In-service teachers' perceptions of technology integration and practices in a Japanese university context

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To understand in-service language teachers' intrinsic barriers to technology integration in higher education contexts, this in-depth study investigated four teachers teaching Chinese as a foreign language (CFL) at a private university in Japan. The researcher trained the four teachers with varied digital literacy how to create and utilise online materials in a dedicated Moodle site, and the teachers' training processes, as well as actual classroom practices, were then observed. Qualitative and quantitative data were collected over three semesters, including: (1) a pilot survey before Moodle integration to access the teachers' attitudes and expectation of educational technology use; (2) classroom observations to investigate how the participants use technology in their CFL classroom; (3) audio recordings and field notes collected in a workshop and interviews to explore reasons behind behaviours; and (4) access logs in Moodle to determine the participants' engagement through online materials inside and outside the classroom. The findings' implications in terms of teachers' experiences, emotions, competences, beliefs, motivations, and sociocultural factors affecting their determinations of technology integration in CFL classrooms in a Japanese higher-education setting are presented. Future considerations and ongoing challenges are discussed to highlight the implications for research, policymakers, teacher educators, and stakeholders.

Keywords: teacher perception, teacher resistance, Japanese contexts, technology integration, teacher training

Introduction

Over the past 30 years, computer-assisted language learning (CALL) technologies have been widely used in language classes to facilitate language input,

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output, interaction, motivation, feedback, and metalinguistic knowledge, not only in the classroom but anywhere and anytime (Thomas, Reinders, & Warschauer, 2012; Hampel & Pleines, 2013). As Bax (2003) states, the end goal of CALL is "normalisation," which means "the stage when a technology is invisible, hardly even recognised as a technology, taken for granted in everyday life" (p. 23). Until recently, although many language teachers were aware of the benefits of CALL, they rarely applied it to their regular teaching practices (Uerz, Volman, & Kral, 2018). It seems that in the field of CALL, teachers and researchers are generally optimistic about using technology in pedagogy, claiming the potentials to motivate learners and shift to more student-centred teaching practice, yet, the constrains that technology can bring are often ignored (Stockwell & Reinders, 2019).

With the use of technology, teachers are expected to take on more responsibilities as task designers, motivational promoters, technical supporters, consultants, progress monitors, learner trainers, decision-makers, and self-taught developer (Hubbard, 2008; Son, 2018; Stockwell, 2009). Regarding values and efforts of using technology in teaching, some teachers look to technology to solve their current pedagogical problems; however, some teachers are reluctant to use technology. Thomas *et al.* (2012) note that "the reality remains that the vast majority may use little more than a computer attached to a projector to display presentation slides" (p. 5). As to the reasons why some teachers reject new technology, and their usage is limited, Ertmer (1999) classifies two main types of barrier: extrinsic and intrinsic obstacles. Accordingly, extrinsic barriers are identified as a lack of resources, adequate training, sufficient equipment, time and curriculum constraint as well as technical skills. Intrinsic barriers include established classroom practices and teachers' unwillingness to change, which are fundamental and personal factors rooted in their beliefs about pedagogy and technologies. Extrinsic barriers could be overcome by providing funds, adequate training, technical support, and teacher community (Bax, 2003; Stickler, Hampel, & Emke, 2020; Stockwell, 2009; Uerz *et al.*, 2018). Intrinsic barriers are relatively difficult to be overcome, given in-service teachers' prior perceptions are unlikely to change and difficult to be measured (Ertmer, 1999). These aspects of internal factors obstruct to promote the normalisation of technologies in language classes. When extrinsic barriers are removed, what specifically intrinsic factors hinder teachers' integration of educational technology remain unclear, thus, exploring teachers' perception shaped by the context may help understand their resistances, adoptions, selections, and implementations of CALL.

Literature review

Teachers' intrinsic barriers to technology integration

How teachers perceive educational technology has a significant impact on their teaching practices, and consequently, students' reactions to the use of technology might affect teachers' technology usage patterns in the classroom

(Lai, Yeung, & Hu, 2016; Stockwell, 2015; Wiebe & Kabata, 2010). In a teacher-centred context, in which teachers play a role as the authority of knowledge and learning processes, the teacher usually is the one who decides whether, what, and how technology should be used constrained by the teaching environment (Tondeur, Van Braak, Ertmer, & Ottenbreit-Leftwich, 2017). Although some teachers are "over-optimistic" (Bax, 2003) of the potentials and effectiveness from technology (see also Stockwell & Reinders, 2019, for "unrealistic outlooks"), they still have various concerns that hinder actual usage in realities. Lai *et al.* (2016) have interviewed university students and teachers about technology use for language learning, and they found a conflict between students' and teachers' perceptions, as the students expected more support from their teachers, while the teachers were concerned about their limited abilities to provide support. This underlying lack of confidence on the part of teachers could be an intrinsic barrier as mentioned previously (see also Kessler & Plakans, 2008). In a similar vein, Ertmer *et al.* (2012) also found that teachers' existing beliefs and attitudes toward CALL have prevented them from implementing technology in teaching and learning effectively (see also Ding, Ottenbreit-Leftwich, Lu, & Glazewski, 2019; Kim *et al.*, 2013; Tondeur *et al.* 2017). This shows that teachers' own experience, pedagogical considerations, and motivation have a crucial effect on classroom practices. In Stockwell's (2009) study, he trained four language teachers with limited CALL experience at a Japanese university to teach themselves to integrate CALL into their teaching practices. Initially, the four teachers were expected to use CALL, anticipating its benefits; however, they still preferred using the existing resources rather than new methods and had difficulties in accessing academic journals and books on CALL topics. Since most of the previous studies examined teachers' perceptions of CALL were conducted through surveys, interviews, or self-reports, little is known about how in-service teachers with low digital literacy interact with technology in the classrooms. Moreover, what teachers stated in the survey often are not congruent with their actual behaviours; thus, an in-depth observation into teaching practices is necessary.

