures because we have so many words from overseas, too. **[(C) Valuing in Affective Domain / (D) Analyze in Cognitive Dimension / Phase III in AIM]**
4	P3	Hi, P10. Thank you for your reply. I think smile is also important because If we smile while talking, people will relax and feel good impression. What do you think? Please tell me your opinion that important thing to communicate with people. **[(C) Valuing in Affective Domain / (E) Evaluation in Cognitive Dimension / Phase I & III in AIM]**
5	P10	Thanks for the question, P3. As you said, smiling is important when talking to people. Another thing that I think is crucial is hand gestures. I guess Japanese people tend not to use as much of them as English speakers when they are speaking Japanese, but I think hand gestures will make you much more persuasive. If you have a look at TED, you will immediately notice the way used to convince the audience! **[(C) Valuing in Affective Domain / (E) Evaluation in Cognitive Dimension / Phase III in AIM]**

Content analysis conducted in this study showed that the two participants developed their higher order thinking in this interaction. It is evident that both the participants, especially P10, used various strategies to facilitate the discussion. To explore what strategies P10 and P3 used in this interaction, I used the same framework as the one that was developed to analyze instructor's mediation strategies in this study.

In the first message in Turn 1, after explicitly showing that he read P3's original post, P10 used (C) Agreement in Affective-related, saying, "I have read your post and I totally agree with you." Then, he used (A) Personal Perspectives in Overarching, providing a specific example that came from his personal experience, saying, "I have a Japanese friend who works as a journalist

… but it seems like she has never had a problem with not being able to communicate with people, even when she went to a small village in Africa." In the second message in Turn 1, P10 used (C) Agreement in Affective-related and (D) Summarizing in IAM-related, saying, "I think it'll be really nice if you can enjoy books, movies and music in English, too!" In the third message in Turn 1, he used (D) Summarizing in IAM-related and (B) Questioning in IAM-related, saying, "Lastly, since you've mentioned that you can learn cultures when studying English, can you think of any other examples about this?"

In the first message in Turn 2, P3 used (D) Gratitude in Affective-related, expressed explicitly that she read P10's post, and used (C) Agreement in Affective-related, saying, "Hi, P10. Thank you for your reply. I read your Japanese friend's experience. And I felt your idea is also true." Then, inspired by P10's example, P3 brought a new idea, strong will, saying, "I think we can communicate with foreigners even if we do not have enough English-speaking skills because we can communicate with strong will." In the second message in Turn 2, P3 answered P10's question directly, saying, "I think words are influenced by cultures or customs. So [i]f we learn word's origin, we can naturally know cultures or customs of the country."

In the first message in Turn 3, P10 reacted first by using (B) Praise in Affective-related, saying, "Interesting, P3." Then, he used (C) Agreement in Affective-related and (B) Questioning in IAM-related again, saying, "Strong will is very important when you communicate with people, but what do you think is important as well as your strong will when communicating?" In the second message in Turn 3, P10 used (C) Agreement in Affective-related and (A) Examples in Cognitive-related, saying, "Yes. That's right. A lot of words came from other countries such as France." Then, he used (B) Different Perspectives in Cognitive-related, directing the focus from English to participants' native language, Japanese, saying "Likewise, I think learning Japanese

will also be a good opportunity to know different cultures because we have so many words from overseas, too."

In Turn 4, P3 first used (D) Gratitude in Affective-related and answered P10's question, saying, "Hi, P10. Thank you for your reply. I think smile is also important because [i]f we smile while talking, people will relax and feel good impression." Then, she used (B) Questioning in IAM-related, saying, "What do you think? Please tell me your opinion that important thing to communicate with people."

In Turn 5, P10 first used (D) Gratitude in Affective-related and (C) Agreement in Affective-related, saying, "Thanks for the question, P3. As you said, smiling is important when talking to people." Then, relating to the topic, P10 used (B) Different Perspectives in Cognitive-related, bringing a topic of hand gesture, saying, "Another thing that I think is crucial is hand gestures." He used (D) Supplementary Explanation in Cognitive-related, elaborating on the new topic, saying, "I guess Japanese people tend not to use as much of them as English speakers when they are speaking Japanese, but I think hand gestures will make you much more persuasive." Finally, P10 used (A) Examples, suggesting an example by which P3 could confirm his argument, saying, "If you have a look at TED, you will immediately notice the way used to convince the audience!"

As shown above, both participants, especially P10, used various strategies in all three categories: Affective-related, Cognitive-related, and IAM-related. Exactly what strategies worked is not known, but it is highly likely that the mixture and their active use of these strategies was one of the reasons why they actively interacted to each other, which led both to develop their higher order thinking. This is a good example of not only instructors but also participants having the capacity to increase teaching presence (Garrison, 2016). With regard to

why they could use various facilitation strategies, I have three inferences. Firstly, they originally had the ability. In the case of P10, he studied at a high school in Australia for one year just before joining this program. He might have developed his communication skills while living in a different culture, which could be inferred from his posts in this program. For example, he wrote in Forum 4, "In Australia, on the other hand, there are so many different people from so many different countries, and so many different values. Therefore, in this community where people from different cultures coexist, you need to be able to communicate your values and opinions clearly to others, as others wouldn't understand you as well as when you are in Japan." Secondly, the instruction on how to build a constructive discussion that I gave participants in the first in-person F2F meeting and posted on the online learning platform might have worked. Finally, they might have modeled the instructor's mediation strategies (Garrison, 2016). I actively joined in Forum 3 and 4 and used various mediation strategies in both forums as described in the previous section. P10 and P3 had never experienced these kinds of constructivist discussion forums; thus, they might have modeled my mediation strategies consciously or unconsciously.

Forum 5 and the post-survey indicated that P10 and P3 found collaborative constructivist learning to be meaningful. P10 wrote in Forum 5:

> By participating in the programme, I learned that people can work together, regardless of how well they use English …Of course, English is very important, but I think what the participants really needed was the ability of logically expressing their own thoughts in the forums and the meetings. This is particularly important when it comes to working in an international environment. Although there must be some difference in skill levels, job descriptions or even cultural backgrounds among the employees, it will be even more important to cooperate with them to tackle on problems. In that sense, this programme

meant a lot to me.

P3 wrote in the post survey:

> I think we need to understand something first, but just memorizing things is meaningless. In that sense, this way of learning is very meaningful. The process in which we learn, think, and express what we thought is important. This kind of learning should be incorporated in regular classes … At first, to be honest, I was not so positive about joining this program. However, I gradually came to enjoy this program after getting replies to my posts…I think this program developed my positive attitude.

They were given an opportunity to experience collaborative constructivist learning, did it themselves, and found it meaningful. Without being given an opportunity and doing it themselves, they may never have found it meaningful. In other words, although this is like a chicken-or-egg question, the most important factor for participants to actively interact and develop higher order thinking in forums is for them to have the hands-on experience to find it meaningful.

In summary, the post-survey revealed that, although the learner-learner interaction was limited, participants still found it meaningful. It was inferred that although participants did not interact much, they thought more deeply than the results gathered from content analysis suggested. This finding supports the concept of ecological constructivism (Hoven & Palalas, 2016). This is discussed in more detail in the next chapter. Also, closer examination of learner-learner interaction revealed that participants who developed their higher order thinking through learner-learner interaction used various facilitation strategies like their instructor did. By reducing factors that might have inhibited learner-learner interaction and giving proper instruction about how to build constructive discussion, participants, who already found

constructivist learning meaningful, might further develop their higher order thinking by interacting more.

Chapter Summary

In this chapter, I explored the possible reasons for the answers to the first research question described in the previous chapter, addressing the second research question: What factors in students' engagement in asynchronous online forums may contribute to the development of higher order thinking, if any? This research question was discussed by answering the three sub-questions, which were created around the three types of interaction: learner-content, learner-instructor, and learner-learner (Moore, 1989). In this program, participants interacted with content through tasks, which were broken into three categories: (1) learning resources, (2) discussion topics, and (3) guiding questions. The coding results and the post-survey suggested that all the three elements of tasks that I purposefully selected worked to encourage participants to think deeply. From the viewpoint of sociocultural theory, all of these elements should be designed developmentally (Lantolf & Poehner, 2004). With regard to learner-instructor interaction, mediation strategies that I used in this program were sorted into four categories: Affective-related, Cognitive-related, IAM-related, and Overarching. The findings suggested that contingent and purposeful mixture of three types of mediation, for modeling and encouraging affective expression, for developing participants' cognition, and for increasing social interaction, would work to stretch participants' thought in forums (Garrison, 2016; Vaughan et al., 2013). In relation to learner-learner interaction, participants' reflections suggested that, although learner-learner interaction in forums was limited, they found constructivist learning meaningful and thought more deeply than the results from content analysis implied. The most prominent reason why participants hesitated to interact online was their feeling that, due to limited social

interaction, they did not know each other well enough to do so. Closer examination of participants' transcripts revealed that two participants who developed their higher order thinking through learner-learner interaction used various facilitation strategies in their interaction. It seems that not only instructors but also participants can contribute to increasing teaching presence (Garrison, 2016).

In the next chapter, I move on to the third research questions to investigate the contextual factors.

Chapter 7. Research Question 3 Discussion

The third research question was: What factors in blended learning design may contribute to the development of higher order thinking, if any? The intervention of this action research study was a BL program, and designers of BL systems should be seeking best practices for how to combine instructional strategies in online and F2F components that take advantages of the strengths of each environment and avoid weaknesses (Graham, 2006). In this chapter, I discuss what contextual factors in this BL program assisted or inhibited the development of higher order thinking, using the post-survey, closer examination of participants' transcripts, and my observations. This research question was addressed through the following three sub-questions: (1) What design factors of the online component of the BL program facilitated or inhibited the presence of higher order thinking?; (2) What design factors of the in-person face-to-face component of the BL program facilitated or inhibited the presence of higher order thinking?; and (3) What design factors of the organization of online and in-person face-to-face components in the BL program facilitated or inhibited the presence of higher order thinking?

Sub-Question 1 for the Third Research Question

The first sub-question for the third research question was: What design factors of the online component of the BL program facilitated or inhibited the presence of higher order thinking? The online component of this program consisted of two components: synchronous meetings and asynchronous forums. I designed this BL program to utilize different affordances that each component provided.

Synchronous Meetings

In this program, each of the two main asynchronous forums, Forum 3 and 4, was followed by a synchronous meeting respectively. A co-instructor, an adjunct professor working at

universities in the United States, was invited to join as the main instructor in both synchronous meetings. In the first synchronous meeting that followed Forum 3, participants introduced themselves, had casual conversation with the co-instructor, and engaged in a game. The main goal of the first synchronous meeting was to break the ice with no cognitively demanding tasks. In contrast, in the second synchronous meeting that followed Forum 4, 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. From the perspective of language acquisition, two synchronous meetings added to asynchronous forums were expected to play a role in the balanced development of the four skills for English proficiency (i.e., reading, writing, listening, and speaking).

It seemed that participants purely enjoyed the first synchronous meeting. Having the external instructor seemed to be an additional motivational hook. Enabling participants physically separated in space to engage in live discussion is one of the advantages of online synchronous meetings (Kanuka, 2008). In this program, participants had the opportunity to learn about different perspectives and specialist knowledge by having a sociolinguist living in the United States as a co-instructor.

Some participants seem to have found further meanings in the flow from asynchronous forums to synchronous meetings, especially in the second one. I elaborate on this aspect later in this chapter, in the section to discuss the third sub-question for the third research question.

Asynchronous Forums

Design inspired by Ecological Constructivism. The COVID-19 pandemic in 2020 has facilitated the spread of online learning; however, we are still encountering online learning programs that seem to be little more than a direct translation of traditional correspondence

courses, where students submit their assignments with little or no learner-instructor and learner-learner interaction, or traditional F2F classes following lecture formats (Hodges et al., 2020). In contrast, mainstream online learning has developed in the past few decades as a new method of technology-mediated learning to replace the concept of self-study and knowledge transmission with the concept of knowledge construction through interaction in collaborative communities of learners. The former might be called emergency remote teaching and the latter quality online learning (Hodges et al., 2020). Asynchronous forums in this program were designed to be the latter.

