The application of reflection journals for developing language teachers' knowledge of technology-enhanced education: A case study of an online teacher education course

Fatemeh Nami[*]
(corresponding author)
Assistant Professor at the Department of Foreign Languages, English Language Teaching, Amirkabir University of Technology, Tehran, Iran
Email: f.nami@aut.ac.ir

ABSTRACT
Preparing teachers for technology-enhanced language education is one of the essences of the field of education. However and in spite of the growing integration of different digital technologies and online platforms for language teaching, teacher education is a less attended to topic in this field. Studies that specifically focus on online teacher education and the approaches for enhancing the efficiency of such courses remain scant. Teacher education for computer assisted language learning (CALL) is largely limited to the introduction of different technologies in teacher-centered courses. Although addressing different technologies can increase participants' technological knowledge to use these tools for general purposes, such a focus cannot be productive in improving participants' pedagogical knowledge. These challenges highlight the essence of integrating more practical approaches to increase the knowledge and awareness of the teachers attending CALL teacher education courses. To satisfy this need, the present study explore the application of reflection journals for increasing and promoting teachers' pedagogical knowledge of CALL. The content of 96 journals written by 8 experienced language teachers who attended a 13-session online teacher education course was analyzed using constant comparison method of analysis. The results revealed the productivity of this approach for increasing participants' knowledge about key concepts, constraints, and the potentials of different technologies for language teaching as well as ability to practically analyze their own learning process. Critical reflection on the topics and ideas presented throughout the preparation course can help teachers to internalize knowledge by integrating it.

Nami, F. (2021). The application of reflection journals for developing language teachers' knowledge of technology-enhanced education: A case study of an online teacher education course. Foreign Language Research Journal, 11 (3), 491-510.

---

[*]   Fatemeh Nami holds a PhD from Alzahra University. Her fields of expertise encompass CALL, teacher education, and digital materials development.

The application of reflection journals for developing language teachers' knowledge of technology-enhanced education: A case study of an online teacher education course

Fatemeh Nami[*]
(corresponding author)
Assistant Professor at the Department of Foreign Languages, English Language Teaching, Amirkabir University of Technology, Tehran, Iran
Email: f.nami@aut.ac.ir

ABSTRACT

Preparing teachers for technology-enhanced language education is one of the essences of the field of education. However and in spite of the growing integration of different digital technologies and online platforms for language teaching, teacher education is a less attended to topic in this field. Studies that specifically focus on online teacher education and the approaches for enhancing the efficiency of such courses remain scant. Teacher education for computer assisted language learning (CALL) is largely limited to the introduction of different technologies in teacher-centered courses. Although addressing different technologies can increase participants' technological knowledge to use these tools for general purposes, such a focus cannot be productive in improving participants' pedagogical knowledge. These challenges highlight the essence of integrating more practical approaches to increase the knowledge and awareness of the teachers attending CALL teacher education courses. To satisfy this need, the present study explore the application of reflection journals for increasing and promoting teachers' pedagogical knowledge of CALL. The content of 96 journals written by 8 experienced language teachers who attended a 13-session online teacher education course was analyzed using constant comparison method of analysis. The results revealed the productivity of this approach for increasing participants' knowledge about key concepts, constraints, and the potentials of different technologies for language teaching as well as ability to practically analyze their own learning process. Critical reflection on the topics and ideas presented throughout the preparation course can help teachers to internalize knowledge by integrating it.

---

[*] Fatemeh Nami holds a PhD from Alzahra University. Her fields of expertise encompass CALL, teacher education, and digital materials development.

1. Introduction

Although teacher education courses have a somewhat long history in Iranian higher education system (see Avanaki & Sadeghi, 2014), teacher preparation for language instruction by means of digital technologies is still a less attended to and studied field (Nami, 2021). Parallel with the advances in the field of information and communication technologies (ICTs) and online educational technologies and platforms, the number of technology-enhanced courses has significantly grown. In the same vein, second and foreign language teaching has been affected by these changes. Over the past decade, particularly the past years, digital content, online teaching platforms, learning management systems, and content generation technologies have turned into an undeniable essence for language education. This growth has also enhanced consciousness about the significance of effective teacher preparation for technology-enhanced language learning.

However, computer assisted language learning (CALL) teacher preparation courses and programs are still inadequate, unrelated, and ineffective (Powell & Bodur, 2019; Yurkosky, Blum-Smith, & Brennan, 2019). In many of these courses, only some tools and digital spaces are introduced without considering relevant pedagogical approaches and theories. Although such a focus, in itself, can improve participants' technological knowledge/literacy, such courses are not usually successful in enhancing teachers' pedagogical knowledge of CALL (Nami, Marandi, & Sotoudehnama, 2016). In effect, teachers participating in these courses do not usually develop a comprehensive understanding about CALL and related pedagogical approaches. In Iran, similarly, after about two decades of introducing digital technologies into the realm of language education, CALL teacher education is not widely attended to in preparation courses as the main instructional topic (Hedayati & Marandi, 2014).

In addition to introducing different digital technologies, CALL teacher education courses should provide a space for participants to not only find opportunities for individual and collective practice using these technologies but also evaluate the effectiveness of the introduced topics and tools through reflection on the process of learning after each educational session. In other words, CALL teacher education, today, needs a fundamental change in the design of preparation courses (Tondeur et al., 2019). To establish a sound relation between the theoretical concepts introduced in teacher education courses with the reality of language classrooms, teachers need critical thinking. One of the strategies that provides opportunities for participants in teacher preparation courses to get engaged in critical thinking and analysis is reflection (Thompson & Pascal, 2012).

