THE DEVELOPMENT OF FOUR EFL TEACHERS' REFLECTIVE THINKING IN A CALL WORKSHOP

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ABSTRACT

The integration of computer technology into teaching practice has been advocated in EFL classrooms in Taiwan; however, many EFL teachers have not fully embraced the computer as a teaching aid. This problem suggests that they might have failed to perceive the relevance of the computer to their teaching. Thus, they should be provided with opportunities to develop their awareness of the possibilities of Information Communication Technology (ICT) in foreign language education. To seek a way to address this problem, reflective practice was employed in the present study to develop the participating teachers' reflective thinking about CALL. Four in-service English teachers were involved in a 12-week reflection-based CALL workshop, in which they were encouraged to reflect on CALL practices via a discussion forum. All of their responses were evaluated for the level of their reflectivity. It was found that the four teachers' reflectivity dynamically varied between the medium level and the high level. To an extent, they demonstrated a potential for critical reflection. The tendency towards higher-order learning might be attributed to the increased interaction among the teachers, the peers, and the professor—communal learning facilitated by the discussion forum. This study suggests that technology-mediated reflective practice perhaps can increase EFL teachers' awareness of ways to apply CALL to EFL classes, possibly changing their prior beliefs about CALL.

Key Words: critical reflection, reflective practice, Computer Assisted Language
          Learning

INTRODUCTION

The applications of computer technologies to educational practice have been promoted at various levels of schooling for decades in Taiwan. Computer hardware and software have been increasingly installed in

classrooms and teachers have been highly encouraged to integrate technology into the curriculum. However, computer-enhanced teaching practices have not been widely and substantially embraced by the teachers here. Many of them have probably not considered computer technology to be an artifact that can be effectively incorporated into teaching procedures and learning tasks (e.g., Chang & Wong, 2006; Hsu & Kuan, 2007). English teachers are no exception. This problem suggests that they might fail to perceive the relevance of the computer to their teaching practice. To solve this problem, language teachers need *space* (Barkhuizen & Borg, 2010) to develop their awareness of the possibilities of Information and Communication Technology (ICT) in foreign language education.

One of the ways that the teachers can professionalize themselves in this aspect is to participate in in-service computer assisted language learning (CALL) programs that incorporate reflective practices, which can help them to attend to and furthermore articulate thoughts about CALL. However, reflection is not commonly employed by the average teacher, let alone critical reflection, because difficulty may come in reflective practice that involves teachers in analyzing what happens in teaching and requires a value judgment about what they observe in classes (Saylor cited in Palmer, Burns, & Bulman, 1994). In response to this problem, this study developed a CALL program that was aimed at promoting critical reflection by providing the participating teachers with access to a web-based discussion forum in which they were guided and supported to reflect on CALL with their peers and the teacher trainer. Special attention was paid to investigating the extent to which the teachers' reflectivity was able to grow. The results may add to the understanding of the role of critical reflection in transforming language teachers into reflective practitioners who are able to make the connections between what they learn in CALL programs and their individual teaching contexts.

Although there has been a surge in the study of technology-facilitated reflective practice in teacher development programs (Liaw, 2003; Lord & Lomicka, 2007; Ruan & Beach, 2005; Shoffner, 2008; Yang, 2009), in-service English teachers' thoughts on the ways reflective procedures can be enhanced via the use of technology have yet to be thoroughly investigated. In other words, little is known about how language teachers engage in reflections and advance to the critical level of reflective thoughts via the mediation of technological tools. The purpose of this study was to identify key factors in promoting reflective thinking from the

perspectives of in-service English teachers. A clearer understanding of what procedures can facilitate critical reflection may, in turn, contribute to the development of CALL programs and workshops that can help language teachers to foster their awareness of ways to use computer applications in the contexts of foreign language teaching. The findings of this aspect of the study may serve to enrich the literature on technology-facilitated reflective practice as a tool for transformative teacher education pedagogy (Barkhuizen & Borg, 2010; Kiely & Davis, 2010; Ostorga, 2002-2003).

LITERATURE REVIEW

This section consists of three sub-sections: (1) theoretical framework, (2) critical reflection, and (3) facilitating reflective thinking with technology.

Theoretical Framework

The theoretical underpinning of teacher learning in this study is the socio-constructivist perspective (Vygotsky, 1978), which posits that individuals construct their knowledge by interacting with their peers in a social and cultural environment. Based on this theoretical framework, this study particularly adopted the concept of community of practice, where teachers are assumed to co-develop expertise with one another in the fulfillment of common interest and goals. Rather than acting as isolated individuals, teachers collaborate and share expertise in order to construct professional knowledge and skills (Johnson, 2009). As Wenger (1998) suggests, the use of technology can deepen relationships within a community of practice. Technological tools can be utilized to facilitate teachers' communities of practice in that technology can promote interaction among teachers, expose them to critical aspects of teaching, and help them to improve existing practice (Killeavy & Moloney, 2010; Murugaiah, Azman, Ya'acob, & Thang, 2010). Drawing on the concept of community of practice, the present study built an online teacher community where the participating teachers were scaffolded to engage in reflective thinking and collaborative discussions about CALL for the development of CALL expertise.