The numerical results around learner-learner interaction and higher order thinking development were shown in the sections in Chapter 5, addressing the first, second, and third sub-questions for the first research question. The section discussing the fourth sub-question for the first research question suggested that fewer posts or units coded into lower categories might not necessarily mean that the participant did not think deeply. This program adopted ecological constructivism (Hoven & Palalas, 2016), in which collaborative and individual aspects of learning are expected to be organically interwoven. As indicated in the section of the previous chapter discussing the post-survey responses, participants might have exercised or developed their higher order thinking even if they were not actively involved in the discussions. In the following section, the post-survey and Forum 5 are investigated to further explore the individual aspect of learning in this program.

Advantages of Asynchronous Forums Identified. One question among the fifteen questions in the post-survey was: How was the online learning experience compared to regular face-to-face classes at school? This question implied that participants experienced collaborative constructivist learning in this program while they learn mainly in a traditional way in their

regular F2F classes or emergency remote learning environments. All of the twelve participants who submitted the post-survey responded to this question, and they all spoke positively about this program.

Five areas in which participants found constructivist learning meaningful were identified. Firstly, all participants stated that constructivist learning in forums guided them to deeper learning. For example, P12, who struggled to express her thought in English in forums, wrote in the post survey, “It was new to me to think and write in English on topics that we usually think in Japanese. This kind of activities will lead us to deeper learning in regular classes if we have enough time and enough support.” P8, who produced units that belong to higher categories in every content analysis instrument, wrote in the post-survey, “I often find topics that I would like to explore while reading the textbook in regular English classes, so I am interested in doing activities in which we ‘think, discuss, and present’ in regular classes.” While P12 and P8 reflected upon deeper learning in the subject area, two respondents commented on deeper learning from the perspective of English learning. P12 wrote, “By seeing variations of English expressions, I could learn more about English.” P9 wrote, “I found new perspectives and different ways of using a particular English word.”

Secondly, three respondents found a meaning in expressing their opinions. For example, P10, who was heavily involved in both forums with units coded into higher categories in every instrument, wrote in the post survey, “Assignments in Forum 3 and 4 that not only gave us knowledge but also required us to express our opinions were useful because they help us develop logical thinking.” P2, who contributed only one post in Forum 3 and 4 respectively, wrote in the post-survey, “This way of learning should be incorporated in regular classes. It was difficult for me to express my own ideas in English. I would like to improve these abilities in regular classes.”

These examples show that not only participants who produced units that were sorted into higher categories but also those who struggled in forums found meanings in one of the most crucial aspects of constructivist learning.

Thirdly, comments from five respondents showed that they developed metacognition to observe their ways of learning English from broader perspectives. For example, P5 wrote in the post-survey, “I think this kind of learning should be incorporated in regular classes. I realized anew why we need to memorize English words and grammar through using English in an authentic situation in this program. This experience motivates me to learn English.” P8 wrote in Forum 5, “I noticed that it is difficult to understand what others want to say and write what I want to say in English. This realization is the most important thing in this lesson for me ... All the training of English such as listening, reading, and writing is necessary to communicate.” These kinds of conscious, articulated realizations indicate the potential to support these students to become more independent learners.

Fourthly, comments from three respondents show that they developed metacognition to observe their transformation broadly. P3, who produced many posts and demonstrated higher order thinking in forums, wrote in Forum 5, “… And I could cultivate my aggressiveness [a positive attitude to express opinions] by this program. Of course, post first one's idea, replying to other[s]. By these steps, I acquired my aggressiveness. I will try to use this ability [in] various scene[s]. This program is really hard but there are many things that I should learn except for [in addition to] using English.” P3 was transformed into a new self, who does not fear to express her opinions through Forum 3 and 4, and observed the transformation from a meta level. P4 wrote in Forum 5, “I felt that challenge [developmental rigor] is the most important in this program. I had a little difficulty when I tried to express my opinion, reply to others and so on. But even if it

doesn't get through well, making efforts to get others to understand myself is so important." P4 found she needed proper rigor to go further. This realization would also be one important factor for students to grow into independent learners.

Finally, three participants explicitly expressed that they *enjoyed* learning in forums. For example, P9 wrote, "I enjoyed the forums because I found different people have different ideas." P13 wrote in the post survey, "It was fun because I could feel I am "using" English in this program." Although only three participants who explicitly expressed their experience in forums as something enjoyable, many favorable comments on forums suggested that the participants enjoyed constructivist learning in forums and found it to be a motivational hook. Therefore, it seems that this program succeeded in cultivating the internal motivation of participants.

In this section, five areas in which participants found asynchronous forums in this program meaningful were described. However, closer examination of the post-survey also revealed challenges that participants faced while attending asynchronous forums. In the next section, those challenges are described.

Challenges of Asynchronous Forums Identified. The post-survey revealed that the most prominent reason why participants hesitated to interact online was their feeling that, due to limited social interaction, they did not know each other well enough to do so. Seven respondents identified this issue as an area for improvement of this program. For example, P7 wrote, "The participants were not so close as to express their opinions freely to each other." P12 wrote, "To activate online discussion, it might have worked if we had a few more face-to-face meetings at the beginning." P12's suggestion will be a possible solution to give participants more opportunities to get closer. How to use in-person F2F meetings is discussed in the following section to answer the second sub-question for the third research question.

As mentioned in the previous chapter, other factors that might have inhibited learner-learner interaction include (1) few experiences with constructivist learning in regular classes, (2) too much thinking before expressing opinions, (3) not enough English proficiency, (4) not having enough time, and (5) technological inconvenience. I briefly describe each factor below.

First, and most importantly, although participants were provided with opportunities to practice interacting in asynchronous forums in Forum 1 and 2, most of them were not familiar with collaborative constructivist learning; thus, they had difficulty in expressing their opinions to others in forums in this program. P3 wrote in the post survey:

> We could reply to discussion questions and questions from teachers, which means that when we are asked, we can reply. I thought we are not good at questioning. Thus, we need an atmosphere in which we can easily ask questions even if they are trivial ones. We are encouraged to develop abilities to have questions on a daily basis.

Second, some participants found it difficult to find a balance between thinking deeply and expressing their opinions. In the first in-person F2F meeting, I encouraged participants to think deeply throughout this program. I had to emphasize the importance of thinking deeply because the aim of this program was to develop higher order thinking, but this advice prevented some participants from contributing to forums earlier. P13 wrote in the post-survey, “I thought too much when making the first post and also when replying to peers. I should have made a post every day even if it is a short one.” P16 wrote in the post-survey, “If we had been expected to write only a sentence or two in the first post like we do in LINE [a social network service in which people exchange written messages], it would have been easier for us to join the discussion.”

Third, although all the participants were advanced EFL learners who had acquired basic

English grammar and vocabulary, most of them had had few opportunities to use English in authentic situations. Thus, as expected, the lack of English proficiency became an obstacle to interact in forums where the medium of instruction and communication was English. P10, the most fluent English user among the participants, took the issue positively, writing in Forum 5, "In fact, there was a gap in the participants' English ability levels, but it appeared that we all thought seriously about each of the questions to make the discussions deeper. Of course, English is very important, but I think what the participants really needed was the ability of logically expressing their own thoughts in the forums and the meetings." On the other hand, to P9 and P16, English proficiency was a challenge to overcome. P9 wrote in the post-survey, "I hesitated to interact in forums because I had not talked with other participants and their English is so great." P16 wrote in the post-survey, "We need a lot more practice to express what we think in English. To express what we think in English is more difficult than to say what we memorized in English."

Fourth, high school students in Japan are usually busy. Although the intervention was implemented during the summer vacation, participants were given a large volume of assignments from their regular classes in summer. In addition, most of them belonged to an extracurricular club such as basketball team, track and field team, or chorus club. Furthermore, the high school where this intervention was implemented was located in Tokyo, and Tokyo Olympic Games were held just while the BL program was implemented. P2 wrote in the post-survey, "I was busy, and also I was a little modest. I should have taken more time to read peers' posts. First, we need to try to spare some time to read posts even if we are busy in order to make discussions active."

Finally, some participants had technological problems. Overall, participants did not have major problems in using the technologies adopted for this program, but four respondents reported minor inconvenience around the usability of the platform that was adopted for asynchronous

forums. For example, P10 wrote in the post-survey, “First, it was difficult to find replies to my post. This is a system problem of the platform.” P4 wrote, “The application was not so user-friendly. What I wrote disappeared when I moved to a different page, so I had to write the post from scratch again. In addition, I received no notification on my smartphone, so I often forgot to open the application.”

In this section, I discussed what design factors of the online component of the BL program facilitated or inhibited the presence of higher order thinking, using participants’ reflections on this program submitted to Forum 5 and the post-survey. The online component of this program consisted of two components: synchronous meetings and asynchronous forums. Enabling participants separated in space to engage in live discussion is one of the advantages of online synchronous meetings (Cleveland-Innes & Wilton, 2018). Having an external instructor from abroad in synchronous meetings seemed to be a motivational hook.

This program was designed to focus on asynchronous forums. It was based on ecological constructivism (Hoven & Palalas, 2016). The post-survey revealed that all the participants who submitted the post-survey took this aspect of the program positively. Five areas in which participants found constructivist learning meaningful were identified. However, the post-survey also revealed that the most prominent reason why participants hesitated to interact online was their feeling that they were not close to each other enough to do so. Five additional factors that might have inhibited learner-learner interaction were identified and discussed.

In the next section, I discuss what design factors of the in-person F2F component of the BL program facilitated or inhibited the presence of higher order thinking.

Sub-Question 2 for the Third Research Question

The second sub-question for the third research question was: What design factors of the in-person face-to-face component of the BL program facilitated or inhibited the presence of higher order thinking? Originally, three in-person F2F meetings were placed in this program at the designing stage. K-12 students tend to need direct instruction due to their lack of independent learning abilities (Halverson, 2017). In addition, constructivist-based online learning has not been common in regular classes in both secondary and post-secondary education in Japan. Thus, a main purpose of introducing in-person F2F components to this BL program was to provide participants with the needed direct instruction to guide them in the online component.

The First In-Person F2F Meeting

The first in-person F2F meeting was held in a classroom at the high school where the intervention was implemented. I explained in Japanese the aims of the program, the procedure, and how to operate the employed technology, emphasizing how and why constructivist learning can be a meaningful educational experience. In addition, after my direct instruction, participants practiced interacting in asynchronous forums with easier topics using the employed platform. The post-survey revealed that participants were satisfied with the first in-person F2F meeting.

The medium of instruction used in the first in-person F2F meeting was Japanese while it was English in the online component of this program. Nine respondents supported the decision, and no one insisted English should have been used there. For example, P8 wrote, “The first F2F meeting should be conducted in Japanese. It is for basic information, and we need to understand it fully.”

Four respondents gave favorable comments on the contents of the first in-person F2F meeting, and no one wrote negative feedback. For example, P13 wrote, “Thanks to the F2F meeting where we learned how to post and interact on Google Classroom by doing it, I could

easily do it at home later." P12 wrote, "It was also good because we wrote our opinions and made posts during the meeting. I could concentrate and get motivated due to that atmosphere."

I posted "Basic Rues in This Program" and "Tips for Making a Good Discussion Forum" (Appendix K) on the employed platform and explained them in person in the meeting. As I wrote in the section addressing the third sub-question for the second research question, the post-survey revealed that no participants found anything uncomfortable in asynchronous forums. In general, learners in asynchronous forums could make other participants feel uncomfortable by, for example, being aggressive or rude; thus, these instructions and rules are important especially if participants are K-12 students or for those who are not accustomed to constructivist learning (Halverson et al., 2017). This strategy seems to have worked in this program.