Although reflection is widely attended to in teacher education studies (e.g., Loughran, 2002; Davis, 2006; Mortari, 2012), its potentials and applications for CALL teacher education, particularly in online teacher preparation courses, are largely unknown (Nami, Marandi, & Sotoudehnama, 2015; Wang, Chen, & Levy, 2010). In an attempt to design an effective and relevant online course for teacher education, the present study explores the application of reflection for promoting or shaping teachers' knowledge of pedagogical CALL.

2. Literature Review

2.1. Preparing teachers for CALL

The growing application of digital technologies for language teaching (Dashtestani & Karami, 2019) has necessitated the design of relevant and appropriate professional development courses to prepare teachers make effective use of these technologies (Wang, Chen, & Levy, 2010). In practice, "providing effective training for academics so that they learn how to effectively redesign learning opportunities… is not straightforward" (Rienties, Brouwer, & Lygo-Baker, 2013, p. 123). In other words, preparing teachers who are capable of effective integration of technology in their classes, above all, requires designing a teacher education course with appropriate and relevant pedagogical structure.

A review of the studies conducted in the field of language teaching reveals that CALL teacher education has mainly focused on introducing different technologies in usually teacher-centered courses (Nami, 2021). In this approach, tools, educational platforms and some software are introduced to the participants throughout the course. The fundamentals and theories of the field are also discussed by the teacher. In such a design, participating teachers do not find that much opportunity for analyzing the introduced concepts and tools and solely focus on memorizing what is taught; a strategy that may not be productive in the process of learning. Such a preparation, according to Dede et al. (2009), lacks structure and coherence and may not be effective. This problem is intensified in the case of online CALL teacher preparation courses with geographically dispersed participants. In practice, dedicating their precious time memorizing concepts and strategies for integrating a number of tools and particular platforms, teachers participating in preparation courses would not be able to translate what is learned into their field of expertise. Thus, they may consider CALL teacher preparation ineffective and useless (Teräs, 2016).

For information to be internalized as knowledge, learner needs to be able to apply it (Davis, 2006) and technically and practically analyze it (Weber et al., 2018). A technique that can contribute to the internalization of knowledge is reflection on the topics introduced in course (Loughran, 2002).

2.2. Reflection and its application in teacher education

Since the first introduction of Dewey's (1933) conceptual framework and later Schön's (1983) theory of *reflective practitioners*, reflection is explored in different areas in a variety of ways. Effective integration of reflection, above all, requires improving teachers' awareness regarding the appropriate method of reflection. According to Davis (2006), reflection can be practiced at three levels. At the first level, technical rationality, the knowledge acquired

from an external source is solely reported and integrated without being understood or questioned. The main objective, in this type of reflection, is only finding an appropriate tool to achieve a pre-determined goal. This type of reflection, which is also referred to as descriptive reflection, does not have any application for teacher education and learning given that it is more based on generalizations and is not attentive to the relation between the concepts and ideas (Cherrington & Loveridge, 2014).

At the second level, practical reflection, the concepts and objectives are somewhat attended to, questioned, and analyzed. But it the third level, critical reflection, that has various educational potentials and is recommended for teacher education courses. Critical reflection involves questioning and analyzing the viewpoints and concepts learned or taught during the course. In other words, rather than instant acceptance and memorization of the topics and information, the individual constructs knowledge through analysis and reflection and, this way, is directly engaged in the process of learning (Cavanagh & Prescott, 2010).

Reflection is practiced in different ways and for different purposes, the most applicable of which includes: reflection on practice and reflection in practice. Reflection in practice usually occurs during real classroom instruction. Reflection on practice, which has a wide usage in teacher education courses, relates to participants' analysis of the learning process, challenges, and even the design of the course (see Loughran, 2002; Ross & Bruce, 2007). According to Dewey (1933), reflection on practice is a key learning strategy. This type of practice significantly enhances teachers' responsibility in their process of learning (Dobbins, 1996).

One of the most commonly used strategies for applying the potential of reflection in teacher education courses is encouraging participants to write reflection journals after each session (Davis, 2006; Zeichner & Liston, 1996). Reflection journal writing is a structured and

systematic attention to write about the ideas and experiences that have occurred over a short period of the times in order to determine their hidden and obvious objectives through analysis. Wilson and Berne (1999) recommend reflection journals to be focused on critical and analytic analysis of the ideas and events rather than merely recording them.

A review of the studies conducted in the field of teacher education reveals that reflection journals are commonly used for satisfying two objectives. These include: (1) enhancing teacher learning and (2) gaining a vision about their learning and thoughts (Davis, 2006). Research findings suggests that learning process would be more effective if teachers participating in the preparation courses are provided with opportunities to critically reflect on their learning throughout the course (Atkinson, 2012). It is widely accepted that reflection makes the learning process more productive (Sangani & Stelma, 2012) and results in quality knowledge enhancement by establishing a link between knowledge and experience (Kaminski, 2014). These potentials are extremely productive for developing practical and professional knowledge (Bower et al., 2011). In this context, reflection is regarded as an undeniable components of *quality* teacher education in different fields including language education.

To explore the impact of reflection on pre-service teachers' professional development, Guichon (2009) conducted a study on 16 Masters level teachers of French language at the University of Lyon. Participants were required to design, manage, and analyze their performance in online teaching sessions. Content analysis of participants' oral reflections revealed that critical reflection enhanced their knowledge of online language teaching challenges and the essential strategies for addressing such problems. Guichon concluded that while confronting and reflecting on different aspects of their learning, pre-service teachers develop their knowledge about online teacher and are more likely to apply such knowledge in other areas of CALL.