Critical Reflection

Reflective practice is regarded as one of the important activities in teacher development. It refers to any procedures associated with reflection. It involves the thoughtful consideration of one's own experiences in applying knowledge to practice (Schon, 1987). As Dewey (1933) argues, when people encounter a confusing situation, they start to think of the means by which they can solve the problem. As such, reflection is viewed as "the kind of thinking that consists of turning a subject over in the mind and giving it serious and consecutive consideration" (p. 3). In relation to language teachers, reflective thinking is considered a procedure in which they reflect on events, tasks, incidents, or problems that happen in teacher development programs or teaching contexts.

When teachers reflect, they are usually encouraged to develop critical reflection. This process refers to how teachers relate what takes place in the classroom to their existing knowledge and beliefs to allow for a better understanding of themselves and the students. It is the often case that teachers take a stand on their thoughts through the process of questioning and challenging their underlying assumptions (Burnett & Lingam, 2007; Korthagen, 1993; Sockman & Sharma, 2008). When the process of questioning is framed by reflection on practical problems, they might consciously take into account historic, cultural, and political values and beliefs (Hatton & Smith, 1995). This critical self-analysis is undertaken in order to effect an improvement in their teaching practices. In the context of teacher development in CALL, critical reflection involves posing questions about how and why a particular technological tool is integrated into language teaching, what values the CALL practices can produce, what alternative procedures might be available, and what limitations the CALL practices may impose. Over time, critical reflection can enable EFL teachers to develop their beliefs about the roles of the computer, the teacher, and students in CALL environments, possibly transforming the teachers into CALL practitioners who are able to effectively design, implement, and evaluate CALL practices.

Critical reflection has been recognized as a significant procedure in developing teachers' knowledge and expertise (Schon, 1987). Researchers are keen to investigate whether a reflective approach has an effect on teacher development. In particular, the extent to which teachers reflect has been examined in the literature. The results generally show that a fairly large number of teachers failed to reflect critically but did reveal a positive

attitude towards the reflective procedures utilized in teacher development programs (e.g., El-Dib, 2007; Farrell, 1999; Ho & Richards, 1993; Kanuka & Anderson, 1998; Lee, 2007; Liou, 2001; Tolmie & Boyle, 2000; Zhu, 2006). For example, Ho and Richards (1993) investigated the reflectivity development of ten in-service English teachers in Hong Kong over a ten-week period by analysis of their journals kept during the time. It was found that the teachers did not become much more critically reflective. Based on Ho and Richards' study, Farrell (1999) examined three in-service English teachers in Korea over a 16-week period and achieved similar results to those that Ho and Richards had found. Partially replicating Farrell's study, Liou (2001) did not see a substantial development in critical reflection among pre-service English teachers in Taiwan. In Egypt, El-Dib (2007) found that prospective EFL teachers reached a low or low-medium level of reflectivity according to their written action research reports in which they chose a problem and attempted to solve it during their experiences of teaching practice. All in all, research conducted over the past decades seems to have revealed little evidence of the promotion of teachers' reflective thinking to a critical level.

Facilitating Reflective Thinking with Technology

Reflection is essentially a personal, private process. When this procedure is applied to teacher education, it becomes public through in-class discussion and journal writing (Ramsey, 2010). Since technology such as a discussion forum allows teachers to get connected with one another, they might be in a good position to share their thoughts and expand their views (Lamy & Goodfellow, 1999; Shoffner, 2009). In this sense**,** reflection can be made more open, a practice that may potentially contribute to the qualities of reflection and the degree of interaction among practitioners (Rocco, 2010). Technology-stimulated reflection would involve reflective conversations in that monologues can be replaced by dialogues or conversations among teachers.

Technology as a medium to promote critical reflection has received increasing interest in recent years (Liaw, 2003; Lord & Lomicka, 2007; Ruan & Beach, 2005; Shoffner, 2008; Shoffner, 2009; Yang, 2009). It is generally concluded that teachers perceive technology as a useful tool for reflective practice. For example, Ruan and Beach (2005) indicated that most of their participants found that online peer dialogue journaling was

beneficial to their reflective practice. Similarly, Lord and Lomicka (2007) found that computer-mediated communication (CMC) tools were indeed advantageous to promoting deeper reflection in their study of pre-service and in-service foreign language teachers who participated in a collaborative project discussing theoretical issues and recent innovations in the field of EFL teaching via CMC applications.

However, the research mentioned above does not reveal that teachers can achieve higher-order thinking or critical reflection via the use of technology. The extent that teachers can reflect via the use of technology has yet to be thoroughly investigated. In particular, Killeavy and Moloney (2010) examined the degree to which beginning teachers in Ireland reflected on their teaching in a blog on peer support networks. There was little evidence to affirm that the teachers undertook any greater reflection. Rather than using the blog as a reflective journal, they used it as a diary. Another study conducted by Yang (2009) investigated whether 43 EFL teachers in Taiwan could develop critical reflection via blogs. It was found that the participating teachers were reflective, and that some of them could reflect on their thoughts critically. The overall picture emerging from the studies discussed above was rather mixed.

