Exploring University EFL Teachers’ Technological Pedagogical Content Knowledge and Teacher Efficacy in Technology-integrated Flipped Classroom

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Abstract
This qualitative study explored teachers’ knowledge and teacher efficacy about implementing technology-integrated flipped classroom (FC) in higher education. Using the technological pedagogical content knowledge (TPACK) framework and teacher efficacy theories, the study probed the experiences and perceptions reported by 12 university teachers of English as a foreign language. Six themes emerged from the study. Themes 1 to 3 depicted how the EFL teachers practiced the three essential teaching tasks of technology-integrated FC. By incorporating the instructional design of FC into TPACK constructs, the study developed a new FC-situated TPACK framework. Themes 4 to 6 revealed that the teachers’ sense of efficacy increased overall but fluctuate slightly. Factors improving teacher efficacy included positive changes in student performance, supportive leadership and climate, effective group work among colleagues, and open-mindedness toward technology. While factors decreasing teacher efficacy encompassed adherence to a unified teaching model imposed by the department, technology’s non-user-friendly, and impersonal characteristics. This study provides a comprehensive view of how the sampled teachers applied FC-situated TPACK. Its findings also enhance the understanding of teacher efficacy, particularly in relation to FC instruction.

Keywords
flipped classroom, technology integration, EFL, TPACK, teacher efficacy, university teachers

Technology-integrated flipped classroom (FC), a new instructional approach, is well suited to teachers and learners of English as a foreign language (EFL). The advancement and integration of Information and Communication Technology (ICT) offer a new perspective on EFL study: technological hardware and software allow teachers to record and deliver video lectures or other content, conduct real-time formative assessments, and organize pair-and-share activities both during and after class (O’Flaherty & Phillips, 2015). On this basis, EFL learners’ individual differentiation, abilities to autonomous and collaborative learning as the major concerns of FC instruction can be strongly undergirded. However, to realize the many potential benefits of technology-integrated FC instruction for EFL study, the relevant technological tools must be appropriately adapted for teaching purposes by teachers (Liu et al., 2018; Long et al., 2017; Sabzian & Gilakjani, 2013).

Today’s EFL teachers still face many challenges when attempting to integrate technology into FC instruction (see Turan & Akdag-Cimen, 2020, for a review). To name a few, it can be difficult for language teachers to identify the resources, tools, or websites that will best serve their classes and students (Kessler, 2018). Teachers may experience problems with video lecture quality and find that such lectures are incapable of covering the course content (Wanner & Palmer, 2015). In addition, preparing and recording video lectures and online materials is rather time-consuming, which may make teachers reluctant to adopt technology (Howitt & Pegrum, 2015; Tomory & Watson, 2015; Wanner & Palmer, 2015). Teachers’ technology integration is a dynamic complex process affected by multiple internal variables including teachers’ knowledge (Fathi & Yousefifard, 2019; Lai et al., 2018), pedagogical beliefs (Ding et al., 2019; Liu et al., 2017; Tondeur et al., 2017), and attitudes toward technology integration (Sabzian & Gilakjani, 2013; Sointu et al., 2019; Teo et al., 2016). Among the multiple internal variables, teachers’ knowledge and beliefs are the two most frequently

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cited barriers to their technology integration (Ertmer et al., 2012; Hew & Brush, 2007). That is, to increase the effectiveness of technology integration, teachers must develop integrated knowledge of teaching, content, and technology and transform their pedagogical beliefs and attitudes to facilitate technology integration.

Qualitative research probing university EFL teachers’ experiences of integrating technology into FC instruction was expected to offer much-needed insights into how internal factors affect teachers’ technology integration. It was also expected to provide a productive starting point for facilitating technology integration among current and future EFL teachers implementing FC instruction. Considering the pivotal roles of teachers’ internal factors in technology integration, this study explored how university EFL teachers translated knowledge and efficacy into their technology integration practices in FC instruction. More specifically, the study qualitatively explored how university EFL teachers applied technological pedagogical content knowledge (TPACK, hereafter) to teach with technology-integrated FC, how their efficacy about integrating technology into FC changed, and what factors influenced their perceived efficacy during this process.

**Literature Review**

**The Role of the TPACK in Technology Integration**

Teachers’ knowledge plays significant roles in how they decide to use technology (Baturay et al., 2017; Fathi & Yousefifard, 2019). For better understanding the roles of teachers’ knowledge in technology integration, Mishra and Koehler (2006) divided teachers’ knowledge into specific types required for the purpose of technology integration. The TPACK framework proposed by them (e.g., Koehler & Mishra, 2008, 2009; Mishra & Koehler, 2006) offered the first theoretical conceptualization of incorporating technology into teaching and has been extensively accepted by research on technology education and teacher professional development (Chai et al., 2013; Rosenberg & Koehler, 2015; Voogt et al., 2013).

As shown in Figure 1, there were seven distinct knowledge elements consisting of the TPACK framework, including CK (content knowledge), PK (pedagogical knowledge), TK (technology knowledge), TCK (technological content knowledge), TPK (technological pedagogical knowledge), PCK (pedagogical content knowledge), and TPACK (technological pedagogical content knowledge; Koehler & Mishra, 2009).

The TPACK framework is thought to benefit insights into the complex phenomenon of technology integration since it separated the intertwined forms of knowledge and took account of their interactions. According to Koehler and Mishra (2009), TPACK has offered a proper way to observe and depict teachers’ thought processes and actions about technology integration in diverse educational contexts. Over the recent decade, educational researchers have been using specific TPACK constructs to predict teachers’ technology using willingness or behaviors in teaching practices. For example, Pamuk (2012) found that PCK can significantly predict 78 Turkish preservice teachers’ the overall technology integration efforts. Mei et al. (2018) found that TPACK was a direct factor affecting 295 Chinese EFL preservice teachers’ intention to use Web 2.0 technological tools in teaching.

TPACK constructs have also been found to strongly influence FC implementation because the FC model usually requires teachers to possess the complex knowledge and pedagogical strategies needed to integrate teaching content with suitable technologies (Saab & Stengs, 2014; Sointu et al., 2019). Moreover, the use of technologies to support flipped teaching reciprocally reinforces teachers’ knowledge, skills, and competencies regarding technology integration (Piotrowski & Witte, 2016).

Although these studies have indicated the importance of TPACK to teachers’ technology integration, particularly in FC settings, none have described the patterns of development and practice associated with each type of TPACK under the complex contextual conditions of FC instruction. The relationships between specific TPACK constructs and characteristics of FC instruction have yet to be fully described.