As for areas for improvement of the first in-person F2F meeting, as mentioned in the previous chapter, answering the third sub-question for the second research question, the post-survey revealed that the most prominent reason why participants hesitated to interact online was their feeling that they were not socially close to each other enough to do so. Five respondents suggested that the first in-person F2F meeting be used for participants to get closer. For example, P16 wrote, "I wanted to interact with each other more in this meeting." P3 wrote, "It was meaningful especially with activities for practice. Personally, I was satisfied with the meeting conducted in Japanese, but I suggest that the instructor explain needed information in English, and then students share what they got. By doing so, participants can get closer, which might lead us to closely interact online too." Including activities for participants to get closer in the first in-person F2F meeting is one promising strategy to improve this program. Another strategy to be used was suggested by P12. Lack of English proficiency was another factor that inhibited learner-learner interaction in forums. P12, who seemed to have struggled with writing in English,

wrote in the post-survey, “I am happy if participants can get some advice on writing posts in English. I had to use the same pattern many times in writing posts. I had difficulty in expressing my ideas in English.” This is also a strategy that can be used to improve the program if the program is conducted in a language that is not a native language for participants. In response to this challenge that some of my students had, I am considering adding a lecture on English writing in the first in-person F2F meeting, and at the same time, posting a list of useful English expressions on the online learning platform adopted in the program.

The Second and Third In-Person F2F Meeting

Originally, the second in-person F2F meeting was placed in the middle of the program and intended to be a place where I would assist participants who might still have been struggling with the program by giving them direct instruction in person. The attendance was optional, and in the end, no one attended. Participants seemed to have understood what to do in the program by attending the first in-person F2F meeting and had fewer technological problems than expected. However, having a mid-term voluntary support session should be considered rather than being rejected when designing future programs because there might be participants who need it.

The third in-person F2F meeting was placed at the end of program and intended to be a place where participants would share what they learned in the whole process of this program and be given feedback from the instructor. However, it had to be canceled due to the COVID-19 pandemic. The meeting was scheduled to be held at the end of August 2021, and around that time, the number of students who could come to school was restricted due to the increasing number of COVID-19 cases. Participants lost an opportunity to share their reflections in person; however, they were able to deepen their reflections guided by open-ended questions in the post-survey and share their reflections in a written form in Forum 5 as scheduled.

In summary, the first in-person F2F meeting worked. I explained the aims of the program, the procedure, and how to operate the employed technology in Japanese, emphasizing how and why constructivist learning can be a meaningful educational experience. In addition, after my direct instruction, participants practiced interacting in asynchronous forums with easier topics using the employed platform. However, some areas for improvement were identified, including the deficiency of activities for participants to get socially closer. No participant attended the second in-person F2F meeting, and the third one was canceled due to the COVID-19 pandemic.

In this chapter so far, I discussed what design factors of the online and the in-person F2F components of the BL program facilitated or inhibited the presence of higher order thinking respectively, using participants' reflections on this program submitted to Forum 5 and the post-survey. In the next section, I discuss what design factors of the organization of online and in-person F2F components in the BL program facilitated or inhibited the presence of higher order thinking.

Sub-Question 3 for the Third Research Question

The third sub-question for the third research question was: What design factors of the organization of online and in-person face-to-face components in the BL program facilitated or inhibited the presence of higher order thinking? Four organizational factors that might have contributed to higher order thinking development were identified by examining participants' reflections on this program submitted to Forum 5 and the post-survey: (1) an in-person F2F meeting at the beginning of the program, (2) asynchronous forums followed by synchronous meetings, (3) developmental organization of asynchronous forums, and (4) a phase for reflection at the end of the program.

An In-Person F2F Meeting at the Beginning of the Program

As discussed in the previous section, the in-person F2F meeting placed at the beginning of the program was mostly effective. Online or blended learning instructors are encouraged to set the right tone for inquiry by sharing norms for operating together and provide opportunities that allow participants to become familiar with other participants and the adopted technologies (Garrison, 2016; Vaughan et al., 2013). In this program, the instructor explained the aims of the program, the procedure, basic rules to build constructive discussion, and how to operate the employed technology in Japanese, emphasizing how and why constructivist learning can be a meaningful educational experience. In addition, with instructor's direct instruction, participants practiced interacting in asynchronous forums with easier topics using the employed platform. The post-survey revealed that participants were satisfied with the first in-person F2F meeting, and they had few problems in operating the online learning platform and no uncomfortable experiences in forums.

As for areas for improvement of the first in-person F2F meeting, the post-survey revealed that the most prominent reason why participants hesitated to interact online was their feeling that they were not close enough to do so. Five respondents suggested that the first in-person F2F meeting be used for participants to get socially closer. Lack of English proficiency was another factor that inhibited learner-learner interaction in forums. Including a lecture for participants to learn English expressions useful in discussion forums with a list of those expressions posted on the online learning platform is another possible strategy to improve the first in-person F2F meeting if the program is conducted in English as a foreign or additional language.

Asynchronous Forums Followed by Synchronous Meetings

As mentioned in the section to answer the first sub-question for the third research question, Forum 3 and 4 were followed by a synchronous meeting respectively. In the first

synchronous meeting that followed Forum 3, participants engaged in activities with low cognitive demand with the aim of breaking the ice. In the second synchronous forum that followed Forum 4, participants were required to give a three-minute individual presentation on a given topic, which was related to what they discussed in the previous two asynchronous forums.

In general, participants seem to have found a motivational hook in synchronous meetings, but some participants seem to have found further meanings in the synchronous meetings placed after asynchronous forums. In the post-survey, P4 wrote, "The flow in which we express our opinions by writing and then express them orally in Zoom meetings was good." P13 wrote, "What we thought and discussed in forums was naturally connected to the presentation in Zoom meetings. It was a nice flow." From the perspective of language acquisition, two synchronous meetings added to asynchronous forums were expected to play an integrative role for four English proficiency skills (i.e., reading, writing, listening, and speaking). In this program, however, the placing of the two synchronous meetings, especially the second one, was designed to play further roles. The concept of ecological constructivism (Hoven & Palalas, 2016) worked here again. The second synchronous meeting was intended to be a device to encourage participants to reflect more deeply on what they discussed in the previous asynchronous forums, and to encourage them to provide not a superficial but rather a *meaningful* presentation. Comments from P4 and P13 quoted above suggest that the design worked to achieve these goals.

Developmental Organization of Asynchronous Forums

Two main five-day asynchronous forums, Forum 3 and 4, were placed in this program. Participants discussed the same theme in both the forums, but the two forums were designed incrementally on the basis of the concept of developmental education (Lantolf & Poehner, 2004). Rather than waiting for individuals to become developmentally ready to learn naturally, in

developmental education instructions are given intentionally to prepare learners for more complex concepts (Lantolf, 2013). In Forum 3, participants read an article, answered guiding questions, and engaged in discussion around the article and its related questions. All of the resources and guiding questions were chosen to build a foundation for the next asynchronous forum. In Forum 4, participants read an article, watched two video clips, and discussed more complicated issues on a given topic, based on the foundation that they built in the previous forum.

As shown in Chapter 5, in the section answering the second sub-question for the first research question, more messages were coded into higher categories in Forum 4 than in Forum 3. In Affective Domain, the proportion of (C) Valuing was larger than the average of all forums while (B) Responding was smaller than the average of all forums. In Cognitive Dimension, the proportion of (D) Analyze was larger than the average of all forums while (B) Understand was smaller than the average of all forums. In the IAM, the proportion of Phase III was larger than the average of all forums while the proportion of Phase I was smaller than the average of all forums. These results suggest that the developmental organization of the two main asynchronous forums worked.

A Phase for Reflection at the End of the Program

Initially, three methods were prepared at the end of the program to guide participants to deeper reflection on what they learned in this program: Forum 5, a post-survey with open-ended questions created to guide participants to reflect on specific aspects of this program, and an in-person F2F meeting. Out of the three devices, the in-person F2F meeting was canceled due to the COVID-19 pandemic. The other two devices seem to have worked.

Although the number of participants who contributed to Forum 5 was limited (n=7), the coding results showed that they demonstrated higher order thinking in this forum. Forum 5 was a

place in which participants were not expected to interact with each other, but rather to submit one reflectional post. Thus, the IAM was not used to analyze this forum. In Affective Domain, five units were coded into (C) Valuing and two into (D) Organizing. In Cognitive Dimension, one unit was coded into (D) Analyze and six into (E) Evaluate. P3 noticed one essential element of asynchronous forums, time to reflect, in her reflection in Forum 5, where she wrote, "Most important experience that [I] learned in this program is practiced learning method of this program. I have never discussed on the screen. So this program is new and became good experience to me. I could see other's post many times precisely because they are on the screen. By this, I could deepen my way of thinking."

Fifteen open-ended questions were included in the post-survey. All of the questions were created to guide participants to reflect on crucial aspects of the intervention. The fifteen questions were categorized into three largest categories: (1) BL design, (2) Technology, and (3) Final comment. While the latter two have no child codes, the first one, BL design, has four child codes: (1) Course, (2) F2F, (3) Online, and (4) Online vs. Traditional. It would have taken each participant one hour or more to answer all the questions, but 12 out of 16 participants submitted the post-survey. Although I emphasized that there would be no negative consequences from writing negative comments or not submitting the post-survey, the answers might be biased due to the power relationship between participants and the instructor in this study; namely, students and their teacher. The bias cannot be wholly removed; however, I encouraged participants to answer honestly so that I could use the information to improve the program. I sought to gain rich data from the post-survey, and it seems that participants did, indeed, reflect upon each crucial aspect in this program. Reflection is expected to develop metacognition, which will help learners to be independent learners (Schunk & Zimmerman, 1998). One of P10's answers suggests that he used

the post-survey for this purpose. P10 wrote, answering to a question about the discussion topic, "It was a very good opportunity for me to make clear my goals. *I enjoyed analyzing myself unexpectedly*" [emphasis added].

In summary, four organizational factors that might have contributed to higher order thinking development were identified by examining participants' reflections on this program submitted to Forum 5 and the post-survey: (1) an in-person F2F meeting at the beginning of the program, (2) asynchronous forums followed by synchronous meetings, (3) developmental organization of asynchronous forums, and (4) a phase for reflection at the end of the program.

Chapter Summary

The third research question was: What factors in blended learning design may contribute to the development of higher order thinking, if any? In this chapter, this research question was addressed by answering three sub-questions. The online component of this program consisted of synchronous meetings and asynchronous forums. Learning with an external instructor from abroad in synchronous meetings seemed to have motivated participants to be better involved in the activities. Enabling participants physically separated in space to engage in live discussion is one of the advantages of online synchronous meetings (Kanuka, 2008). All the respondents to the post-survey spoke positively about collaborative constructivist learning. In addition, participants demonstrated reflections in two main forums (Forum 3 and 4), a reflectional forum (Forum 5), and a post-survey. The concept of ecological constructivism (Hoven & Palalas, 2016) appears to have worked in this program. In regard to the F2F component, the post-survey, with some useful suggestions for improvement coming from participants, revealed that the first in-person F2F meeting enabled participants to work comfortably throughout the program. It is important for instructors to set the right tone for inquiry by sharing norms for operating together and provide

opportunities that allow participants to become familiar with other participants and the adopted technologies (Garrison, 2016; Vaughan et al., 2013). I included all these elements in the first in-person F2F meeting. Finally, four organizational factors that might have contributed to higher order thinking development were identified by examining participants' reflections: (1) an in-person F2F meeting at the beginning of the program, (2) asynchronous forums followed by synchronous meetings, (3) developmental organization of asynchronous forums, and (4) a phase for reflection at the end of the program.

The three previous discussion chapters, Chapters 5 to 7, were organized around three research questions that guided this study. I discussed the total of ten sub-questions, using the coding results, closer examination of participants' transcripts, the post-survey, my observations, and related literatures. In the next chapter, I present a conclusion of this study, providing the summary, significance, limitations, and implications for future practice and research.

Chapter 8. Conclusion

In this chapter, I first summarize the results of the study in relation to research questions that guided the project. Then, I present the significance of this study, which includes BL models that I created on the basis of the study results. Subsequently, I describe limitations of the study, followed by implications for future practice and research.

Summary of Results

The purpose of this study was to investigate a BL program that I created as an intervention to improve the higher order thinking of EFL learners at a public high school in Japan. The following is a summary of the main results of the study organized according to three research questions.

