



## A qualitative study on a situated experience of technology integration: reflections from pre-service teachers and students

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### ABSTRACT

Integrating technology into the foreign language classroom has introduced challenging demands for prospective teachers in designing technology-enhanced lessons. Thus, careful guidance is required to help pre-service teachers identify, integrate, and reflect on appropriate technologies to create more learning opportunities. The present study aims to guide pre-service teachers in incorporating technology into their situated teaching practices during a 12-week practicum experience via a step-by-step training procedure. It explores both their own ideas and those of students about technology-enhanced lessons. For this purpose, eight pre-service teachers and 95 students in an English as a Foreign Language (EFL) context in Turkey participated in the study. Qualitative analyses of diaries and focus group interviews revealed that prospective teachers and their students had positive attitudes towards integrating technology into a second language and/or foreign language (L2) class albeit a few concerns and problems were raised. Technology-enhanced classes promoted language skills, contributed to creating a favorable and motivating learning atmosphere, fostered active participation, and helped pre-service teachers tailor their lessons to their students' needs and interests. By offering a situated learning opportunity to incorporate technology into L2 classes blended with reflective practice, findings of the study may illuminate future practices for successful technology integration in language teaching.

### KEYWORDS

Technology and language teaching; pre-service teacher education; technology integration into teacher education; reflective practice

### Introduction

There has been a tremendous interest in incorporating technology into L2 classrooms, which is easily discernible even in the variety of relevant terminology ranging from 'computer-assisted language learning (CALL)' to 'technology-enhanced learning' and to 'information and communication technologies (ICT)' (Dudeney & Hockly, 2012). Despite the variety in the use of terminology, all these terms denote an understanding of

technology integration into language teaching to foster learning opportunities for language learners. Incorporating technology for language teaching purposes is not a novel idea. Starting from late 1970s and early 1980s, with access to microcomputers, teachers began to use technology to support learning, and the interest to apply ideas of CALL in language teaching and teacher education has increased dramatically among practitioners and researchers over the years (Egbert, 2005; Hubbard & Levy, 2016; Levy, 2000). A decade ago, Luke and Britten (2007) anticipated that technology would become an indispensable part of FL teacher education and that language teachers would need to develop an understanding about how to implement technology to cater to students' needs.

From a historical perspective, Bax's (2003) taxonomy can shed light on the development of technology for teaching purposes. Earlier attempts of using technology in language teaching were defined as 'restricted'. In this stage, technology use was reduced to limited feedback for the learner and often without any communicative value. The second stage is termed as 'open' referring to our current practices with the advancements in internet and related interactive and productive practices. The final stage will be 'integrative' in which the use of technology will become somewhat normalized and invisible as an integral part of language practice. To welcome the upcoming integrative stage, teachers' roles are becoming crucial in guiding the dynamics of technology-enhanced classrooms (Healey, 2016). Although using CALL in language study has long been under investigation with its contribution to experiential learning, motivation, student achievement, and greater interaction opportunities, earlier attempts were inhibited by financial barriers, unavailability of computer hardware and software, lack of knowledge and technical skills, and teachers' resistance to using technology (Lee, 2000).

Researchers and practitioners in CALL area have long been aware of the challenges brought by developments in hardware (e.g. powerful computers, capacitive touchscreens, smart boards, interactive white boards) and software (e.g. corpus based programs, social networks, web tools, website, online/offline applications) for students, teachers, and teacher educators about deciding on the best practices of technology employment, and adapting them into their classrooms (Aşık, 2016; Butler-Pascoe & Wiburg, 2003; Egbert, Paulus & Nakamichi, 2002; Farr & Murray, 2016; Felix, 2002; Kennedy, Judd, Dalgarno & Waycott, 2010; Kessler & Hubbard, 2017; Lei, 2009; Thompson, 2013). Teachers' frequent use of technology in and out of the class does not guarantee successful integration of technology for language teaching purposes. Using technology for pedagogical purposes requires combination of knowledge, training, technical skills, opportunities for use, and instructional support coming from various sources (e.g. knowledgeable peers, educational

trainers, technology support groups, etc.). When teachers' pedagogical purposes are supported with the effective use of technological tools, then they may create space to foster learning opportunities for students.

Numerous gains are reported for integrating technology to foster grammar (Heift & Vyatkina, 2017), vocabulary learning (Ma, 2017; Tozcu & Coady, 2004), reading competency and strategy use (Liaw & English, 2017; Park, Yang & Hsieh, 2014), listening comprehension (Chen, Zhang & Liu, 2014; Hubbard, 2017), writing instruction (Li, Dursun & Hegelheimer, 2017; Storch, 2012), and speaking skills (Abrams, 2003; Blake, 2017) in various L2 contexts (see Chapelle & Sauro, 2017 for a rigorous review of studies on technology integration in language skills and areas). When technology is incorporated to help learners solve problems, grasp meaning, reflect on their learning and more importantly interact with multiple representations in meaningful ways (Cutrim Schmid, 2008), its benefits become more tangible. Using technology in an EFL class may also facilitate practicing language skills in contexts where such practice is limited (Alsied & Pathan, 2013). Despite its numerous benefits, teachers may hesitate to integrate technology into their lessons due to lack of sufficient guidance and support (Beetham & Sharpe, 2013). Hence, teachers may need help to create technology-enhanced learning environments.

With all these in mind, faculties face with demanding requests for qualified courses and/or programs with recent advancements, skills, and knowledge to implement technology into teaching environments (Dooly, 2009; Hong, 2010). One way of paving the way for technology integration is guiding pre-service teachers (PSTs henceforth) to become familiar with available technologies and to incorporate them purposefully during their teacher education (Hong, 2010; Hubbard, 2008; Hubbard & Levy, 2006). The aim of this study is to bridge the gap between technology use and language teaching in PST education by guiding PSTs to implement technology into their situated teaching practices, and to explore both their own and students' ideas about technology-enhanced lessons. The findings of the study are expected to illuminate future attempts and practices for successful technology integration in language teaching.