The potentials of reflection journals in teacher education were explored in a cognitive qualitative study conducted by Mortari (2012). Focusing on the data obtained from interviews and journals of 20 participants, Mortari observed that writing such journals promote the habit of questioning and analysis in teachers and consequently enhance their learning. In another study, Sangani and Stelma (2012) noted that reflection provides opportunities for teachers to address the challenges of the learning context in teacher education. In this case of study which was conducted on a group of experienced teachers of English writing in Iran, the participants found reflection an effective experience for developing knowledge about their professional and pedagogical expertise.

2.3. Reflection in CALL teacher education

Although the importance of reflection for teacher education and its pedagogical potentials for learning are widely addressed in previous research, data on its application for CALL teacher education remains scant (Cutrim Schmid, 2011; Gao et al., 2011; Nami, Marandi, & Sotoudehnama, 2015; Wang, Chen,& Levy, 2010). For instance, Wang et al. (2010) applied reflection as one of the main components in their cyber/face-to-face CALL teacher education model. Analyzing the content of 26 reflection journals, 108 comments posted in online discussion forum, and 210 analytical reports obtained from eight teachers participating in the study, Wang et al. (2010) different reflection strategies enabled participants to explore their own learning process in a sustainable and comprehensive manner. The researchers concluded that reflection should be considered as a fundamental step in teacher education to facilitate theory translation into practice. In other words, just as teacher education is essential for promoting teachers' professional growth; reflection on the process of learning is needed to convert this expertise into practical knowledge.

In a longitudinal CALL teacher education program, Cutrim Schmid (2011) explored the contribution of video reflection on EFL

teachers' professional development. The results of the content analysis of the field notes, classroom observations, interviews, and recorded classroom sessions indicated that this experience provided teachers with an opportunity to evaluate the potentials and applications of the technologies introduced throughout the course for classroom language instruction. According to Cutrim Schmid (2011), this type of reflection increases teachers' control over the learning context and, in effect, contributes to the application of the taught concepts into their actual classroom practice. In another study, Gao et al. (2011) focused on the potential of reflection for developing teachers' technological knowledge. Drawing on the results of the content analysis of reflection journal, classroom discussions, and interviews with 14 pre-service teachers who attended a two-hour workshop, they observed that reflection on the learning experience helps participants (in spite of their individual differences) develop their technology integration knowledge and skills.

Nami et al. (2015) defined reflection as a one of the building blocks of their CALL teacher education model. Analyzing data obtained from three CALL teacher education courses (i.e., online, face-to-face, and blended), the researchers observed that writing reflection journals provided participants with an opportunity to translate information into practical knowledge applicable for classroom settings.

3. The purpose of the study

In response to the need for designing more efficient CALL teacher education courses, particularly online ones, the present study has explored the effectiveness of an online CALL teacher education course. As a review of research on the application of reflection and critical thinking for learning in CALL teacher education courses reveals, studies are mainly confined to face-to-face and, at times, to blended courses. However, in order to ensure the productivity of any pedagogical approach, its integration in different educational settings with different characteristics should be attended to

(Sangani & Stelma, 2012). Considering that online CALL teacher education is in its infancy and a less traversed field of study, the lack of relevant research regarding the application of the common approaches in teacher education (e.g. reflection journals) for promoting participants' knowledge and skills in integrating different technologies appears quite natural. In this regard, Gao et al. (2011) have emphasized the need for understanding "how… teachers' self-reflection impacts their development and translation of TPK" (p. 999). In an attempt to address this underexplored issue and to increase understandings about the possible application of reflection for online teacher education courses, a case study was conducted on eight experienced in-service English language teachers in order to address the following research question:

- **How does reflection journals shape the learning of teachers who participated in an online teacher education course?**

4. Methodology

4.1. Participants

The participants in the CALL teacher education course included eight (seven females and one male) in-service teachers and university instructors who were selected following convenience sampling procedure. Table 1 summarizes participants' demographic information. As illustrated in the table, half of the participants were language institute teachers, two were university instructors, and two were high school teachers. The overall objective of the course was fully explained to the participants. The teaching experience of the participants ranged from 10 to 23 years. Participants' pedagogical knowledge of technology-enhanced language instruction was evaluated using CALL pedagogical knowledge questionnaire (Nami et al., 2015) in order to design a course relevant to teachers' needs. Questionnaire data revealed that half of the participants were average technology users and three were totally novice. Only one of the participants was at an advanced technology user.

Additionally, six participants (75%) were novice and two were at average level in terms of CALL pedagogical knowledge. The research participated in the study as the course instructor.

Table 1. Participants' demographic information

Participants	Age	Teaching Experience	Educational Background	Teaching Context	TK	Pedagogical knowledge of CALL	Gender
No. 1	55	20	Masters	University	Novice	Novice	Female
No. 2	46	10	PhD student	Language institute	Novice	Novice	Female
No. 3	45	10	Masters	High school	Average	Novice	Female
No. 4	40	16	Masters	Language institute	Average	Novice	Female
No. 5	34	13	PhD student	Language institute	Average	Average	Female
No. 6	49	20	Masters	High school	Average	Novice	Female
No. 7	46	23	PhD	University	Expert	Average	Female
No. 8	42	20	Masters	Language institute	Novice	Novice	Male

4.2. The structure and purpose of the teacher education course

The CALL teacher education course comprised 13 two-hour sessions (26 educational hours) which were held in an online real-time classroom platform. Considering participants' busy work schedules, the sessions were set for 4-5 PM. During the first two sessions, the participants attended the class using their webcams. The rationale was helping participants see and know about their peers and the course instructor as well as introducing the realities of virtual education and the features of live session platform to be used in case of technical glitches encountered when video streaming. According to the information provided in technical support website, the minimum internet speed required for smooth session attendance in the online platform using video streaming is 356 kbps and the recommended speed is 1 mbps. The minimum required and recommended internet speed for audio-enhanced classroom participation are 300 and 512 kbps, respectively. Although all participants were using broadband internet connections, due to the fluctuations in the internet speed, live video streaming by nine participants (eight teachers and a course instructor) reduced the quality of sharing and streaming and sometimes seriously affected the

connections. Thus, communication between the participants in the remaining 11 sessions was achieved in audio-enhanced mode along with the use of text-chat box.