**The Role of Teacher Efficacy in Technology Integration**

Teacher knowledge and competency are vital elements for effectively integrating technology into instruction. However, only when the teachers believe in the value of technology will they proactively apply their knowledge and expertise to technology integration (Ding et al., 2019; Ertmer & Ottenbreit-Leftwich, 2010; Yildirim, 2000). Many
psychologists believe that teacher knowledge and beliefs are two interlaced variables (e.g., Baturay et al., 2017; Scherer et al., 2018) and therefore they were regarded as integrated inherent parts of teacher agency (Tondeur et al., 2017). That is, when teachers come across the need of integrating technology into teaching, they should not only upgrade their knowledge of instructional strategies, methods, and approaches but also change their attitudes, beliefs, and pedagogical ideologies (Ertmer & Ottenbreit-Leftwich, 2010).

Teacher efficacy is a teacher’s belief with an important influence on teachers’ confidence and competence in engaging with a given task (Lemon & Garvis, 2016; Tschanne-Moran et al., 1998). Researchers investigating teacher efficacy have drawn on two theories: Bandura’s self-efficacy theory and Rotter’s internal-external locus of control theory (Kelly & Denson, 2017; Kim & Seo, 2018). Grounded in social cognitive theory, emphasizing the evolution and exercise of human agency (Bandura, 2006; Skaalvik & Skaalvik, 2010), teacher efficacy is defined as individual teachers’ confidence and beliefs in their own ability to plan, organize, and implement educational activities to attain certain goals (Skaalvik & Skaalvik, 2010; Tschanne-Moran et al., 1998). Teacher efficacy has a far-reaching impact on the entire educational setting, as it is strongly associated with teachers’ commitment to the profession, morale, and perseverance (Kelly & Denson, 2017).

Teacher efficacy is a significant driver of teachers’ acceptance and integration of technology. Teachers’ positive perceptions of their own ability to integrate technology often encourage more meaningful pedagogical interactions with technology tools (Hall et al., 2019; Kundu et al., 2020). Teo et al. (2018) assessed Chinese EFL teachers’ (N = 183) self-efficacy in the use of computers (i.e., teachers’ self-evaluations of their ability to use a computer) and found that the teachers’ computer self-efficacy was a statistically significant antecedent on their behavioral intention to use technology. Another two studies also highlighted the role of teacher efficacy in teachers’ acceptance and use of FC as a new instructional model. Kelly and Denson (2017) qualitatively examined three STEM teachers’ teacher efficacy when teaching in an FC environment and found that it was affected by the teachers’ prior flipped instruction experience, students’ active participation in FC, and support from the school. Lai et al. (2018) contended that teacher efficacy is of great importance in teachers’ continuous adoption of FC instruction, noting that participants (N = 169) with greater perceived efficacy and intrinsic motivation were more likely to teach with technology in an FC. Therefore, we postulate that strengthening teacher efficacy is a crucial way to promote technology integration in FC settings.

According to self-efficacy theory (e.g., Bandura, 2006; Bandura et al., 1999), individual self-efficacy beliefs can be influenced by four primary sources: (a) enactive master experiences, (b) vicarious experiences, (c) social influences, and (d) physiological and affective states. Ertmer and Ottenbreit-Leftwich (2010) argued that the most potent source of efficacy is mastery experience, followed by vicarious experience, probably because the more successful experiences teachers have of using technology, the more likely they are to be comfortable using technology. Additionally, observing significant others, especially colleagues and peers who successfully complete tasks would encourage observers to believe that “if he/she can do it, then I can too” (Ertmer & Ottenbreit-Leftwich, 2010, p. 269). Socio-cultural factors are also important sources of changes in teachers’ sense of efficacy, as teachers’ practices and beliefs are continuously shaped both by their ongoing experiences as teachers and by the values and ideas conveyed by people around them (Ertmer & Ottenbreit-Leftwich, 2010). Therefore, aspects of the school context, such as organizational structure and climate, principal leadership, and collective efficacy, can also boost teacher efficacy (Tschanne-Moran et al., 1998).

The Present Study

Given the equal importance of TPACK and teacher efficacy to technology integration, this study focused on university EFL teachers’ TPACK types and teacher efficacy in relation to their use of technology to facilitate FC implementation. Specifically, we aimed to answer the following research questions:

1. How do university EFL teachers apply TPACK knowledge constructs to implement technology-integrated FC?
2. How do university EFL teachers perceive their teacher efficacy change while implementing technology-integrated FC?
3. What factors affect university EFL teachers’ perceived sense of teacher efficacy during the implementation of technology-integrated FC?

Methods

Research Design

As the associations between teachers’ knowledge, efficacy, and their technology integration closely link to the teaching context in which such integration takes place, it may be difficult to separate teachers’ statements from the context in which they are stated. Compared with quantitative methods, qualitative methods yield a more naturalistic, contextually sensitive, and holistic understanding of interactions between human behaviors and complex environments (Todd et al., 2004). In addition, according to Ganeson and Ehrich (2009), the aim of phenomenological research is to enable subjects to fully describe their experiences, which are context-related. Therefore, a qualitative methodology with a phenomenological approach was deemed appropriate, as we focused on multiple teachers’ shared experiences of integrating technology.
into FC instruction. A phenomenological approach based mainly on interviews and document analysis was used to probe a group of university EFL teachers’ thoughts, perceptions, and attitudes regarding technology integration into FC instruction.

**Participants and Ethical Considerations**

A purposive sampling strategy with a homogeneous sample was conducted. When choosing a sampling strategy for a phenomenological study, it is essential that all participants have experienced the phenomenon being studied (Creswell & Poth, 2016; Groenewald, 2004). Because we focused on the phenomenon of technology integration into EFL FC instruction, the participants had to satisfy the following criteria: (a) being in-service university EFL teachers; (b) possessing FC experience; and (c) possessing technology integration experience. A homogenous sample, namely a group of EFL teachers from the same university, was recruited to maintain a focused, simple, and accessible approach to the data collection (Creswell & Poth, 2016). However, to obtain more diverse perspectives within this group of individuals with a similar background, we also considered gender, age, teaching experience, and the grade and major of the students whom the participants taught. Creswell and Poth (2016) regarded 5 to 25 as an acceptable sample size to reach saturation for a phenomenological study.

Twelve participants, all of whom were English language teachers from a public university in southwestern China, were selected. Pseudonyms are used here to protect their identities. To ensure that our research was ethical, we used an informed consent agreement (Groenewald, 2004), which guaranteed that the participants were well informed of the purpose, procedures, risks, and benefits of the research, the voluntary nature of their participation, and the procedures used to protect confidentiality. Ethical approval was also granted by the research ethics panel of the first author’s institution.