Although the use of technology may potentially be useful for developing critical reflection, relatively little systematic research has been conducted in this regard. Questions remain regarding the use of technology in enhancing teachers' reflective thinking. To address this problem, the present study set out to examine the development of four in-service EFL teachers' reflective thinking by involving the teacher educator (i.e. the professor, or the first author of this paper) in helping the teachers to engage in critical reflection on the integration of CALL resources into their English teaching via a discussion forum because research in the literature suggests that teachers' reflection can possibly be stimulated with external feedback, such as the professor's input and guidance (McLoughlin & Mynard, 2009; Shoffner, 2009).

In light of the research gaps identified above, the following research questions were addressed in this study:

1. To what extent could the participating teachers develop reflective thinking about CALL?
2. What were the perceived factors in enhancing the teachers' reflective thinking from the perspectives of the in-service English teachers?

METHODOLOGY

This section provides descriptions of (1) the participating teachers, (2) the CALL workshop, (3) data collection, and (4) data analysis.

The Participating Teachers

Sixteen in-service English teachers voluntarily enrolled in the workshop prior to the study. Upon entering the workshop, they were surveyed for their willingness to participate in this study, in which they could learn to integrate the computer into their teaching through the use of reflection. They were told that the content they contributed in the workshop would be collected and analyzed in the study. At the end of the workshop, only four out of the 16 teachers (under pseudonyms: Shirley, Fanny, Teresa, and Fiona) were selected for data analysis in this study because they were the only ones who completed the two tasks designed for the study, i.e., submitting all weekly reflection entries over the course of 12 weeks and joining individual interviews at the end of the workshop. The failure of the other 12 teachers to complete the assignments is probably due to the fact that this workshop was taken as an extension course without any academic credit granted. Unlike the professors in general regular courses, the professor in this workshop, the first author of this study, had difficulty imposing the assignments on the participating teachers. Unfortunately the 12 teachers skipped some weeks and missed submitting some weekly reflection entries. Their sporadic reflections were considered inappropriate for data analysis because the intermittent submission of the reflection entries might not fully represent the development of their reflective thinking.

With regard to the four teachers, Shirley, Fanny, and Teresa were full-time junior high English teachers each at an age of around 35 with approximately 10 years experience as teachers. In contrast, Fiona was teaching part-time at the university and at cram schools. She was a little younger than the other three teachers, but all of them had taught for roughly the same number of years.

The CALL Workshop

To undertake the research, a 12-week CALL workshop was designed by the first author and held at the English Language Training Center of a national university in northern Taiwan. Sixteen teachers, who came from

various local elementary or high schools, met face to face on-campus for three hours a week for a total of 36 hours over the twelve weeks.

In addition to the weekly three-hour teacher-student interactions in a physical classroom, the CALL workshop also extended to the Internet, where an Online Learning Community of Practice (OLCoP) was built. The participating teachers and the professor (the first author) could interact with one another over this online platform.

The CALL workshop was designed to help the English teachers to not only learn technological skills but also develop their proficiency in relating technology to individual teaching contexts through a reflective procedure. More specifically, they could learn to operate authoring programs, such as for editing audios and videos, blogging, podcasting, utilizing presentation software, and generating online quizzes. While they were familiarizing themselves with the authoring tools, they were encouraged to reflect on how and why they incorporated particular technologies into their teaching. The reflective procedure involved the teachers in submitting weekly reflection entries to the discussion forum where the professor moderated discussions by providing reflective prompts specifically related to particular topics scheduled in the 12-week syllabus. They contributed one entry at a time a week, except for the tenth week reserved for writing lesson plans. Thus, there were totally eleven entries to be evaluated for their development of reflective thinking. For example, in the fourth week, the teachers were asked to reflect on a prompt regarding the incorporation of a weblog into English teaching.

> According to your teaching experiences, are there any language components you want to teach with a weblog? Alternatively, are there any teaching strategies you hope to enhance with the use of a weblog? Please illustrate how you can improve your teaching with this technology and explain why you would like to teach in this way. (The reflective prompt of the fourth week)

According to Ho and Richard (1993), reflective prompts can be utilized to provide participating teachers with opportunities to engage in descriptive reflections that involve technical procedures and pedagogical descriptions as well as critical reflections that concern evaluation, analysis, and theory building. That is, the teachers could possibly describe how they incorporated a certain technology into a particular teaching procedure and articulate why they designed the technology-enhanced task.