The first research question was: To what extent can higher order thinking be demonstrated among participants in asynchronous online forums? In response to this research question, the findings suggest that higher order thinking can be demonstrated among participants, including those who are not actively involved in the discussion, to varying degrees and can be developed in asynchronous online forums embedded in purposefully-designed programs. Another main result around this research question is that there is a limit to how much understanding we can gain into human thinking using content analysis, regardless of employing multiple instruments.

Learner-learner interaction was not highly activated as a whole; however, more messages were coded into higher categories in Forum 4 than in Forum 3. Forum 5 was a place in which participants were not expected to interact with each other, but rather to submit one reflective post. Although the number of participants who contributed to Forum 5 was limited (n=7), the coding results showed that they demonstrated higher order thinking in this forum. When each individual

participant was analyzed with three content analysis instruments, I found that, on the one hand, two participants (P3 and P10) interacted actively with instructors and other participants and created more units that were categorized into higher categories in every coding instrument than other participants did. On the other hand, some participants who did not actively interact in forums created units that were sorted into higher categories. Closer examination of participants' transcripts revealed that the use of multiple instruments for content analysis succeeded in capturing a more nuanced picture of the participants' higher order thinking development; however, no content analysis can capture the whole picture of participants' thoughts. Some participants seem to have thought deeply without contributing to the forums. In addition, it is unknown from the coding results alone, whether each participant fully exercised their potential.

The second research question was: What factors in students' engagement in asynchronous online forums may contribute to the development of higher order thinking, if any? In response to this research question, the findings suggest that the following three factors may contribute to this purpose: (1) tasks that are purposefully selected, (2) instructors' use of three types of mediation (affective, cognitive, and social), and (3) collaborative constructivist learning. Another main result is that the most prominent reason why participants hesitated to interact online was their feeling that, due to limited social interaction, they did not know each other well enough to trust each other to do so.

Tasks in this program were broken into three categories: (1) learning resources, (2) discussion topics, and (3) guiding questions. The coding results and the post-survey suggested that all three elements of tasks that I purposefully selected worked in this study to encourage participants to think deeply.

Mediation strategies that I developed were sorted into four categories: Affective-related,

Cognitive-related, IAM-related, and Overarching. Originally, my focus in providing mediation was only on DA (Poehner, 2007) to develop participants' cognition, which was represented by Cognitive-related. DA worked; however, I also provided mediation for social interaction to increase the co-construction of knowledge (Garrison, 2016; Vaughan et al., 2013), which was represented by IAM-related, and mediation for building rapport in the learning community, which was represented by Affective-related. The findings of this study therefore suggest that contingent and purposeful mixture of these three types of mediation might work to stretch participants' thought in forums. In addition, two participants who developed their higher order thinking through learner-learner interaction used various facilitation strategies in their interaction as I used in both forums. Thus, it seems that these two participants integrated the mediation strategies that I modelled in my interaction with them, when they responded to me or interacted with other students. This serves as a good example of not only instructors, but also students demonstrating the capacity to increase teaching presence (Garrison, 2016).

Learner-learner interaction in forums was not highly activated; however, participants' reflections suggested that they found constructivist learning meaningful and thought more deeply than the results from content analysis implied. Participants mentioned that they hesitated to interact online because they felt that they did not know each other well enough to do so. Seven respondents explicitly indicated this issue as an area for improvement of this program in the post-survey.

The third research question was: What factors in blended learning design may contribute to the development of higher order thinking, if any? In response to this research question, the findings suggest that the following three factors may contribute to this purpose: (1) the organic integration of collaborative and individual learning in the area of the online component, (2) a

purposeful gathering at the beginning in the area of the F2F component, and (3) asynchronous forums followed by synchronous meetings, developmental organization of asynchronous forums, and a phase for reflection at the end of the program, in relation to the organization of both the components.

The online component of this program consisted of two components: synchronous meetings and asynchronous forums. Synchronous interaction was not the focus of this study, but having an external instructor from abroad in synchronous meetings seemed to have a motivational effect. Enabling participants physically separated in space to engage in live discussion is one of the advantages of online synchronous meetings.

The design of this program was based on ecological constructivism (Hoven & Palalas, 2016). In this program, participants were given opportunities to interact with each other, which rarely happens in the current practice in regular classes in K-12 Japanese education. In addition, they were explicitly required to exercise reflection, an element of learning internal to individual learners, in Forum 5 and the post-survey toward the end of the program. All the respondents to the post-survey spoke positively about this aspect of this program, although it was new to all of them.

In the section titled “Models for Blended Learning,” all these factors in blended learning design that were identified in discussing the third research question are described in more detail to present four BL models to support students who are not accustomed to online constructivist learning as a contribution of this study.

Significance

In Chapter 2, I discussed the suggestion from the literature presented that constructivist asynchronous forums can develop participants’ higher order thinking through the power of

writing and reflection. Nevertheless, one gap identified in Chapter 2 was that, while emergency remote teaching has prevailed since the onset of the COVID-19 pandemic in early 2020, research to explore the possibility of constructivist asynchronous forums in secondary education, especially in Asian countries, has not been adequately pursued. This action research study was undertaken to investigate whether or how asynchronous forums embedded in a BL program could contribute to the higher order thinking development of EFL learners at a public high school in Japan.

Findings of this study are tentative, and generalizations are not possible, because of the context-specific nature of the study; however, this study suggests that constructivist asynchronous forums can be utilized to develop the higher order thinking of EFL learners in K-12 settings with appropriate program design, instructor mediation, and content. The findings further indicate that asynchronous forums should be given serious consideration by educators working in K-12 settings. As described in Chapter 4, content analysis showed that, although participants had no prior learning experience in constructivist asynchronous forums, nor were they familiar with constructivist learning activities in general, in this study they demonstrated higher order thinking in asynchronous forums created as an intervention. In addition, as described in Chapters 5 to 7, the post-survey revealed that participants, including those who did not actively interact in forums, found collaborative constructivist learning to be meaningful. To be more specific, one question included in the post-survey was: How was the online learning experience compared to regular face-to-face classes at school? This question implied that they learn mainly in a traditional way in their regular F2F classes or emergency remote learning environments. All the respondents spoke positively about the collaborative constructivist element in this program in answering this question and others.

Although technology has the inherent potential to facilitate dynamic and interactive educational experiences, introducing technology for the sake of technology does not work (Cleveland-Innes & Wilton, 2018). Introducing technology in classrooms is not a goal, but rather, it is a tool to achieve the goal of facilitating learning. Each online/blended learning program is required to find appropriate design, mediation strategies, content, or any other measures that suit the context. What factors contributed to or hindered the development of higher order thinking in the BL program in this study were explored in Chapters 5 to 7. These discussions were highly context-dependent; however, some factors presented might be applicable in different settings, because many K-12 institutions have similar challenges, including students' lack of independent learning abilities and teachers' lack of experience teaching online (Halverson et al., 2017). This study has provided tentative explanations about how asynchronous forums can be utilized in K-12 settings and has made a first step towards addressing the gap identified in Chapter 2. One contribution that the insights gained in this study might present is the development of BL models to support students who are not accustomed to online constructivist learning.

Models for Blended Learning

In reviewing the literature on BL in Chapter 2, I defined the term, model. The term was used differently from other two terms, theory and framework, in this study. While *theory* and *framework* referred to concepts that can contribute to providing a common language in creating and expanding knowledge broadly, the term, *model*, referred to the systematic categorization that can be handily adopted in practice. By accumulating models that fit purposes in specific, richly-described educational settings, BL designers can collectively create a repository of valuable resources that teachers on the ground can access when designing and implementing a new program. I present below four models for BL that are suggested by the findings of this study. All

of these models are aimed at helping students who are not accustomed to online constructivist learning to develop higher order thinking.

Purposeful Gathering at the Beginning

The beginning is crucial. An in-person F2F meeting makes it easier for participants and instructors who are not accustomed to the online environment to socially interact. Although an online meeting could also fulfill this purpose, due to the multitude of unfamiliar factors, having an in-person F2F meeting at the beginning would mitigate some of the unfamiliarity. In this meeting, participants first need to understand the purpose of the program (Vaughan et al., 2013). The instructors are encouraged to explain why and how constructivist learning can be meaningful, and be committed to it themselves. Second, participants need basic rules for constructive discussion. Without these rules, participants who are not accustomed to constructivist learning might make other participants feel uncomfortable by, for example, being aggressive or rude in asynchronous forums. Third, participants need an initial phase to practice asynchronous interaction. Participants should be doing this with tasks that are not cognitively demanding, to enable greater focus on the practice of asynchronous interaction, and in using technologies that are employed in the program. Finally, participants need this phase to socially interact. Instructors should ideally prepare some fun activities that facilitate students getting to know and trust each other more. Without this phase, as participants in my study indicated, it is difficult for participants to interact with each other in the following asynchronous forums in the program.

Purposeful Mixture of Interaction and Reflection

The concept of ecological constructivism (Hoven & Palalas, 2016) supports this model, in which collaborative and individual learning through personal reflection are organically

integrated. Interaction is a crucial part of constructivist learning, but, at the same time, reflection is also crucial for developing higher order thinking (Rose, 2013). Asynchronous interaction naturally invites reflection, but explicit phases for reflection, such as a reflective forum with guiding questions at the end of the program, are recommended to encourage participants to think further and reflect more deeply on their learning.

Flow from Asynchronous to Synchronous Interaction

From the perspective of language acquisition, synchronous meetings following asynchronous forums are expected to integrate four skills for English proficiency (i.e., reading, writing, listening, and speaking) at a higher level. Furthermore, if participants are provided with an opportunity to give a presentation in synchronous meetings following asynchronous forums, participants are more motivated and better prepared to reflect more deeply on what they discussed in the previous asynchronous forums. This flow can thus be expected to enable participants to give a more meaningful, rather than superficial presentation, even in a target language (Roessingh, 2005).

Developmental Organization of Multiple Asynchronous Forums

If multiple asynchronous forums are included in a program, these forums can be designed developmentally on the basis of the concept of developmental education (Lantolf & Poehner, 2004). Rather than waiting for individuals to become developmentally ready to learn naturally, in developmental education, instructions are given intentionally to prepare learners for more complex concepts (Lantolf, 2013). In earlier forums, resources and guiding questions can be selected to build a foundation on the chosen topic. In latter forums, participants can discuss more complicated issues on the topic, using the foundation that they built in the previous forums.

Limitations and Implications for Future Practice

I identified six limitations after completing this study. Firstly, the concept of higher order thinking, or thinking, was not fully developed in this study. This study started after finding a problem: a lack of learning activities to develop higher order thinking due to test-oriented practices in EFL classrooms at high schools in Japan. In Chapter 2, I reviewed the literature on *higher order thinking*, defining it as the cognitive mental functions of understanding, applying, analyzing, evaluating, and creating knowledge that are voluntarily controlled and facilitated through interaction. However, the concept of thinking is profoundly more complicated; thus, the definition is temporal. The concept of higher order thinking needs to be further explored.

Secondly, in relation to the limitation mentioned above, methods to explore thinking have not been, or perhaps cannot be, fully developed. Content analysis is an established method, and in this study, I used multiple content analysis instruments, one established model and two tested taxonomies, to analyze transcripts of participant interactions. In addition, on the basis of the coding results gathered from content analysis, I closely reread all of the transcripts to examine what contributed to or hindered the development of higher order thinking. Furthermore, I used a post-survey and my observations to help understand this phenomenon. By these means, I succeeded in capturing a nuanced picture of the participants' higher order thinking development; however, what was captured can only represent a part of the participants' actual thoughts, since the post-survey suggested that participants who did not actively interact in forums seem to have thought deeper than their forum participation seemed to indicate. Written or spoken interactions or reflections can be seen, but only a fraction of thought is or can be expressed through the written or spoken word. For example, in the intervention in this study, P5 made only one post in Forum 3 and no post in Forum 4, but he wrote in the post-survey, "I was pushed to think the

matter more deeply. It was an interesting experience." While methods to explore thinking should be further refined, it should always be recognized that there is a limit in measuring or understanding human thinking (St. Pierre & Jackson, 2014).