As shown in Table 1, seven of the participants were female and five were male. They ranged from 26 to 47 years old. Their teaching experience varied between 1 and 26 years, and the students they taught were in either grade 1 or grade 2. They all had flipped teaching experience across one to five terms, and the majors of the students they taught were diverse, including Chinese (CHN), Journalism and Communication (J&C), Education (EDU), Business-related (BUS), Law (LAW), Management (MAN), French (FRE), German (GER), and Russian (RUS).

**FC Course Context**

College Comprehensive English, the FC course taught by our participants, was an EFL course offered to all Grade 1 and Grade 2 undergraduates studying non-English majors at the university. In other words, it was a mandatory course taught to students in different majors that aimed to foster basic English language knowledge and the practical language skills of listening, speaking, reading, and writing. To meet university requirements, teachers in the Department of College English Teaching started to implement FC instruction as a new instructional model in the spring semester of the 2017 academic year. At the time of this study, the FC approach had been implemented as a main instructional model for more than five terms. Various technological tools had been integrated to facilitate flipped teaching throughout the course by the teachers, as illustrated in Figure 2.

Unipus is a learning management system (LMS) on which the students watched video lectures, took quizzes, did exercises, and submitted assignments. This system allowed the teachers to observe the students’ online learning progress

### Table 1. Teacher Profile.

| Teacher (pseudonym) | No. | Age (years) | Years of teaching experience | Terms of flipped teaching | Student grade level | Student major |
|---------------------|-----|-------------|-------------------------------|--------------------------|--------------------|--------------|
| Ms. Yin A           | 47  | 26          | 5                             |                          | Grade 1            | CHN, J&C, and EDU |
| Mr. Mur B           | 42  | 22          | 4                             |                          | Grade 2            | EDU          |
| Ms. Wan C           | 43  | 17          | 2                             |                          | Grade 1            | BUS          |
| Ms. Lynn D          | 37  | 10          | 4                             |                          | Grade 1            | BUS and J&C |
| Ms. Gigi E          | 37  | 8           | 5                             |                          | Grade 1            | BUS, LAW, CHN, and EDU |
| Ms. Shin F          | 36  | 6           | 5                             |                          | Grade 1            | BUS          |
| Ms. Ye G            | 34  | 8           | 5                             |                          | Grade 2            | BUS and EDU |
| Ms. Hua H           | 33  | 6           | 5                             |                          | Grade 1            | BUS, CHN, and J&C |
| Mr. Zhou I          | 30  | 3           | 4                             |                          | Grade 2            | FRE, GER, RUS, and CHN |
| Mr. Shunn J         | 27  | 2           | 4                             |                          | Grade 2            | CHN, EDU, and MAN |
| Mr. Jackson K       | 30  | 5           | 5                             |                          | Grade 2            | CHN, BSN, and J&C |
| Mr. Lee L           | 26  | 1           | 1                             |                          | Grade 1            | BUS          |

a Mr. Mur was also a curriculum group leader.

b Mr. Shunn was also the department computer technician.
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based on their time watching the videos and the percentage of learning task completion. There were also some Web 2.0 plug-in tools on Unipus, such as voting, absence checking, and random drawing. The Jukuu English Essay Assessor, an automatic writing evaluation system (AWE), supported the teachers in grading the students’ writing quality and providing qualitative feedback. Utalk, automated speech recognition (ASR) software, was used to help the teachers recognize the students’ accented or mispronounced spoken input and to provide evaluations.

Data Collection

At the core of phenomenology is the intent to “provide a description of human experience as it is experienced by the person herself” (Bentz & Shapiro, 1998, p. 96). To reconstruct the inner world of the subject’s experience from a phenomenological perspective, informal semi-structured interviews are an appropriate means of collecting data as they help researchers to gain in-depth knowledge of participants’ perceptions (Creswell & Poth, 2016; Groenewald, 2004). Therefore, in the current study, the data were collected mainly from semi-structured interviews and complemented by relevant documents and artifacts.

Interviews. Each participant was interviewed individually for about 90 minutes, and several were interviewed multiple times during the period of FC course. The interviews were semi-structured and conversation-like to encourage the informants to tell their own stories. To ensure accuracy, all of the interviews were recorded by the researchers.

Depending on the research aims and research questions that guide the study, an interview protocol containing two types of interview questions (i.e., exploratory central questions and illustrative sub-questions) was developed and employed as the main instrument. Exploratory central questions directly tapped into the participants’ experiences, feelings, and beliefs concerning the theme in question (Groenewald, 2004). The exploratory questions were open-ended and phrased in a way that interviewees can easily understand, such as,

- Tell us about your understanding of technology integration into teaching.
What specific types of technology do you use in flipped teaching?

Can you describe each of technological tool and how you apply them in/outside classes?

There then followed by illustrative sub-questions to further probe the deep meaning of their answers to the exploratory questions, such as

- Is technology integration important in your teaching, and if so, why?
- By using the specific technological tools, how do you maximize the effectiveness of your pedagogy with technology? Please give examples.
- By using the specific technological tools, how do you enhance the content of your lessons? Please give examples.

Following the guide of in-depth and interactive probing (Legard et al., 2003), the interview probing questions did not move on to next point until a full understanding of interviewees’ perspectives had been reached.

**Documentation.** In addition to collecting data from interviews, we obtained relevant documentation with the participants’ consent, such as the participants’ syllabi, work e-mails, online meeting posts, and their reflective teaching journals. The documentation voluntarily provided by the teacher participants was a record chain of their teaching process. It was important to note that these documentations were not collected through any designed research instruments, but presented in its original and spontaneous forms.

Another group of the FC course participant, namely three students taking the course (see Table 2), were invited to write down their experiences and reflections on the course. The student reflection data was collected through a designed reflection protocol which contained the requirement on participants’ personal information, consents, and three probing questions shown as follows.

- Would you please recall the basic procedure of English flipped classroom?
- What is the most challenging part you feel about taking the English flipped course?
- How do you comment on your teacher’s teaching with using technological tools?

**Teaching artifacts.** The teaching artifacts included several video lectures and the Unipus, the smartphone application. The data were collected from three sources as a form of triangulation, enabling us to compare and thus validate the findings by determining whether similar findings emerged (Creswell & Poth, 2016; Groenewald, 2004; Yin, 2017).