The purpose of the course was enhancing teachers' pedagogical knowledge of CALL, introducing digital educational technologies and providing opportunities for using them, and exploring the application of these technologies for teaching different language skills. Given that the majority of the participants had limited knowledge about educational technologies, the first three sessions were dedicated to the introduction of the key concepts, definitions, educational theories, and prerequisites of CALL. Additionally, online teaching platforms, learning management systems (LMSs), online a/synchronous classroom session definition and attendance strategies, and massive open online courses (MOOCs) were introduced. Different potentials of LMSs (e.g. content authoring software, online classroom setting, video conferencing tools, text-chat window, digital whiteboard, test-making software, file sharing, and session recording) were introduced to the participants. In addition to introducing different tools, participants were engaged in different collective and individual projects to create content and present during the live sessions.

4.3. Instrumentation

To achieve the research objective, the researcher applied reflection journals both as an instrument for data collection regarding the degree of the effectiveness of the course and as a strategy to encourage participants to get engaged in reflection throughout the process of learning. As it was noted earlier, from among the three reflection strategies, it's the critical reflection which entails educational potentials. However, applying these potentials requires developing participants' understanding about the concept of critical reflection. This is the only way to ensure teachers will not mistake reflection journals with simple reporting or similar methods. Given that none of the participants had the experience of writing reflection journals, a part of the first classroom session was dedicated to the introduction of critical/evaluative reflection and the possible strategy for achieving it in journal writing. During this session, the difference between descriptive reporting and evaluative writing was focused on and discussed.

Participants were required to write a reflection journal after each session (from session two onwards) and upload it prior to the forthcoming session in the online classroom group. The rationale behind sharing reflection journals in an online group was providing an opportunity to have access to a collection of peer writing and evaluation of the points addressed in their journals (see Attard, 2012). All journals were written in English and shared in the form of PDF files. Journal writing comprised a part of course requirement for successful accomplishment of the course and the participants were informed about this at the onset of the course. By the end of the course, a total of 96 reflection journals was collected from the participants; 12 journals belonging to each teacher. To preserve the flexibility of the experience and help teacher enhance their sense of participation and attendance to the activity (Polly, 2011), participants were not forced to follow a rigid pre-set pattern or framework to write reflection journals. They were asked to talk about their preferred topic using their own language.

4.4. Data analysis

According to Davis (2006), applying knowledge application is an indication of knowledge acquisition and "productive reflection can promote knowledge integration processes like adding, distinguishing, and linking ideas through helping learners articulate and consider their ideas" (p. 283). This conceptualization is applied as the theoretical framework for analyzing and evaluating participants' reflection journals. Accordingly, critical writings in which the teacher attended to four main aspects of teaching (i.e. instruction, learning process, educational content, and subject matter or CALL knowledge) were taken as indications of knowledge application. Critical writing is conceptualized as (a) the analysis of a topic

providing proof and justification for the claim, (b) the act of questioning, and (c) the evaluation of author's personal perceptions and beliefs rather than mere reliance on providing descriptive information. In this context, sentences that contained author's evaluation, proof-based analysis, and questioning of the topics introduced during the educational session were selected for analysis.

The content of the journals was analyzed following constant comparative method of analysis. In this approach, after identifying, codifying, and categorizing the extracted topics; the codes and categories are analyzed through several rounds to finalize the overall categories. Following open coding strategy, related topics are clustered together in themes. Each theme includes sentence(s) that contain the identified codes. After several rounds of reading and constant comparison, 324 reflective texts were extracted from a total of 96 journals. Each reflective text comprised at least one sentence which, according to the above definition, analyzes topic(s) introduced throughout the course by providing proofs or justification, questioning, or perception evaluation. Following this, the 324 reflective texts were clustered into 13 thematic units. Following constant comparison, the 13 extracted thematic units were grouped into five categories. Table 2 illustrates the overall coding strategy including the main and sub-themes along with sample texts obtained from participants' journals.

After finalizing the themes and thematic units, each, depending on the focus and topic, was labeled: (1) notes analyzing the tools and concepts introduced throughout the course about CALL, (2) notes reflecting participants' feelings, (3) notes analyzing constraints, and (4) notes evaluating personal learning (Tables 2 and 3). Descriptive statistics, including frequencies and percentages of each category, was calculated. In the first category, the focus of the sentence(s) was on CALL concepts, tools, and the online platforms which were introduced throughout the teacher education course. In the second category, the writings reflected participants' feelings and different uptakes regarding the preparation course, technology, CALL, their learning process, classroom activities, and the practicality of the introduced topics. In the third category, notes can be divided into two broad groups: (1) analytical sentence(s) focused on the affordances of digital technologies in general and (2) the sentences reflecting participants' analytic perspectives about the potentials of CALL. The forth category was concerned about two topics: the constraints and glitches of digital technologies and CALL and the problems related to the infrastructures and hardware. The fifth category encompassed sentences which directly reflected participants' evaluation of their learning with respect to (1) the characteristics of a CALL teacher, (2) keywords and main concepts in CALL, and (2) technology-enhanced classroom management.