In addition to posting reflective prompts on the discussion forum, the professor also immersed himself in interactions with the participating teachers with the purpose of promoting their reflective thinking. When the teachers' reflection entries were submitted for a certain reflective prompt, he would give his responses by summarizing particular teachers' innovative ideas about the integration of technological tools into specific instructional scenarios, praising them for their creative design of certain CALL tasks, suggesting alternative treatments for certain teaching procedures, and most importantly, relating their CALL practices to pedagogical principles or theoretical concepts. The professor's contributions are illustrated in the following extract, in which he replied to Teresa's reflection on the application of blogs to English teaching and learning.

> After reading your entry, I can understand that you will apply blogs for use in class management and writing tasks. [summarizing] This idea is great. [praising] However, what you designed involves asking students to contribute their entries to the teacher's blog. Instead, you can let your students create their own blogs, on which they can work on assigned tasks such as translation, sentence making, paragraph writing, and diary. Later on, you can choose certain students' blogs for public discussion in class. [suggesting]

> Such practice is expected to provide students with ownership. Thereby, they can possibly write with a conscientious and hard-working attitude, engage in digital publication, and eventually develop electronic literacy. [relating]

Data Collection

The study employed two data collection procedures. One source of data comes from the four teachers' reflection entries, which were used to examine their development in thinking reflectively and their perceptions of the process of reflective learning. While all of the weekly reflective prompts concerned the integration of various technologies into English teaching, a few questions, included only in the last week, addressed the teachers' perceptions of how their reflective thinking could be enhanced. All of the reflective prompts are listed in Appendix 1.

The other source of data comes from individual interviews that were

conducted separately with the four teachers, with the purpose of further revealing their thoughts on the ways that could enhance reflective thinking skills. The interviews were semi-structured with the questions designed beforehand. The questions are shown in Appendix 2. The conversation in the interviews lasted for 20-30 minutes. Each interview was audiotaped and transcribed verbatim.

Data Analysis

Because the main focus of this study was the development of the reflective thinking of the participating teachers, a coding framework was needed to determine the levels of reflectivity revealed by the forum entries. To serve this purpose, the revised Bloom's *Taxonomy for Educational Objectives* (Anderson, Krathwohl, Airasian, & Bloom, 2001), which has been used to measure levels of reflectivity in some studies (e.g. Bradley, Thom, Hayes, & Hay, 2008; Christopher, Thomas, & Tallent-Runnels, 2004; Crotty & Allyn, 2001; Gilbert & Dabbagh, 2005), was chosen because the teachers' reflections on how and why a particular technology is integrated into teaching could be roughly comparable to the six levels of cognitive development specified in Bloom's scheme: *Remember*, *Understand*, *Apply*, *Analyze*, *Evaluate*, and *Create*. More specifically, the teachers' reflections might involve recalling concepts and practices associated with CALL (*Remember*), explaining the significance of certain technological tools in foreign language teaching (*Understand*), integrating particular CALL resources into teaching practices (*Apply*), organizing their thoughts about CALL practices (*Analyze*), judging the effectiveness of CALL practices (*Evaluate*), and generating a new conception of CALL (*Create*). Based on Bloom's taxonomy, a coding scheme was developed to rate the teachers' responses which were divided into three levels to reflect the differences in the levels of the reflectivity of different teachers: Low (*Remember* and *Understand*), Medium (*Apply* and *Analyze*), and High (*Evaluate* and *Create*). Accordingly, each meaningful segment out of a forum entry was coded into one of the above three levels. For the convenience of rating, a numerical score was given to each level to indicate the degree of reflectivity: 1 (*Remember* and *Understand*), 2 (*Apply* and *Analyze*), 3 (*Evaluate* and *Create*). Each entry was treated as a whole unit of analysis. The ultimate level of a particular entry was determined by the segment that received the highest rating among all the segments of the entry, a procedure modeled on Liaw's (2006) and Bradley

et al.'s (2008) studies. Appendix 3 shows the coding scheme, which defines levels of reflectivity, Bloom's six categories, and a sample of reflection segments.

To establish rating reliability, a CALL expert who holds a PhD in English teaching and CALL was invited to help with determining the degree of reflectivity measured in the discussion forum entries. She was briefed on how the level of a particular reflection segment was determined and then given a training session   on how to segment a particular entry into a certain number of complete conceptual units. Then, the main researcher and the CALL expert proceeded to determine the level of reflectivity for a segment according to the coding scheme. The two raters negotiated discrepancies in order to develop consistency in rating. Afterwards, the researcher and the CALL expert independently rated the reflection entries. The inter-rater reliability, as computed by Spearman Rank Order Correlation, was 0.894 ($r = 0.894$, $p = 0.000$). The result shows that the ratings between the two raters were generally consistent.

In addition to the rating of the level of the participants' reflection entries, data collected from the discussion forum and the interviews were analyzed for their perceptions of the process of reflective practice. Special attention was paid to any remarks on procedures and incidents that would facilitate or hinder the teacher's reflections. The teachers' accounts were identified with regard to factors associated with enhancing critical thinking. The factors discerned in this analysis were subsequently organized into patterns.