**Validation and Truth Value**

The truth value of qualitative research has been consistently emphasized (Bernard et al., 2016; Creswell & Poth, 2016; Groenewald, 2004; Yin, 2017). Our use of a rigorous phenomenological research design, combining multiple validation strategies (i.e., bracketing past experiences, triangulation of data sources, member checking, and external audits) altogether contributed to the truth value of this study.

First, we conducted bracketing, a phenomenological process whereby researchers set aside their own beliefs, perceptions, and feelings about a phenomenon to focus on the experiences of the study participants (Anderson & Spencer, 2002; Creswell & Poth, 2016). As the investigators in the present study, we began by writing a full description of our own experiences and understanding of technology integration and the FC instructional model, as a conscientious attempt to systematically set aside all of our prior knowledge and experiences of the research topic (Creswell & Poth, 2016). Next, we constantly compared the researchers’ descriptions with the data during the analysis process to maintain a distinction between the researchers’ experiences of technology integration and FC instruction and those reported by our participants (Kelly & Denson, 2017). Second, triangulation was conducted by comparing data from different sources to enhance credibility and minimize the influence of researcher bias (Creswell & Poth, 2016; Yin, 2017). For example, the data from the document analysis were compared with the interview data to clarify and amplify the meaning of the findings. Particular attention was paid to disagreements between participants, information accuracy, and negative evidence to constantly check the validity of our data (Bernard et al., 2016). Third, the strategy of member checking (Bernard et al., 2016; Creswell & Poth, 2016), which involves sharing emerging findings with participants to solicit their responses, was also used during the study. The participants’ statements regarding how well the ongoing data analysis represented their experience provided valuable feedback concerning the accuracy of the preliminary analyses (Hays & Singh, 2011). Some of their feedback was

**Table 2. Student Profile.**

| Student (pseudonym) | No. | Gender | Age (years) | Terms of flipped learning | Grade level | Major |
|---------------------|-----|--------|-------------|--------------------------|-------------|-------|
| Lily                | A   | Female | 19          | 3                        | Grade 2     | EDU   |
| Jessica             | B   | Female | 19          | 3                        | Grade 2     | EDU   |
| Gorge               | C   | Male   | 18          | 1                        | Grade 1     | J&C   |
applied to revise the text where they wished to clarify, elaborate on, or expand the information they had contributed during the interviews. Finally, external audits were conducted to ensure that the findings, interpretations, and conclusions of this study were supported by the data (Creswell & Poth, 2016). An experienced researcher who had no connection with the study was invited to serve as an auditor, examining both the process and the products of the research to assess their accuracy.

Data Analysis

The data analysis was guided by Creswell and Poth’s (2016) phenomenological analysis framework, which provides systematic procedures for identifying significant statements, units of meaning, and, ultimately, the essence of a phenomenon. Based on this approach, all 12 transcripts and 10 documents were first read several times to establish their overall sense. Second, significant phrases or sentences pertaining to the participants’ experiences of technology integration and FC instruction were identified in each transcript and document and then classified as a list of significant statements. This procedure, also known as horizontalization, aims to retain the invariant constituents of an experience while removing overlapping, repetitive, and vague statements and other content that do not contain necessary or sufficient moments for understanding the experience (Creswell & Poth, 2016; Moustakas, 1994). Third, we read the significant statements and developed them into broader units of meaning. Each unit should clearly express a meaning that distinguishes it from other units (Ganeson & Ehrich, 2009). Fourth, we grouped the formulated meanings into themes, which led to the emergence of themes common to all participants’ transcripts and documents. Once the themes had been developed, we generated, using verbatim examples, textural descriptions of the participants’ experiences of technology integration and FC instruction. Subsequently, we developed structural descriptions of how such experiences had occurred, with a focus on the FC settings of technology integration. Finally, a composite description incorporating both the textural and structural descriptions was composed to reflect the essence of the experience, including what the participants had experienced regarding technology integration and how they had experienced it in an FC setting.

Results

About 79 significant statements were extracted from the 12 transcripts and 10 documents. Organizing the formulated meanings into groups ultimately resulted in six distinguishing themes.

In response to the first research question, Themes 1 to 3 revealed that the technology-integrated FC instructional model comprised three major elements: video lectures, students’ self-regulated learning, and face-to-face (f2f, hereafter) classes. The teacher knowledge elements respectively related to CK, PK, TK, TPK, TCK, PCK, and TPACK required to deliver the whole FC course were fully coded, as shown in Table 3 titled FC-situated TPACK framework. With respect to the second and third research questions, Theme 4 reported that during the 2-year implementation of FC instruction, the participants’ sense of teacher efficacy fluctuated slightly but increased overall. Themes 5 and 6 focused on the factors improving their efficacy, which included positive changes in student performance, supportive leadership and climate, effective group work among colleagues, and teachers’ open-mindedness toward teaching with technology. While their sense of efficacy was negatively affected by adherence to a unified FC teaching model, technology’s non-user-friendly and impersonal characteristics. The six themes are unpacked in turn below.

Results to Answer RQ1

Theme 1 TPACK for creating “informative and attractive” video lecture. During the first year of implementing FC, one of the greatest challenges perceived by the participants was the creation of effective video lectures. Video lectures delivered before f2f classes were crucial components of the FC instructional model. The primary function of video lectures was to enable students to acquire new basic English language knowledge points, such as vocabulary, sentence patterns, and grammar. A typical video lecture was a 10-minute microlesson with four parts: instructional slides and videos, graphical illustrations, embedded quizzes, and associated exercises. As elaborated by Ms. Ye, Participant G, the major obstacles to creating video lectures were selecting appropriate numbers of topics and materials and tailoring them to meet the technical requirements of each video lecture.

“Due to the time restriction of a video lecture, there is a limitation on the content too. It is impossible to cover all of the course content in such short time. Therefore, we have to carefully select the most important topics and cases to make the video content both informative and concise.” (Participant G)

In addition to time limitation, the video lecture approach was constrained by its one-way transmission and lack of interaction; it was easy for the students to become bored. In her reflection, the student participant Lily confirmed this point by stating that “it was difficult to be fully devoted to watching the video lecture all the way along” (Student A). Therefore, attracting and maintaining students’ interest in watching video was another main concern of the participants. Ms. Hua, Participant H, reflected on this in her reflective teaching journal:

“As students today are flooded with enormous information and are easily bored by dry content, it is hard to attract their attention and even harder to remain their sustained attention on the video. However, making the content funnier can be a solution. Hot topics debated on social networks and Internet buzzwords can
Table 3. FC-Situated TPACK Frameworks.