Table 2. The extracted themes and related thematic units

Thematic Units	Themes	Samples
Notes analyzing tools and CALL concepts	Technologies, tools, and concepts related to CALL	*These three slide generators are fairly similar tools as…*
Notes reflecting participants feelings	About the course	*What I enjoyed most about the course was reading other people's journals and report mainly because…*
	About CALL	*I was really fascinated by the [learning] opportunities provided by these online*

		games. *For example,…*
	About their learning process	*I feel really excited about learning to make my personal blog.*
	About activities	*I found online reading comprehension tasks interesting especially since it can be used for learners in different levels of proficiency.*
	About the practicality of classroom discussions	*The discussions during session 5 were very productive given that…*
Notes analyzing constraints	Of the digital technologies and CALL	*I really don't think an actual learning might occur in those kinds of classes running on MOOCs… and so many other factors may affect the process of learning a bit negatively. These include…*
	Of the infrastructures and hardware	*The third reason for the uniqueness of the session was that no mic worked and that*
		I did not hear the voice of the instructor all through the session.
Notes analyzing the potentials	Of digital technologies (tools, software, and platforms)	*Aggregators are useful platforms because they collect information from different sites, and bring them together in one place.*
	Of CALL	*I really found EnglishCentral appealing and useful for improving the oral skills.*
Notes analyzing personal learning	About the characteristics of a CALL teacher	*I really appreciate the instructor's tolerance. This was an important lesson I learned from this course. If you cannot tolerate low speed & unstable internet, don't even think about using online technology in your classes.*
	About keywords and main concepts of CALL	*I also learned a lot about the concept of VLEs standing for…*

	About technology-enhanced classroom management	*The second lesson I learned from this course was to have replacements because technology failure comes silently, unexpectedly and suddenly.*

To ensure the validity of the findings two strategies were applied: (1) the sub/themes identified by the researcher were evaluated by two experts in the field of qualitative research and the differences were discussed to achieve an agreement and (2) data analysis procedure was discussed with a colleague to make sure that the identified codes and categories appropriately feature participants' reflections. Additionally, participants' writings were used and referenced to as much as possible in the analysis and discussion phases (see Wood et al., 2005).

As indicated in Table 2, reflection journals were not restricted to descriptive reports but also encompassed evaluative analysis of the concepts. Descriptive words are bold-faced in the sample sentences. Additionally, sample words indicating analysis, cause, and evaluation (e.g. since, as, because) are underlined in the sentences.

Table 3. Topical categories of the themes extracted from reflection journals

	Topical categories	Total	
		Frequency	Percentage
1	Notes analyzing tools and CALL concepts	98	30.2%
2	Notes reflecting participants feelings	61	18.8%
3	Notes analyzing constraints	75	23.1%
4	Notes analyzing the potentials	57	17.7%
5	Notes analyzing personal learning	33	10.2%
	Total	324	100.0%

5. Results and discussion

As shown in Table 3, of a total of 324 reflective notes, 30.2% analyzed the tools and concepts which were introduced in the CALL course. The most frequent topical category after this group was the notes that reflected participants' analysis of the constraints (23.1%). The sentences related to participants' feeling and the analysis of the educational and technical potentials of different tools and platforms respectively comprised 18.8% and 17.7% of the total categories. The fifth category features the notes that analyze participants' learning process (10.2%). In what follows, the topics introduced and focused on in each category are discussed.

5.1. Analytic evaluation of the tools and concepts in CALL

As indicated in Table 3, the notes that contained authors' analysis of digital tool and CALL concepts were the most frequent. This type of texts directly indicate the potential of reflection journals for encouraging teachers to think about the topics and concepts introduced in classroom meetings. Given that applying knowledge is an indication of knowledge acquisition (Davis, 2006), this finding suggests reflection journal writing can be productive for developing teacher learning (Loughran, 2002). Mortari (2012),

similarly, notes that reflection on (learning/teaching) experience enables teachers to construct practical knowledge about the topic and gain professional expertise. Chitpin (2011) emphasizes that critical reflection activates personal information and results in the development of practical knowledge. For instance, in the following text, one of the teachers analyzes the application of online screencasting software:

Of different screencasting software, these two are browser-based and work only with Java... In Brainshark, you can also upload image, presentation file, and video. Audio can be added to these files. After uploading, the file is automatically converted into presentable output whose duration depends on the type of the file. This environment generates an embedding code or sharing link for you. If we have access to an online environment such as a weblog, we can watch the recorded output directly in our blog page.

Participants in Gao et al.'s (2011), Nami et al.'s (2015), and Nami's (2021) studies, similarly, reflection, which was operationalized in the form of personal or group projects, is applied to indicate one's awareness and knowledge about the topics introduced in classroom discussions. However, in Gao et al.'s (2011) study, no samples are offered from participants' reflections and the researchers restrict their focus on the data obtained from questionnaire and interview responses. The present study, on the other hand, has enriched the findings through the content analysis of participants' reflection journals.

5.2. Critical analysis of the constraints

The second highly frequent topical categories in participants' reflection journals included the notes that critically analyzed the problems related to digital technologies, CALL, and infrastructures/hardware. Reflection on the problems experienced throughout the course enhanced teachers' ability in precise analysis of

these problems and their impact on CALL. For instance, drawing on her personal experience of participating in a MOOC course, teacher No. 3 analyzed the constraints related to these environments for language teachers in one of her journals:

Another problem of these classes is that an unlimited number of students can join the session at any time; this disrupts classroom order given that some of the students will remain behind the schedule while others have progressed along with the course. Maybe it can be argued that the problems of these classes is more for language education compared to other subject matters.

