A Qualitative Action Research Study of the Barriers to Information and Communication Technology Integration at a Japanese Liberal Arts College

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ABSTRACT

The purpose of this qualitative action research study was to explore the perceptions and experiences of English as a foreign language (EFL) university teachers in Eastern Japan to overcome barriers to integrate information and communication technology (ICT) in their daily teaching practice. The problem addressed was that universities in Japan are pressured to align their curriculums with government initiatives that demand ICT integration. However, governmental guidelines for faculty development have not been developed. The research setting was a liberal arts college in Eastern Japan, and purposeful sampling was used to attain a sample of 12 EFL university teachers. Activity Theory served as the theoretical framework. The MAXQDA 12 software was used to identify codes, patterns, and themes across the data. The three major themes were: (a) no computer, no projector, and no Internet were faculty barriers to ICT integration, (b) difficult software for teaching purposes was a barrier to ICT integration, and (c) faculty contemplation of learning objectives/outcomes informed decisions to integrate ICT successfully. Recommendations for educational leadership included (a) to equip every classroom with an Internet-connected computer/projector and to ensure these devices were maintained regularly, (b) to provide reliable Wi-Fi to improve adoption of ICT, (c) to create a theoretically-driven ICT training program tied to curriculum learning objectives, and (d) to hire educational technologists to provide "just-in-time" techno-pedagogical support.

INTRODUCTION

Since the turn of this century, the desire of the Japanese government to encourage educational institutions to enhance learning outcomes with information and communication technologies (ICTs) has been outlined in various white papers issued by the Japanese Ministry of Education, Culture, Sports, Science, and Technology's website (MEXT, 2016). Within the largest English-speaking teachers' association in Japan, The Japan Association of Language Teachers (JALT), the launch of the JALT CALL (computer-assisted language learning) special interest group and the JALT CALL Journal in 2005 signaled a need for an official channel devoted to

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research in the use of technology in language learning. The trend of incorporating more ICT into Japanese higher education has been evident in recent studies focused on ICT integration in various teaching contexts throughout the nation (Fryer & Bovee, 2016; Toland et al., 2014; Uehara & Noriega, 2016).

REVIEW OF THE LITERATURE

Despite the rhetoric of the importance that technology has on the future of education, a vision shared by MEXT and JALT, the fact remains there has been no official national program for teacher development in ICT integration. The idea of a nationwide teacher-training program for technological integration has yet to be crystallized by MEXT. Moreover, the government has not provided a transparent timeline for delivering such a program (Fryer & Bovee, 2016; Kitade, 2015; MEXT, 2016). Without a national plan for teacher training in ICT, it has been left to institutions or individual teachers to independently pursue professional development. As a result, teachers in Japanese education have remained mostly untrained in aligning the use of new media with learning objectives in their day-to-day teaching practice. At institutions that have lacked any faculty development in digital skills training, instructors continue to bear the burden of integrating new digital media with pedagogical and content knowledge without being able to explain how that integration affects learning outcomes (Fryer & Bovee, 2016). Apart from two studies (Stanley, 2015; Toland et al., 2014), research devoted to professional development training in ICT integration remains a dearth of literature reporting on professional development in ICT in Japan altogether.

Although the desire for a contemporary pedagogical approach to ICT integration in Japan has been warranted, the rapid, iterative hardware and software design changes pose a more significant challenge to developing professional training programs in Japan and worldwide (Kitade, 2015; Park & Jo, 2017). Because technology changes so frequently, numerous studies reported that the one-size-fits-all, passive, general professional training workshops have been largely ineffective because they did not affect sustainable change in teacher practice (Goodnough, 2018; Stanley, 2015). In contrast, research into training programs specifically designed for teacher development in ICT integration that combined technological, pedagogical, and content knowledge, have identified the cognitive tensions inherent in the teaching context a factor that has been often overlooked and deserves consideration for effective, sustainable change in teaching practice (Carpenter et al., 2020).

The integration of ICT into university teaching practice has been a multifaceted endeavor requiring English as a foreign language (EFL) teachers to attend to a complex array of linguistic, methodological, and institutional challenges. Recent studies have shown that using English as a medium of instruction was problematic when using technology for foreign-language learners of English (Fryer & Bovee, 2016). Other studies have found that the norms and assumptions associated with the target language (e.g., English as the language of instruction) can also serve as a source of resistance for learners who are not native users of English (Hwang et al., 2018). Institutional barriers related to a teacher's intrapersonal factors such as perceptions and beliefs affect the instructional design and have been sources of conflict in ICT integration in education (Daniela et al., 2019). Institutional and curricular factors also posed a challenge for instructors in

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implementing digital technology in their teaching practice (Fryer & Bovee, 2016; Kaatrakoski et al., 2017). These studies suggest that a teacher's perception of ICT integration barriers might have had just as much to do with the technology itself as it did with cognitive and environmental factors.