| TK                  | CK                                      | PK                                      | TCK                                      | TPK                                      | PCK                                      | TPACK                                      |
|---------------------|-----------------------------------------|-----------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|---------------------------------------------|
| Creating video lectures |  • Understanding the functions of video recording tools;  • Knowing how to operate video editing software;  • Knowing the functions of LMS and being able to deliver lecture videos through LMS platform; |  • Mastering concepts, theories, ideas, knowledge, proof, and evidence of the subject matter presented in the self-regulated learning materials;  • Established practices and approaches toward developing such knowledge; |  • Understanding how students learn from video lectures;  • Knowing to use appropriate strategies to attain students’ attention on watching video lecture (e.g., combining hot topics debated on social network and the Internet buzzword with the learning topic);  • Strategies for evaluating student understanding after watching video lecture (e.g., conducting the online quiz);  • Understanding how certain features of video lectures may constrain their abilities to address subject-matter learning (e.g., the time span of video lecture was too limited to contain all knowledge points need to learn); |  • Knowing how to facilitate student video watching process (e.g., being aware of students’ video lecture watching progress and sending reminders to students online);  • Knowledge and techniques used to strengthen students’ motivation to watch video lecture (e.g., creating impressive visual effect of the videos);  • Knowing how LMS can be used to better convey and represent subject matters (e.g., delivering pre-class learning materials through Unipus); |  • Knowledge and strategies to evaluate students’ understanding in f2f class;  • Understanding how much knowledge points the students have already learnt before coming to f2f class;  • Mastering broader, deeper, more intensive English language and culture knowledge conveyed in f2f class;  • Established practices and approaches toward developing such knowledge; |  • Being able to flexibly integrate TK, PK and CK any time when they develop content-rich and fun video lectures;  • The ability to construct effective solutions to any problem in practice by applying technology, pedagogy and content as interrelated knowledge bases; |
| Promoting students’ self-regulated learning |  • Knowing the functions of LMS and being able to use its plug-in tools (e.g., online quiz, online discussion forum) |  • Mastering concepts, theories, ideas, knowledge, proof, and evidence of the subject matter presented in the self-regulated learning materials;  • Established practices and approaches toward developing such knowledge; |  • Understanding the students’ self-regulated learning process and knowing the appropriate strategies to scaffold their learning (e.g., guiding students to take notes);  • Knowing strategies to manage students’ self-regulated learning and assess their learning outcomes (e.g., checking and grading students’ notes); |  • Knowing how LMS can be used to better convey and represent subject matters (e.g., delivering pre-class learning materials through Unipus); |  • Knowing how to interpret the subject matter delivered in video lectures, finds multiple ways to represent it, adapts and tailors the learning materials to alternative conceptions and students’ prior knowledge and experience; |  • Being able to flexibly integrate TK, PK and CK any time when they prepare and conduct f2f class;  • The ability to construct effective solutions to any problem in practice by applying technology, pedagogy and content as interrelated knowledge bases; |
| Designing f2f class |  • Knowledge and skills to use presentation software (e.g., PowerPoint, WPS) for creating lecture slides;  • Knowing the features of Web 2.0 tools (e.g., voting, online quiz, absence checking) for organizing in-class activities |  • Mastering broader, deeper, more intensive English language and culture knowledge conveyed in f2f class;  • Established practices and approaches toward developing such knowledge; |  • Understanding how students learn in f2f class;  • Knowledge and strategies to evaluate students’ understanding in f2f class;  • Knowledge and skills to plan f2f lessons;  • Knowledge and strategies to conduct classroom management; |  • Knowing when and how Web 2.0 tools can be used for conducting classroom management;  • Knowing when and how Web 2.0 tools can be used for evaluating students’ understanding (e.g., using online quiz tool);  • Knowledge and strategies to search online resources for lesson planning; |  • Knowing how to interpret the subject matter delivered in f2f class, finds multiple ways to represent it, adapts and tailors the learning materials to alternative conceptions and students’ prior knowledge and experience; |  • Being able to flexibly integrate TK, PK and CK any time when they prepare and conduct f2f class;  • The ability to construct effective solutions to any problem in practice by applying technology, pedagogy and content as interrelated knowledge bases; |
Similarly, Mr. Zhou suggested that videos must be designed to foster students’ learning interest. However, he tackled this issue in another way: “For me, creating impressive visual effects in the video is the best way to draw my students’ focus” (Participant I).

Taken together, to address the drawbacks of limited duration and a lack of opportunities for interaction, the teachers attempted to fill the video lectures with both informative and attractive content. To achieve this goal, they had to have a sound understanding of the subject matter delivered in the video lectures (CK and TCK), grasp the features of relevant technological tools, and further apply technological skills to record and edit the videos (TK and TPK). Simultaneously manifested during this process were their pedagogical strategies, such as sending reminders with guiding instructions and creating mechanisms to enhance students’ understanding, maintain students’ motivation to watch the video lectures (PK and PCK), and encourage participation in associated online exercises (TPK and PCK).

Theme 2 TPACK for promoting students’ self-regulated learning in prior to f2f classes. Enhancing students’ self-regulated learning before f2f classes was another essential teaching task for the participants. Consistent with Pintrich’s (1995) conceptual framework, self-regulated learning is characterized by students’ active, goal-directed control of their behavior, motivation, and cognition in academic tasks. During their self-regulated learning, the students had to independently watch the video lectures, grasp the features of relevant technological tools, and further apply technological skills to record and edit the videos (TK and TPK). Simultaneously manifested during this process were their pedagogical strategies, such as sending reminders with guiding instructions and creating mechanisms to enhance students’ understanding, maintain students’ motivation to watch the video lectures (PK and PCK), and encourage participation in associated online exercises (TPK and PCK).

Note-taking, which repeatedly occurred in the participants’ own language, was an idiomatic teaching strategy focused specifically on the process of students’ self-regulated learning. As explained by the participants, note-taking was a comprehensive pre-class assignment that followed a spiral process: based on the guiding materials, the students set goals for pre-class learning, planned appropriate actions, enacted learning strategies based on pre-defined goals, monitored and assessed outcomes, and adapted and adjusted their learning approaches when necessary. Four of the participants, Ms. Yin (Participant A), Ms. Lynn (Participant D), Ms. Ye (Participant G), and Ms. Hua (Participant H), highlighted the unique significance of note-taking based on evaluating how much their students had learned in the pre-class activities:

"Note-taking is the epitome of the students’ learning process and can reflect whether they have really learned something. Good note-taking and sloppy ones look very different. Students’ performance in an f2f class is also related to the quality of their note-taking." (Participant A)

The students were expected to develop and apply a series of self-regulated learning strategies in their pre-class learning activities. They had to read the course materials carefully, make notes, and form a mind map of what they had read. Learning strategies, such as outlining and integrating course materials that might assist them in processing the material in a deep and meaningful manner, seeking help from peers, requesting feedback from teachers, and searching relevant literature for new ideas, were often used during this process. The following reflection was written by Jessica (Student B):

"As an independent learner, I need to be responsible for managing my own learning process such as properly regulating time, resources, and strategies to better achieve my learning goals. I was not used to the self-learning model at the beginning, but with the support of teachers’ guiding materials and the note-taking task, I gradually found my own way of self-learning." (Student B)

In a nutshell, the participants’ solid content knowledge (CK), pedagogical knowledge (PK), and integration of content and pedagogical knowledge (PCK) were manifested in three ways: An understanding of how students learn in the self-regulated learning process; the ability to cope with the needs, obstacles, and difficulties that students may come across in improving their self-regulated learning; and specific teaching strategies for creating an environment conducive to self-regulated learning development.