Challenges for educational technology in Japan

In Japan, efforts to enhance CALL integration have been crucial. The Japanese government has been promoting the use of Information and Communication Technology (ICT) in education. For example, the Japanese Ministry of Education, Culture, Sports, Science and Technology has formulated a policy called "The Vision for ICT in Education in 2011" (MEXT, 2011, p.2) with the believes that "fully utilising ICT" may:

1. make classes more interactive and easy-to-understand, through teaching and learning among students themselves
2. reduce burdens of teachers and other school staff
3. enhance children's information literacy

Most of the national policies are targeted at elementary and secondary

education levels, where the trainee teachers have to receive training in the use of technology for teaching in the compulsory course called "Operation of Information Technology (情報機器の操作)" at university to obtain a teacher's license. However, to teach a foreign language at university levels in Japan, teacher license and the basic technology training are not necessary.

Research indicates insufficient teacher training is the crucial factors of technology implementation (Stockwell & Hubbard, 2013) where the teachers are under pressure from top-down requirements (e.g., government or educational institutions) to use technology (Stickler *et al.*, 2020; Stockwell & Reinders, 2019). According to PISA 2018, Japan has ranked last in terms of usage of digital devices (desktop, laptop, or tablet) in classrooms across all 37 OECD countries. The AXIES (2019) survey among Japanese universities identifies the lack of digital skills and motivation among lecturers as the principal significant barrier to technology use. The so-called "digital immigrant" teachers, who were born before the spread of technology (Prensky, 2001), are the ones who determine the course content and the teaching materials and approaches. It seems that the normalisation of CALL in such context does not predict whether teachers will successfully adopt technology in their everyday teaching. How do experienced in-service teachers perceive their new role in undertaking innovate technology that they have not been taught with? Understanding teachers' perceptions of technology integration could bridge the gap between policy and practice that help promote teachers' professional development.

Complex factors affecting CALL adoption and implementation

With a specific focus on the perceptions of technology, the literature continues to measure various aspects of the factors involved in CALL adoptions and implementation. One of the most widely used theories to explain the reasons for teachers' acceptance or rejection of technology is the technology acceptance model (TAM) proposed by Davis (1989), which evaluates perceived usefulness (PU) and perceived ease of use (PE) to predict teachers' attitudes toward technology use. However, TAM has been criticised for lack of evidence linking attitude and actual use (Turner, Kitchenham, Brereton, Charters, & Budgen, 2010). The trend in CALL research into psychology has been shifting from quantitative approaches to qualitative data and mix-method approaches (Aşık *et al.*, 2020; Levy, Hubbard, Stockwell & Colpaert, 2015; Stickler & Hampel, 2015). While technology has changed the traditional classroom, why "traditional teachers" reject change remains unclear (Stockwell & Reinders, 2019; Thomas *et al.*, 2012). Researchers suggest looking deep into the CALL contexts as a variety of components are connected, from cultural, social, political, and institutional components to teaching practices and students' interaction. Blin (2016) termed these contextual aspects "CALL ecosystems", which consist of:

> interacting components including language learners, teachers and other users of the target language, technological devices, applications and platforms, and multimodal material/semiotic artefacts and resources, all of

which participate in a language learning/use activity, as well as the social processes and semiotic practices that characterise the way the human actors interact with one another and with other components of the system. (p. 39)

Another criticism has been that in the CALL field, researchers tend to borrow theory from second-language acquisition (SLA) and technological theories without combination (Beatty, 2010; Chapelle, 2009; Hubbard & Levy, 2016). Additionally, critics have claimed that studies on attitudes conducted solely through interviews or surveys lack in-depth insights as attitudes change over time (Dörnyei & Ushioda, 2013) and observational research looks at educational technology adoption from social aspects has remained relatively scarce. Grounding in multiple research data resources, this longitudinal ethnographic study aimed to identify what specifically intrinsic barriers obstruct in-service teachers' CALL adoption and implementation when new educational technology is first introduced. In particular, the current study sought to address the following research questions:

1. How do in-service language teachers perceive and adopt educational technology integrating into their teaching practices?
2. What are the possible factors affecting in-service language teachers' decisions on the use of educational technology?

Methodology

Procedure

Since pedagogical practice in real-world involves complex factors that can hardly be conducted in experiment settings (Nunan, 1992), this study was carried out as ethnographic research in naturalistic contexts to observe teacher behaviours with (or without) using technology for teaching purposes. Data collection took a total of three academic semesters (1.5 years) with a small group of participants in-depth: one semester of investigation (i.e., a pilot survey, informal interviews, and classroom observations) to understand what materials the teachers would like to use through a Learning Management System (LMS) called Moodle, then, the researcher helped establish a Moodle site and provided training on how to develop online CFL teaching/learning materials and use Moodle through workshops. In the following two semesters, Moodle was deployed in the teachers' classes. The teachers were provided with in-class technical support to help overcome technical barriers; also, follow-up training on the Moodle usage was provided if the teachers needed. The training processes and technology used in the classrooms along with the teachers' access logs in Moodle were observed.

Participants and research context

The current study used convenience sampling to select four Chinese language teachers who taught CFL at a private university in Tokyo, including three

Japanese and one Chinese in the same department. The department in which the four teachers teach provides seven foreign language courses: English, German, French, Chinese, Russian, Spanish, and Korean. As a feature of learning various foreign languages aside from the major subjects, students in the department are required to choose two of the language courses as compulsory subjects. Aside from English courses, Chinese is the most popular second foreign language among the students. According to the department's policies, the teachers were free to use their preferred teaching materials and approach in their classes following a general curriculum to enhance students' four language skills. In order to conduct an in-depth investigation on teaching practice and interaction in terms of the classroom context, four classes taught by each of the teachers were observed. Each of the four teachers had two 90-minute Chinese language classes per week that the researcher planned to investigate but some of the class periods overlapped, finally, four 90-minute classes of each teacher were observed in the current research.

Learning Management System (LMS): Moodle

Moodle itself covers a variety of educational technology recourses (e.g., wiki, ePortfolio, chat, quiz, forum) and enables sharing of class materials as well as accessibility to other online materials. Another significant feature of Moodle is the tracking function that allows accessing actual detailed usage data. Since self-reports (e.g., journals and surveys) have been criticised for the limitation of capturing accurate user patterns, Moodle is a useful tool to keep users' log reports (e.g., login and logout time, IP address, devices, activity history). It should be noted that although the participants had an existing LMS developed by the university, they had little experience with it. Also, since the university planned to adopt Moodle soon at that time, it was assumed that the teachers were motivated to use Moodle. Thus, the latest versions of Moodle website and the Moodle mobile application that the four teachers had never used were introduced.