### ***Technology integration into L2 teacher education***

The increasing influence of digital technologies on teaching and learning has raised concerns about technology integration into teacher education (Graham, 2011; Mishra & Koehler, 2006), yet the majority of teacher training programs do not accommodate training opportunities for technology education (Li & Ni, 2011). Hubbard (2008, p. 177) lists the

barriers to successful technology integration as (i) difficulty in changing teaching approach which is fixed at some point; (ii) ignorance of options available for technology integration; (iii) insufficient time to create space for CALL courses; (iv) insufficient infrastructure resulting in limited access to technology; (v) insufficient technology standards for language teaching; (vi) lack of established methodology for technology integration; and (vii) lack of experienced and knowledgeable educators for technology education in general. In correspondence with the list above, insufficient training opportunities at faculties lead to technical level technology courses offered by unknowledgeable trainers only about the physical or technological devices (Garrett, 2009; Hanson-Smith, 2016; Kessler, 2007; Lambert & Gong, 2010; Maddin, 2012). This shortage can be explained by the mere aim to improve computer skills as a tool to enter the digital world but not to enhance learning, and by somewhat marginalized status of technology for educational purposes (Vockley, 2008).

Approaches to integrate technology into teacher education vary from *breadth-first* one (with a traditional survey course), to *depth-first* one (with a focus on a single topic exploration while learning technology), and from *integrated* one (by implementing technology throughout a teacher education program) to *online* one, or *blended* one (Kessler & Hubbard, 2017). Furthermore, various processes for teacher trainers have been proposed, such as incorporating project-oriented technology use (Debski, 2006), implementing technology in context within situated learning environments (Egbert, 2006), creating reflective learning opportunities while incorporating technology (Slaouti & Motteram, 2006), integrating portfolio-based technology use (Van Olphen, 2007), expert-novice teacher mentoring in language learning technology (Meskill, Anthony, Hilliker-VanStrander, Tseng & You, 2006), and forming communities of practice for effective technology implementation (Hanson-Smith, 2016). Despite the variety in approaches and processes for technology integration, teacher education programs mainly leave teachers on their own to find their way through a ‘do it yourself’ stance, which may result in frustration about effective use of technology.

Kessler (2007) designed a study in which 108 TESOL master’s degree graduates responded to a survey asking about their technology education, and found a discrepancy between these professionals’ confidence in CALL technology and in integrating it into classroom instruction. One obvious reason for teachers’ reluctance and lack of confidence to integrate technology into L2 teaching was linked to lack of experience and training opportunities. Dooly’s (2009) study on novice and experienced teachers investigated long-term effects of a teacher training course that integrated ICT use into language teaching. Various sources of

quantitative and qualitative data such as questionnaires, semi-structures interviews, field notes, and observations of teaching contexts yielded that teachers were not confident in putting continuous effort into technology integration despite opportunities provided for technology integration. In order to overcome the challenges in-service teachers have to tackle, creating a prior experience of technology integration during PST education may help to build a positive attitude towards adopting technology in future practices during in-service years (Hong, 2010).

Redesigning existing technology courses can guide PSTs to follow recent developments and approaches to incorporate technology into an L2 class, and can also lead them to find out the best practices for technology-enhanced language study. Lambert and Gong (2010) redesigned a technology course by integrating twenty-first century skills of critical thinking and problem solving (e.g. database creation and queries), creativity and innovation (e.g. video and web site creation), information and media literacy, and civic literacy and global awareness with a focus on using technologies such as blogs, newsletters, and nonlinear multimedia to foster communication and collaboration. The findings of the study pinpointed that when PSTs were instructed on twenty-first century paradigms for technology preparation, their anxiety towards computers decreased and they improved their technical skills and knowledge to implement them in their teaching practices. Moreover, they developed positive beliefs and self-efficacy in technology-enhanced classroom experiences.

In the Turkish context, PSTs may be unwilling to integrate technology into their teaching practices due to insufficient technical facilities presented to them, inadequate instructional courses or training opportunities to enhance classroom experiences, and lack of situated learning practice activities that would guide them in their teaching (Aydın, 2013; Başal, 2015; Merç, 2015). Aydın (2017) proposed a training model called Reverse Mentoring Model in which PSTs designed and used digital materials aligned with the learning outcomes of particular classes during practicum experience. Upon receiving feedback on the use and effectiveness of these materials, they taught how to prepare these materials to their mentor teachers, who in return prepared similar materials with the tools they learned. In this way, teaching practice process was restructured as a mutual learning ground for both mentors and PSTs. In a recent study in Turkish EFL context by Sert and Li (2017), PSTs were given opportunities to design and develop CALL materials with various online teaching tools over a 14-week period. Qualitative analyses of their reflections pointed out that PSTs developed awareness on the use of these tools and demonstrated a critical understanding of CALL materials to enable

authenticity, provide rich and multimodal resources for learners; and hence, facilitate language learning. PSTs in this study were able to develop instructional knowledge to design and select materials, and deal with technical problems along with developing contextual knowledge based on learners' levels and interests. Based on the findings of the study, Sert and Li (2017) suggested to follow an experiential learning cycle as a model for CALL pedagogy in PST education. In this respect, when PSTs are given a chance to critically reflect on the design and implementation of technology, they may develop necessary pedagogical knowledge for technology integration in their future practices.