Thirdly, it takes time for students to become accustomed to constructivist learning, and the participants in this study had no prior learning experience in forms of constructivist learning, including asynchronous forums. If participants had had some experiences in constructivist-based online learning before joining this program and had low mental and affective barriers towards interacting online, the results of this study might have been different. The post-survey and my observations suggested that most participants did not have major problems in using technologies that were adopted in this study and that they found constructivist learning valuable. However, it was difficult for them to interact with each other mainly due to their feeling that they did not know each other well enough to do so. I created an opportunity for participants to get to know each other in the first in-person F2F meeting, but it was not enough. In future practice, asynchronous forums can be partly included in regular F2F classes for students to become familiarized with constructivist learning over a longer period.

The fourth limitation is related to the program design. As stated above, participants had no prior experience in online constructivist-based learning. In addition, the intervention was an extracurricular program so that participants struggled to find a balance between engaging in this program and completing many other requirements from their regular classes, club activities, and more. Thus, collaborative activities in the intervention had to be limited. Participants worked together in forums to deepen their thoughts or to construct knowledge, discussing a given topic; however, for example, I was not able to give them any other collaborative assignment, such as a group presentation, due to the other demands on their time. A program that included more

collaborative tasks might have yielded different findings.

The fifth limitation is related to the language in use. Although the focus of this study was on the development of higher order thinking, the language used in the online component of the intervention was English, which was the target language for the participants. For some participants, their development of higher order thinking in the forums seems to have been restricted by their command of the English language. On the basis of this study, I conclude that, in future practice, asynchronous forums using participants' native language can be integrated in any subject area to develop higher order thinking.

The last limitation is that I created and implemented an intervention, targeting advanced EFL students, who had already acquired the basics of English grammar and vocabulary. Furthermore, the participants were students who voluntarily attended the program, which meant that they were already motivated to learn. In other words, the BL program in this study was created as a value-added option for higher-achieving students. Although online/blended learning can be exploited for this purpose, technology-mediated learning can also be used in designing a program to help students who have difficulty in learning or attending regular F2F classes. It might be possible for constructivist asynchronous forums to be embedded in a program for this purpose, capitalizing on the potential of technologies to connect people and facilitate dynamic, interactive educational experiences.

There are two more implications for future practice to add to those mentioned in relation to limitations above. As stated in the section titled, Significance, this study suggested that students in secondary education participating in forums in a foreign language can develop their higher order thinking with appropriate program design, mediation, and content. While the necessary focus on test-taking skills is one reality for both students and teachers in high school

settings in Japan or any other settings, another reality is that the focus has shifted to developing the higher order thinking skills needed to find alternative solutions to various problems in this complex world (Collins, 2014). It is natural for people, including educators, to stay in their comfort zone. Thus, if, for example, a teacher currently relies on lecture formats as a main instructional strategy, a first step for the teacher might be to try a program including a constructivist asynchronous forum.

Although generalizations are not appropriate, given the scope of this study, on completion of the BL program, participants who had no constructivist-based online learning experience found constructivist asynchronous forums meaningful. The BL program was an extracurricular program, which meant that the program was not part of regular class that required official grading needed for participants' graduation; nevertheless, most participants were motivated, engaged, and demonstrated improved understanding and use of higher order thinking skills in the program. Thinking and expressing what one thinks might be the most fundamental motivation for people to learn. Once given an opportunity to learn in a constructivist asynchronous forum, students might try it, be engaged, think deeply, become motivated, and be guided to become more independent learners. Therefore, it is an important first step for teachers to break out of their comfort zone and provide students with new opportunities such as these.

The second implication for future practice is that teachers are encouraged to pay attention to the power relationships that they might impose on their students in introducing asynchronous forums in their programs. The design, mediation strategies, and content are all highly context-dependent; however, instructor involvement in online/blended learning seems to be a necessary element, especially in K-12 settings (Garrison, 2016). Even given this context, teachers have power, and instructor involvement might have detrimental effects (Cohen et al., 2018). For

example, instructors' mediation in asynchronous forums can unintentionally control participants' thoughts. In future programs, attention should be paid to the power relationships or any other detrimental effects that instructor involvement might cause. One fundamental principle should be that participants understand that they have the right to disagree with the instructor and each other, without fear of negative repercussions.

Implications for Future Research

I present two implications for future research to close this study. The first recommendation for future research is to explore the effects produced by asynchronous forums designed to develop higher order thinking in the field of foreign or additional language acquisition. This study focused on the development of higher order thinking; thus, although the reported BL program was for EFL learners, this study did not examine how or whether participants' English proficiency was improved. If this kind of program is adopted in the field of foreign or additional language teaching to also investigate improvement of English language proficiency, such a study might shed new light on the interaction effects of higher order thinking and language acquisition.

The second recommendation is related to the approach adopted in this study. I recommend that action research be implemented more broadly at school with appropriate training and support for teachers. Action research can be a strong method to improve practice and, ultimately, to make a change in society. Action research usually takes a cyclical process in which teachers and/or researchers identify a problem, design a solution drawing on the concept of praxis, implement an intervention, reflect on the process and the results, and then proceed to tackle a new problem (Cohen et al., 2018). Action research can be an individual endeavor. In this project, I took on the role of researcher, program designer, and instructor, and this is one possible

approach; however, in reality, teachers are often busy with many responsibilities. Therefore, collaborative strategies, in which trained researchers and teachers work together for designing and implementing action research, might be a solution to nurture action research culture in school settings on a long-term basis (Greenwood & Levin, 2007).

In Chapter 3, I introduced Kemmis's (1997) concept of two approaches in the field of action research: action researchers as reflective practitioners or alternatively, as critical theorists. On the one hand, action research can be conducted as one form of the professional development of teachers, focusing on a particular problem at the local level. By conducting this type of action research, teachers' successful practice, which tends to be intuitive, can be systemized, shared, and accumulated. On the other hand, action research can be part of a broader agenda that is related to social justice. In the context of this study, educators are expected to fulfill a responsibility to provide learning environments conducive to the development of capable and creative minds readied for the challenges of this complex world. Campbell and Schwier (2014) stated that online constructivist learning can contribute to nurturing active and critical citizens who help shape tolerant, diverse, and inclusive communities. Ultimately, developing higher order thinking is an educational goal for people to become mature citizens and to build a healthier society. Implementing interventions to develop higher order thinking in successive action research cycles, while thinking about thinking, might be a first step to achieve this ultimate goal. I hope that the contributions of the findings of this study, including the BL models, can assist in moving this goal forward.

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Appendix A: Letter of Permission for the School Principal (in English)

Letter of Permission

I give Hiroshi Miyashita permission to conduct a research project entitled 'Developing Higher Order Thinking Through Asynchronous Forums in Blended Learning Design: Action Research at a Public High School in Japan' at Tokyo Metropolitan Showa High School in summer 2021 after he gained permission from participants and their parents. I understand that, as written in letters to participants and their parents, privacy and confidentiality of participants will always be maintained during this study and that no personal data obtained in this study will be disclosed in reporting.

_____ _____

Signature of School Principal Date

Principal Investigator's Signature:

I have explained this project to the best of my ability. I invited questions and responded to any that were asked. I believe that the principal fully understands what is involved in the research project.

_____ _____

Signature of Principal Investigator Date

Appendix B: Letter of Permission for the School Principal (in English and Japanese)

Letter of Permission

I give Hiroshi Miyashita permission to conduct a research project entitled 'Developing Higher Order Thinking Through Asynchronous Forums in Blended Learning Design: Action Research at a Public High School in Japan' at Tokyo Metropolitan Showa High School in summer 2021 after he gained permission from participants and their parents. I understand that, as written in letters to participants and their parents, privacy and confidentiality of participants will always be maintained during this study and that no personal data obtained in this study will be disclosed in reporting.

本校主任教諭である宮下洋が本年７月から８月にかけて「ブレンド型学習に組み込まれた非同期対話による高次思考の育成：日本の公立高校におけるアクションリサーチ」と題する研究を東京都立昭和高等学校で行うことを許可します。
参加者（本校生徒）及び参加者の保護者から許可を得ること、参加者のプライバシーを厳重に管理し個人情報が決して公開されることがないことを条件とします。

_____ _____

Signature of School Principal Date

Principal Investigator's Signature:

I have explained this project to the best of my ability. I invited questions and responded to any that were asked. I believe that the principal fully understands what is involved in the research project.

_____ _____

Signature of Principal Investigator Date

Appendix C: Recruitment Poster

PARTICIPANTS NEEDED FOR
RESEARCH IN Blended English Learning

We are looking for volunteers to take part in a study of a blended English learning program to develop higher order thinking.

As a participant in this study, you would be asked to engage in online synchronous and asynchronous activities with English as a medium of communication while being supported by face-to-face sessions conducted in Japanese.

Your participation is **entirely voluntary.** In the one-month program, you will join four online discussion forums, two Zoom meetings, and three face-to-face meetings at Showa High School.

By participating in this study, you will help us to understand how we can develop English learners' higher order thinking effectively.

By participating in this program, you will be able to experience collaborative online English learning that is expected to guide you to higher order thinking.

To learn more about this study, or to participate in this study,
please contact:

Principal Investigator
Hiroshi Miyashita, a teacher at Showa High School
and a doctoral student at Athabasca University
moana38ffy@gmail.com

This study is supervised by:
Dr. Debra Hoven at Athabasca University, Canada
debrah@athabascau.ca

This study has been reviewed by the Athabasca University Research Ethics Board.

Appendix D: Letter of Information and Informed Consent Form (in English)

LETTER OF INFORMATION / INFORMED CONSENT FORM

Project Title: Developing Higher Order Thinking Through Asynchronous Forums in Blended Learning Design: Action Research at a Public High School in Japan

July 1, 2021

Principal Investigator (Researcher):
Hiroshi Miyashita
moana38ffy@gmail.com

Supervisor:
Dr. Debra Hoven
debrah@athabascau.ca

Your child is invited to take part in a research project entitled 'Developing Higher Order Thinking Through Asynchronous Forums in Blended Learning Design: Action Research at a Public High School in Japan.'

This form is part of the process of informed consent. The information presented should give you the basic idea of what this research is about and what your child's participation will involve, should your child choose to participate. It also describes your child's right to withdraw from the project. In order to decide whether your child wishes to participate in this research project, you should understand enough about its risks, benefits and what it requires of your child to be able to make an informed decision. This is the informed consent process. Take time to read this carefully as it is important that you understand the information given to you. Please contact the principal investigator, Hiroshi Miyashita, if you have any questions about the project or would like more information before you consent to participate.

It is entirely up to your child whether or not your child takes part in this research. If your child chooses not to take part, or if your child decides to withdraw from the research once it has started, there will be no negative consequences for your child now, or in the future.

Introduction
My name is Hiroshi Miyashita and I am a doctoral student at Athabasca University. As a requirement to complete my degree, I am conducting a research project about developing students' higher order thinking through online discussion forums that are conducted in English. I am conducting this project under the supervision of Dr. Debra Hoven.

Why are your child being asked to take part in this research project?
Your child is being invited to participate in this project because your child is a student at a Tokyo Metropolitan High School where the principal investigator works, i.e., Showa High School.

What is the purpose of this research project?
The purpose of this project is to explore an extracurricular blended learning program that I have designed as an intervention to develop the higher order thinking of English learners at a high school in Japan.

What will your child be asked to do?

Your child is invited to engage in online synchronous and asynchronous activities with English as a medium of communication while being supported by face-to-face sessions conducted in Japanese. The online component of the program consists of four one-week asynchronous forums and two ninety-minute synchronous meetings. The F2F meetings are held at school and are placed at the beginning, in the middle, and at the end of the program. The program will start on July 26, 2021 and end on August 27, 2021. Your child will be asked to answer pre- and post-surveys.

What are the risks and benefits?
Throughout the program, I will try to build a learning community where participants can learn comfortably together, respecting each other. I will carefully observe each participant and try to control the workload and solve any problem immediately, if any. The blended learning program is expected to develop higher order thinking of the participants through collaborative constructivist learning.