Data collection and analysis

Survey. A pilot survey consisted of two sections: Section 1 investigated the four participants' teaching background, device ownership, technology usage and experience for CFL learning and teaching purposes; Section 2 measured the teachers' perceptions of technology for pedagogical purpose which was carried out with a 5-point Likert scale based on TAM and expectancy-value theory (Wigfield & Eccles, 2000).

Workshop and interviews. The researcher intended to develop online CFL materials with the four teachers through Moodle; however, according to the results of the pilot survey (see the result section), the teachers' technology skills were fairly low. Thus, existing online resources which were new to the teachers were introduced as well. A hands-on workshop was held in a computer

laboratory to train the teachers how to use Moodle by the following phases: (1) setting up an account and logging in, (2) introducing the several functions on Moodle, (3) demonstrating a sample class with online resources (e.g., Quizlet, YouTube, Vyond, Kahoot!), and (4) a Q&A session. The teachers were encouraged to ask questions and discussed with one another during the workshop. Two teachers (T1 and T2) who did not attend the workshop had an individual training with the same procedure of the workshop. In addition to the workshop, individual training of how to use Moodle was provided if the teachers requested. By the end of the third semester, semi-structured interviews were conducted individually to clarify their perceptions of educational technology with/without integration into practices. The training process as well as the teachers' responses in the workshop and interviews were recorded through field notes and audio recordings with their permissions.

Classroom observations. A total of 139 90-minute observations in the four teachers' classroom were conducted through field notes across three semesters (see Table 1), in which the researcher intended to play a role as a non-participant observer (see the dynamic role of the researcher in the discussion section). A classroom observation scheme based on Wajnryb's (1992) classroom observation tasks were adopted to identify the four teachers' in-class practices in terms of the teachers' medium of instruction, teaching procedures, materials and devices used, in-class activities, and assignment.

Table 1. The number of classroom observations

Semester	T1's class	T2's class	T3's class	T4's class
2018 Fall	12	13	13	13
2019 Spring	9	10	3	12
2019 Fall	12	14	15	13
Total	33	37	31	38

Note. The number of classes had been observed is not equal due to the teachers' convenience (e.g., cancellation of a class, rejection of observation, students' examination).

Access logs in Moodle. In order to measure the participants' engagement in the online materials, behavioural observation data outside of the classroom were imperative. Participants' Moodle usage patterns, including access time on the activities, the platform (website or app) used, and IP address were recorded in the built-in system, collecting from the workshop to the end of the third semester (including a summer break and a winter break). At the end of the research period, the data exported to Microsoft Excel file were analysed, and access time was counted as the frequency of use (see Figure 1).

Time	User full name	Affected user	Event context	Component	Event name	Description	Origin	IP address
11/01/19, 17:01		-	Course: 機能紹介	System	Course viewed	The user with id '9'	web	
11/01/19, 17:00		-	File: 文件（ファイ	File	Course module viewe	The user with id '9'	web	
11/01/19, 17:00		-	Course: 機能紹介	System	Course viewed	The user with id '9'	web	
11/01/19, 17:00		-	URL: 网页地址（「	URL	Course module viewe	The user with id '9'	web	
11/01/19, 16:59		-	Course: 機能紹介	System	Course viewed	The user with id '9'	web	
11/01/19, 16:59		-	Glossary: 词汇表	Glossary	Course module viewe	The user with id '9'	web	
11/01/19, 16:58		-	Course: 機能紹介	System	Course viewed	The user with id '9'	web	
11/01/19, 16:58		-	Forum: 讨论区（	Forum	Course module viewe	The user with id '9'	web	
11/01/19, 16:58		-	Course: 機能紹介	System	Course viewed	The user with id '9'	web	
11/01/19, 16:57		-	Chat: 聊天室（チ	Chat	Course module viewe	The user with id '9'	web	
11/01/19, 16:57		-	Course: 機能紹介	System	Course viewed	The user with id '9'	web	
11/01/19, 16:57		-	Choice: 投票（投	Choice	Course module viewe	The user with id '9'	web	
11/01/19, 16:57		-	Course: 機能紹介	System	Course viewed	The user with id '9'	web	
11/01/19, 16:57		-	Course: 機能紹介	System	Course viewed	The user with id '9'	web	
11/01/19, 16:56		-	Workshop: 互动评	Workshop	Course module viewe	The user with id '9'	web	
11/01/19, 16:56		-	Course: 機能紹介	System	Course viewed	The user with id '9'	web	
11/01/19, 16:55		-	Quiz: 测验（小テ	Quiz	Course module viewe	The user with id '9'	web	

Figure 1. An example of Moodle logs exported to Microsoft Excel

Data a**nalysis**. Following the mixed-method approach, the data generated from each instrument mentioned above was analysed separately. Quantitative data from the survey and logs in Moodle were statistically analysed via Microsoft Excel. On the other hand, qualitative data collected from the classroom observations, along with the audio-recordings generated from the workshop and the interviews were transcribed in the languages the participants used (i.e., Japanese and Chinese). As the primary data sources, the interview results were thematically analysed through Coggle (an online mind-mapping tool) and the crucial parts of the findings were extracted and translated into English. Then, both quantitative and qualitative results were compared and contrasted to find the connections across the data sources and broken down into categories. Finally, the data sources were merged and interpreted thematically, as can be seen in the discussion section.

Results

Survey

Demographic data gathered from the survey indicated teachers' educational backgrounds, experience using technologies for teaching and learning, as well as their perceived expectancy and value of educational technology. The participants' names were coded, and their personal information was briefly summarised in the following table. As shown in Table 2, these teachers had similar teaching backgrounds regarding age, education, and academia, all with a PhD degree in Chinese literature. The data also indicated that though they had an average teaching experience of over 15 years, they had not received teacher training to teach CFL before. In terms of individual differences, as can be seen, the teachers' first language, employment status, and personal devices ownership varied. It is worth mentioning here that T2 and T4 did not own a smartphone at the time the survey was conducted.