### ***Significance and aim of the study***

It is possible to glean from previous research that there has been a growing awareness on the role of training opportunities provided for PSTs to bridge the gap between training offered and the realities of the actual classroom environments (Dooly, 2009). PSTs also need opportunities to implement technology in real classroom contexts by taking various challenges and constraints related to school culture, administrative limitations, and availability of technological tools into consideration. In this way, they may gain confidence in using technology by finding realistic solutions to challenges they face before they embark on their professional lives. Such hands-on experiences within a 'situated learning' context can help to shape prospective teachers' attitudes and beliefs for more effective integration of technology (Egbert, 2006; Dooly, 2009). Kessler and Hubbard (2017) also underline a need to design studies investigating circumstances that support situated learning in different contexts to endorse future attempts of technology integration in language teacher education. Based on the apparent need to explore the effects of training opportunities and actual classroom applications in language teacher preparation, the aim of this study is to design a technology-enhanced language teaching practice interwoven with reflective practice, and investigate PSTs' and their students' perceptions of this experience. Therefore, this study seeks to answer the following research question:

- How do PSTs and students perceive integration of technology into FL classrooms during a situated practicum experience?

## **Method**

### ***Participants***

Eight PSTs who were senior students in an English Language Teaching (ELT) program in Turkey participated in the study. Ninety-five students

in PSTs' practicum classes also took part in the study to share their ideas about technology-enhanced classroom experiences. Convenience sampling (Creswell, 2005) was adopted since participants were available and willing to participate. The age of the PSTs ranged between 21 and 23 years, and the students were between 11 and 14 years old. Five of the PSTs were females whereas three of them were males. As for the students, 54 of them were females and 41 of them were males. PSTs in the study were assigned to a state school as a requirement of a practicum course. They had received various courses related to ELT methodology previously, and had been trained in lesson planning and material selection/development for teaching English. However, they neither received a formal course regarding technology integration into language teaching nor had previous experiences of using technology for pedagogical purposes. All participants signed consent forms to ensure confidentiality of their voluntary participation. They were informed that they were free to opt out from the study any time they liked since this study depended on their voluntary contribution.

### **Context**

As part of ELT diploma programs in Turkey, PSTs are required to take a practicum course prior to graduation. Accordingly, they are assigned to elementary and middle schools under the guidance of a university supervisor, and they prepare lesson plans on a weekly basis to teach various language skills and areas. The university supervisor observes and evaluates their performance two times in a term to provide feedback. At other times, PSTs are observed and guided by a cooperating teacher at their assigned schools. In the practicum school context, students follow coursebooks on a regular basis and are responsible for the requirements entailed by the coursebook materials. Technology is not integrated in a systematic fashion, and teachers use technology from time to time on single occasions either for warm up or as a time filler.

### **Procedure**

The study lasted for a total of 12 weeks following the procedure below:

**Step 1/Week 1: Exploring what PSTs think about the role and implementation of technology for language teaching purposes.**

- A mini **survey** (see Appendix A) was designed to elicit PSTs' ideas about technology use for teaching purposes. The aim of this background survey was to draw a general picture about how they perceived the role of technology for teaching purposes, and to prepare



an effective training based on their needs. PSTs acknowledged that they used technology to search for their assignments, learn more about topics for their academic studies, and visit educational blogs and forums to prepare materials. They were aware of some web sites, tools, and applications that could be of use for language teaching; however, they stated that they did not exactly know how they would use such tools purposefully in their own teaching contexts.

**Step 2/Weeks 2–3: Necessary skills and knowledge: Training PSTs on how to integrate technology into an FL classroom.**

- PSTs were assigned various **articles** on the role of technology in language classrooms and how to implement technology for language teaching purposes. **Discussions** were carried out on these articles in an interactive fashion. The purpose was to create an awareness on the role of necessary technical skills and pedagogical knowledge required to use technology in FL classrooms. Following discussions on various articles, PSTs reflected on their familiarity with technical devices, knowledge on CALL materials, how to use technology for language teaching purposes, and pedagogical knowledge necessary to design, adapt, and use such materials in technology-enhanced classrooms.
- PSTs **analyzed sample activities** that aimed incorporating technology in groups (e.g. creating written digital stories in a class blog, using animated videos for oral skills practice, practicing pronunciation of minimal pairs based on short video clips). Whole **group discussions** were held afterwards on how these activities would create learning opportunities for students and how and when they could be used in class.
- **Tasks were presented to help PSTs design activities** for sample teaching situations. Those tasks included information about contexts (students, age, level, etc.), aim of the lessons and technological tools to be used. PSTs were asked to design activities for any stage of the lesson given within the tasks.
- **PSTs decided on a language skill or area, identified learning outcomes accordingly, and prepared lesson plans** that focused on designing a technology-enhanced FL learning experience (see Appendix B for sample learning outcomes and tools). **Each of them presented their lesson plans to the whole group, and discussions** were carried out under the guidance of the supervisor.
- PSTs **reflected** on what they learned throughout this training experience and how it would be of use for their situated practicum experiences.



**Step 3/Weeks 4–5: Observation of school and class environment: Checking the availability of technology in the school environment.**

- PSTs were assigned to state schools for practicum experience.
- Two weeks were reserved to observe the school environment and students to have an idea about their levels and interests. PSTs examined any technology available (e.g. interactive white board, internet connection, computer lab, laptops) in the school context, regulations of using such devices (e.g. administrative policy, restrictions on internet use), and the classroom setting (e.g. class size and organization).

**Step 4/Week 6: Selecting the appropriate technological tools.**

- PSTs selected various technological tools they believed to be practical and useful in their own teaching contexts. They were guided to question the effectiveness of these tools, their features, possible benefits, and whether they were compatible with the learning outcomes (see Appendix C for guiding questions).
- PSTs presented selected tools/applications to their peers. While presenting, they focused on giving rationales for their choices, discussed potential outcomes of the tools for their classes, how these tools would be helpful in fostering language learning, and how they would implement them in their own teaching context in the practicum schools.
- Following the discussions, prospective teachers decided on how they could implement technology into their classrooms for five weeks throughout the practicum experience. They were required to design weekly lesson plans (for one class hour a week) by implementing technology into their lessons.

**Step 5/Weeks 7–12: Integrating technology into FL teaching- Actual implementation**

- Implementation was carried out in two phases for five weeks:

Phase 1 (Before the lesson): Discussion with peers and the supervisor at the faculty about the implementation procedure, potential problems, and possible solutions.