Theme 3 TPACK for designing f2f classes with higher-level pedagogical objectives. In essence, the FC model in the present study encompassed two schedules: pre-class self-regulated learning and in-class f2f learning. As the pre-class learning activities targeted relatively basic knowledge and skills, the f2f class session was maximized by teachers to provide more interactive activities and personalized feedback for students. Normally, as the f2f class activities were designed to allow the students to practice the knowledge acquired in the video lectures, the students were expected to actively participate in f2f class by utilizing higher-level cognitive skills such as applying, analyzing, evaluating, and synthesizing. During the f2f classes, the time spent on simply teaching textbook content was significantly reduced. Instead, the class time was used more dynamically, focusing on projects, in-class discussion, and problem-solving activities in which the students actively and collaboratively engaged.

When designing the f2f lessons, it was vital for the teachers to recall that the teaching objectives should be based on the prior domain knowledge, skills, and abilities acquired by students in pre-class sessions and brought to each f2f class.
Hence, broader, deeper, and more intensive subject knowledge and higher-order thinking skills needed to be cultivated and passed on to the students. The teachers had to devote much more time and stamina to preparing the learning content and structuring interactive activities. Most of the participants contended that a more solid English subject knowledge foundation was strongly required to prepare the f2f learning activities, as the amount and scope of knowledge delivered in class were more substantial than before. Additionally, more flexible and dynamic teaching strategies were needed to cope with more targeted questions from students and to provide more personalized mentorship or guidance when necessary, as Ms. Ye recalled in her reflective journal:

“In a traditional class, I am more or less clear about the students’ misconceptions beforehand based on my prior experience, but now I am facing more flexible and deeper questions raised by students who have already mastered the basic knowledge points through watching video lecture. Therefore, I must be even more well-prepared to give them effective feedback.” (Participant G)

Nevertheless, most of the participants conveyed their endorsement of the FC model, despite the greater time and self-devotion required to design f2f learning activities. The teachers reported that the f2f classroom had been “liberated from the one-way output or mechanical drills of teachers” (Participant H), shifting to “a higher level of meaningful and deep conversation between the teacher and students” (Participant E).

Indeed, because they no longer simply delivered lecture-based content to the students, the participants relied more on their subject knowledge and abilities (CK) and pedagogical strategies and techniques (PK) to develop successful f2f classes. Consequently, the students became active participants instead of passive listeners. The participants also had to be able to flexibly integrate TK, PK, and CK at any time while preparing and conducting f2f classes. Moreover, they had to cultivate the ability to construct effective solutions to any problem in practice by applying technology, pedagogy, and content as interrelated knowledge bases.

Results to Answer RQ 2

Theme 4 teacher efficacy fluctuating slightly but increasing overall. Teacher efficacy was defined as the teachers’ confidence and belief in the positive effect of FC instruction on student learning outcomes. Over the past 2-year implementation of technology-integrated FC, by and large, the 12 participants perceived an overall growth in their efficacy about FC. In specific, they perceived significantly lower sense of efficacy during the early days of FC implementation. Their initial feelings about teaching with technological tools were almost negative. Seven participants used derogatory terms, such as “worried,” “resistant,” “suspicious,” “stressed,” to describe their perceptions about teaching with technological tools for FC. Ms. Hua (Participant H) explained why she lacked efficacy at the beginning:

“In the early stage of flipped classroom implementation, we experienced constant investment in time, effort, and expense, but cannot see the results and gains for the time being, thus, it was impossible for me to have great confidence in using technology for flipped classroom. It was more of a feel-the-rocks-across-the-river attitude, seeing as we go.” (Participant H)

However, as they experienced more positive effects of technology-integrated FC, their sense of efficacy grew piece-meal. Five participants articulated that it took them at least one semester to build up confidence in technology-integrated FC. As Mr. Zhou (Participant I) noted, “After about a full year of practice, I started to feel I am efficacious about using this new instructional approach.” Notably, three participants were still unsure if they were confident with themselves in teaching with FC at the time of the interview. However, when asked if they were more confident now compared to the initial period, they affirmed an incremental sense of confidence. In other words, although the degree of efficacy they perceived varied, their sense of efficacy in implementing FC tended to grow over time.

It was also notable that despite the overall increase in participants’ perceived efficacy, the growth trend was not stable. Half of the participants mentioned that their sense of efficacy fluctuated midway through the process. For instance, Mr. Jackson explained,

“Originally, my confidence in implementing the flipped classroom was growing steadily, especially as I became more proficient in the use of IT tools. But about a year after the flipped classroom, the department released more regulations and requirements on flipped teaching, which directly undermined my sense of efficacy.” (Participant K)

Ms. Ye (Participant G) also experienced similar fluctuations as Mr. Jackson, although the reasons causing the fluctuations were different. “There were a few instances of losing confidence especially when technical obstacles were frequently occurred and cannot be solved effectively.”

Results to Answer RQ 3

Theme 5 students’ improvement, cooperative climate, supportive leadership, effective group work, and open-mindedness enhancing teacher efficacy. In this cluster, we focused on the factors enhancing perceived teacher efficacy. The descriptions of factors improving teacher efficacy were generally consistent but drawn from various experiences, such as witnessing students’ improvement, gaining colleagues’ and leaders’ support, perceiving group work effective, and being open-minded regarding the use of technology in teaching practice.