Activity Theory Approach to ICT Integration in Higher Education

The theoretical framework for this study consisted of Vygotsky's (1978) Activity Theory. The model finds its origin in Vygotsky's focus on individual learning development and mediated action in a social setting (Postholm, 2015). However, activity theory also includes the critical factor of previous experience when determining how cognitive and physical tools affect individual and group learning development in a situated context. The following discussion of the theoretical framework below will explain how these theorists' ideas underpin this study.

The Activity Theory framework has several ideas that connect it to Vygotsky's work. For Vygotsky's research, the artifact, or tool, played a pivotal role in mediating an activity and how it contributed to the development of an individual's learning (Postholm, 2015). Leontiev expanded on the notion of tools to include a subject's interaction with other members in a community (Postholm, 2015). Moreover, the notion of tools is expanded and understood as being bound by local culture and history. Leontiev's modification to the Activity Theory framework adds rules, community, and division of labor to complete the architecture of the activity system. As illustrated in Figure 1, where Vygotsky's work focused primarily on the dynamic interplay of the uppermost triangle (subject, tool, and object), Leontiev's iteration expands the theory to include the activity's social context.

FIGURE 1
Engestrom's triadic activity systems framework
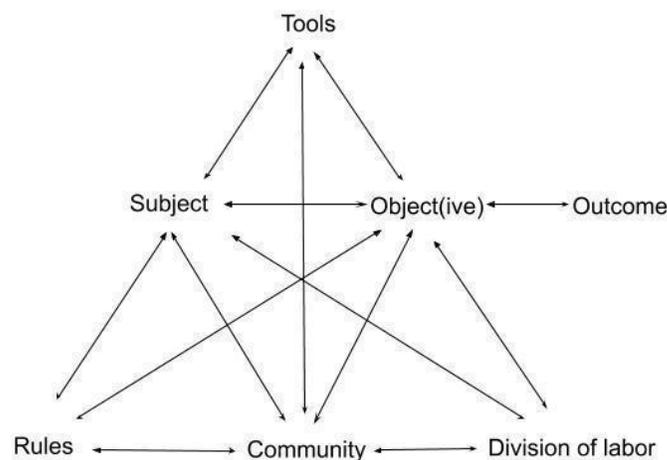
Constraints inherent in an activity's actions pave the way for Engestrom's significant contribution of "activity systems" (Shi, 2017, p. 1062)[2]. Recognizing the importance of Leontiev's contribution of not isolating the individual from the motives of the collective, Engestrom developed a model that is ideal for understanding how various factors come together to inform the psychological motives inherent in an activity system. When an activity becomes the unit of measure, Engestrom's model is useful for understanding the tensions that arise when any component of the activity system conflicts with reaching the objective (object) of the activity (Engestrom, 2015). Tensions or contradictions in an activity are either opportunities for transformation towards a resolution or barriers that prevent the subject of an activity from achieving the intended outcome. From an interventionist perspective, Engestrom's contribution of the activity system to the Activity Theory framework is instrumental for tracking actions or any other relevant aspect that serve as points of contention that obstruct the achievement of an intended outcome (Lilley & Hardman, 2017). Identifying the problem within an activity system may prove instrumental in formulating viable solutions.

A key concern in this study was that ICT integration in higher education in Japan is characterized by relatively disparate research on the use of technology in EFL teaching and lack of theorized reporting on the relationship between the localized learning context and EFL university teachers' perceptions and experiences. The teacher is the linchpin who transforms the complex array of university curricula, pedagogical, and technical factors into teaching deliverables. Therefore, the rationale for using Activity Theory as an appropriate framework for this study lay in establishing a viable means for investigating the impact of those variables on the teacher decision-making process. What distinguishes Activity Theory from other theories was that it accounts for the action of individual human behavior in a tool-mediated, socially distributed context (Engestrom, 2015). This model was particularly relevant for the purpose of this study because it helped explain the perceived barriers that EFL teachers, untrained in using technology, had when they used digital tools to achieve specific learning outcomes.

Previous research also underscored the need for instructors in higher education to be open to resolving pedagogical tensions with their students when introducing new technology. In a qualitative case study, Kitade (2015) examined Japanese university instructors' pedagogical transformations as they responded to cognitive tensions in the computer-assisted language-learning environment. The author found that teacher awareness of the mismatch between their ideals in using ICT with their students helped them modify and improve their pedagogical approach. Through this awareness, teachers were able to improve their effectiveness in teaching "by negotiating differences in the values around ICT held by themselves [and] their students" (Kitade, 2015, p. 413). Kitade (2015) argued that teaching with technology in higher education requires being open to new teaching methods and requires instructors to anticipate tensions that may arise and be prepared to negotiate resolutions with the students.

Moreover, past research has established the Activity Theory holistic approach of considering all the components within an activity system (the teacher, the tool, and the environment) as instrumental in unpacking the complexity of factors that may form tensions in the use of technology in daily teaching practice (Kaptelinin & Nardi, 2006; Karasavvidis, 2009). A consideration of interacting activity systems may also provide insights into how new activity

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[2] Although Engestrom (2015) prefers to use the term "Cultural-Historical Activity Theory", the author has chosen to use Activity Theory to avoid confusion.

systems are formed or help identify contradictions that prevent the transformation of achieving the object(ive) activity (Goodnough, 2018).