Table 2. Teachers' background information (n = 4) (data collected in 2018)

	T1	**T2**	**T3**	**T4**
Age range	45–50	45–50	45–50	45–50
First language	Chinese	Japanese	Japanese	Japanese
Employment status	Associate Professor (without tenure)	Professor (with tenure)	Associate Professor (with tenure)	Associate Professor (with tenure)
Degree	PhD	PhD	PhD	PhD
Field	Chinese literature	Chinese literature	Chinese literature	Chinese literature
Teaching experience	13 years	20 years	15 years	15 years
Have been trained as a CFL teacher?	No	No	No	No
Personal devices ownership	Desktop, smartphone	Desktop, laptop, tablet, flip phone	Desktop, laptop, smartphone	Desktop, flip phone

In terms of the teachers' experiences of using technology for learning and teaching Chinese as a foreign language, Table 3 indicates that T2 had not used technology to learn Chinese before, and T3 and T4 learned CFL with different devices to acquire different language skills.

Table 3. Participants' CFL learning experiences with technology (n=4).

	Experience	**What materials did you learn with?**	**What language skills/areas did you learn with technology?**
T2	No	N/A	N/A
T3	Yes	CD, video, website	Vocabulary, listening, reading
T4	Yes	Electronic dictionary, website	Listening

Note. Since T1 is a Chinese native speaker, she did not learn Chinese as a foreign language.

All of the participants reported that they had used technologies for teaching before. The materials they used to teach and the language skills/areas they taught are shown in Table 4. T1 had used the most variety of materials to teach; in contrast, T3 had merely used videos before. The LMS T1 and T2 referred was a system developed by the university, which they mainly used it for posting announcements (e.g., class cancellations).

Table 4. Participants' CFL teaching experiences with technology (n=4).

	Experience	What materials did you teach with?	What language skills/areas did you teach with technology?
T1	Yes	CD, video, email, electronic dictionary, software, website, LMS	Vocabulary, grammar, listening, speaking, reading, writing
T2	Yes	PowerPoint, video, website, application, LMS	Vocabulary, grammar, listening, reading, writing
T3	Yes	Video	Vocabulary, listening
T4	Yes	Video, website	Vocabulary, grammar, listening, speaking

Table 5 indicates that the four teachers' attitudes toward using technology for CFL teaching were generally positive. From the mean ratings, it can be seen that seven of the items were rated as high agreement within the categories of Interest (M = 3.75), Beliefs (M = 3.50 and 3.75), Extrinsic Motivation (M = 4.00 and 3.50), and Social Motivation (M = 3.50 and 3.75). It seems that all teachers regarded technology useful as the item' useful for teaching' received the highest rating (M = 4.00). On the other hand, the items' knowing how to train students' (M = 3.00), "lack of financial or technical support" (M = 3.00), and "difficult to control learning patterns" (M = 3.00) received the lowest mean ratings. The results also show that the teachers' opinions on "lack of discussion with colleagues" were dispersed (SD = 1.29), though they were teaching in the same department.

Table 5. Participants' expectancy and value regarding using technology for CFL teaching (N = 4).

Categories	Items	T1	T2	T3	T4	Mean	SD
Confidence	– I am confident in my technological skills.	4	4	2	3	3.25	0.96
	– Learning to teach with technologies would be easy for me.	4	3	2	4	3.25	0.96
Competence	– I know how to select appropriate online materials for teaching and learning.	4	3	2	4	3.25	0.96
	– I know how to train students to use technologies for pedagogical purpose.	4	3	2	3	3.00	0.82
Relatedness	– I am sufficient to current teaching approach.	4	2	4	3	3.25	0.96
Interest	– I am interested in using technology in teaching.	3	4	4	4	3.75	0.50
Beliefs	– I believe using technology can facilitate students' motivation.	3	4	4	3	3.50	0.58
	– I believe students can get access to Chinese language and culture outside of the classroom with the use of technology.	3	4	5	3	3.75	0.96
Perceived cost	– I think using technology for pedagogical purposes will gain more effort (e.g., time consuming, heavier workload).	3	4	3	3	3.25	0.50
	– I lack financial or technical support for integrating technology into teaching and learning.	3	3	4	2	3.00	0.82
Concerns	– I worry that using technology will be difficult to control students' learning pattern.	4	4	2	2	3.00	1.15
Extrinsic motivation	– I believe technologies are useful for my teaching.	4	4	5	3	4.00	0.82
	– I think classroom management will be easier by using technologies.	3	4	4	3	3.50	0.58
Social motivation	– There is a lack of technology-related sharing, discussion, or support among CFL teachers at this school.	2	3	5	4	3.50	1.29
	– I think students are interested in using technology in learning.	4	4	4	3	3.75	0.50

(1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree)

Workshop and interviews

According to the teachers' responses in the workshop and interviews, they did not have a specific idea about what online Chinese teaching materials should be used but addressed their concerns and beliefs about how language should be taught/learned. As can be seen in Table 6, when being asked (1) what types of online materials the teachers would like to develop through Moodle, and (2) if the teachers planned to use any online tools and Moodle's functions in their teaching after the workshop, most of the teachers simply want to post audios and reading materials related to Chinese culture and stressed various concerns from both teacher and student perspectives. For instance, they perceived that developing online materials and using Moodle might increase both teachers' and students' workload. The teachers were also concerned about the contents that against their teaching beliefs. For instance, the teachers believed that students were unable to learn tones through Chinese songs and typing tasks because of the features of tonal language. Accordingly, T2 and T3 claimed that tones are omitted when doing writing tasks through typing, and T3 thought teaching Chinese songs was meaningless since tones are taken away by melody. When introducing Quizlet's text-to-speak (TTS) flashcard, T1 and T3 showed their disagreement on the TTS function, as they believed that students were supposed to learn "correct" and "standard" pronunciation from the teacher under face-to-face instruction. With a lack of confidence in language competency (i.e., Chinese pronunciation and grammar), as T2 had claimed in the workshop, he asked the researcher to record the audio contents for the materials made by himself on Moodle, and he confirmed the grammar used in the self-made materials with the researcher as well. Also, though T4 did not voice his opinions in the workshop, he tended to be more willing to reveal his lack of linguistic knowledge, language proficiency, and digital skills in the individual interviews.