RESULTS

This section reports on the findings regarding the four teachers' development of reflective thinking over the course of the CALL workshop and the perceived factors in enhancing reflective thinking.

The Development of the Teachers' Reflective Thinking

The rating results of all of the reflection entries submitted by the four teachers are summarized in the table that follows. At the very beginning of the workshop, specifically in the first two weeks, the teachers, apart from Shirley at the medium level, started their reflections at the low level. In terms of Bloom's Taxonomy, they became aware of the possibilities of ICT in English teaching contexts by *remembering* and *understanding* the

significance of various technologies in foreign language education. Afterwards, most of the teachers' responses varied between the medium level and the high level. That is, their reflective thinking revealed that they were able to *apply* CALL tools to particular teaching scenarios and *analyze* the advantages and disadvantages of the CALL practices. At times, their reflections indicated their ability to *evaluate* the CALL practices by using theoretical principles and concepts and even to *create* personal conceptions of CALL.

In particular, while Fanny's and Shirley's reflectivity fluctuated between the medium level and the high level all the way throughout the workshop, Teresa's remained fixed at the medium level between the second week and the eleventh week, and she abruptly grew into a reflective practitioner of a high order in the last week. As for Fiona, her responses revealed a steady rate in the growth of her level of reflectivity over the course of the workshop. The level was low in the first two weeks, but in the third week, her reflectivity began to rise to the medium level by the eighth week, when she grew to the high level until the end of the workshop.

Although the four teachers' reflectivity dynamically varied between the medium level and the high level, they were all reflective to the extent that they demonstrated a potential for critical reflection.

Table. The Levels of the Four Teachers' Reflectivity Over the Course of the Workshop

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
Fanny	1	--	2	2	3	3	2	3	2	--	2	3
Shirley	2	--	2	2	2	2	3	2	2	--	3	2
Teresa	1	2	2	--	2	2	2	2	2	--	2	3
Fiona	1	1	2	2	2	2	2	3	3	--	3	3

Note. 1 (low level), 2 (medium level), 3 (high level). Dashes indicate that no reflection entry was rated that week due to there being no requirement for one or there being a delay in entry submission.

The Perceived Factors in Enhancing Reflective Thinking

The teachers thought that the interactive reflective practice enhanced by the discussion forum provided them with an opportunity to

communicate their thoughts to their peers and the professor, thereby facilitating them to engage in critical reflection.

Specifically, the four teachers found they became committed to public discourse when they shared their reflective thoughts through the discussion forum. Teresa thought that this sort of reflective procedure could help her learn deeply:

> [K]eeping a journal or a written record (i.e., the reflective entries on the forum) is important to a learning process. I found I could acquire a very solid knowledge of CALL through the process of constant retrospection, thinking, sharing, stimulation, modification, and recreation. Moreover, I could carry out a review and even ask for help from others. (Forum reflection, Teresa)

Sharing ideas through the discussion forum was believed to promote critical reflection, which would often come as a result of incorporating the peer's ideas into one's own thoughts. For example, Fanny said:

> I found better replies (reflection entries) would come out … through thinking over others' ideas … I think good replies should be ones that draw on collective wisdom and incorporate all of the useful ideas because a single person's answers (the teachers' reflections) are made from a restricted angle. (Interview, Fanny)

Given the facility of the discussion forum, the four teachers were able to initiate their reflections by referring to one another's ideas submitted on the discussion forum. Therefore, the four teachers often did not submit their reflection entries until the last minute on the due date. The reason was that while they were nurturing their reflections, they would usually wait to see others' reflection entries first, a process that could help them to generate innovative ideas. Shirley in particular relied on the discussion forum to stimulate her reflections: "I am a person who has a bit of difficulty expressing thoughts, so I frequently waited for others' completed reflection entries from which I then sought inspiration." (Forum reflection, Shirley) For example, Shirley borrowed Teresa's idea of applying multimedia-based *PowerPoint* to language practice. Shirley noted: "The way suggested by Teresa to take advantage of dialogue bubbles (one of the functions supported by *PowerPoint*) and contextual images to review lessons is a great idea." (Forum reflection, Shirley)

Acquiring this idea, Shirley added it to her repertoire of CALL practices.

The other way for the four teachers to enhance their reflective thinking was to read the professor's comments which had been posted on the discussion forum. Without the feedback from the professor, the four teachers might have focused more on the technical aspect of computer applications than on the pedagogical aspect of the use of computers. For example, Teresa thought that the professor's replies to her reflection entries helped her to focus on the relevance of technology to pedagogy. She said:

> The role of the professor was very important. Not just giving a reply, in fact, you (the professor) stimulated everyone to re-log on [to the website (the OLCoP)] to click on [the forum entries]. Due to your frequent stimulation, we had to constantly reflect on the relation [of computer technology] to teaching practice … We couldn't possibly have generated so much thought if you hadn't frequently helped us to hold on to this topic [purpose]. (Interview, Teresa)

Although reflection was an arduous and challenging task to the four teachers, they acknowledged that they could benefit from the reflective practice. In particular, Fiona expressed this view:

> Now, reflective practice will make me examine myself and contemplate my teaching. It is true that there is something inside the brain, but sorting it out is pretty exhausting. However, after I write out something, I will have a deeper understanding about teaching and learning. (Forum reflection, Fiona)

In summary, the discussion forum was thought to provide favorable conditions for critical reflection. The technology helped the teachers connect with one another by allowing them to engage in dialogues rather than deliver monologues. More specifically, their reflective thoughts were made accessible to one another and to the professor. Their reflections on CALL were stimulated by the community of fellow teachers who shared creative ideas in relation to the integration of the computer into teaching. Also, the teachers were sometimes inspired by the input of the professor. All in all, the discussion forum served to create an online community of practice in which the teachers were enabled to develop their reflective thinking about CALL.

DISCUSSIONS AND IMPLICATIONS

As reported in the previous section, there was a fluid change in the four teachers' reflectivity. The development of their reflectivity can be considered as a process of alternating lower order thinking with higher order thinking rather than as a static and linear process. The variation in the level of their reflectivity echoes Chi's (2010) claim that teachers' reflection is an ongoing and dynamic process. As noted by Ostorga (2002-2003), teachers' reflectivity does not stay at a fixed level. Instead, the degree to which they reflect moves from one level to another, resulting from the different perspectives of the teachers on issues of practice.

Although the four teachers' reflections were essentially dynamic and fluid, they were reflective overall to the extent that they demonstrated a potential for critical reflection. This result is consistent with Yang's (2009) study that the teachers were reflective and that some of them could reflect critically. Also, the result is comparable to Christopher et al.'s (2004) study, in which, although 10 teachers in gifted education mostly displayed thinking of the medium level according to Bloom's scheme, some of them generated responses rising towards the high range.

In the present study, the promotion of the four teachers' reflectivity could perhaps be attributed to the social interaction among the teachers, their peers, and the professor via the discussion forum. As perceived by the teachers, technology might play a role in mediating the teachers' reflective writing and their interactions with others. This finding is consistent with Yang's (2009) study that EFL teachers thought of blog technology as a useful tool for reflecting and interacting with each other in terms of promoting critical reflection. More specifically, as maintained by several researchers of teacher education, a discussion forum can give teachers access to others' pedagogical ideas associated with technology (Ruan & Beach, 2005), "expansive feedback" (Ostorga & Yanes, 2007), and "professional dialogue" that can facilitate teachers' reflections (Wickstrom, 2003). In the present study, the discussion forum offered the participating teachers chances to view each other's reflection entries, so this tool seemed to help them overcome the problem of having no ideas for reflection. As the four teachers stated in this study, they tended to wait for their peers to post reflection entries on the discussion forum, so as to inspire their own thoughts on innovative CALL practices.

Although the discussion forum appears to lend itself well to the sharing and comparing of information among the members within a community of common interest (De Latt, 2002; Ostorga & Yanes, 2007),

teacher educators should not equate sharing information via the discussion forum with the practice of critical reflection. To ensure the development of critical reflection among teachers in the discussion forum, teacher educators perhaps can consider incorporating meta-cognitive reflective training into future teacher training programs. More specifically, the teachers can be explicitly informed of the evaluative model or framework used to describe the level of reflectivity before they engage in reflections in the discussion forum. Bloom's Taxonomy adopted in the present study is a case in point. The meta-cognitive reflective training may put the teachers in a better position to develop critical reflection (Crotty & Allyn, 2001; Tate & Sills, 2004).

In addition to the discussion forum, the professor was thought to play a crucial role in developing the participants' reflective thinking. In particular, the professor helped direct the four teacher trainees' reflections on the relation of technology to pedagogy. For example, Teresa reported that the professor had stimulated her thoughts about the pedagogical significance associated with a particular technology. Without the guidance and advice of the professor, her reflections might have ended up simply focusing on technical issues rather than on pedagogical implications. Therefore, like the pre-service teachers in Lee's (2007) study, Teresa showed great appreciation for the professor's advice and comments. Unlike the current study, no intervention and guidance by a professor was provided in Christopher et al.'s (2004) study. As a result, most of their participants' responses on the discussion forum were measured at the medium level of critical thinking. A comparison of the result of the present study with that of Christopher et al. (2004) suggests that the professor can assume an influential role in promoting teachers' reflective thinking through the use of CMC technology such as the discussion forum.

As Farrell (2004) suggests, providing teachers with *external input* is an effective way to enhance their reflections. In the present study, the external input given by the professor was believed to contribute to the development of the teachers' reflective thinking. The pedagogical implication is that the teacher educator should play an active role in promoting the teachers' reflectivity in future teacher training programs. With the guidance and supervision of the teacher educator, language teachers can learn to examine CALL practices critically.