Does your child have to take part in this project?
As stated earlier in this letter, involvement in this project is entirely voluntary. Even after joining the project, your child can withdraw at any stage just by saying so to Hiroshi Miyashita. Any data collected from you up to that point can be removed if it is needed.

How will your child's privacy and confidentiality be protected?
The ethical duty of confidentiality includes safeguarding participants' identities, personal information, and data from unauthorized access, use or disclosure. Your child's privacy and confidentiality will always be maintained during this study.

How will your child's anonymity be protected?
Anonymity refers to protecting participants' identifying characteristics, such as name or description of physical appearance. This blended learning program is group-based, so participants will get to know each other, but no personal data obtained in this program will be disclosed in reporting. Every reasonable effort will be made to ensure your anonymity; you will not be identified in publications without your explicit permission.

How will the data collected be stored?
Electronic data will be stored in my personal computer, using passwords to log into the computer and the files. Paper-based data will be kept in a locked cabinet in my house. The principal investigator will have the only access to the data. The data will be shared with his supervisor, Dr. Debra Hoven. The final report will be available to the Athabasca University.

Who will receive the results of the research project?
The existence of the research will be listed in an abstract posted online at the Athabasca University Library's Digital Thesis and Project Room and the final research paper will be publicly available.

Who can you contact for more information or to indicate your interest in participating in the research project?
Thank you for considering this invitation. If you have any questions or would like more information, please contact me, (the principal investigator) by e-mail moana38ffy@gmail.com or my supervisor by debrah@athabascau.ca. If you are ready to let your child to participate in this project, please complete and sign the attached Consent Form and return it to Hiroshi Miyashita at Showa High School directly or through your child.

Thank you.

Hiroshi Miyashita

This project has been reviewed by the Athabasca University Research Ethics Board. Should you have any comments or concerns regarding your child's treatment as a participant in this project, please contact the Research Ethics Officer by e-mail at rebsec@athabascau.ca or by telephone at 780.213.2033.

Informed Consent:
Your signature on this form means that:

- You have read the information about the research project.
- You have been able to ask questions about this project.
- You are satisfied with the answers to any questions you may have had.
- You understand what the research project is about and what you will be asked to do.
- You understand that your child is free to withdraw your participation in the research project without having to give a reason, and that doing so will not affect you now, or in the future.
- You understand that if your child chooses to end his or her participation **during** data collection, any data collected from your child up to that point will be retained by the researcher, unless you or your child indicates otherwise.
- You understand that if your child chooses to withdraw **after** data collection has ended, your child's data can be removed from the project at your request entirely.

Your signature confirms:

- You have read what this research project is about and understood the risks and benefits. You have had time to think about your child participating in the project and had the opportunity to ask questions and have those questions answered to your satisfaction.

- You understand that participating in the project is entirely voluntary and that your child may end your participation at any time without any penalty or negative consequences.

- You have been given a copy of this Informed Consent form for your records; and

- You agree to let your child participate in this research project.

_____ _____

Signature of Parent/Caregiver Date

Principal Investigator's Signature:

I have explained this project to the best of my ability. I invited questions and responded to any that were asked. I believe that the participant fully understands what is involved in

participating in the research project, any potential risks and that he or she has freely chosen to participate.

_____ _____

Signature of Principal Investigator Date

Appendix E: Letter of Information and Informed Consent Form (in English and Japanese)

LETTER OF INFORMATION / INFORMED CONSENT FORM

Project Title: Developing Higher Order Thinking Through Asynchronous Forums in Blended Learning Design: Action Research at a Public High School in Japan

タイトル：ブレンド型学習内の非同期対話を利用した高次思考の育成：日本の公立高校におけるアクションリサーチ

July 1, 2021

Principal Investigator (Researcher): Hiroshi Miyashita moana38ffy@gmail.com

Supervisor: Dr. Debra Hoven debrah@athabascau.ca

Your child is invited to take part in a research project entitled 'Developing Higher Order Thinking Through Asynchronous Forums in Blended Learning Design: Action Research at a Public High School in Japan.'

This form is part of the process of informed consent. The information presented should give you the basic idea of what this research is about and what your child's participation will involve, should your child choose to participate. It also describes your child's right to withdraw from the project. In order to decide whether your child wishes to participate in this research project, you should understand enough about its risks, benefits and what it requires of your child to be able to make an informed decision. This is the informed consent process. Take time to read this carefully as it is important that you understand the information given to you. Please contact the principal investigator, Hiroshi Miyashita, if you have any questions about the project or would like more information before you consent to participate.

It is entirely up to your child whether or not your child takes part in this research. If your child chooses not to take part, or if your child decides to withdraw from the research once it has started, there will be no negative consequences for your child now, or in the future.

この書類は「ブレンド型学習内の非同期対話を利用した高次思考の育成：日本の公立高校におけるアクションリサーチ」と題する研究の詳細を説明するものです。お子様がこのプロジェクトへの参加を希望する場合、保護者の方にもその趣旨を理解していただく必要があります。このプロジェクトは希望者のみが参加するもので、途中で参加をやめることもできます。質問等ございましたら都立昭和高校主任教諭の宮下洋までご連絡ください。

Introduction

My name is Hiroshi Miyashita and I am a doctoral student at Athabasca University. As a requirement to complete my degree, I am conducting a research project about developing students' higher order thinking through online discussion forums that are conducted in English. I am conducting this project under the supervision of Dr. Debra Hoven.

私は本校主任教諭であるとともにカナダ・アサバスカ大学博士課程の学生として研究活動をしています。現在英語による非同期対話を利用した生徒の高次思考育成の研究をしています。指導教官はアサバスカ大学の Debra Hoven 教授です。

Why are your child being asked to take part in this research project?
Your child is being invited to participate in this project because your child is a student at a Tokyo Metropolitan High School where the principal investigator works, i.e., Showa High School.

このプロジェクトに参加できるのは都立昭和高校の生徒だけです。他校の生徒は参加しません。

What is the purpose of this research project?
The purpose of this project is to explore an extracurricular blended learning program that I have designed as an intervention to develop the higher order thinking of English learners at a high school in Japan.

この研究は私が設計したブレンド型学習プログラムの効果を探ることを目的としています。英語学習者の英語による高次思考の育成を目指し設計したものです。このプログラムは課外活動の一環として実施されます。

What will your child be asked to do?
Your child is invited to engage in online synchronous and asynchronous activities with English as a medium of communication while being supported by face-to-face sessions conducted in Japanese. The online component of the program consists of four one-week asynchronous forums and two ninety-minute synchronous meetings. The F2F meetings are held at school and are placed at the beginning, in the middle, and at the end of the program. The program will start on July 26, 2021 and end on August 27, 2021. Your child will be asked to answer pre- and post-surveys.

参加者は英語によるオンライン学習と日本語による対面学習に取り組みます。オンライン学習は 4 回の非同期フォーラム（1 週間）と 2 回の同期ミーティング（90 分）で構成されています。対面のミーティングは 3 回でプログラムの開始、中間及び終了時に設定されています。期間は本年 7 月 26 日から 8 月 27 日までです。事前・事後アンケートも実施します。

What are the risks and benefits?
Throughout the program, I will try to build a learning community where participants can learn comfortably together, respecting each other. I will carefully observe each participant and try to control the workload and solve any problem immediately, if any. The blended learning program is expected to develop higher order thinking of the participants through collaborative constructivist learning.

ほとんどの参加者はオンラインでの英語の協働学習を経験したことがないはずです。最初は戸惑うかもしれませんが、互いを尊重し、快適に学習できる共同体を築くよう配慮します。このプログラムは「授業を聞く」という受動的な学習ではなく、生徒主体の協働学習を英語で行うものです。

Does your child have to take part in this project?
As stated earlier in this letter, involvement in this project is entirely voluntary. Even after joining the project, your child can withdraw at any stage just by saying so to Hiroshi Miyashita. Any data collected from you up to that point can be removed if it is needed.

このプログラムは希望者のみが参加するものです。途中での参加中止も可能です。途中で参加をやめる場合、その時点までに得られたデータは削除することができます。

How will your child's privacy and confidentiality be protected?
The ethical duty of confidentiality includes safeguarding participants' identities, personal information, and data from unauthorized access, use or disclosure. Your child's privacy and confidentiality will always be maintained during this study.

参加者のプライバシーは厳重に管理します。個人情報が公開されることは一切ありません。

How will your child's anonymity be protected?
Anonymity refers to protecting participants' identifying characteristics, such as name or description of physical appearance. This blended learning program is group-based, so participants will get to know each other, but no personal data obtained in this program will be disclosed in reporting. Every reasonable effort will be made to ensure your anonymity; you will not be identified in publications without your explicit permission.

このプログラムは協働学習ですので、当然ながら参加者は誰が参加しているのかを認識します。しかし私がこのプログラムを論文としてまとめる際に参加者の氏名等個人が特定される情報を含めることは決してありません。

How will the data collected be stored?
Electronic data will be stored in my personal computer, using passwords to log into the computer and the files. Paper-based data will be kept in a locked cabinet in my house. The principal investigator will have the only access to the data. The data will be shared with his supervisor, Dr. Debra Hoven. The final report will be available to the Athabasca University.

オンライン学習等で得られた電子データ、アンケート等紙ベースのデータはいずれも厳重に管理します。データを扱うのは私だけですが、指導教官であるアサバスカ大学の Debra Hoven 教授とは情報を共有します。完成した論文はアサバスカ大学のデータベースを通して閲覧可となります。

Who will receive the results of the research project?
The existence of the research will be listed in an abstract posted online at the Athabasca University Library's Digital Thesis and Project Room and the final research paper will be publicly available.

作成中の論文の要約はアサバスカ大学図書館のデータベースに掲載されます。完成した論文はこのデータベースを通して一般公開されます。

Who can you contact for more information or to indicate your interest in participating in the research project?
Thank you for considering this invitation. If you have any questions or would like more information, please contact me, (the principal investigator) by e-mail moana38ffy@gmail.com or my supervisor by debrah@athabascau.ca. If you are ready to let your child to participate in this project, please complete and sign the attached Consent Form and return it to Hiroshi Miyashita at Showa High School directly or through your child.

質問等ございましたら私か指導教官の Debra Hoven 教授にお問い合わせください。お子様の参加に同意いただける場合は、署名の上以下の同意書を宮下までご提出ください。ご協力に感謝いたします。

Thank you.

Hiroshi Miyashita

This project has been reviewed by the Athabasca University Research Ethics Board. Should you have any comments or concerns regarding your child's treatment as a participant in this project, please contact the Research Ethics Officer by e-mail at rebsec@athabascau.ca or by telephone at 780.213.2033.

このプロジェクトはアサバスカ大学の Research Ethic Board により精査されています。このプログラムについてご意見・ご質問等がありましたらアサバスカ大学 Research Ethic Board までご連絡ください。

Informed Consent:
Your signature on this form means that:

- You have read the information about the research project.
- You have been able to ask questions about this project.
- You are satisfied with the answers to any questions you may have had.
- You understand what the research project is about and what you will be asked to do.
- You understand that your child is free to withdraw your participation in the research project without having to give a reason, and that doing so will not affect you now, or in the future.
- You understand that if your child chooses to end his or her participation **during** data collection, any data collected from your child up to that point will be retained by the researcher, unless you or your child indicates otherwise.
- You understand that if your child chooses to withdraw **after** data collection has ended, your child's data can be removed from the project at your request entirely.

この文書を読みました。
質問する機会を与えられました。
質問に対する回答を得ました。
この研究の趣旨を理解しました。
希望者のみの参加で途中での参加中止も認められることを理解しました。
途中で参加を中止する場合、その時点までに集められたデータを削除できることを理解しました。
プログラム終了後であっても、データの削除が可能であることを理解しました

Your signature confirms:

- You have read what this research project is about and understood the risks and benefits. You have had time to think about your child participating in the project and had the opportunity to ask questions and have those questions answered to your satisfaction.
- You understand that participating in the project is entirely voluntary and that your child may end your participation at any time without any penalty or negative consequences.
- You have been given a copy of this Informed Consent form for your records; and
- You agree to let your child participate in this research project.