To better understand students’ experiences of and opinions on FC, the department organized regular evaluation
activities to collect feedback from students who had taken the FC course. The evaluation results were sent to instructors anonymously for them to adjust teaching strategies and better meet the students’ needs. Most of our participants claimed that they had received generally positive evaluation results. Ms. Ye reported that “about 70% of my students gave a satisfactory rating in the evaluation, which allows me to say that I am doing well with this new teaching model” (Participant G). Ms. Hua echoed her point: “The survey results told me that I should have confidence in FC teaching” (Participant H). Other aspects of positive changes pertaining to student performance in the FC classes, not limited to evaluation outcomes, were also noticed by the participants. For instance, Mr. Zhou stated:

“With shifting from traditional lecture-based to an active participatory classroom, the students now have more opportunities to present and perform, rather than just sit and listen as passive learners. I feel that more students have raised their heads and listened carefully in class over the last two years. Their earnestness and devotion have inspired me in turn.” (Participant I)

Besides students’ acceptance and improvement, as FC instruction was conducted in a group context, the social environment also played a role in shaping the participants’ sense of teacher efficacy. In the interviews, the 12 participants all mentioned the cooperative climate of the department and the leadership of the dean had affected their sense of teacher efficacy. Mr. Zhou gave an example of how the dean’s praise reinforced his sense of efficacy:

“Once, at the end of a classroom observation, the dean came to me and praised the design of my lecture slides. His compliment delivered on this public occasion really surprised me. After that, I was highly motivated to design more elaborate slides.” (Participant I)

Likewise, we found the participants also shown appreciation for group work among colleagues in their online meeting posts; they felt that group work provided different perspectives on, insights into, and ideas for curriculum development and lesson planning. For example, Ms. Gigi posted the following message to a colleague: “I am so grateful for your constructive advice on the translation practice when I almost ran out of ideas” (Participant E). Group work also strengthened the participants’ emotional connections with each other. Ms. Shin posted as follows: “During the most turbulent time, when my child was ill, it was Joanna (pseudonym) who helped me out with technical issues on Unipus” (Participant F).

Having an open mind regarding integrating technology into FC was another significant factor resulting in the growth of teacher efficacy. About 9 of the 12 participants were found to have positive attitudes toward the technologies used in FC teaching. They agreed that technology use had become commonplace in daily life and thus extra effort should be made to enhance technology-integrated teaching and keep up with the requirements of the information age. The younger participants, namely those under 35 years old, all stated that they intended to use and were able to handle the majority of the technologies used in teaching. For example, Ms. Ye expressed her interest in using emerging technologies; her rich experience of using social networks such as WeChat and Weibo naturally led her to connect the Internet resources with teaching tasks. She elaborated as follows: “In my understanding, the essence of education is communication. Internet technology, especially social networking, coincides with the essence of education” (Participant G).

Theme 6 unified model of FC, non-user-friendly and impersonal characteristics of technology curtailing teacher efficacy. Although the teachers’ sense of efficacy had generally increased over the past 2 years of practice, there were still several times when they felt discouraged by several aspects of FC instruction. Their sense of efficacy was reduced by three main factors: they were required to follow the department’s unified model of FC instruction; the technologies used in teaching were not user-friendly enough; they worried that the impersonal characteristics of technology might hinder students’ oral expression.

Most participants revealed a fact that based on the teachers’ collective teaching experiences, the college English department had formed a unified FC model with its corresponding requirements on individual teachers’ teaching. Notwithstanding the trust and support gained from group work with their colleagues, Mr. Jackson and Mr. Zhou pointed out the negative side of the unified teaching model, which Mr. Jackson explained as follows:

“To take full advantage of the collective teaching experience, the department established a unified teaching model of FC that every single teacher must follow, but it is stressful for me to copy and enact this teaching model. I am afraid that the uniqueness of teachers’ own teaching styles will fade away.” (Participant K)

A conversation in an online meeting between Ms. Wan (Participant C) and Mr. Mur (Participant B) further corroborated the existence of conflict between conformity and autonomy of teaching. Mr. Mur, the curriculum leader, asked why Ms. Wan did not send handouts to her students through the online learning system, as how the other teachers did. Ms. Wan expressed her dislike for the online teaching platform, believing that “the ultimate goal of teaching is to improve students’ learning effects, rather than blindly follow the so-called advanced model of teaching” (Participant C).

Ms. Wan was not the only participant who believed that the use of current technological tools could not fully meet actual teaching needs. Non-user-friendly aspects of the technological tools consumed the teachers’ time and increased
their workload. Mr. Shunn, the department technician, gave an example:

“The automatic grading system on Unipus is not smart enough to allow teachers to provide qualitative feedback for students; therefore, they must spend time searching for substitute tools to address this problem.” (Participant J)

Compared with the possibility of an increased workload, some of the participants were more concerned that technology would hinder students’ oral communication. Mr. Jackson expressed concern about students’ overuse of online communication:

“Some students who are very active on social networks are no longer accustomed to the teachers’ oral greetings and idea exchanges. In addition, although the use of Utalk can help correct students’ mispronunciation, it does not really understand their implicit semantic meaning. I think that the more time spent talking to a machine, the more emotionally detached the speaker will become.” (Participant K)

Given the limitations of artificial intelligence in understanding users’ spoken input, the technologies used by the teachers were not smart enough to be truly interactive. To some extent, the lack of user-friendliness and impersonality of the technological tools reduced the teachers’ confidence in these tools and willingness to integrate them.

**Discussion**

As mentioned in literature review section, teachers’ lack of appropriate knowledge or positive beliefs about technology integration was recognized as the two main internal factors impeding technology integration into teaching practice (Ertmer et al., 2012; Hew & Brush, 2007). In order to address the barriers imposed by the two factors, this qualitative study focused on 12 university EFL teachers’ shared experiences of integrating technology with FC instruction and, especially, how they applied their knowledge and skills to integrate technology, perceived the changes in teacher efficacy and the factors affecting teacher efficacy while implementing FC. The data generated six interrelated themes that altogether resulted in an in-depth view of how university EFL teachers implemented technology-integrated FC. We will then discuss the findings in terms of TPACK and teacher efficacy respectively.

Among existing TPACK studies conducted in FC context, the majority using quantitative methods investigated the relationships between TPACK constructs and FC-related variables, such as the relationship among teachers’ TPACK level, intention to continue FC instruction, willingness to use technology in FC settings, and their self-efficacy about technology integration (e.g., Cai et al., 2019; Joo et al., 2018). These quantitative studies had provided us valuable empirical evidence of the existence of such relationships, namely, TPACK did play a role in teachers’ FC practice; nevertheless, they could barely disclose how teachers combine specific knowledge components regarding TPACK with the implementation of the instructional strategies of FC or the accommodation of the specific technological tools. Moreover, although qualitative methods were well suited to addressing such research questions, to our knowledge, there was a limited quantity of qualitative studies in the available research body. The only one that explored university teachers’ implementation of FC through the lens of TPACK was conducted by Long et al. (2017). However, the results of this study focused on the university teachers’ perceived definition of FC, pros and cons of the FC model, and the teachers’ perceived approaches to enhance the effectiveness of FC. Yet we can hardly glimpse the connections between teachers’ TPACK and their implementation of FC.