Phase 2 (After the lesson): Discussion with peers and the cooperating teacher at the practicum school about how the lesson proceeded and what to do in the next lesson based on their observations and reflections.

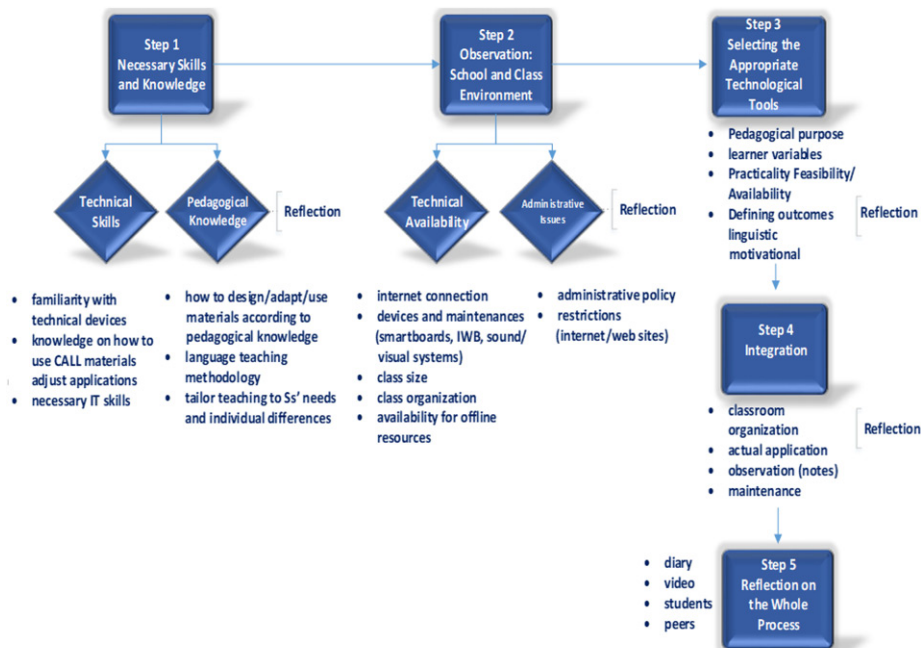
- PSTs and their students wrote reflective diaries on their experiences of technology-enhanced lessons after each implementation.

## Step 6/Week 12: Reflection on the whole process: Conducting focus group interviews

- In-depth **focus group interviews** were conducted to explore the implementation of technology in FL classes and to help participants reflect on their own experiences.

The procedure described here constituted a model for technology integration into an L2 classroom. This model emerged as a result of first-hand experience regarding the needs of PSTs and students in terms of effective technology implementation into language teaching, and the relevant literature. The suggested model consists of five steps and details can be seen on **Figure 1** below:

The first step consists of technical and pedagogical skills as prerequisites for technology integration. Familiarity and knowledge on CALL materials, pedagogical knowledge on how to design and adapt materials, and knowledge to tailor teaching to variety among students are concerns in this step. Successful integration of technology into L2 classes needs to be based on the realities of the actual classroom environments. Thus, in the second step, practitioners need to evaluate availability of technology tools and the presence of any administrative regulations or limitations. The third step is the selection of appropriate tools aligned with pedagogical purposes and linguistic/motivational outcomes of an L2



**Figure 1.** A suggested model for integrating technology into L2 classroom.

classroom along with analysis of practical factors for tool selection. The fourth step is the application of the selected tools and materials for successful integration of technology. Practitioners need to consider the classroom configuration and arrange tools accordingly. Moreover, practitioners may take mental or written notes to refer to in further applications. The final step is the reflection on the whole process of technology incorporation. Effective integration cannot be realized without reflective practices. Various tools can be used here such as reflective diaries, reflections on video recordings of actual applications, or students' or peers' reflections on technology-enhanced practices. What is crucial in this model is the ongoing reflective practice carried out throughout the implementation process. In each step, teachers need to get into a reflective state to question their actions and thinking processes to turn their experiences into a cyclical fashion of revision, editing, and correction. Such reflective attitude would help practitioners critically evaluate their actions and provoke motivation to carry out best practices. Within the given procedure, the participants followed the steps in this model for effective technology integration into their actual language teaching practices during the practicum period.

## ***Instruments***

### ***Reflective diaries***

It is suggested that reflective diary keeping promotes self-awareness and in-depth realization of perceptions for practitioners (Radcliffe, 2013). In order to elicit PSTs' and students' opinions and feelings about their practices regarding technology integration, both parties kept reflective diaries after each experience in technology-enhanced FL classes (a total of five times). Participants could write diaries in their native language to ensure convenience and openness in their opinions without any language limitation. To help them reflect on their experiences, guiding questions (see Appendix D for guiding reflection questions) were provided for diary keeping since such questions would provide more substantive responses. In order to keep track of the reflective diaries, they were coded in numbers (e.g. PST1 Diary 2, S2 Diary 3).

### ***Focus group interviews***

Focus group interviews provide deeper understanding of collective views and help participants interact with each other to elaborate more on their actual feelings and opinions (Krueger & Casey, 2014). Within the purposes of the study, focus group interviews were conducted with all PSTs and 10 of the students to shed more light onto experiences of technology integration. Interview data were used to support qualitative findings

gathered through reflective diaries. To familiarize PSTs and students with interview procedure and to give them some time and space to think about their experiences, questions were given beforehand (see Appendix E for interview questions). Interviews were scheduled at participants' convenience, and all interviews were carried out in a quiet place at the practicum school. Participants were interviewed in groups of four or five, and interviews lasted for nine to 12 minutes for each group. A total of 42 minutes of interview data were audio recorded, and audio files were transcribed verbatim. Transcriptions were stored electronically for data analysis by coding each transcript with the date for each group of participants (e.g. Date- PST Focus Group 1, Date-S Focus Group 2).