RESEARCH QUESTIONS

Current research has identified the need to account for the factors that explain the infrastructural and psychological challenges that EFL teachers, untrained in ICT integration, face in their day-to-day teaching practice (Carpenter et al., 2020). Moreover, there remained a gap in the literature that explained how EFL teachers in Japanese universities deal with the complexity of ICT integration factors in the situated learning context and its effect on student learning (Carpenter et al., 2020; Lilley & Hardman, 2017). The purpose of this qualitative action research study was to examine the perceived barriers and experiences EFL university teachers in Japan had with the implementation of ICT integration at a liberal arts college in Eastern Japan.

The following two research questions guided the study:

1. What were the perceptions and experiences of EFL liberal arts college teachers in Eastern Japan and their perceived barriers to ICT integration at a liberal arts college in Eastern Japan?
2. What were the perceptions and experiences of EFL liberal arts college teachers in Eastern Japan and their decisions to integrate ICT successfully at a liberal arts college in Eastern Japan?

The answers to these research questions should contribute to professional development in digital technology for educational purposes in the local teaching context and inform teaching practices globally. Furthermore, the use of the Activity Theory framework may prove instrumental in research that explores the connection between the use of digital media in a given context and how that impacts educational technology for achieving successful learning outcomes.

METHOD

A qualitative research method design was determined to be the most appropriate fit for this study because qualitative research was ideal for generating detailed descriptions of a phenomenon (Mills & Butroyd, 2014). Moreover, this research method allowed examining college teachers' perceptions and experiences of barriers and successes in integrating ICT at a liberal arts college in Eastern Japan. Furthermore, an action research approach was used to explore an approach to teaching to improve college teaching practices (Mills & Butroyd, 2014).

Action research is the type of research that allows for reflection on collected data by all stakeholders (e.g., researcher and participants) to improve professional practices (Stringer, 2014). Action research is also based on an iterative cycle of identifying new and improved courses of action that mainly serve to inform the participant (Mills & Butroyd, 2014). Deciding on a new course of action based on findings and previous research is called praxis (Mills & Butroyd,

2014). Using praxis to improve teaching practices set this form of qualitative research apart from all other forms because it empowered the participant to overcome obstacles and achieve success in professional practice (Mills & Butroyd, 2014). Teacher participants in this study were asked to plan a course of action, execute that plan, and reflect on their perceptions and experiences of integrating ICT in a liberal arts classroom in Eastern Japan.

The target population that served as the sampling frame for this study was 45,000 EFL teachers in 783 universities across Japan (including national, prefectural, municipal, and private universities). Purposive sampling was used to select a minimum of 10 participants (from a pool of 34 EFL instructors) at an English department at a liberal arts college in Eastern Japan. With 12 participants, the qualitative sample was large enough to represent the diversity of characteristics contained within the target population of the sampling frame (Mills & Butroyd, 2014). Potential participants were excluded if they did not teach at least one year at their current teaching post to mitigate the excuse of unfamiliarity with the curriculum content as a barrier to ICT integration.

A post-intervention interview protocol was designed for the verbal data collection of the teacher participants' perceptions and experiences of barriers and successes to using ICT for teaching. The interview protocol was intended to guide the study and ensure the interview process was tied to the research problem and the research questions (Bloomberg & Volpe, 2016). Moreover, the interview protocol's purpose was to elicit verbal data using clear and understandable language and provide consistency in the verbal data generated for analysis. The background of the research problem, the purpose of the study, the theoretical framework, and the research questions formed the basis for creating the interview protocol questions to explore teaching with ICT to develop improvements following an intervention (Mills & Butroyd, 2014). The questions were designed to allow participants to respond in their own words and nurture reflection on their perceptions of barriers and successes in teaching with technology.

A field test was conducted with two academic professionals in education to establish the interview protocol's validity as an instrument for use in this study (Bloomberg & Volpe, 2016). Feedback on the transparency of the instrument's wording from the academic professionals was considered. The field test helped identify ambiguities in word choice and ensure clear and concise meaning concerning the desired verbal data needed to address the research problem and the research questions.

The research study commenced once approval to conduct the study was obtained from the college's research ethics committee and the English department director. The teachers were recruited from a roster of teachers obtained from the department director. Participants were informed of the risks and protections via the informed consent form. Participants were also provided ample time to consider the consent form information and ask questions before consenting to participate.

The action research intervention provided each participant with an initial 20-minute professional development training session using Engestrom's Activity Theory model to plan an activity using technology (Goodnough, 2018). Participants were instructed to keep a reflective journal to record their perceptions and experiences of implementing their lesson plans using the Activity Theory model and their decisions to overcome any barriers. Moreover, the participants were instructed on using the journal to reflect on the Activity Theory model's use to anticipate possible obstacles in their lesson design to overcome potential barriers after implementing their activity.