Compared with the previous research findings, the results of the present study well addressed this specific research gap in the following ways. First, it clarified the entire procedure of technology-integrated FC that comprised three essential teaching stages, namely, creating and delivering video lessons, promoting students’ self-regulated learning, designing, and conducting f2f classes. It also identified the species of technological tools frequently used by the teachers to assist the operation of each stage. Furthermore, it revealed both comprehensive and clear-cut knowledge segments that the teachers exploited to accomplish the main teaching task. Finally, in light of the concepts and descriptions of each knowledge construct of TPACK, it incorporated the specific knowledge components into seven different dimensions of TPACK framework (see Table 3). That was, by integrating specific contextual aspects, especially the instructional design of FC and the teachers’ perspectives and beliefs into TPACK constructs, this study developed a new FC-situated TPACK that can reinforce our understanding of teaching with technology-integrated FC. In a nutshell, the FC-situated TPACK contribute to researches of TPACK and FC by (1) clarifying the core knowledge, abilities, and skills related to the content, pedagogy, and technology required by teachers to perform specific teaching tasks in the diverse and complex settings of today’s FC and (2) defining and depicting each construct of the TPACK framework based on specific scenarios of FC instruction.

For the teacher efficacy aspect, we illustrated the changes of teachers’ perceived efficacy and various factors affecting their sense of efficacy in implementing technology-integrated FC. First and foremost, the study results suggested that the teachers’ sense of efficacy demonstrated a trend of slight fluctuations in the overall increase. As social cognitive theorists emphasize, teachers’ sense of self-efficacy can be enhanced and primarily strengthened by their achievement of educational goals (Schunk et al., 2012). Given the main goal of the 12 teachers was to facilitate students’ EFL study, students’ learning improvement associated with the implementation of FC directly made them feel they were approaching their goal, and hence they increasingly believed in their own abilities to handle technology-integrated FC.
Further, the influence of social factors echoed the reciprocal relationships between the school context and teacher efficacy beliefs (Tschannen-Moran et al., 1998). Research has shown that teachers who work in schools where an orderly and healthy atmosphere prevails, administrators are responsive to teachers’ concerns, and colleagues support each other in attempts to satisfy students’ needs are likely to be more efficacious (Tschannen-Moran et al., 1998). The present study obtained similar findings, probably for the following reasons. First, the dean’s support can provide teachers with a wide range of resources, such as larger budgets for advanced devices for video creation, and swift responses from administrative staff. Moreover, the smooth functioning of group work, combining everyone’s strengths and incorporating diverse perspectives and ideas, generated fruitful curriculum, and instruction products. In addition, group work reduced individual workload through appropriate labor division. Lastly, group cohesion met the teachers’ need to be connected with others and reinforced their collective identity and sense of belonging. In sum, the teachers gained both cognitive and emotional support from working together to cope with the new requirements brought about by FC instruction.

It is worth noting that despite the overall upward trend in teachers’ efficacy, there was still slight decline or stagnation in teacher efficacy. Two of the most discussed negative factors were the imposition of a unified teaching model by the department, non-user-friendly and impersonal aspects of technological tools. Considering why department’s imposition of a unified FC model could curtail some of the participants’ sense of efficacy, it probably because following the unified instructional model damaged the teachers’ autonomy in teaching. The unified teaching model undoubtedly had some benefits, as it was built on collective wisdom and strengths and offered guidance for initial attempts at FC instruction, particularly for novice teachers. However, it also curtailed some teachers’ autonomy as it gave them less choice and disabled their perceived competence. The collective experience of a new teaching practice should not be enforced through inflexible rules that every teacher in a group must obey. Facing with new pedagogical reforms such as technology-integrated FC, teachers’ flexible adaptation of experience and theories to their own needs is always important.

Lastly, non-user-friendly and impersonal aspects of technological tools were likely to harm teachers’ sense of efficacy. Concerns about the negative side of technology were almost a cliché. We repeat this discussion not just because to which degree the technology should be adapted to language education is still controversial and critical today. Furthermore, we appeal for an ideal line dividing the oversold from the appropriate integration of technology into language education. From the study results we can draw an assertion that not all ICT tools can be adapted perfectly for FC instruction. The over-reliance on ICT tools may compromise the effectiveness of learning outcomes or even harm the psychological well-being of students. Facing technology’s dual power, the language teachers should understand the potential of technology in a way that was comprehensible and viable for everyday work: Being able to confront the complexity and challenge of technology integration and properly treating the supporting part that technology play in language teaching. After all, technology has become part of our everyday life, and language educators cannot afford to neglect its potential, use it in a passive manner or get frustrated as long as technical problems arose.

Implications for Future Studies

Despite our findings offered a rich and holistic account of how university EFL teachers perceived their experiences of technology integration in FC, the current study also has its limitations. Given that qualitative study findings are closely related to the study context, the findings in present study cannot be simply generalized to other educational settings but can provide valuable references to understand similar situations. In spite of lacking representativeness, the study findings still extend the large research body of educational technology integration by generating in-depth knowledge of how several important teachers’ internal factors (e.g., TPACK, teacher efficacy, and technology usage) associated with one another from the teachers’ own perspectives. Therefore, the identified themes and factors could be used as a foundation of future studies for exploring their associations with more psychosocial components in social settings to see the “big picture.” For example, teachers’ autonomy in teaching plays a significant role in increasing teacher efficacy. To protect the teacher efficacy of university teachers when implementing an innovative teaching approach, it is particularly important for future studies to focus on teachers’ choices and decision-making autonomy in collaborative work. It should be noted that as suggested by findings of the present study, teachers have strong intrinsic motivation and are open-minded toward teaching innovation only when their autonomy is protected. Besides, since technology integration is a complex phenomenon that involves multiple stakeholders such as teachers, students, school administrators and technicians, and intertwines with a variety of other issues in an educational setting, this current study solely focusing on teachers’ perspectives did not lead us to a conclusion of this phenomenon but propelled us to the next level of study by including more important stakeholders and interpreting this phenomenon from diverse perspectives. For example, a comparison between perceptions of university teachers and students will deepen insight on the issues under discussion. And the inclusion of other ethnic groups of teachers, teachers of different background and in wider range of conditions are recommended in the future.

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