この文書を読みこのプロジェクトの趣旨とあり得るリスクを理解しました。自分の子どもの参加について考える時間と質問する機会を与えられました。質問に対する回答を得ました。
希望者のみの参加で、プログラム途中での参加中止も認められることを理解しました。
この文書のコピーを受け取りました。
自分の子どもがこのプログラムに参加することに同意します。

_____ _____
Signature of Parent/Caregiver Date

Principal Investigator's Signature:

I have explained this project to the best of my ability. I invited questions and responded to any that were asked. I believe that the participant fully understands what is involved in participating in the research project, any potential risks and that he or she has freely chosen to participate.

_____ _____

Signature of Principal Investigator Date

Appendix F: Assent Form for Participants (in English)

Assent Form

Hiroshi Miyashita
An English teacher at Tokyo Metropolitan Showa High school and a doctoral student at Athabasca University, Canada
moana38ffy@gmail.com

Introduction
My name is Hiroshi Miyashita, an English teacher at Tokyo Metropolitan Showa High school and a doctoral student at Athabasca University, Canada. I want to see if you are interested in joining a research project entitled 'Developing Higher Order Thinking Through Asynchronous Forums in Blended Learning Design: Action Research at a Public High School in Japan.'

Why are you being asked to take part in this research project?
You are being invited to participate in this project because you are a student at Tokyo Metropolitan Showa High School.

What is the purpose of this research project?
The purpose of this project is to explore an extracurricular blended learning program that I have designed to develop the higher order thinking of English learners in Japan.

What will you be asked to do?
You are invited to engage in online synchronous and asynchronous activities with English as a medium of communication while being supported by face-to-face sessions conducted in Japanese. The online part of the program consists of four one-week asynchronous forums and two ninety-minute synchronous meetings. The F2F meetings are held at Showa High School at the beginning, in the middle, and at the end of the program. The program will start on July 26, 2021 and end on August 27, 2021. You will also be asked to answer pre- and post-surveys.

What are the risks and benefits?
You might feel uncomfortable at first because you are not accustomed to online collaborative learning. However, you will soon find yourself enjoying the program because I will carefully observe each participant to control the workload and solve any problem immediately, if any. Throughout the program, I will try to build a learning community where participants can learn comfortably together, respecting each other. The blended learning program is expected to develop higher order thinking of the participants through collaborative constructivist learning.

Do you have to take part in this project?
No. Involvement in this program is entirely voluntary. Even after joining the program,

you can withdraw at any stage just by saying so to Hiroshi Miyashita. Any data collected from you up to that point can be removed if it is needed.

How will your privacy and confidentiality be protected?
The ethical duty of confidentiality includes safeguarding participants' identities, personal information, and data from unauthorized access, use or disclosure. Your privacy and confidentiality will always be maintained during this study.

How will your anonymity be protected?
Anonymity refers to protecting participants' identifying characteristics, such as name or description of physical appearance. This blended learning program is group-based, so participants will get to know each other, but no personal data obtained in this program will be disclosed in reporting. Every reasonable effort will be made to ensure your anonymity; you will not be identified in publications without your explicit permission.

How will the data collected be stored?
Electronic data will be stored in my personal computer, using passwords to log into the computer and the files. Paper-based data will be kept in a locked cabinet in my house. The principal investigator will have the only access to the data. The data will be shared with his supervisor, Dr. Debra Hoven. The final report will be available to the Athabasca University.

Who will receive the results of the research project?
The existence of the research will be listed in an abstract posted online at the Athabasca University Library's Digital Thesis and Project Room and the final research paper will be publicly available.

What if I have questions?
You can ask me questions at any time. My phone email address is at the top of this page. You can also ask your parents or guardian if you have any questions because the study has been explained to them. If you want, you can also contact the Research Ethics Officer at Athabasca University by e-mail at rebsec@athabascau.ca or by telephone at 780.213.2033.

I will give you a copy of this form in case you want to ask questions later.

Agreement
I have decided to be in the study even though I know that I do not have to do it. Hiroshi Miyashita has answered all my questions.

_____ _____

Printed Name of Participant Date

_____ _____
Signature of Participant Date

Hiroshi Miyashita

_____ _____
Printed Name of Researcher Date

_____ _____
Signature of Researcher Date

Appendix G: Assent Form for Participants (in English and Japanese)

Assent Form

Hiroshi Miyashita
An English teacher at Tokyo Metropolitan Showa High school and a doctoral student at Athabasca University, Canada
moana38ffy@gmail.com

Introduction
My name is Hiroshi Miyashita, an English teacher at Tokyo Metropolitan Showa High school and a doctoral student at Athabasca University, Canada. I want to see if you are interested in joining a research project entitled 'Developing Higher Order Thinking Through Asynchronous Forums in Blended Learning Design: Action Research at a Public High School in Japan.'

英語科の宮下です。私はカナダ・アサバスカ大学の博士課程でオンライン学習の研究をしています。現在「ブレンド型学習内の非同期対話を利用した高次思考の育成：日本の公立高校におけるアクションリサーチ」と題する研究に取り組んでいます。今夏本校生徒でこのプログラムに参加する生徒を募集しています。

Why are you being asked to take part in this research project?
You are being invited to participate in this project because you are a student at Tokyo Metropolitan Showa High School.

本校生徒であれば誰でもこのプログラムに参加することができます。他校の生徒は参加しません。

What is the purpose of this research project?
The purpose of this project is to explore an extracurricular blended learning program that I have designed to develop the higher order thinking of English learners in Japan.

この研究は私がデザインしたブレンド型学習（オンライン学習と対面学習の併用）プログラムの効果を探ることを目的としています。英語学習者の英語による高次思考の育成を目指しています。このプログラムは課外活動の一環として実施されます。

What will you be asked to do?
You are invited to engage in online synchronous and asynchronous activities with English as a medium of communication while being supported by face-to-face sessions conducted in Japanese. The online part of the program consists of four one-week asynchronous forums and two ninety-minute synchronous meetings. The F2F meetings are held at Showa High School at the beginning, in the middle, and at the end of the program. The program will start on July 26, 2021 and end on August 27, 2021. You will also be asked to answer pre- and post-surveys.

参加者は英語によるオンライン学習と日本語による対面学習に取り組みます。オンライン学習は4回

のオンランディスカッション（1週間×4）と2回のZoomミーティング（90分×2）で構成されています。対面のミーティングは3回で、プログラムの開始、中間及び終了時に設定されています。期間は本年7月26日から8月27日まで。事前・事後アンケートも実施します。

What are the risks and benefits?
You might feel uncomfortable at first because you are not accustomed to online collaborative learning. However, you will soon find yourself enjoying the program because I will carefully observe each participant to control the workload and solve any problem immediately, if any. Throughout the program, I will try to build a learning community where participants can learn comfortably together, respecting each other. The blended learning program is expected to develop higher order thinking of the participants through collaborative constructivist learning.

ほとんどの参加者はオンラインでの英語協働学習を経験したことがないはずです。最初は戸惑うかもしれませんが、互いを尊重し、快適に学習できる共同体を築くよう配慮します。楽しく、有意な学習ができるはずです。また学習負荷が大きくなり過ぎないように配慮します。「授業を聞く」という受動的な学習ではなく、生徒主体の協働学習を英語で行うことにより、高次思考（深く考えること）の育成を目指します。

Do you have to take part in this project?
No. Involvement in this program is entirely voluntary. Even after joining the program, you can withdraw at any stage just by saying so to Hiroshi Miyashita. Any data collected from you up to that point can be removed if it is needed.

このプログラムは希望者のみが参加するものです。途中での参加中止も可能です。途中で参加をやめる場合、その時点までに得られたデータ（オンラインディスカッションへの書き込み等）は削除することができます。

How will your privacy and confidentiality be protected?
The ethical duty of confidentiality includes safeguarding participants' identities, personal information, and data from unauthorized access, use or disclosure. Your privacy and confidentiality will always be maintained during this study.

あなたのプライバシーは厳重に管理されます。安心してください。

How will your anonymity be protected?
Anonymity refers to protecting participants' identifying characteristics, such as name or description of physical appearance. This blended learning program is group-based, so participants will get to know each other, but no personal data obtained in this program will be disclosed in reporting. Every reasonable effort will be made to ensure your anonymity; you will not be identified in publications without your explicit permission.

このプログラムは協働学習ですので、当然ながら参加者は誰が参加しているのかわかります。しかし私がこのプログラムを論文としてまとめる際に参加者の氏名等個人が特定される情報を含めることはありません。

How will the data collected be stored?

Electronic data will be stored in my personal computer, using passwords to log into the computer and the files. Paper-based data will be kept in a locked cabinet in my house. The principal investigator will have the only access to the data. The data will be shared with his supervisor, Dr. Debra Hoven. The final report will be available to the Athabasca University.

電子データも紙ベースのデータも厳重に管理します。データを扱うのは私だけですが、私の指導教官であるアサバスカ大学のDebra Hoven教授とは情報を共有します。完成した論文はアサバスカ大学のデータベースを通して閲覧可となります。

Who will receive the results of the research project?
The existence of the research will be listed in an abstract posted online at the Athabasca University Library's Digital Thesis and Project Room and the final research paper will be publicly available.

作成中の論文の要約はアサバスカ大学図書館のデータベースに掲載されます。完成した論文はこのデータベースを通して一般公開されます。

What if I have questions?
You can ask me questions at any time. My email address is at the top of this page. You can also ask your parents or guardian if you have any questions because the study has been explained to them. If you want, you can also contact the Research Ethics Officer at Athabasca University by e-mail at rebsec@athabascau.ca or by telephone at 780.213.2033.

質問があればいつでもしてください。保護者の方にも説明の文書をお渡ししています。アサバスカ大学の Research Ethics Officer に問い合わせることもできます。

I will give you a copy of this form in case you want to ask questions later.

この文書のコピーも渡します。保管してください。

Agreement
I have decided to be in the study even though I know that I do not have to do it. Hiroshi Miyashita has answered all my questions.

このプログラムへの参加を希望します。宮下（英語科主任教諭）が疑問点について回答しました。

_____ _____
Printed Name of Participant Date

_____ _____
Signature of Participant Date

Hiroshi Miyashita

_____	_____
Printed Name of Researcher	Date
_____	_____
Signature of Researcher	Date

Appendix H: Asynchronous Discussion Forums Prompts

Asynchronous Discussion Forum for Self-Introduction (Forum 1)

[Participants did this in the first in-person F2F meeting.]

1. Please introduce yourself, including the following information:

- My name is…
- I live in…
- My favorite pastime is…
- I would like Inst-2 to do/eat/go to___in Japan because…

2. Respond to your peers' postings. Write comments and/or ask questions to at least 3 peers.

Asynchronous Discussion Forum for Practice (Forum 2)

1. In 100-200 words, please discuss the following question:

   What is the best "tool" of *Doraemon*? Why?

2. Respond to your peers' postings. Write comments and/or ask questions to at least 3 peers.

Asynchronous Discussion Forum I (Forum 3)

Instruction: Please read the article and then answer the questions below.

Source: EF English Live
https://englishlive.ef.com/blog/english-in-the-real-world/english-became-global-language/

Article: How English Became the Global Language

People often talk about English as a global language or lingua franca. With more than 350 million people around the world speaking English as a first language and more than 430 million speaking it as a second language, there are English speakers in most countries around the world. Why is English so popular, though? And why has it become a global language?

People often call English the international language of business, and it's increasingly true as international trade expands every year, bringing new countries into

contact. Many of the best MBA programs are taught in English, so speaking it well can put you in a position to get the best training and credentials. Most multinational companies require a certain degree of English proficiency from potential employees so in order to get a position with a top company, more and people are learning English.

If your ambitions lie in science or medicine, you can't neglect English either. Much of the technical terminology is based on English words, and if you want to learn about the latest developments and discoveries from around the world, you'll read about them in journals and research reports published in English, no matter whether the scientists who wrote them are from China or Norway. And, of course, with good conversational English, you'll be able to network and make important contacts at conferences and seminars.