Contrary to Whyte (2011) who believes that the analysis of constraints by participants in teacher education courses does not have any research value given that it is largely dependent on research context, in the present study and consistent with Guichon (2009), it was observed that such notes have the potential to highlight the special needs in the field of education as teachers are usually engaged in attempts to find solutions for these problems.

The high frequency of this type of notes in participants' journals is inconsistent with Sangani and Stelma (2012) observation that teachers do not directly address problems and constraints in their reflection journals. Sangani and Stelma (2012) attribute this to the time required for teachers to achieve ample understanding regarding how to write reflection journals. Reflection in Sangani and Stelma's (2012) study was confined to a 120-minute session and was experienced collectively. The participants in the present study experienced reflection over a five week period. Hence, time can be one of the main reasons for the presence of more details in the writings of these participants. It may also be attributed to what Loughran (2002) refers to understanding the topic.

The observed difference can also be attributed to the way reflection was experienced

in these two studies. Teachers, in Sangani and Stelma's (2012) study, experienced reflection orally at the presence of other teachers who played the role of judging colleagues. By increasing teachers' conservativeness, this strategy may have avoided teachers from free expression of their ideas about the problems given that they did not want to appear unprofessional. In the absence of colleagues who play the role of judges, participants in the present study could benefit from their personal privacy and focus on different aspects of their learning experience and analyze it.

These findings are consistent with the findings of the previous research. For instance, Nami et al. (2015) similarly observed participants' special attention to the constraints of CALL in their reflection journals (also Guichon, 2009). In the same vein, participants in Antoniadou's (2011) study focused on online teaching constraints in their reflections.

Furthermore, the session-by-session analysis of the topics addressed in teachers' journals revealed that the problems highlighted in the writings directly related to what teachers experienced during each session. For instance, during the ninth session, the majority of the participants experienced connection problems and this seriously affected the quality of their classroom attendance. It is interesting to note that reference to the constraints of digital technologies and CALL in participants' journals written for the ninth session was significantly more compared to other journals. In other words, experiencing technical glitches during different sessions and reflecting them in journals can increase participants' awareness about the problems related to appropriate use of technologies for language instruction.

5.3. Journals reflecting participants' feelings

The third group of topical categories involved notes reflecting participants' feelings. It appears that the teachers participating in this course found reflection journal writing as an appropriate opportunity for reflecting their feelings about the educational course,

technology, CALL, their personal learning process, activities, and the practicality of classroom discussions. Although expressing feelings does not directly reflect teachers' pedagogical knowledge, it indicates the impact of reflection and critical analysis. As Richards and Lockhart (1994) and Zeichner and Liston (1996) note, meaningful reflection happens when teachers collect data and information about their personal learning experience and analyze their feelings and perceptions in this regard. Thus, the findings of the present study can be taken as indications of reflection on learning experience for enhancing technical and pedagogical knowledge of teachers.

5.4. Critical analysis of the pedagogical and technical potentials of the online tools and platforms

The fourth category of the themes extracted from teachers' journals focused on the pedagogical potentials of (1) digital technologies in general and (2) CALL in particular. For instance, analyzing the application paperrater.com for writing evaluation, teacher No.7 wrote: "this site can help both learners and teachers… analyze paragraphs and their article with respect to word choice, grammar, plagiarism, etc." Comparing the video conferencing feature in two free platforms, teacher No. 4 notes that one of them is more convenient for holding online sessions given that it enables teachers to better manage the class. Such a comparison indicates participant's awareness regarding the essence of technology-enhanced classroom management.

This attention to the potentials of technology and CALL in participants' reflection journals distinguishes the present study from previous research. In the majority of previous studies, teachers mainly used reflection journals to report the technical glitches encountered during the sessions (e.g. Guichon, 2009; Sangani & Stelma, 2012). Consistent with the present study, Gao et al. (2011) observed teachers' use of reflection journals to analyze the potentials of technology. In fact, participants in Gao et al.'s study did not attend to the constraints and problems related to

CALL. This can be attributed to the fact that their participants were asked to write their journals in accordance to the reflection framework provided for them. This framework encompasses three questions: how, now what, and in what meaning. In other words, the topics that the teachers could have addressed in their writings should have responded at least one of these questions.

As it was indicated earlier, participants in this study were free to write reflection journals the way they found convenient. This might have resulted in participants' attention to more diverse topics in more details. However, it should not be forgotten that the topics addressed in these journals might also reflect the concepts introduced in the instructional content. For instance, in this study, not only different technologies were introduced in different sessions; but also participants' attention to the essence of attending to the affordances and constraints of the selected technologies for language instruction was drawn during classroom discussions. This might be considered as one of the reasons behind participants' attention to the pedagogical potentials and constraints of different technologies in their reflection journals.

According to Ertmer and Ottenbreit-Leftwich (2010), knowledge of and awareness about the affordances and constraints of digital technologies is one of the indicators of teachers' pedagogical knowledge of CALL. In effect, the presence these references in teachers' analytical writings can be taken as indications of their growing awareness about such topics throughout the teacher education course.

5.5. Analytical evaluation of personal learning

The third topical category related to the writings that featured teachers' direct analysis of their personal learning process. Contrary to the participants in Antoniadou's (2011) study whose evaluation of the learning process was mostly negative, teachers in the present study focused on the topics they believed they had learned.

These notes had a lower frequency compared to the previous categories and were divided into three groups. In the first group, teachers reported what they had learned about classroom management by means of technology. Such an analysis is observable is teacher No. 5's writing:

> Two hours before the class, I did not have access to the internet. I decided to call the instructor and ask her to cancel the session. Then I thought to myself that if such a thing happens to us we cannot cancel the class. Instead, we need to look for a solution for the problem. The most important lesson I learned was that I always need a plan B for CALL so that in case of unexpected happenings I would know what to do.