CONCLUSION

This study investigated the extent to which the teachers were able to develop their reflective thinking about CALL as well as the factors perceived in the process of enhancing reflectivity. Although the four teachers' reflectivity dynamically varied between the medium level and the high level, they were reflective to the extent that they demonstrated   a potential for critical reflection. As evidenced in the four teachers' perceptive accounts of the technology enhanced reflective practice, the tendency towards higher-order learning might be associated with the increased interaction among the teachers, their peers, and the professor—communal learning facilitated by the discussion forum. More specifically, the technology allowed the teachers to access their peers' pedagogical design as well as the professor's comments, thereby stimulating their reflections and possibly promoting their capabilities to reflect on the integration of the computer into teaching. This study has provided empirical evidence on how in-service EFL teachers can develop reflective thinking through a discussion forum. This finding suggests that language teachers can be in a good position to create and evaluate CALL practices critically if they are provided with opportunities for interaction and reflection (Kiely & Davis, 2010; Ostorga, 2002-2003). In this sense, reflective practice perhaps can increase EFL teachers' awareness of ways to apply CALL to their classes, possibly changing their prior beliefs about CALL. In the long run, they will probably transform into reflective practitioners who attach significance to computer technology in their teaching practice.

There are three methodological limitations to this study. One limitation is concerned with the limited number of teachers. The study is restricted to four teachers (i.e., three junior high school teachers and one university lecturer), so the findings of this study cannot account for the development of the reflective thinking of all EFL teachers at various levels of schooling in Taiwan. The results might have been different if the study had been conducted with participants with more diverse backgrounds such as elementary school teachers and senior high school teachers. Such teachers are an obvious area for future investigation. Another limitation involves potential bias that might occur in the findings of this study because the study concentrated only on the four teachers who submitted all of the weekly reflection entries. It was likely that they were teachers who had a strong motivation for CALL and were willing to engage in the reflective practices required by the workshop. Thus, they

exhibited positive perceptions of the technology-facilitated reflective practice. As for the other participating teachers who failed to submit all of the reflective assignments, they might have perceived the reflective practice differently. It may be beneficial to examine such population in future study. The other limitation is related to the nature of the reflective prompts on the discussion forum. Although the teachers were encouraged to reflect on how and why a particular technology was integrated into teaching, they would sometimes generate reflections related to the technical and procedural aspects of CALL. To address this problem, higher-level reflective prompts should be provided in order to engage the teachers in critical reflection (Chen, Wei, Wu, & Uden, 2009; McLoughlin & Mynard, 2009). Given such an improvement in reflective prompts, future studies may offer better insights into how teachers' reflective thinking can be enhanced critically.

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APPENDIX

Appendix 1. Weekly Discussion Prompts

Week	Discussion prompts
1	*Integrating the Computer into Your Teaching* *Do you have a different view about the role of the computer in your teaching now after the first-week introduction to the workshop? What role will the computer play in your future teaching? That is, how will you use the computer to support your teaching? Please come up with possible pedagogical applications according to your current teaching context, including instructional objectives, students' English proficiency level, school facilities, and teaching setting. Also, articulate why you would like to do so in terms of instructional principles or goals.*
2	*Grabbing State-of-the-Art Information on Educational Technology* *On the internet, there are a lot of professional development communities or organizations, through which we can keep abreast of the latest information on educational technology all the time. Please choose a particular piece of technological hardware or software introduced and discussed in any community or organization and think about how it can be integrated into your teaching. Take into account your instructional objectives, students' English proficiency level, school environment, and the roles of the students, the teacher, and the computer. Please also make an assessment of such kind of teaching. Is this sort of teaching supplementary to or in conflict with your current teaching environment? Does it meet with your teaching philosophy?*
3	*Audio Editing and English Teaching* *Sounds can be further edited and stored through computer software. How will you incorporate this program into your teaching? In terms of the role the program plays in teaching, is there any difference between the program and the traditional teaching aids such as a tape recorder or a CD player? Please express your views about the way instruction can be carried out when speech sounds are digitalized.*

Appendix 1. Weekly Discussion Prompts (continued)

Week	Discussion prompts
4	***Applying Weblog to English Teaching*** *According to your teaching experiences, are there any language components you want to teach with weblog? Or are there any teaching strategies you hope to enhance with weblog? Please illustrate how you can improve your teaching with this technology and explain why you would like to use it in this way?*
5	***Applying DVD films to English Teaching*** *DVD films can be further edited with computer software, for example, segmenting videos and adding captions. Do these edited videos inspire you to teach differently? Please voice your comments on film-based English teaching.*
6	***Applying Podcasts to English Teaching*** *How will you use podcasts to increase the opportunities for oral practice by students? Please state your opinions on this kind of teaching method.*
7	***Applying PowerPoint to English Teaching*** *Would you like to teach with PowerPoint after viewing the instructional models and related articles? Can you come up with any other creative practice which is different from the examples introduced? Whatever it is, please articulate your thoughts on PowerPoint-based instruction. That is, make a comment on this authoring program, particularly its teaching functions, its roles, and its potential contributions.*
8	***Applying a 'Hot Potato' in English Teaching*** *Do you think that an online test is better than a traditional pen-and-paper test? Is an online test simply another burden that is unnecessary and redundant? Will you replace a pen-and-paper test with an online test? If yes, how will you integrate online exercises into your teaching? Also, please tell us why you want to teach this way. If not, why not?*