DATA AND ANALYSIS

The Participants

Although a minimum of 10 participants was needed to proceed with the study (Krathwohl, 2009), all 34 EFL teachers in the department were accepted into the study if they expressed an interest in participating. Therefore, 12 participants, all of whom had more than one year of teaching in the department, were accepted into the study. With 12 participants, the qualitative sample was large enough to represent the diversity of characteristics contained within the target population of the sampling frame (Mills & Butroyd, 2014). The national representation of participants was: four Japanese, three American, three British, one Canadian, and one Australian. Participant ages ranged from 30 to 65. Ten participants had master's degrees, and two had doctorates. Two participants were tenured, and ten were on short-term teaching contracts. Ten participants had less than ten years of teaching experience, two had less than 20 years, and two had less than 30 years of teaching experience.

Data Collection

Data collection included the participants' lesson designs, the participants' reflective journal entries, the staff handbook, post-intervention audio recordings, and researcher memos. In addition to a 20-intervention, it lasted about 45 minutes and was audio recorded. To maintain consistency throughout the interview process and to prevent the intrusion of researcher perceptions and bias, the technique of asking each question in the order presented in the interview protocol was employed (Stringer, 2014). However, the researcher also employed a semi-structured, open-ended approach to elicit participant expansion of their understanding of the interview protocol questions (Bloomberg & Volpe, 2016) and co-construct a mutual understanding of their answers to those questions (Mills & Butroyd, 2014). Moreover, the participants were encouraged to consult their lesson designs and reflections during the interview process.

Analysis of the Data

Transcribed data were read and re-read to allow the researcher to develop a firm understanding and familiarity with each participant's perspective. The MAXQDA 12 software was used to code the data for general categories that align with the theoretical framework, the research problem, and the research questions. Moreover, the software was used to analyze the data for patterns and themes (Yin, 2017). Triangulation of the data was achieved by comparing, analyzing, and interpreting the transcribed interview data with the participants' lesson plans, reflection journals, the staff handbook, and researcher memos.

Assumptions

The first assumption was that EFL teachers in higher education in Japan had some pedagogical knowledge and experience using technology for teaching before the intervention took place. Moreover, each teacher's perception of the intervention varied due to their respective experiences with ICT and pedagogical approach to language teaching in general. The second assumption was that all participants had no formalized training in applying pedagogical principles when using technology to teach English as a foreign language. The third assumption was that this study's teacher participants would know how to use the Activity Theory model to plan an activity using technology aligned with learning objectives, the students' needs, and the course content.

Limitations

The author of this study design recognized that in conducting action research, there were limitations regarding the extent to which the results of the findings were transferable to other settings (Stringer, 2014). The results of the findings were limited in transferability only to other teaching contexts that were similar to the liberal arts college in Eastern Japan selected for this study. Moreover, this study explored the perceptions and experiences of using technology for teaching using only a small sample size of teachers, which was another limiting factor. Additionally, the use of open-ended interview questions called the trustworthiness of participant answers into question because participants might not have fully disclosed all the necessary information for various reasons (Stringer, 2014). As a result, rigor in checks for trustworthiness was employed to countermeasure surface answers and ensure the data's veracity and truthfulness (Stringer, 2014).

FINDINGS

Data were uploaded into MAXQDA12 for coding, and qualitative data analysis involved Mills and Butroyd's (2014) qualitative content analysis in determining emergent themes. Data analysis consisted of developing 40 codes collapsed into seven common patterns found within the 12 participant responses. There were 26 codes collapsed into four patterns associated with research question 1, and 14 codes collapsed into three patterns associated with research question 2. Moreover, major themes consisted of 75% of participants reporting on a theme, and a minor theme was a simple majority.

Research Question 1

What are the perceptions and experiences of EFL liberal arts college teachers in Eastern Japan and their perceived barriers to ICT integration at a liberal arts college in Eastern Japan? Two major themes emerged for research question 1: (a) No computer access, no projector, and no Internet in the non-computer room classes were barriers to ICT integration, and (b) Software too difficult for teaching purposes was a barrier to ICT integration (see Table 1).

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Table 1
Research Question 1: Major Themes

Theme	Frequency	Percent
1. No computer access, no projector, and no Internet in the non-computer classroom were faculty barriers to ICT integration	12	100
2. Software too difficult for teaching purposes was a faculty barrier to ICT integration	9	75

Note. N = 12.

Major Theme 1

No computer access, no projector, and no Internet in the non-computer classroom were faculty barriers to ICT integration.

All participants reported no computer, no projector, and no Internet in the non-computer classroom were barriers to ICT integration. Participant 3 described this and said, "Before class, I need to get on a computer to set up the activities, and I have trouble getting access to a computer…Sometimes I have difficulty getting onto a computer. This one day I had trouble logging into a computer [from the helpdesk] to set up the activities using some digital tools." In a similar vein, Participant 7 said, "Last year I was using my own Mac, but it's getting a bit old now, so before class, I pick one up from the helpdesk with the key to turn on the projector [sighs]. I plug it in, I have to log into Google Drive, Google Classroom [sighs again]. It takes about ten minutes before I can get going [starts laughing]. I guess that's why people might be reluctant to use more technology because it might seem like it's too much hassle." Additionally, Participant 4 reported, "Some classrooms didn't have Internet, and some don't have [LCD] projectors." Likewise, Participant 9 recalled, "The barriers I mostly experience are when things don't work. It can be the [LCD] projector is not lighting up or problems with the Wi-Fi."