### **Data analysis**

Qualitative data gathered through reflective diaries and focus group interviews were analyzed based on the ideals of grounded theory (Charmaz, 2006). In this regard, Constant Comparison Method (CCM) was carried out for analysis. This method allowed for a data-led approach for analysis with a focus on emerging patterns and themes rather than preconceived ones (Boeije, 2002). Accordingly, the gathered data were segmented into codes. A code here refers to the smallest segment of data—a single word or a phrase—which reflects an opinion, a thought or a feeling regarding the integration of technology in an FL class. Identified codes were compared and contrasted with each other in a cyclical manner for several times until similar codes were grouped to generate categories with related themes. Two separate raters conducted this process of coding, categorizing, delineating themes, and connecting them to increase the reliability of qualitative analysis. One of the raters in this study was the researcher of this paper and the supervisor of the PSTs. To overcome subjective bias—if any—towards the data, another rater who was experienced in CCM independently coded the same data, and discussions were carried out to solve any disagreement or challenge faced throughout the analysis. To measure inter-rater reliability, percentage of agreement between the raters was calculated by using percentage agreement statistics as it was a directly interpretable way for reliability among raters (Tawney & Gast, 1984). Agreement was 0.92, which indicated a high level of consistency between raters.

### **Results**

#### ***R.Q.: How do PSTs and students perceive integration of technology into FL classrooms during a situated practicum experience?***

Qualitative analyses revealed a total of 1227 codes regarding the perceptions of the participants (PSTs and their students) on technology-

enhanced experiences in L2 classrooms. These codes were grouped under four main themes and 23 sub-themes. Main themes were identified as contribution of technology-enhanced lessons to improve *language skills and areas* (495 codes), the *classroom atmosphere* (418 codes), and some *challenges and problems* (221 codes) such classes had. Lastly, one final theme emerged from the qualitative analysis specific to PSTs' own *teachers' gains* (93 codes) denoting how this experience helped them to notice and improve certain aspects of their teaching. The rest of this section presents each of the main themes in detail with excerpts from reflective diaries and interviews.

### **Main theme 1: Language skills and areas**

The prospective teachers and their students at the practicum schools expressed benefits of technology-enhanced lessons to improve language skills and areas. A total of 495 codes were identified within this main theme under six sub-themes as shown in Table 1 below.

Both PSTs and their students stated that technology-enhanced classes were helpful for listening and speaking skills as PSTs used various tools in an engaging way for oral skills improvement (142 codes). With the help of tools used, students were encouraged to work in pairs and groups in a collaborative fashion, which in turn helped improve oral skills. Implementing technology in an L2 classroom also aided practicing and learning new vocabulary (101 codes) in a context with the help of auditory and visual input provided by various forms of multimedia sources. Students and PSTs underpinned the availability of getting immediate feedback (89 codes) regarding language use thanks to technological tools offering practical online individual and group feedback options on language use. Such feedback provided opportunities for checking understanding of what they had learned. With the help of multimodality provided by technology, students had the chance to interact through various sensory channels, which in turn increased variety in learning information (72 codes), and helped to retain information (64 codes) in a more effective way. Integrating technology into L2 study also assisted the students in doing better on language

**Table 1.** Distribution of codes according to main theme 1: language skills and areas.

Main theme 1: language skills and areas	Students	PSTs	Total
<i>Technology-enhanced lessons helped to ...</i>	N*	N*	N*
improve oral skills	75	67	142
practice/learn new vocabulary	78	23	101
get immediate feedback for checking understanding	40	49	89
provide variety in learning information	22	50	72
retain information	13	51	64
do better in language tests	9	18	27
General total	237	258	495

N\*: number of codes.

tests (27 codes), which was a major concern for students and PSTs alike. The following excerpts highlight benefits of technology-enhanced lessons to improve language skills and areas:

Our teacher used short video clips and all the activities were very enjoyable. I tried to say the words like the characters in those videos. It was very good for my English. They were short and fun ... moving from one clip to another and trying to understand and say what they say will help me in speaking. (S45)

What is good about today's lesson is that the tool I used helped me to give immediate individual feedback on the screen to each student. All students could see their results in real time all at the same time. Afterwards, we focused on individual mistakes, and discussions were very helpful to acknowledge these mistakes. (PST7)

As seen in the excerpt above, technology used in the classroom helped S45 enhance his speaking ability in an engaging way. That is, technology integration provided a meaningful learning context for this student to watch, listen to, and model characters in the short video clips, which led him to improve his speaking skills in the target language. Similarly, PST7 benefited from technology to provide immediate feedback to her students which was otherwise quite difficult in crowded classrooms. Technology-enhanced lessons helped students focus on their individual mistakes, and assisted PST7 in creating awareness on language use through whole class discussions. In addition to gains in language skills and areas, students and PSTs alike reported positive outcomes of technology integration into the language classroom in terms of creating a more positive classroom atmosphere for learning.

### ***Main theme 2: Classroom atmosphere***

The second theme emerged from the qualitative data was about the benefits of technology-enhanced classes with respect to creating a positive classroom atmosphere. A total of 418 codes were identified within this main theme with four sub-themes as shown in [Table 2](#) below.