Interview results also indicate that T1 and T2 were in the same department previously. According to T1, CFL teachers in the department were required to use a Chinese learning software developed by the department for their formal teaching practices. During class time, students used the software to learned general language skills by themselves in computer rooms, and the teachers monitored students' engagement simultaneously. T1 revealed that she was not satisfied with the method, which threatened her role as a teacher:

> *I feel alone when seeing the students actively engaging in the system in the classroom. The only thing I was doing is walking around and waiting for them to ask me a question.*

T2 pointed out that he was one of the developers of the software, though he thought it was not designed well, he had to contribute to the contents under the superior's direction because of his lower position (as a research assistant) at that time.

Table 6. Teachers' needs and concerns about online materials (n=4).

Teacher	Needs	Concerns/beliefs
T1	To digitalize the textbook used in class and provide Chinese culture learning materials	"We (the teachers) are too busy to do extra work." "Students do not have time to learn more outside the classroom...they have other subjects to learn." "Students should learn standard pronunciation."
T2	To provide materials introducing Chinese culture, to import audios from self-made materials and textbook CD	"Teachers are merely a manager (while students using technology)." "I do not have time to set up the materials." "Students can't learn tones by typing."
T3	To provide materials about modern Chinese culture and reading materials irrelevant to the formal class	"I prefer to teach face-to-face." "Students might hate the subject if they have to do the required assignments after class." "They (the students) cannot learn correct Chinese from a machine." "Students cannot learn tones from songs because tones are omitted in songs...also in typing."
T4	No idea	"I'm not confident about teaching." "I don't know how to correct writing tasks, because I'm not native." "I'm not an expert (in linguistic)." "My students rely on me a lot, but my digital skills are worse than theirs."

Classroom observations

The teachers' language and teaching materials used, as well as teaching procedures were observed in their classroom practices before and after the training session. Before Moodle and the online resources were introduced, all teachers tended to apply grammar translation method (GTM) and audio-lingual method (ALM) in a teacher-centered way without peer works and group activities (see Table 7). According to T1, she claimed that it was common to teach language as a subject in order to pass examination at Japanese universities, so "*teachers preferred to teach like a cram school did*". It was evident that though there were essential equipment (e.g., PC, projector, Wi-Fi, speaker, monitor, CD/DVD player) in the classrooms, the four teachers rarely used it. Only the MP3 player and CD were used in class to play the textbooks' audios. None of the teachers provided out-of-class learning materials but three of them had weekly vocabulary test, and T1 distributed weekly assignment sheets copied from another textbook, asking her students to write an article based on a selected topic.

Table 7. Classroom practices before Moodle and online resources were introduced (first semester)

Subject	T1	T2	T3	T4
Material(s) used	Textbook	Textbook, sub-textbook, handouts, dictionary, MP3 audios	Textbook, sub-textbook, dictionary, MP3 audios	Textbook, sub-textbook, handouts, CD
Device(s) used	N/A	MP3 player	MP3 player	CD player, PC
Smartphone ban	Not strictly restricted	Banned	Banned	Not specified
Teacher's meta language(s)	Japanese	Japanese, Chinese	Japanese	Japanese
Dominated teaching approach(es)	GTM	ALM, GTM	GTM	GTM
Content and focus	Grammar, translation	Pronunciation, grammar, translation	Pronunciation, vocabulary, grammar, translation	Vocabulary, grammar, translation, culture
In-class activities	Free conversation, grammar instruction, textbook exercises, recitation, translation task	Recitation, drill, translation, interpretation, vocabulary test	Recitation, shadowing, translation, interpretation, vocabulary test	Recitation, shadowing, translation, interpretation, vocabulary test
Weekly assessment(s)	N/A	Dictation test	Dictation test, recitation	Dictation test, recitation
Assignment	Weekly essay	N/A	N/A	N/A

After the workshop, it was observed that T1 did not change her teaching styles and did not adopt any of the online resources and Moodle use in her classrooms, whereas the other three teachers made varied changes in their teaching practices. T2 slightly changed the teaching materials and activities, as he used Google Map to teach directions in Chinese in one of his classes. Since the teachers were voluntarily participating in this study, they were free to withdraw at any time. T3 resisted being observed in the second semester, claiming that he would like to build his "teaching authority" in his class at first. Instead of that, he started a 30-minute pronunciation class before the formal class and allowed the researcher to observe. It was observed that he used NHK's (a national broadcasting organization in Japan) video clips as a language model to correct the students' pronunciation one-to-one. Despite the fact that T4 raised fewer views on technology integration, he tried various new technology in

classrooms (e.g., student presentation via PowerPoint, singing Chinese songs and watching videos through YouTube, demonstrating textbook and assigning tasks through Moodle, and Quizlet) that he had not used before the training. However, he claimed that he had limited digital skills and asked the researcher to upload the materials (e.g., online writing tasks, online listening tasks, pronunciation recording tasks) in Moodle for him; besides, he asked the researcher for more advice on teaching and learning. Worth to mention here is that even three of the teachers adopted new methods in their teaching after the training, their teaching approaches did not change significantly, and their teaching styles remained teacher centered. For instance, T4 presented the textbook contents through Moodle and demonstrate Quizlet on the screen and asked the students to translate the texts/vocabulary.

Access logs in Moodle

Since the workshop, T1, T2, and T3 had not logged in to Moodle. When the researcher asked them the reasons of the non-accession, T1 claimed that she forgot her account; T2 claimed he was too busy to check it; T3 did not give specific reason. By contrast, T4 logged in frequently, with a total of 2,355 logins (see Table 8). It was recorded that T4 used only the website version of Moodle, and records of his activities and IP addresses indicated that he accessed Moodle mostly at the university for viewing the contents (as he presented the contents in the classrooms), as well as grading and giving feedback on students' assignments outside of class.

Table 8. T4's engagement in Moodle

Event name	Access time
Viewing (Total =2,123)	
Course module viewed	754
Grading form viewed	418
Course viewed	415
Grading table viewed	263
The status of the submission has been viewed	139
Submission viewed	61
User profile viewed	27
User list viewed	23
User log report viewed	11
Grader report viewed	6
Notes viewed	4
Producing (Total = 232)	
The submission has been graded	164
Course activity completion updated	63
Comment created	5
Exporting (Total =2)	
All the submissions are being downloaded	2

Note. Event name refers to something a user conducted. Access time is calculated from a user first clicks on something in an event until he or she clicks outside the event or logs out.