Major Theme 2

Software too difficult for teaching purposes was a faculty barrier to ICT integration.

Nine of the 12 participants reported some software that was too difficult to use for teaching as a barrier to ICT integration. For example, Participant 11 expressed, "We were supposed to introduce a citation manager called Zotero in [course name]. I couldn't figure that [software] on my own, so I skipped that." Similarly, Participant 12 explained the difficulty of understanding the same software, "Zotero was hard for me. I never used it for teaching." Participant 8 noted, "I went to a Moodle workshop, I had no idea what was going on, I just

listened. When I went to use it for my teaching, I had completely forgotten what they said, so I didn't use it," and likewise, Participant 3 stated, "I don't really know how to use Google Classroom for my teaching. I'm not ready to teach with that technology."

Research Question 2

What are the perceptions and experiences of EFL liberal arts college teachers in Eastern Japan and their decisions to integrate ICT successfully at a liberal arts college in Eastern Japan? One major theme emerged for research question 2: Thinking about learning objectives and learning outcomes, informed decisions to integrate ICT successfully (see Table 2).

Table 2
Research Question 2: Major Theme

Theme	Frequency	Percent
1. Faculty contemplation of learning objectives and learning outcomes informed decisions to integrate ICT successfully	12	100

Note. N = 12.

Major Theme 1

Faculty contemplation of learning objectives and learning outcomes informed decisions to integrate ICT successfully.

Participant views of effective utilization of digital media for teaching and learning focused on the importance of learning objectives and learning outcomes played when making decisions to integrate ICT successfully. All 12 participants described their success in integrating ICT to meet learning objectives and achieve enhanced student learning outcomes. Participant 8 described this and said, "So even though the recording didn't succeed that was okay for me as long as they [the students] did their rehearsals. So that means I always feel like I have nothing to lose [if] that technology part doesn't work…as long as I get the goal [learning objective], my lesson plan was successful but if I add [the] technology part and it works then everything is much better than my original plan." Likewise, Participant 9 stated, "Because the students were able to see what their classmates were doing [on Google Docs] and they were able to see the teacher interacting with them, giving them feedback, it raised the quality of the research and the essays across the board. And really, the end product was, because of the quality of the process, was really outstanding." Similarly, Participant 5 noted, "I would say that the quality of the work I'm receiving [via Google Docs] is definitely better. I think that their essays are much more polished; they're much more fleshed out. I'm able to provide them with models so much more easily [which] they incorporate into their subsequent drafts. I felt like I was providing them with twice the amount of feedback in half the amount of time then when we just used paper."

DISCUSSION

The purpose of this qualitative action research study was to explore the perceptions and experiences of English as a foreign (EFL) university teachers in Eastern Japan to overcome barriers to successful information and communication technology (ICT) integration in their daily teaching practice. The problem addressed in this study was that universities in Japan are under pressure to align their curriculums with nationwide government initiatives that demand ICT integration (MEXT, 2016), but standardized governmental guidelines for faculty development in localized contexts across educational institutions have not been developed nor were any forthcoming (Fryer & Bovee, 2016; Kitade, 2015). Moreover, past researchers have reported many instructors are not adequately trained to align the integration of new digital media with pedagogical learning objectives and, as a result, they might have been unknowingly contributing to the decline of their teaching methods (Carpenter et al., 2020).
Implications

Three major themes were identified from data analysis: two major themes were for research question 1, and one major theme was identified for research question 2: (a) no computer access, no projector, and no Internet in the non-computer classroom, and (b) software that was too difficult to use for teaching purposes were barriers to ICT integration, and (c) faculty contemplation of learning objectives and learning outcomes informed decisions to integrate ICT successfully. The following are inferences of the study theme findings by research question.

Major Theme 1

No computer, no projector, and no Internet in the non-computer room classroom were faculty barriers to ICT integration.

The first implication of major theme 1 was the importance of ensuring the availability and readiness of computers, projectors, and Internet for instructional use; the inability of faculty to depend on the availability of ICT blocked them from implementing e-learning activities in the non-computer classroom and negatively impacted their overall satisfaction of using digital media for EFL learning (Fryer & Bovee, 2016). The second implication of major theme 1 was the lack of a computer, projector, and the Internet hampered instructors from further developing their pedagogical use of ICT to make that part of their EFL instruction more relevant, effective, and engaging (Hodgson & Shah, 2017; Shelton, 2017). Further, lack of regular and dependable access to ICT in the non-computer classroom has done little to contribute to innovative teaching practice with technology on an individual instructor-level and as a community of practitioners within the department (Bennett et al., 2017; Shih et al., 2017). The third implication of major theme 1 was the lack of a strong and reliable campus-wide Wi-Fi bandwidth had prevented faculty from developing student-centered pedagogy because students' mobile bandwidth coverage was limited (Dintoe, 2018). Moreover, a weak college Wi-Fi bandwidth prevented the learners from using mobile technology for collaborative activities that required everyone to be

working at the same pace and also forced teachers to adopt a more teacher-centric pedagogy to ICT integration as a result (Hodgson & Shah, 2017; Huang et al., 2017).