Students and PSTs alike underlined the positive influence of technology integration into their classes in fostering an enjoyable and motivating atmosphere (211 codes), and catalysing more active participation and interaction among students (122 codes). Such an atmosphere was reported to cultivate active participation of the students and stimulate more interaction (122 codes). PSTs used various tools that promoted kinaesthetic activity, group work, and collaboration in various skills (e.g. digital collaborative writing activities, online language laboratories for listening and blogs for peer feedback) in accordance with the learning outcomes of their lessons. The students used the classroom space effectively,

formed different groups, and joined challenging online games in a competitive manner. With the help of this motivating atmosphere created in technology-enhanced classrooms, students experienced a sense of togetherness and worked in cooperation (59 codes) as a whole class, with their peers or in small groups. There were shy and unwilling students, and some students had a general attitude to stay silent in English lessons. When technology was integrated in their classes, it also provoked self-confidence (26 codes) since the students were able to get feedback in crowded classes, and they were motivated to participate more in the technology-enhanced activities. The following excerpts show how incorporating technology is appreciated by both students and PSTs in creating a supportive learning environment:

This is the first time I don't hate English. In groups of three, we wrote a story together by choosing pictures from the smart board according to our theme. Then, the teacher published them digitally. Our story was great, and it was chosen as the best one. I couldn't understand how time passed by. (S65)

I was able to involve all students in today's lesson. We compared city and village life by using an online mind mapping tool. Students came to the board in pairs, created mind maps and expanded existing ones both for city and village life. Others directed the ones at the board. Then, we had a wonderful discussion together. You should have seen the class, the atmosphere...they were all motivated and worked together. (PST2)

In the excerpt above, S65 highlighted how digital story writing activities fostered cooperation and cultivated interaction in the classroom when the students worked cooperatively to create stories, share their ideas, and select the best performances. Technology served as a way to provoke motivation towards language study and created a sense of togetherness among students. PSTs were also able to sustain more student involvement with the help of interactive interfaces presented via technological tools. PST2 stressed the effect of student involvement in promoting a motivating and supportive classroom atmosphere which was difficult to witness in regular class hours. Despite all the gains provided by technology-enhanced lessons during the study, students and PSTs reported some challenges and problems.

**Table 2.** Distribution of codes according to main theme 2: classroom atmosphere.

Main theme 2: classroom atmosphere	Students	PSTs	Total
<i>Technology-enhanced lessons supported/fostered ...</i>	N*	N*	N*
enjoyable/motivating atmosphere	102	109	211
active participation and interaction	59	63	122
sense of togetherness/cooperation	13	46	59
self-confidence in class	8	18	26
General total	182	236	418

N\*: number of codes.



### Main theme 3: Challenges/Problems

Technology-enhanced classes were not without certain challenges. The third theme identified from reflections and interviews was the challenges/problems both PSTs and students faced throughout the study as displayed in Table 3 below.

Although all classes in the school were equipped with smartboards and internet along with extra computers and projectors in some classes, both parties expressed certain technical difficulties (77 codes), which ruined the positive atmosphere and distracted the students from the engaging activities they were involved in. Poor internet connection, and problems in quality of sound and visuals were some of the technical problems expressed by students and PSTs alike. Some of the students did not have access to computers or technological tools to practice or continue activities outside the class (39 codes) which prevented taking further advantage of technology for learning purposes. In regular classes, teachers generally led the classes with a few higher level students while the rest were in a rather passive mode. However, with the engaging and interactive nature of technology-enhanced classes, the students participated more, and such increase in active participation unveiled difficulties lower level students experienced (36 codes). When low-proficient students were motivated yet could not keep up with high-proficient ones, they expressed a kind of insufficiency for language production. Class hours were limited (40 minutes a week for technology-enhanced lessons), and students and PSTs had to end some lessons although they were in the middle of an engaging and motivating learning experience (31 codes). Few of the students and PSTs complained about boredom or lack of interest (22 codes) especially when some serious technical problems were experienced. Finally, classes were quite crowded, and due to interactive and engaging nature of technology-enhanced lessons, not all students had a chance for equal interaction opportunities (16 codes). This challenge was expressed only by the PSTs in the study as can be seen in the following extract:

I wish I had fewer students to make the best of technology-enhanced lessons.  
Today, we built our vocabulary blog together for confusing words in the

**Table 3.** Distribution of codes according to main theme 3: challenges/problems.

Main theme 3: challenges/problems	Students	Teachers	Total
<i>Technology-enhanced lessons had problems in terms of...</i>	N*	N*	N*
technical aspects	32	45	77
difficulties for use outside the class	19	20	39
difficulties for lower level students	22	14	36
limited time	13	18	31
boredom/lack of interest	12	10	22
class size	–	16	16
General total	98	123	221

N\*: number of codes.

coursebook. Students decided on the visuals, formed sample sentences and even created links to a corpus... They were quite motivated but some of them felt really sorry. I saw some students crying because they thought I did not give them enough floor for speaking and expressing their ideas. It was not possible to involve everyone, now I feel awful. (PST7)

As stated by PST7 above, class size was a challenge while implementing technology in the language classroom. Technology-enhanced classes were engaging for most of the students and provoked active participation. PST7 had a facilitative role here while the students were working together towards a shared goal and using technology to create their own vocabulary blog. However, due to limited class time in crowded classrooms, PST7 could not provide sufficient and equal opportunities for all students. Such a challenge stemming from class size would likely worry PSTs for not being able to involve all the students when they were enthusiastic about taking part in technology-enhanced lessons.

Three of the main themes presented so far reflected PSTs' and their students' perceptions on the benefits and challenges of technology integration into their language classrooms. PSTs reported additional gains of such experiences on their professional development as well.

#### ***Main theme 4: Teachers' gains***

The final theme was related to PSTs' gains as teachers apart from the effects of technology-enhanced classes on students and classroom atmosphere. Throughout their practicum teaching experience, they had the opportunity to observe and evaluate themselves while integrating technology into their lessons. Table 4 below shows sub-themes related to PSTs' own gains as teachers during the study.