Appendix 1. Weekly Discussion Prompts (continued)

Week	Discussion prompts
9	***Evaluating EFL Websites*** *Please choose an EFL website introduced in the workshop. Express your views about that website according to the website evaluation principles you learned in class. Also, describe how you can integrate it into your teaching.*
10	No discussion prompt was posted in this week because the time was reserved for the teachers to plan their CALL lessons.
11	***Evaluating EFL CD-ROM Programs*** *Please choose an EFL CD-ROM program introduced in the workshop. Express your views about the package according to the foreign language software evaluation principles you learned in class. Also, describe how you can integrate it into your teaching.*
12	***The Reflection* on the Workshop *in the Last Week*** *What was your impression of CALL prior to the workshop? Can you recall the reflections you made in the first week? What are your views on CALL at present? Has there been any change in your thoughts on CALL? You can articulate the differences with a reference to (1) language teaching, (2) language learning, (3) the role of the computer, (4) the role of the teacher, (5) the role of students, and (6) the contexts.* *In addition, please tell us how you feel about the reflective procedure, i.e., replying to weekly reflective prompts on the forum. What might you have learned through reflection? With this reflective practice, have you made any progress in the way you integrate the computer into English teaching?*

Appendix 2. Interview Questions

1. What do you think about sharing reflections on the forum?
2. Were you always late in submitting your reflection entries? If so, what was your reason?
3. Did you read other teachers' reflection entries? What do you think about this practice?
4. Did you cite other teachers' ideas when you wrote up your reflections? What do you think about this procedure? Support your statement with an example.
5. What do you think about the professor's replies on the forum? Were they necessary? Were you inspired?
6. Overall, what do you think about the reflective practice incorporated in the workshop?

Appendix 3. Coding Scheme for Evaluating the Levels of the Teachers' Reflectivity

Levels of Reflectivity	Points	Definition & Example
Low	1	*Remember*: Recognize and recall relevant facts, concepts, and knowledge As Teacher XX said in class, current blog**s** are mostly about class management. Take Old Su's blog for example. It's a blog in which a home-room teacher reflects on his/her teaching. On the blog of Teacher Hsieh, who is a teacher at Jing-xing Junior High School, there are some shared English applications. In particular, she incorporates story-telling developed collaboratively by students. Teacher Chan's blog provides a wealth of the latest information on English teaching and learning. *Understand*: Construct meaning through paraphrasing, exemplifying, classifying, summarizing, inferring, comparing, and explaining. I think I will let them have an opportunity to practice speaking with *Audacity* (an audio editing program). Through the process of recording, I also hope they can practice speaking time after time so as to reach the goal of mastering it.

Appendix 3. Coding Scheme for Evaluating the Levels of the Teachers' Reflectivity (continued)

Levels of Reflectivity	Points	Definition & Example
Medium	2	*Apply*: Execute and implement a task in a particular situation Junior high students nowadays almost cannot live without music. Therefore, I'll let them choose a particular favorite song and use English to introduce its singer, the story of the lyrics, and the reasons why they favor it. They can act as a DJ, recording their own mini-broadcast and sharing it with their classmates. *Analyze*: Break a whole into constituent parts; organize pieces of evidence for and against a proposition Then students can be provided with the edited dialogue materials to which they can also add a couple of dialogue utterances they record by themselves. For the students who are low achievers, they can be offered transcriptions and they can practice the dialogues accordingly. As for the high achievers, they can be allowed to design and record the dialogues that suit particular contexts. In this way they can simulate the contexts and practice conversations. The regret due to the lack of opportunities to practice the dialogues with the native speakers in the EFL environment can be slightly remedied.

Appendix 3. Coding Scheme for Evaluating the Levels of the Teachers' Reflectivity (continued)

Levels of Reflectivity	Points	Definition & Example

High	3	*Evaluate*: Make judgments according to criteria and principles
		
		    I think the selection and use of websites depend on teachers' teaching content. After all, it's impossible to find a website that meets all [evaluation] principles. Therefore, in the selection and use of a website, "learner fit," "authenticity," and "practicality" would be the first three considerations for me. The other principles can be enhanced by drills and other activities conducted by teachers themselves.
		
		Create: Put elements together to generate a new idea and conception
		
		    The traditional roles of the teacher and students can be described as being in a corresponding relationship of giving and receiving. The teacher directly transmits the so-called "truth" and "scholarship" to the next generation (students). With the mediation of the computer, the role of the teacher is made to become somewhat more like "an integrator." Because the materials are available on the vast and boundless internet, whatever they are, the teacher can obtain them. Nevertheless, the teacher can "get rid of the weed and keep the flower of the leek:" to select the information appropriate for students with experience and wisdom and present it in a way that suits their needs.