Discussion

The study aimed to explore the factors influencing how the in-service teachers adopted (or avoided) using technology in their teaching practices when new educational technologies were first introduced. According to the results above, the current study indicated how the four university teachers perceived technology integration and how the individual and interpersonal factors affected their adoptions or resistance to use technology for pedagogical purpose. The teachers were categorised according to their perceptions and engagement on Moodle and online resources; also, the significant factors influenced their adoption include: (1) experience in teaching and learning, (2) emotional factors, (3) competence in language and culture knowledge, (4) teaching beliefs, (5) motivation, and (6) sociocultural factors.

Teachers' perception and adoption of technology

Based on the behaviours and attitudes of the teachers, it is possible to tentatively categorise the teachers into four main types, as described below.

Confident but anti-technology. T1 has relatively good digital skills, but she was reluctant to use technology in teaching. As she had claimed that she was

"too busy to do extra work," it seems that she tended to focus more on administration works and research instead of spending time on changing her existing teaching. Also, the negative experiences in teaching with technology (i.e., the use of a CALL software complying with the superiors' demand) might have caused her unwillingness to try new methods.

Interested but hesitant. T2 has more experience in teaching with technology compared with other teachers, and he showed more interest and indicated an awareness of the usefulness of technology integration in teaching. It was somewhat of a contradiction that he rarely adopted new technology in his classroom practices, but as discussed above, he did not own a smartphone and banned smartphone usage in class. The previous experiences of using the CALL software caused his worries about losing control in students' learning might be the reason for the hesitation of adoptions.

Fear of losing authority. T3 has limited digital skills and less confidence in his language competence. He seemed to realise the difficulties he had but was reluctant to ask for help or discuss these with the teaching community. The results also reveal that T3 tended to build his authority in the classroom. The fear of losing face in front of his students/colleagues might explain why he rejected using new technologies.

Open-minded but anxious. T4 is the only one who adopted Moodle and various online resources in his teaching practices. However, he tended to consult with the researcher for teaching methods more often than asking for technical support. Although the researcher was willing to provide him with more training for using Moodle, T4 preferred to ask the researcher to upload the materials for him. It shows that T4 is ready to try new methods but still nervous to use unfamiliar technologies.

Factors affecting educational technology use

Experience in teaching and learning. The four participants reported that they had had experience in teaching Chinese with technology; however, this previous experience might have caused hesitation to adopt new technologes. As the results shown by in T1 and T2's statement indicated, prior experience with teaching using technology resulted in concerns about losing control in students' learning. Additionally, the four teachers from literature backgrounds had not been trained as a language teacher before, according to T1: "*I didn't receive any training. I think the other teachers are the same. We all teach from our classroom experience.*" With a lack of SLA knowledge, they tended to teach in the way they had learned or been taught. For instance, the teachers preferred paper-based materials and encouraged the students to bring a dictionary to class, because these were the "*effective ways*" to learn Chinese with which they had learned, as they claimed. In the interviews, T3 mentioned that he had learned Chinese by listening to radios and watching NHK's television programs and videos clips,

so he used the NHK's videos to teach in class. T1 als*o pointed out that "The contents (self-made printouts) are original, but the teaching methods are from my previous Chinese learning experience.*" These CFL teaching/learning experiences the teachers perceived effective might explain why they still applied the traditional approach and rarely accepted new teaching methods.

Emotional factors. Positive and negative emotional factors also led to different outcomes (Williams *et al.*, 2016), not only confidence but also anxiety had been revealed in this study across time. The findings are in line with Howard's (2013) study that found the teachers with less confidence in using technologies perceived more risks, and the uncertain attitudes toward technology limit their use (see also Ertmer *et al.*, 2012). For instance, T3 indicated that he had little confidence in digital skill and avoided using technology. He tended to build authority and appeared to fear losing face in front of his students, whom he perceived as so-called "digital natives" (Prensky, 2001). This outcome shows some parallels with Kessler and Plakans (2008), who found that highly confident teachers used less technology compared with the less confident teachers. However, in this study, it was found that T2, who had indicated he was confident with his digital skills, did make some minor changes to his practice, but he appeared to be anxious about using technology as he feared the teacher's role may be taken over by technology (see also Lam & Lawrence, 2002). Similarly, T1 indicated relatively high confidence but did not make any changes to her practice; this might have been because she was concerned that using technology might causer her to lose her control over students' learning patterns, as she mentioned in her survey responses. Compared with previous studies, the current study found that the teachers' confidence in language proficiency and second language teaching knowledge played a more crucial role in determining technology adoption. T4 indicated he had low digital skills and low satisfaction with his current teaching, yet he made the most significant changes adopting various new methods. He was anxious about his limited linguistic and pedagogical knowledge according to what he revealed in the interview. It appears that confidence and anxiety are two sides of a coin associated with digital skills, language skills, and teaching skills, which might be factors leading to accepting or resisting innovative technologies.

Competence in language and culture knowledge. The competences in providing appropriate materials for students were revealed in this study, according to the teachers' needs and concerns. The three non-native Chinese teachers were more concerned about their language proficiency, which can be observed by their reliance on audios and requests for "native speaker" help. For instance, T2 asked the researcher to make audio recordings for his self-made materials, T3 invited the researcher to judge the students' pronunciation, and T4 wanted the researcher to provide feedback on the students' online tasks with him. Not only proficiency in the target language, but the awareness of English might also be the factor avoiding implementing online resources. In the training workshop, when the online resources (e.g., video maker, animation maker, and Kahoot!)

that used English as the interface language were introduced, T3 and T4 revealed their concerns about their English proficiency. When the researcher suggested that teachers might consider attending international conferences and reading academic journals related to the CALL field, T4 also addressed his lack of English proficiency though he was interested. Additionally, the limitation of access to pop culture might be a barrier to providing materials for students. T2 and T4 claimed that their students asked them if they could recommend any Chinese pop songs or Chinese movies. Yet, because the teachers had been away from the target language environment for over ten years, they asked the researcher to provide the materials about Chinese culture that their students might be interested in.