Before the study, prospective teachers had expressed in the background survey that they did not know how to integrate technology into their classes aligned with their pedagogical outcomes albeit they used technology quite often in their lives. Some of them thought technology-enhanced classes required more time and effort for material selection and preparation. After the study, they realized that incorporating technology into lessons saved time and energy (26 codes) instead. PSTs did not use technology for its own sake but designed lessons according to learning outcomes, and while doing so they became more active and creative (22 codes) in designing enjoyable classes. From PSTs' perspective, various technology tools compatible with learning aims and tailored to students' needs and interests from multimodal sources helped to involve different learning styles and multiple intelligences (19 codes). PSTs also had a chance to identify students' levels (16 codes) during technology-enhanced lessons as they could observe their students interacting in pairs

**Table 4.** Distribution of codes according to main theme 4: teachers' gains.

Main theme 4: teachers' gains	Teachers
<i>Technology-enhanced lessons helped teachers to ...</i>	N*
save time and energy	26
be active and creative	22
involve different learning styles and intelligences	19
identify students' level	16
analyze and organize class environment	10
Total	93

N\*: number of codes.

or in groups and elicit individual responses more effectively than regular classes. Technology-enhanced lessons required them to observe classroom environment and analyse it (10 codes) as most of the activities centred around pair and group works (both in small and big groups). Depending on the type of the activity and their aims, they organized classroom environment accordingly. PSTs' gains as teachers in the technology-enhanced lessons can be traced in the following extract:

Designing animated videos helped me a lot. While choosing the characters and creating dialogues I realized that they appealed to all students with different styles. Visual, auditory and kinesthetic learners enjoyed these tools a lot. It was not possible to involve students with different learning styles in such an effective way in regular classes. (PST9)

In the excerpt above, PST9 stressed the role of designing technology-enhanced lessons in realizing individual differences and tailoring her teaching accordingly. Different from ordinary classes, PST9 was able to identify needs of individual students and implement technology to involve students of different learning styles. In this way, she had a chance to take individual variety into consideration while designing effective lessons.

As a result, the prospective teachers and their students in the study had positive attitudes towards integrating technology into an L2 class even though a few concerns and problems were raised throughout the process. Qualitative analysis indicated that both parties enjoyed technology-enhanced classes in general, were motivated and inspired by the tools used, and were able to see linguistic gains as well as gains for improving classroom atmosphere. Following extracts taken from the interviews unfold the effectiveness of designing classes around technologically augmented tools and activities:

We realized that at the beginning students generally associated computers and technology with only playing games... this was most of the time banned by parents and viewed negatively. Integrating technology into the classrooms and showing them ways of using technology for language learning purposes expanded their perspectives. (PST 8)

I wish all our English classes included such types of activities we used this term. I always sit down at the back and pray for the teacher not to pick me for any activity... I love computers, the internet, technology in general... Using them in class was fun, and I tried to speak in English most of the time. It was like playing computer games in class and no one was yelling at you. (S5)

PST8 in the excerpt above pinpointed a general problem in the research context about the perception of technology use by parents and students. Parents usually link technology use with their children's social detachment, and students associate technology with only playing computer games. At the beginning of the study, students were far from realizing the effectiveness of technology for language improvement. However, PST8 underlined the positive outcomes of the study to create an awareness on how technology would assist students in their learning. S5 expressed that in technology-enhanced classes, he was motivated to take active part in the lessons and had a chance to see how technology could become an effective tool for learning when used purposefully and effectively in the language classroom.

## Discussion and conclusion

The results in general yielded that prospective teachers and students in this study benefited from technology-enhanced classes and experienced an increased awareness on how to incorporate technology for more learning opportunities. Hockly (2015) pinpoints that technology needs to support language aims, otherwise it is pointless to use technology for technology's sake. In line with this view, PSTs in this study used technology to achieve learning outcomes, foster language skills, improve classroom atmosphere, and promote engagement with content. Throughout this study, students expressed that the tools and activities centered around implementing technology resulted in increased motivation towards L2, and illuminated their ways to find a shared ground between L2 learning and their interest in technology outside the class. The aim of this study was not to publicize the use of certain technology tools available, but to serve as a catalyst to broaden the perspective of teacher trainers, prospective teachers, and students by maximizing opportunities for purposeful technology integration. Technological tools, activities and even platforms are doomed to change; that is one tool working today may become outdated tomorrow. Tracing the findings of the current study, an implication can be drawn in creating spaces for language practitioners to develop necessary skills and knowledge to reconcile technology and language learning.

A successful teacher preparation program to incorporate technology needs to focus on learning processes that involve hands-on experience

with technology, has links to actual classroom settings, and is based on promoting reflective practices (Hubbard, 2008; Kiraz & Özdemir, 2006; Sert & Li, 2017). Throughout the study, PSTs were provided with opportunities for a situated learning experience in real classrooms to integrate technology, and they reflected on this experience. They underlined the effectiveness of reflective practice in an ongoing fashion to observe the strengths and drawbacks of technology-enhanced lessons, and take action to revise their plans and teaching practices. They also took their students' reflections into account to maximize interaction and involvement. Another implication regarding the reported benefits of the current study would be to foster a reflective attitude towards technology integration in PST education to overcome certain challenges and enhance motivation to incorporate technology into future practices.

As it is evident from the results of the study, PSTs need training that would provide necessary grounds to interrelate technology and pedagogical outcomes. Otherwise, prospective teachers may have difficulty in finding the right track to cope with the ever-changing needs of students in digitally driven modern classrooms. Dudeney and Hockly (2016) assert that a step by step stance needs to be taken in any training opportunity for technology integration. This study put forward that when PSTs were given the right circumstances and training to effectively make technology part of language teaching in a step by step fashion, they were able to cultivate collaboration among students, facilitate activities that would otherwise be difficult to use, and eventually construct and build knowledge rather than simply deliver information. The positive outcomes of designing technology-enhanced classrooms for improving language skills and areas, creating a favorable classroom atmosphere, and providing opportunities to PSTs for professional development may not be novel to many CALL practitioners in various contexts. However, the importance of the study lies in the fact that it provides valuable insight into teacher preparation on the role of guidance and training required for effective integration of technology. Furthermore, while integrating technology into educational contexts, taking students' views into consideration and exploring how they perceive its effects are crucial. This study did not solely focus on technology integration from the perspective of PSTs but it also focused on how students perceived it. In this respect, receiving feedback from the students helped to shed more light on incorporating technology into FL classroom.