English also opens doors in the academic world. Of course, if the best program in your field is in an English-speaking country, English will give you the opportunity to study with the top scholars. Western universities are attracting more and more visiting scholars, students and professors from all around the world, and their common working language is English. As well as studying and teaching, attending international conferences and publishing in foreign journals are some of the key steps to success in academia. In order to speak at these conferences or publish in these journals, excellent English is essential.

Journalists and writers around the world are finding a good command of English to be an increasingly useful skill. Even if you're writing your articles and doing interviews in your own language, with good English you can get background material from international wire services and papers and magazines from around the world. You can interview foreign businessmen, diplomats and maybe even get sent to cover overseas stories. Good English skills mean that you are not reliant on translators and can work faster and more accurately with English information sources.

If you want a career in travel, English is absolutely essential. As the international language of aviation, pilots and cabin crew all need to speak English. Even if you're not up in the air, speaking English accurately will ensure you are able to communicate with clients and suppliers all over the world.

So, what's stopping you from learning this global language? With all the English resources available on the internet and so many other English speakers around the world to practice with, there's never been a better time to start learning English. Pick up a book, learn a few words, or even start a course today and take your first steps towards becoming one of nearly 800 million English speakers in the world.

1. In 200-300 words, please discuss the following questions:

- Do you agree with the author? Why? Why not?
- Why do you study English?
- What are your strategies to improve your English?

2. Respond to your peers' postings. Write comments and/or ask questions to at least 3 peers.

Asynchronous Discussion Forum II (Forum 4)

Instructions: Last week we discussed reasons why people study English. This week we will discuss the pros and cons of English as a global language. Please watch two video clips and read the article, and then answer the questions below.

Source: TED Talks
https://www.ted.com/talks/jay_walker_the_world_s_english_mania#t-5504
Video Clip 1: The World's English Mania by Jay Walker

Source: TED Talks
https://www.ted.com/talks/patricia_ryan_don_t_insist_on_english#t-615835
Video Clip 2: Don't Insist on English by Patricia Ryan

Source: PronunciationPro
https://www.pronunciationpro.com/english-as-a-universal-language-the-pros-and-cons/

Article: English as a Universal Language: The Pros and Cons

Despite other languages having more speakers, English is the universal language. This is because of the dominance of English-speaking countries that have had great influence over the world. By looking at the pros and cons, we can understand the impact of the language on the world.

Here are the pros:
1. Unites the World

Having a universal language brings everyone together. We can understand people and this allows us to move in the same direction.

A good example is the partnerships we see between companies in different countries. The result is people get great products and services. Sometimes, it makes things less expensive for everyone due to cheaper raw materials.

2. Eases Communication

People can overcome language barriers by speaking English. This means they can travel, work, and interact with other cultures.

3. Allows People to Engage and Share in Art and Science

Using English as a universal language allows cultures to share the arts and sciences. People watch movies and TV shows from different nations. Others share scientific ideas that lead to great breakthroughs.

4. Is Simple to Learn

English is easy to learn due to the lack of complicated symbols used in other languages. Also, it doesn't have strange characters, which change the pronunciation.

With the pros out of the way, here is the negative side of English:
1. Affects Local Languages

The more people speak English, the less they speak their own languages. This leads to the loss of these languages.

2. Sometimes Difficult to Pronounce

Pronouncing English words can be difficult for foreign learners. As if that's not tough enough, there are regional accents of the English language as well. This makes it hard to listen, understand, and communicate.

3. It Hinders Cultures

When speaking a different language, you notice that your expressions and behavior change. Foreigners make great attempts to fit in the new culture. Unfortunately, this affects their own cultures.

1. In 200-300 words, please discuss the following questions:

- Do you agree with the 'pros and cons' presented by the author? Why? Why not?
- Are there any other pros or cons of English as a global language that should have been mentioned?

2. Respond to your peers' postings. Write comments and/or ask questions to at least 3 peers.

Asynchronous Discussion Forum for Reflection (Forum 5)

Question: What is the most important lesson you learned in this program?

First please fill in the post-survey, and then try to answer this question.

Appendix I: Pre-Survey Questions

Pre-Survey

This survey is part of the study, Developing Higher Order Thinking Through Asynchronous Forums in Blended Learning Design: Action Research at a Public High School in Japan.

The purpose of this survey is to give you the opportunity to describe your thoughts about learning and the theme of this program: Why do we learn English?

We appreciate and value your participation. The survey should take you approximately 30 minutes to complete. It is only the instructor Hiroshi Miyashita who can access to this survey. When Hiroshi Miyashita publishes an article using the data taken from this survey, no identifying information will be disclosed.

If you do not wish to answer a particular question, you can simply skip the question. You may stop doing the survey at any time. You can submit this survey to Hiroshi Miyashita either directly or through email.

Questions about Learning

- What do you think about learning online?

- What do you think about learning through discussion?

Questions about Theme of This Program

- Why do you think people learn English?

- Why do you learn English?

- What are positive aspects of English as a global language?

- What are negative aspects of English as a global language?

Appendix J: Post-Survey Questions

Post-Survey

This survey is part of the study, Developing Higher Order Thinking Through Asynchronous Forums in Blended Learning Design: Action Research at a Public High School in Japan.

The purpose of this survey is to give you the opportunity to describe your experiences with the blended learning program that you attended at Showa High School.

We appreciate and value your participation. The survey should take you approximately one hour to complete. It is only the instructor Hiroshi Miyashita who can access to this survey. When Hiroshi Miyashita publishes an article using the data taken from this survey, no identifying information will be disclosed.

If you do not wish to answer a particular question, you can simply skip the question. You may stop doing the survey at any time. You can submit this survey to Hiroshi Miyashita either directly or through email.

Questions about Technology

- Did you have any trouble in using technology? If yes, please elaborate.

Questions about Tasks

- Did you find something meaningful in the learning tasks (i.e., reading and watching materials, online discussion, and online presentation) in this program? If any, please elaborate.

- Did you find something uncomfortable in the learning tasks (i.e., reading and watching materials, online discussion, and online presentation) in this program? If any, please elaborate.

Questions about Asynchronous Forums

- Did instructors' comments assist you to learn in online discussion forums? If yes, please elaborate.

- Did you find something uncomfortable in instructors' comments in online discussion forums? If any, please elaborate.

- Did students' comments assist you to learn in online discussion forums? If yes, please elaborate.

- Did you find something uncomfortable in students' comments in online discussion forums? If any, please elaborate.

- After finishing this program, do you have any ideas to make online discussion active? What do you want to try to facilitate online discussion if you join this kind of program again?

- What do you think instructors should do to improve online discussion forums in the next program?

Questions about Program Design

- This program had three discussion forums and two synchronous sessions in the online component. What are your thoughts about the design?

- Do you have any suggestions to improve the design of the online component?

- How was the online learning experience compared to regular face-to-face classes at school?

- This program had face-face meetings at the beginning, in the middle, and at the end? Did these face-to-face meetings assist you to learn in this program? If yes, please elaborate.

- Three face-to-face meetings were conducted in Japanese. What do you think about that?

- What do you think instructors should do to improve the face-to-face component in the next program?

Questions about the Theme of This Program

- The topic of this program was "Why do we learn English?" What do you think about the topic?

- Why do people learn English?

- Why do you learn English?

- What are positive and negative aspects of English as a global language?

The Final Question

- Please feel free to write anything about this program if questions above did not cover what you want to say about it.

Appendix K: Basic Rules in This Program

Basic Rules in General

- Try to **be polite** to your peers and instructors throughout the program.
- We call each other by **our first name**, including instructors. Mr. Miyashita is Hiroshi in this program.
- We share our personal information with peers in this program. You **cannot** share any personal information that you get in this program with those who are not in this program.

Basic Rules for Discussion Forums

- When you reply to your peers or instructors, first make it clear **who you are writing to**. Write at the very beginning, for example, "Hi Hiroshi, thank you for your question" or something like that.
- Write **your name at the end** of the post.
- Take time to **think**, and try to write what you really want to write. Try not to write what you can write.
- We make grammatical mistakes. It is OK, but **read your post one more time** before uploading it so that you can find and correct careless mistakes.

Here are some tips for making a good discussion forum.

- Take time and **think deeply**.
- Try to make and post **good questions**.
- When you agree, **say so** and try to add one reason and/or one example.
- Your peers might have different opinions from yours, but try to **be open to different perspectives**. In the end, you will learn to see your way of thinking from broader perspectives, which will make your argument stronger.
- **Watch your language** in discussion forums. When you respond to opinions that are different from yours, which do you think is a better way to develop the discussion, Group A or Group B?

Group A:

- I cannot understand what you are saying at all. I think….
- It doesn't make any sense. I am disappointed to see your post.
- Are you an idiot?

Group B:

- I have never seen the problem in that way. Thank you for providing us with a new perspective. From my experience, I think…. I appreciate it if I could share your ideas on this issue.
- Your reply forced me to stop and think. The argument you made must be important for this discussion. I am not sure what you meant by saying… Would you give me some more details or examples?

Appendix L: Athabasca University Research Ethics Board Approval

Athabasca University
RESEARCH CENTRE

CERTIFICATION OF ETHICAL APPROVAL

The Athabasca University Research Ethics Board (REB) has reviewed and approved the research project noted below. The REB is constituted and operates in accordance with the current version of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2) and Athabasca University Policy and Procedures.

Ethics File No.: 24400

Principal Investigator:
Mr. Hiroshi Miyashita, Graduate Student
Faculty of Humanities & Social Sciences\Doctor of Education (EdD) in Distance Education

Supervisor:
Mr. Hiroshi Miyashita (Principal Investigator)
Dr. Debra Hoven (Supervisor)
Ms. Robyn Stobbs (Research Data Management Librarian)

Project Title:
Developing Higher Order Thinking Through Asynchronous Forums in Blended Learning Design: Action Research at a Public High School in Japan

Effective Date: July 18, 2021 **Expiry Date:** July 17, 2022

Restrictions:

Any modification or amendment to the approved research must be submitted to the AUREB for approval.

Ethical approval is valid *for a period of one year*. An annual request for renewal must be submitted and approved by the above expiry date if a project is ongoing beyond one year.

A Project Completion (Final) Report must be submitted when the research is complete *(i.e. all participant contact and data collection is concluded, no follow-up with participants is anticipated and findings have been made available/provided to participants (if applicable))* or the research is terminated.

Approved by: **Date: July 18, 2021**

Davina Bhandar, Chair
Faculty of Humanities & Social Sciences Departmental Ethics Review Committee

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Athabasca University Research Ethics Board
University Research Services, Research Centre
1 University Drive, Athabasca AB Canada T9S 3A3
E-mail rebsec@athabascau.ca
Telephone: 780.213.2033

Appendix M: Athabasca University Research Ethics Board Approval Renewal

Athabasca University
RESEARCH CENTRE

CERTIFICATION OF ETHICAL APPROVAL - RENEWAL

The Athabasca University Research Ethics Board (REB) has reviewed and approved the research project noted below. The REB is constituted and operates in accordance with the current version of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2) and Athabasca University Policy and Procedures.

Ethics File No.: **24400**

Principal Investigator:
Mr. Hiroshi Miyashita, Graduate Student
Faculty of Humanities & Social Sciences\Doctor of Education (EdD) in Distance Education

Supervisor:
Dr. Debra Hoven (Supervisor)

Project Title:
Developing Higher Order Thinking Through Asynchronous Forums in Blended Learning Design: Action Research at a Public High School in Japan

Effective Date: June 6, 2022 **Expiry Date**: June 05, 2023

Restrictions:

Any modification or amendment to the approved research must be submitted to the AUREB for approval.

Ethical approval is valid *for a period of one year*. An annual request for renewal must be submitted and approved by the above expiry date if a project is ongoing beyond one year.

A Project Completion (Final) Report must be submitted when the research is complete *(i.e. all participant contact and data collection is concluded, no follow-up with participants is anticipated and findings have been made available/provided to participants (if applicable))* or the research is terminated.

Approved by: **Date: June 06, 2022**

Carolyn Greene, Chair
Athabasca University Research Ethics Board

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