This note reflect teacher's engagement in the act of questioning and problem-solving which is one of the expected outcomes of reflection (Marcos, Sanchez, & Tillema, 2011). Additionally, it indicates teacher's knowledge about the essence of having an alternative lesson plan to face with software, hardware, and technical glitches when using digital technologies. Such an awareness shows what Hew and Brush (2007) refer to as technology-enhanced classroom management knowledge. This knowledge provides the teacher with an opportunity to appropriately and rationally deal with technical and unexpected problems when integrating technology into classroom instruction (Hubbard & Levy, 2006).

The second group included writings reflective of teachers' learning about different technology and third category related to narrations that indicated teachers' knowledge about the essential characteristics of a CALL teacher. For example, teacher No. 3 noted that:

> I truly admire instructor's patience and think that she is a good model for anyone who wants to use technology in her online course. It is an important lesson that I learned from today's session. If you are a kind of person who cannot stand fluctuations in the internet

speed or the individual differences of your students in using technology, do not think about using technology in your classes specially the online ones since it may result in failure.

The above note clearly illustrates the potential of reflection on experience for developing teachers' professional knowledge about technology. As noted by Donnell and Harper (2005), analyzing and evaluating the degree of understanding and knowledge acquired through the learning process enables teachers to establish a relationship between professional and practical knowledge and would result in their professional growth.

6. Conclusion

This article focused on the application of reflection journals both as a data collection method and a strategy for preparing teachers for CALL. A small scale case study was conducted including eight Iranian language teachers attending an online teacher education course. Analyzing the content of journals written by participants, five topical categories were identified, the most frequent of which related to the notes in which the participants evaluated and analyzed the tools, concepts, and platforms for CALL. According to Ertmer and Ottenbreit-Leftwich (2010), the pedagogical knowledge of CALL includes (1) technological knowledge about tools, (2) the knowledge about the constraints and potentials of these tools and platforms in general and for CALL in particular, (3) the knowledge content authoring, and (4) the knowledge of technology-enhanced classroom management. Based on the findings, it can be concluded that this experience has promoted teachers' pedagogical knowledge of CALL.

It should be noted that the main objective for conducting this study was by no means introducing reflection journals are the only effective factor in shaping pedagogical knowledge of teachers. The goal has been indicating the application of a commonly used method in the field of teacher education for online course. Some general implications can be drawn from the findings. First, it should not be forgotten that reflection can be more effective in long term (Cutrim Schmid, 2011). In effect, to depict a more comprehensive picture of its application in teacher education, longitudinal studies are required. Second, although a part of the first session was dedicated to the introduction of reflection and the strategy for its application, in practice, the effectiveness of this approach largely depends on teachers' complete understanding about it. Hence, adequate preparation time should be dedicated to help teachers learn how to use it. Additionally, it should be borne in mind that the application these approaches increase when teachers develop a positive perception about them. As a result, it is essential to dedicate a special attention to teachers' viewpoints and perceptions about reflection.

References

Antoniadou, V. (2011). Using activity theory to understand the contradictions in an online transatlantic collaboration between student-teachers of English as a Foreign Language. *ReCALL, 23* (3), 233-251.

Atkinson, B. M. (2012). Rethinking reflection: Teachers' critiques. *The Teacher Educator, 47* (3), 175-194.

Attard, K. (2012). Public reflection within learning communities: An incessant type of professional development. *European Journal of Teacher Education, 35* (2), 199-211.

Avanaki, H. J., & Sadeghi, B. (2014). A comparative study of teacher education in Iran and the UK. *Journal of Language Teaching and Research*, 5(5), 1153.

Bower, M., Cavanagh, M., Moloney, R., & Dao, M. (2011). Developing communication competence using an online video reflection system: pre-service teachers' experiences. *Asia-Pacific Journal of Teacher Education, 39* (4), 311-326.

Cavanagh, M., & Prescott, A. (2010). The growth of reflective practice among three

beginning secondary mathematics teachers. *Asia-Pacific Journal of Teacher Education, 38*(2), 147-159.

Cherrington, S., & Loveridge, J. (2014). Using video to promote early childhood teachers' thinking and reflection. *Teaching and Teacher Education, 41*, 42-51.

Chitpin, S. (2011). Can mentoring and reflection cause change in teaching practice? A professional development journey of a Canadian teacher educator. *Professional Development in Education, 37* (2), 225-240.

Cutrim Schmid, E. (2011). Video-stimulated reflection as a professional development tool in interactive whiteboard research. *ReCALL, 23* (3), 252-270.

Dashtestani, S. R., & Karami, H. (2019). An analysis of Iranian online EFL teachers' technological, pedagogical, and evaluation skills. *Foreign Language Research Journal*, *9*(3), 815-830.

Davis, E. A. (2006). Characterizing productive reflection among preservice elementary teachers: Seeing what matters. *Teaching and teacher education*, *22*(3), 281-301.

Dede, C., Ketelhut, D. J., Whitehouse, P., Breit, L., & McCloskey, E. M. (2009). A research agenda for online teacher professional development. *Journal of Teacher Education, 60*(1): 8–19. https://doi.org/10.1177/0022487108327554

Dewey, J. (1933). *How we think.* Lexington, MA: DC Heath.

Dobbins, R. (1996). The challenge of developing a 'reflective practicum'. *Asia-Pacific Journal of Teacher Education*, *24*(3), 269-280.

Donnell, K., & Harper, K. (2005). Inquiry in teacher education: Competing agendas. *Teacher Education Quarterly*, 153-165.

Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of research on Technology in Education*, *42*(3), 255-284.