In this study, a teacher training model to incorporate technology into L2 classroom was suggested (Figure 1). This model depended on bridging theory and practice for technology integration with a focus on creating space for hands-on experiences and reflective practices. Models for

technology integration, as the one suggested here, would provide insight into teacher preparation, and would surely serve as a guide for effective implementation. A crucial implication here is that teacher educators can purport to various models like this in order to prepare prospective teachers for the challenges of technology driven classrooms. Alternative models like reverse mentoring model (Aydın, 2017), which actively involves PSTs teach how to integrate technology to their mentors following a rigorous training, and Sert and Li's (2017) model for teacher training in CALL pedagogy based on experiential learning cycle may also help to open new perspectives in teacher preparation. The suggested model here aligns with these models as it guides and trains PSTs to take active roles for effective integration of technology during their teaching experiences. Practitioners of this model would have a chance to revise their practices and question the effectiveness of technology integration into their own contexts. Hence, the suggested model of technology integration defined here guides prospective teachers to identify necessary skills and knowledge required for integration of technology, take contextual differences into account, and select the most appropriate tools that would serve their learning outcomes in an ongoing reflective manner.

In conclusion, the results of the study suggest that when PSTs are provided with training opportunities to integrate technology in their language teaching practices, technology can become an effective teaching and learning tool. The context of this study has its own dynamics and realities. Bearing this in mind, technology integration into various local educational contexts may not follow similar procedures. What is important within the limitations of the current study is that, it is a duty to equip prospective teachers with technical and pedagogical knowledge and skills to incorporate technology effectively into language teaching. We need technology-minded teachers to face with challenging demands of technology-enhanced classrooms, and to create favorable learning atmosphere with the help of available tools. A further study may focus on exploration of PSTs' experiences to follow each step of the proposed training model in order to investigate the effectiveness of it in various L2 contexts. Another suggestion for future research might be to explore beliefs and attitudes of practitioners before and after training on technology integration in order to shed more light on the effects of training on what teachers think, know, and believe regarding practices to design technology-enhanced language lessons. Furthermore, another study might focus on the effects of such lessons on students' L2 learning in comparison with more traditional ways of learning. One direction for further research may also concentrate on how variables such as motivation, language teaching anxiety, and self-efficacy contribute to success of technology-enhanced L2 classes.

## Disclosure statement

No potential conflict of interest was reported by the author.

## Notes on contributor

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## Appendix A. Mini survey questions on PSTs' ideas on technology integration before the study used in step 1 of technology integration procedure

This survey was not analyzed in the results section but it was used to identify PSTs' readiness, familiarity and needs for technology integration.

1. Do you use technology for learning purposes? If yes, how?
2. What do you think about the role of technology in FL learning?
3. Do you know recent technological tool/s you can use for language teaching purposes? If yes, briefly talk about such tool/s.
4. What do you think about implementing technology into your lessons during practicum?

## Appendix B. Sample learning outcomes and tools used in technology-enhanced lessons

Sample learning outcomes	Language skills/areas	Sample technology tools
By the end of the lesson, the students will be able to...		
<ul style="list-style-type: none"> <li>• brainstorm ideas on a given topic</li> <li>• make comparisons between/ among similar things/ideas</li> <li>• create visuals on a topic and present them to their peers</li> <li>• work on multiple diagrams and visuals to lead discussions within pairs and small groups</li> <li>• use multimodal sources to prepare presentations on various topics</li> <li>• test their knowledge on different topics/language skills or areas</li> <li>• identify and analyze their language mistakes based on actual data</li> <li>• prepare various quizzes for language study in groups</li> <li>• listen various texts and study on problematic sounds</li> <li>• identify syllable stress on two and more syllable words</li> <li>• focus on reduction of functional words while listening to texts</li> <li>• practice grammar in real life contexts through pair and group work</li> <li>• create arts and crafts for language study based on the analysis of visual and aural input</li> <li>• create stories individually, in pairs and in groups with given pictures/prompts</li> </ul>	<p>Listening, speaking, writing/grammar, vocabulary</p> <p>Listening/grammar, vocabulary</p> <p>Speaking, listening/ pronunciation, vocabulary</p> <p>Reading, writing, speaking/grammar, vocabulary</p>	<p>Popplet (popplet.com) Glogster (edu.glogster.com)</p> <p>Quibblo (quibble.com) Plickers (plickers.com)</p> <p>Voscreen (voscreen.com) TV English Club (tv-english.club) ESL Lab (esl-lab.com) Games to Learn English (gamestolearnenglish.com)</p> <p>Go Animate (goanimate4schools.com)</p>

(continued)

Continued.

Sample learning outcomes	Language skills/areas	Sample technology tools
<ul style="list-style-type: none"> <li>engage in creative activity to express themselves in English</li> <li>create dialogues in English based on their own animations/picture books</li> <li>build up empathy and express this in English based on imaginative characters they created on various platforms</li> <li>focus on various language functions by analyzing visual and aural input</li> <li>express their ideas in English and defend their arguments by responding to others' posts/written productions</li> </ul>		Storybird (storybird.com) Kidsblog

### Appendix C. Guiding questions for selecting technological tools used in step 4 of technology integration procedure

While deciding on a technological tool/application consider these:

- Is it useful in my own teaching context? If yes, how?
- Is it an online/offline tool? Is required technology (e.g. internet connection, computer lab, white board, mobile devices, etc.) for this tool available in my class?
- Is it appropriate for age, level and interests of the students in my class?
- How can I achieve my learning outcomes with this tool?
- What would be possible benefits of this tool for my own teaching context?

### Appendix D. Guiding questions for reflective diaries

- What do you think about today's lesson?
- What do you think about the use of technology in this class?
- How do feel about using technological tools in the lesson today? (only PSTs)
- Is there any benefit/drawback of the technological tool used for today's language practices? If yes, talk about them.

### Appendix E. Focus-group interview questions

- What do you think about integration of technology into your classes?
- Is there any change in your ideas about the integration of technology into FL learning after this study?
- What are the positive and negative aspects of this experience?

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