Major Theme 2

Software too difficult for teaching purposes was a faculty barrier to ICT integration.

The first implication of major theme 2 was the importance of implementing a formal feedback system to respond to the ICT needs of faculty and to provide "just-in-time" ICT support on an individual instructor level and in the form of faculty development workshops that trained instructors how to use new software they were unable to learn how to use for teaching purposes on their own (Jorgensen et al., 2018). Further, this displayed evidence of the failure on the part of the heads of the English department to communicate with the curriculum developers and educational technology leaders to design an effective training program to assist teaching faculty in adopting the use of new software to meet learning objectives (Shih et al., 2017). The second implication of major theme 2 was the need for management to include faculty in selecting digital tools to meet the curriculum's learning objectives (Becuwe et al., 2017). Theme 2 contributed to already existing empirical literature that found top-down decisions of mandating the use of new software without involving faculty in the decision-making process alienated the instructors from sharing their pedagogical knowledge of technology use, which resulted in a loss of tool agency and also negatively impacted their willingness to use unfamiliar digital media for teaching purposes (Shelton, 2017). Finally, the third implication of major theme 2 was lack of needs-based training prevented teachers from optimizing the use of learning management systems (LMSs), like Moodle or Google Classroom, from assessing and monitoring students' learning performances efficiently and from exploring the affordances of LMSs to provide individualized learning management such as differentiated learning (Stanley, 2015; Toland et al., 2014; Zanjani et al., 2016).

Major Theme 3

Faculty contemplation of learning objectives and learning outcomes informed decisions to integrate ICT successfully.

The first implication of major theme 3 was the need for faculty to base decisions to integrate ICT successfully on how well the learners achieved the learning objectives (Carpenter et al., 2020). The second implication of major theme 3 was the usefulness of Activity Theory framework as a cognitive tool to help instructors align ICT use with learning objectives and achieve successful learning outcomes (Carpenter et al., 2020). The Activity Theory framework helped faculty identify and resolve tensions in using technology to achieve learning objectives to improve techno-pedagogical decisions to use digital media in the future (Kinsella, 2017). The third implication of major theme 3 was the need for collaboration and discussion between practitioners in pedagogical planning, such as that afforded by this action research study, to help faculty make informed decisions to integrate ICT successfully (Kinsella, 2017). This implication was illustrated by the third major theme as positive effects can come from colleagues mutually

exploring complex issues of choosing digital technology best to meet learning objectives (Hodgson & Shah, 2017).

One study theme finding also contributed to this study's theoretical framework, the Activity Theory framework (Engestrom, 2015). For example, in theme 3, every teacher evaluated the successful integration of ICT based on achieving the learning objectives and the quality of student learning outcomes; this theme aligned with similar past research findings (Hancock & Miller, 2017; Park & Jo, 2017). In sum, study findings contributed to the potential for a better understanding of how faculty resolution of contradictions in the planned use of ICT to achieve learning objectives leads to successful learning outcomes (Kinsella, 2017).

CONCLUSION

Three major themes emerged from data analysis. For research question 1, they included: (a) no computer, no projector, and no Internet in the non-computer room classroom were faculty barriers to ICT integration, (b) software too difficult for teaching purposes was a faculty barrier to ICT integration. For research question 2, the theme was faculty contemplation of learning objectives, and learning outcomes informed decisions to integrate ICT successfully.

The implications for major theme 1 indicated an imperative for the college to ensure the availability of a computer, a projector, and the Internet to enable faculty to implement e-learning activities satisfactorily (Fryer & Bovee, 2016). The second implication of major theme 1 reflected lack of dependable access to those digital resources hampered teacher development of effective, pedagogical development of ICT integration and negatively impacted the progress of innovative practices at the individual and community level (Bennett et al., 2017; Hodgson & Shah, 2017; Shelton, 2017), and the third implication of major theme 1 was weak and unreliable Wi-Fi bandwidth in the non-computer classroom forced teachers to be more teacher-centered, interfered with student-centered pedagogical development, and prevented collaborative, student-centered, mobile-assisted learning activities (Hodgson & Shah, 2017). The first implication of major theme 2 was the need to implement a formal feedback system to provide "just-in-time" ICT support to respond to ICT needs of faculty on an individual and group level to improve communication between curriculum developers, educational technology leaders, and faculty and to design effective ICT workshops (Shih et al., 2017). The second implication of major theme 2 was the need for management to include faculty in selecting digital tools to meet the curriculum's learning objectives and to encourage a willingness to use new media (Becuwe et al., 2017; Stanley, 2015). The third implication of major theme 2 was to provide training that should help faculty use digital technology to be more efficient in assessing and monitoring student progress and incorporating differentiated learning (Toland et al., 2014; Zanjani et al., 2016). The first implication of major theme 3 underscored the importance of faculty to base decisions to successfully integrate ICT on achieving learning objectives (Carpenter et al., 2020). The second implication of major theme 3 was the need for faculty to use the Activity Theory framework to resolve ICT tensions in planning and re-aligning integration with successful learning outcomes, and doing so in collaboration with other colleagues (Kinsella, 2017). The third implication of major theme 3 was the need for collaboration and discussion between

practitioners in pedagogical planning, such as that afforded by this action research study, to help faculty make informed decisions to integrate ICT successfully (Kinsella, 2017).