Teacher beliefs. Though the teachers had several choices in teaching materials with the use of technology, they tended to maintain usage that was determined by their beliefs (e.g., Lai *et al.*, 2016; *Tondeur et al.*, 2017). *In particular, this study concurred with Ding et al.*'s (2019) *findings that teachers' technology use generally aligns with their content-specific pedagogical beliefs. The emphasis on "accuracy" also became a barrier of trying new methods (i.e., providing typing tasks, teaching through songs, using TTS and authentic materials). Not only the teacher who taught beginners but also the teacher who taught advanced learners did not encourage authentic online materials. They preferred textbook-based resources, which they regarded more "accurate"* and preferred face-to-face instruction in a classroom environment. For instance, T1 claimed *that she did not encourage her students to practice pronunciation by themselves, in the way that "They will learn incorrect pronunciation outside of the classroom."* With the belief that *"students should learn standard pronunciation,"* T3 played video *clips as a language model to correct his students' pronunciation individually in class. Still, he also picked on the "imperfect"* pronunciations pronounced by the "native speakers" in the videos. Though the teachers adopted new methods in their teaching, they still maintained their teaching in a traditional way consistent with their teaching beliefs. Regarding beliefs about technology, it seems that technology is simply a "digitalised method" for the teachers' existing teachings (i.e., drills and practices).

The teacher's existing pedagogical beliefs play a crucial role of technology use as seen in Ertmer *et al.*'s study (2012). Although the researcher encouraged collaborative learning activities with technology, the teachers preferred one-way (teacher-student) instruction. After demonstrating Kahoot! in one of T4's classes, the teacher was asked about his reflections on the game-based quiz platform. As T4 stated:

> *The form of game-based teaching with team working...Can they really learn from that? It is interesting, but they end up having fun... It's interesting, but for the students' sake, it's better to have a test after that, or they will forget their learning.*

Believing that traditional teaching approaches work better might explain why T4 preferred Quizlet, which provides Chinese words and pinyin (a romanisation

of Chinese) on one side and the Japanese translation on the other side, as it coincided with his translation-based teaching approach.

Motivation. How the teachers viewed the value and relatedness of adopting new methods might have impacted upon motivation. The findings echo Stupnisky *et al.*'s (2018) results that the teachers might value research over teaching in the institution with a tenure/promotion system. Since the Japanese university requires research achievement to get promotion, T1, who was an associate professor without tenure, claimed that she was too busy to do extra work for developing any materials in Moodle. Results of classroom observation showed that T2 and T3 tended to use their published textbooks to teach. While they claimed that developing online materials might gain their workload, it is perhaps online materials do not count as published output. On the other hand, T4 expressed less interest and perceived usefulness in educational technology in the pilot survey, but his engagement in Moodle was surprisingly high. T4 *had tried various teaching materials in class and asked for more teaching advice, showing his intrinsic motivation without any external rewards to use technology in his teaching practices might have been triggered. However, in the interview, he admitted that using Moodle gained his workload: "I have to spend more time preparing the materials and giving feedback to the students."*

Sociocultural factors. The findings showed the interpersonal relationships (i.e., among the teachers, the teachers with their superiors, the teachers with the students, and the teachers with the researcher) might predict the teachers' perceptions in such context. Teacher community is suggested to exchange experience and search for advice for applying CALL into pedagogy (Stockwell, 2009); however, this study shows that despite the four teachers being colleagues, there was a lack of teaching collaboration and communication in the top-down hierarchy workplace. In the interviews, it was interesting that the four teachers asked the researcher questions such as "*What the others are doing in the class?" "Are they using Moodle?*" In Bartlett's (2020) study, he pointed out the younger and lower-ranked teachers' reluctance to try a new approach that might offend the existing practices in the Japanese workplace. In line with it, the current study also found that the junior teachers (younger or have less teaching experiences in the department) tended to follow what the superiors/seniors required them to do (e.g., T1 and T2 used the system they did not like). Also, in a group meeting to obtain the teachers' permission for this study and the workshop, it was found that T3 was the most talkative. In contrast, the other three teachers rarely expressed their opinions and mostly showed agreement with T3. According to T1, *that was because "T3 is our senior. He has the longest teaching experience in this department among us."* When encountering teaching problems, they tended to solve by themselves rather than asking their colleagues for help, as T1 *claimed:*

We are colleagues, so we don't propose working methods even if we find

something inappropriate. Should we say anything? No, we don't. We can't…
At least these teachers don't communicate about teaching methods.

These are likely because of the *sempai-kohai* system (system of seniority) rooted in Japanese society that hindered the teacher community, as juniors were not encouraged to speak out in front of their seniors.

Although in the field of cross-cultural psychology, Japanese collectivism has been criticised as a stereotypical notion and Japanese is shifting to individualism (Hofstede, 2011), the concept is still valid and appears to be deeply rooted in Japanese educational systems. For example, Sugimoto (2010) notes that institutions in Japan value psychological integration as a process of socialisation to "generate a sense of group cohesion and achievement." This can explain why T2 believed using a smartphone may damage "*a sense of unity*" within the class, as he stated in the interview:

> *I don't mind the students using a smartphone to look up words in class, but the*
> *class becomes out of order. One of the interesting things to come to the class*
> *is to get together and feel "the sense of unity".*

This social pressure might cause individuals to avoid conflict and embarrassment within a group, for instance, refraining from showing disagreement or from being competitive among group members. Collectivism among the teachers was found in this study. While T1 strongly disagreed on the survey item "There is a lack of technology-related sharing, discussion, or support among CFL teachers at this school," in the interview, T1 admitted that she did not know what the other teachers were doing in their classes. T1 also asked the researcher if they could track each other in Moodle. The tracking functions (logs report) in Moodle was questioned by T4 as well, as he asked, "*Am I being tracked by you (the researcher)?*" The concerns about being tracked might have cause different outcomes regarding their usage. For instance, T1 was aware that others might observe the Moodle logs. It is interesting that the teachers tended to protect their privacy of teaching from their colleagues but revealed their concerns and sought for help outside of the community.

The findings also suggested that how the teachers perceived their students' perceptions plays a crucial role in technology adoption. It seems that the teachers perceived their students as lacking in motivation to learn Chinese, and they knew most of the students took the course simply to get the required credits rather than to acquire the language. That is, the low learning motivation perceived by the teachers might have affected how much effort they were willing to put into their teaching. Moreover, as mentioned previously, the teachers perceived the students had better digital skills. The myth of digital natives (see also Stockwell & Reinders, 2019) might prevent teachers from trying new technology to save face and build authority. Besides, it was found that the non-native teachers requested audio- and culture-based materials from the researcher. It might because of the native-speakerism rooted in the context where native speakers are considered as serving as the model of language and culture (Holiday, 2006). Their ideology in language education might have

influenced how the teachers chose or rejected technology in their teaching practices.