Gao, P., Chee, T. S., Wang, L., Wong, A., & Choy, D. (2011). Self reflection and preservice teachers' technological pedagogical knowledge: Promoting earlier adoption of student-centered pedagogies. *Australasian Journal of Educational Technology, 27* (6), 997-1013.

Guichon, N. (2009). Training future language teachers to develop tutors' competence through reflective analysis. *ReCALL, 21* (2), 166-185.

Hedayati, H. F., & Marandi, S. S. (2014). Iranian EFL teachers' perceptions of the difficulties of implementing CALL. *ReCALL*, *26*(3), 298-314.

Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: current knowledge gaps and recommendations for future research. *Education Tech Research Dev, 55*, 223-252.

Hubbard, P. & Levy, M. (2006). The scope of CALL education. In Hubbard, P. & Levy, M. (eds.), *Teacher education in CALL*. Amsterdam: John Benjamins, 3–20

Kaminski, E. (2014). Promoting pre-service teacher education students' reflective practice in mathematics. *Asia-Pacific Journal of Teacher Education, 31*(1), 21-32.

Loughran, J. J. (2002). Effective reflective practice in search of meaning in learning about teaching. *Journal of Teacher Education, 53* (1), 33-43.

Marcos, J. M., Sanchez, E., & Tillema, H. H. (2011). Promoting teacher reflection: What is said to be done. *Journal of Education for Teaching: International research and pedagogy, 37* (1), 21-36.

Mortari, L. (2012). Learning thoughtful reflection in teacher education. *Teachers and Teaching: Theory and Practice, 18* (5), 525-545.

Nami, F. (2021). Developing in-service teachers' pedagogical knowledge of CALL

through project-oriented tasks: The case of an online professional development course. *ReCALL,* 1-16. DOI:10.1017/S0958344021000148

Nami, F., Marandi, S. S., & Sotoudehnama, E. (2016). CALL teacher professional growth through lesson study practice: an investigation into EFL teachers' perceptions. *Computer Assisted Language Learning*, *29*(4), 658-682.

Nami, F., Marandi, S. S., & Sotoudehnama, E. (2015). *Exploring the impact of Tech/CALL practice, reflection, and collaboration on EFL teachers' pedagogical knowledge of CALL: Developing the CALLPK model*. (Unpublished PhD Dissertation). Alzahra University, Tehran, Iran.

Polly, D. (2011). Teachers' learning while constructing technology-based instructional resources. *British Journal of Educational Technology, 42* (6)*, 950-961.

Powell, C. G. & Bodur, Y. (2019). Teachers' perceptions of an online professional development experience: Implications for a design and implementation framework. *Teaching and Teacher Education, 77,* 19–30. https://doi.org/10.1016/j.tate.2018.09. 004

Richards, J. C., & Lockhart, C. (1994). *Reflective teaching in second language classrooms.* Cambridge, MA: CUP.

Rienties, B., Brouwer, N., & Lygo-Baker, S. (2013). The effects of online professional development on higher education teachers' beliefs and intentions towards learning facilitation and technology. *Teaching and Teacher Education, 29,* 122–131. https://doi.org/10.1016/j.tate.2012.09.002

Ross, J. A., & Bruce, C. D. (2007). Teacher self-assessment: A mechanism for facilitating professional growth. *Teaching and Teacher Education*, *23* (2), 146-159.

Sangani, H. R., & Stelma, J. (2012). Reflective practice in developing world contexts: a general review of literature and a specific consideration

of an Iranian experience. *Professional Development in Education, 38* (1), 113-129.

Schön, D. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.

Teräs, H. (2016) Collaborative online professional development for teachers in higher education. *Professional Development in Education, 42*(2): 258–275. https://doi.org/10.1080/19415257.2014.961094

Thompson, N., & Pascal, J. (2012). Developing critically reflective practice. *Reflective Practice, 13,* 311-325.

Tondeur, J., Scherer, R., Baran, E., Siddiq, F., Valtonen, T. & Sointu, E. (2019). Teacher educators as gatekeepers: Preparing the next generation of teachers for technology integration in education. *British Journal of Educational Technology, 50*(3), 1189–1209. https://doi.org/10.1111/bjet.12748

Wang, Y., Chen, N., & Levy, M. (2010). The design and implementation of a holistic training model for language teacher education in a cyber face-to-face learning environment. *Computers & Education, 55,* 777-788.

Weber, K. E., Gold, B., Prilop, C. N. & Kleinknecht, M. (2018). Promoting pre-service teachers' professional vision of classroom management during practical school training: Effects of a structured online- and video-based self-reflection and feedback intervention. *Teaching and Teacher Education, 76,* 39–49. https://doi.org/10.1016/j.tate.2018.08.008

Whyte, S. (2011). Learning to teach with videoconferencing in primary foreign language classrooms. *ReCALL, 23* (3), 271-293.

Wilson, S. M., & Berne, J. (1999). Teacher learning and the acquisition of professional knowledge: An examination of research on contemporary professional development. *Review of Research in Education, 24,* 173-209.

Wood, E., Mueller, J., Willoughby, T., Specht, J., & Deyoung, T. (2005). Teachers' perceptions: Barriers and supports to using technology in the classroom. *Education, Communication & Information, 5*(2), 183-206.

Yurkofsky, M. M., Blum-Smith, S., & Brennan, K. (2019) Expanding outcomes: Exploring varied conceptions of teacher learning in an online professional development experience. *Teaching and Teacher Education, 82*, 1–13. https://doi.org/ 10.1016/j.tate.2019.03.002

Zeichner, K. M., & Liston, D. P. (1996). *Reflective teaching: An introduction.* Mahwah, NJ: Lawrence Erlbaum.