Recommendations for educational leadership in practice included (a) to equip every non-computer room classroom with an Internet-connected computer and a projector and to ensure these devices were operational at the start of class (Dintoe, 2018), (b) to provide reliable, easily accessible Wi-Fi connectivity with sufficient bandwidth to every teacher and student to improve adoption of ICT (Hodgson & Shah, 2017), and (c) to create theoretically-driven ICT training with clear benchmarks that include formative and summative assessment, to institute a formal feedback system to provide "just-in-time" techno-pedagogical support, and to design hands-on, experimental, and collaborative ICT workshops to nurture pedagogical discussions between faculty (Shih et al., 2017).

Recommendations for future research included (a) a mixed-method study for theme 2 and 3 to examine and operationalize variables of the TPACK framework to compare instructors' use of technology with a qualitative understanding of the Activity Theory framework to develop strategies needed to improve faculty development training in ICT integration (Carpenter et al., 2020) and (b) a qualitative case study of theme 3 with the perceptions and experiences of teachers in other disciplines in universities across Japan to compare to the findings of this study in order to contribute to a more comprehensive and holistic pedagogical training in ICT integration tied to learning objectives (Hwang et al., 2018).

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APPENDIX 1
Interview Protocol

Interview Participant_____
        Date_____

Preamble: Hello, my name is (insert researcher name). Thank you for agreeing to participate in this study. The purpose of this interview is to gather information for my doctoral research. The focus of my research is to understand teachers' perceptions and experiences in overcoming barriers to integrating technology for teaching purposes. This interview will last approximately 45 minutes. Your participation in this interview is completely voluntary. With your permission, I would like to audio record this session so that I may accurately document your answers. You may skip any question you do not feel comfortable answering. Also, if at any point you feel uncomfortable with the interview, you are free to stop it. Moreover, any data collected will not be used and erased should you so desire it. I would like to reassure you that your answers to the questions will remain strictly confidential, so please feel at ease when expressing your perspectives on your experiences. With your permission let us get started.

Demographic Questions:
1. What gender, if any, do you identify with?
2. What is your country of origin?
3. What is your education level?
4. How many years of experience do you have as an EFL teacher in Japan?
5. What training have you received for using digital technology (such as Microsoft Word, PowerPoint, Google Docs, and so on) in language teaching?

Interview Questions
Successful Integration of ICT
6. Please describe your experiences of successfully integrating digital technology to achieve a learning objective?
7. Please describe your successful strategies for integrating digital technology for teaching.
8. Please describe your perceptions and experiences of how professional development can influence your decisions to successfully integrate digital technology for teaching.

Barriers to ICT Integration
9. Using technology for teaching can be a challenge at times; what barriers to using digital tools for a learning activity have you experienced?
10. Have you experienced any organizational barriers (e.g., departmental, curriculum, staff handbook, etc.) that interfered with your use of digital technology for teaching?
11. Describe your experiences of barriers to implementing the rules of using digital technology with your students.
12. What insights into overcoming barriers to using technology for teaching would you give to other colleagues in this department?
13. Do you have any additional thoughts about using digital technology for teaching we have not discussed that you would like to include?

Optional probes to assist in expanding participant answers:
- Please tell me a bit more about that.
- Could you explain what you mean by X?
- I am not sure I understand what you mean by X.

APPENDIX 2

Coding Schema

Research Question 1: Coding Schema

Initial Codes	Emergent Patterns
Teacher can't get access to a computer	No computer access, no projector, and no Internet in the non-computer classroom were faculty barriers to ICT integration
Teacher having difficulty logging into a computer	
Some students don't own laptops	
Students not bringing laptops	
Classroom doesn't have a projector	
Classroom projector not working	
Wi-Fi not working	
Internet going down	
I couldn't figure out software on my own	Software too difficult for teaching purposes was a faculty barrier to ICT integration
I had no idea what was going on at the Moodle workshop	
I didn't know how to use Google Classroom	
I don't feel competent to use software for teaching	
We weren't trained to teach Zotero	
I can't use Zotero (software)	
We cannot teach how to use Zotero (software)	
I just can't stand Moodle	Teachers' negative feelings towards software and digital media were a barrier to ICT integration
I'm not interested in Google Classroom	
I don't want to automate everything	
I won't be using any techy things	
I don't want students to depend on digital tools	
I don't usually use digital tools	
Students have never used word processing	Students lack of basic computer skills and negative attitudes towards technology: barrier to ICT integration
Students aren't good at technology	
Students were lost in the computer room	
Some students hate technology	