Limitations and suggestions for future research

Although the teachers volunteered to participate in this study without any benefits, due to ethical concerns, the researcher had to reveal the purpose of conducting the classroom observation in order to get the teachers' permission to collect the data. While the researcher did not explain the explicit goals of observing the teachers' technology used in the classrooms and Moodle logs during data collection, it was unclear if the teachers changed their intentions to use technology when they knew they were being observed.

The role of the researcher should be clarified here. At the beginning of this study, the researcher did not have a personal relationship with any of the participants and intended to provide only technical support and training for the teachers. Although the researcher attempted to be a non-participant observer in their classes, the researcher was required to take part in certain teaching activities (e.g., reading the textbook, correcting the students' pronunciation) as the teachers asked in class. There was a slight shift in the relationship over time as the teachers perceived the researcher as "a native speaker of Chinese," "a linguistic expert," "a high-skilled technology user," and "an experienced teacher," and became more willing to reveal their real voices. It was likely unintentional but can be seen as a reason for gaining trust within the community, where a dynamic relationship can be found between the participants and the researcher, as the teachers became more willing to reveal their lack of experience and confidence in teaching with technology over time. Note that different researchers replicating this study may obtain different results according to the relationships between the participants and the researcher in hierarchical contexts; also, the findings generated from the small sample size are difficult to generalise to other social contexts.

As this study found, the participants' responses in the survey and the interviews might not reveal a whole picture of their perceptions, in other words, what they claimed in the self-reported survey might not have reflected their actual behaviour. The one and a half years of investigation might not have been long enough to see how the teachers changed their existing practices, since adopting new methods is time-consuming and challenging. Therefore, this study suggests more longitudinal ethnographic research into exploring CALL ecosystems from sociocultural perspectives to discover the complex impacts on the way in a teaching environment as time progressed. Understanding how society and culture shape teachers' perceptions and behaviours might help raise awareness of the educational issues in such a context.

Conclusion and implications

This study sought to investigate in-service language teachers' perceptions of integrating technology into their teaching practices in a naturalistic setting

to shed lights on the internal factors that hampered "fully utilising ICT" and "normalisation" of CALL. The results outline the reality of teachers' resistance to technology integration for pedagogical purposes in such a specific context, where the language teachers from literature backgrounds without training in language teaching nor technology training. The lack of CALL knowledge and the teachers' concerns about their language skills (i.e., the three Japanese teachers perceived themselves as non-native language teachers) might have caused psychological responses that affected their decisions to use Moodle and online resources. It seems the teachers' existing teaching methods rooted in their beliefs and strengthened by the teaching environment (e.g., teacher-centred curriculum, learners' CFL motivation, workplace atmosphere) around them affected how they integrated technology into their teaching practices (see also Kim *et al.*, 2013; Lai *et al.*, 2016; Liu, 2011). In particular, teachers' beliefs shaped from the early stages of their own language learning and prior experience might cause resistance to change.

Though new roles for teachers in technology-enhanced language learning environments have been suggested in the literature, these teachers were reluctant to take on these new roles as the teachers perceived their authority (e.g., control over students' learning, the authority of knowledge) were taken away from technology (see also Lam & Lawrence, 2002). Moreover, the myth of "digital natives" and "face" culture might hinder the experienced teachers to become "learners of technology" because of the threat to the traditional teacher's role. In this study, it appears that when the experienced teachers faced teaching problems, they tended to ask for the researcher's help rather than their teaching community. As discussed above, it seems in such social contexts where there is a fear of negative evaluations by others; the teachers might be anxious about losing face in front of their students and colleagues.

Regarding the integration of new technology into teaching, it was found that the teachers choose the online resources which matched their existing teaching styles. It is not surprising that T4 used Moodle frequently, but mainly for viewing the materials in a digitalised textbook format. Although T4 provided feedback on students' assignment through Moodle, he seemed to underestimate the social features that Moodle can bring. The traditional teacher-centred practice deeply rooted in the context, where "teacher authority" lies as a central belief, might cause "teaching an old dog new tricks." Hampel and Stickler's (2005) skills pyramid has suggested the goal of teacher education in educational technology is to develop teachers' own teaching style emerging with technology usage as they gain familiarity and confidence with technology use. However, encouraging the teachers to try resources they were not familiar with seemed to be difficult in this study, since the teachers showed their various concerns about new technology and merely adopted the CALL resources that matched their existing teaching styles. Integrating new technologies into current practices meant that the teachers had to alter their lesson plans and teaching processes. However, these experienced teachers had established their teaching routines in the classrooms, and they had their priority of work order (e.g., research and administrative activities), which meant that adopting new

methods might have increased their workload. Moreover, two of the teachers did not have a smartphone, and all the teachers mainly only used Microsoft Word and email in their everyday life. It comes as no surprise that the teachers who rarely used technology in their personal life did not embrace technology, though the extrinsic barriers could have been removed.

This study can be seen as a technology preparation for experienced in-service teachers who are novices with CALL. Observing the teachers' natural use of technology may shed light on the barriers regarding promoting policies about CALL adoption. Although the researcher attempted to help the teachers develop their CALL skills through a training workshop and follow-up support, the teachers seek more teaching advice rather than technical support. Previous studies have suggested overcoming extrinsic barriers to the use of technology in teaching by providing training, technical support, and teaching community, but the four experienced in-service teachers in this study were reluctant to "be trained" and unwilling to exchange teaching ideas nor to look for peer support. How to provide support and training to experienced in-service teachers with intrinsic barriers is an ongoing challenge for institutions, who usually play a crucial role in promoting educators to use technologies (Son, 2018). Therefore, in such a top-down educational system, institutions should be more aware of teachers' pedagogical needs and concerns to understand what hampers educational technology integration, especially for teachers who already have ingrained teaching beliefs. Providing teaching support and encouraging a teaching community will likely be an ongoing challenge in such hierarchical contexts where the teachers are unwilling to speak up against policies and practices.

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