Students are not as into technology	

Research Question 2: Coding Schema

Initial Codes	Emergent Patterns
I thought using smartphones was a success	Faculty contemplation of learning objectives and learning outcomes informed decisions to successfully integrate ICT
Students gained confidence using smartphones	
Google Docs overpowering advantage to paper for student essay writing	
Google Doc's sharing capabilities altered my decision to use it	
The learning objective was achieved with Google Docs	
Google Classroom: Easier to measure students' success with learning objectives	
With Google Classroom discussions were more effective	
One-to-one sessions with an expert helps with integrating ICT	Faculty asking colleagues for help influenced their decisions to successfully integrate ICT
Having tech savvy people close by is good for ICT integration	
Seeing someone use software is really useful for ICT integration	
I go to others for advice on how to integrate ICT	
Grinding through digital media is the best way to integrate ICT	Faculty experimenting with digital media influenced decisions to successfully integrate ICT
Playing around with technology helps with integrating ICT	
Don't be afraid to try new things when integrating ICT	

APPENDIX 3
Intervention Instructions

Pre-activity Directions: Answer each of the questions before implementing your activity.
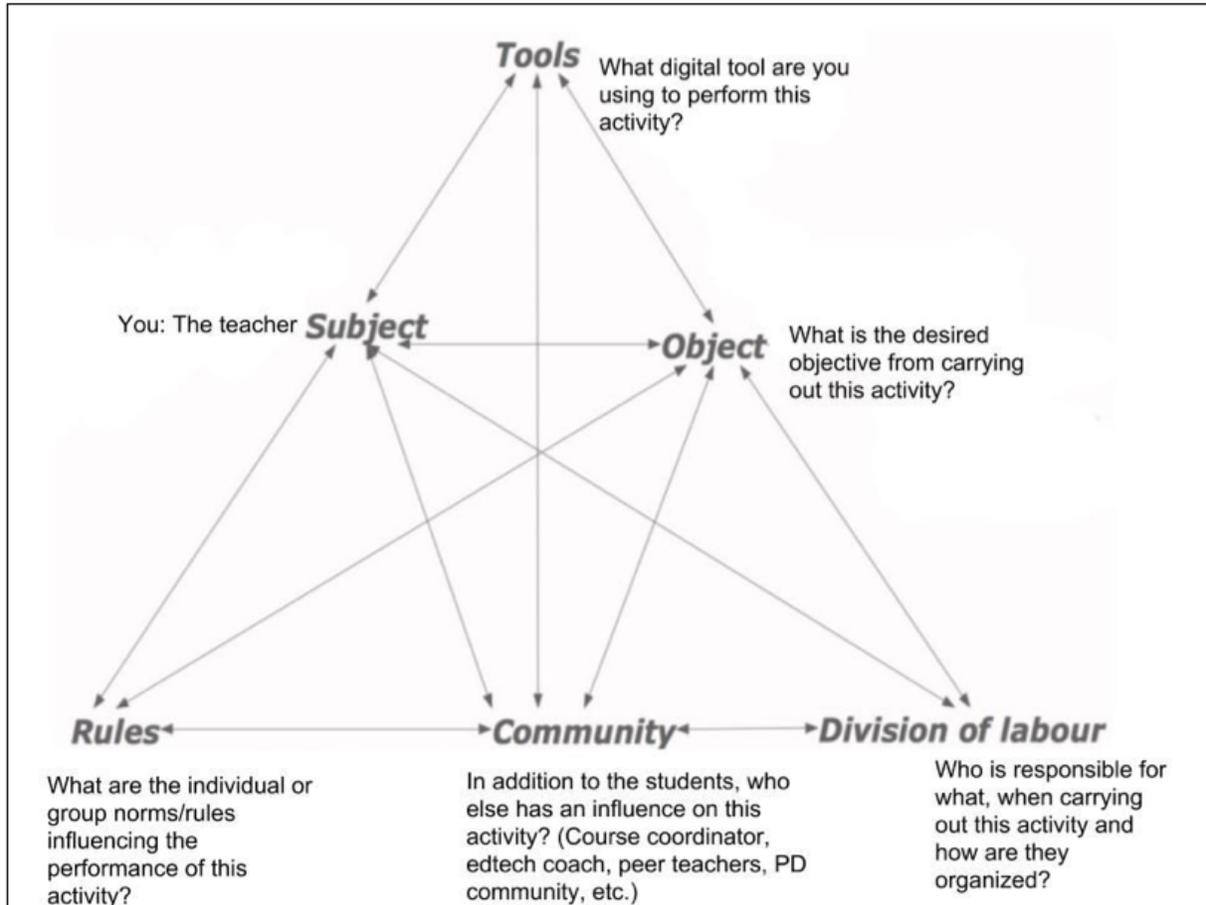
Post-activity directions:

Write a reflection answering the following:
Did you achieve your object(ive)? If so, describe what contributed to your success. Did you encounter any barrier(s) in carrying out the activity? If so, describe how you were able to overcome any barriers. If not, describe what you would do differently if you were to teach the same activity.