CHINESE EFL TEACHERS' APPLICATION OF E-EDUCOLOGY OF FOREIGN LANGUAGES: AN INVESTIGATION BASED ON TPACK FRAMEWORK[1]

by **Liu Xiaobin, Zhang Wei (corresponding author), Zhong Huiwen** and **Jiang Lijun**

South China Normal University

55 Zhongshan Avenue (West), Tianhe,

Guangzhou, Guangdong, China

zw19881211 @ 126.com

Abstract

For the past few years, TPACK has become a hot issue in the research fields of teacher education, integration of Information Technology (IT) and curricula as well as teacher knowledge. Besides, more and more concerns have been on TPACK of teachers in different subjects. Based on the TPACK Theory, the author uses questionnaires and interviews to investigate practical application status of Educology of Foreign Languages among English teachers involved in National English Teachers Training Project. The author also offers strategies and suggestions for trainings on Educology of Foreign Languages. The results show that the practical application of English teachers stays pessimistic in that teachers are far from the criterion required in terms of TPACK.

Keywords: Chinese EFL teachers, EEFL, TPACK, EEFL trainings.

1. Introduction

The rapid development of Information Age increases the permeating pace of information and communication technology (ICT) into different areas of society, which has subtly altered human beings' ways of thinking. And the impact of ICT upon education has accelerated the process of e-education as well as set off an upsurge of

[1] This article is the research product of Scientific Research Innovation Fund for Post- Graduate Students in South China Normal University. (Item number: 2012kyjj204)

reforms in the area of education. With the development of e-education, integrating ICT into curriculum has not only become a hot spot in the reform of K-12 education, but has also led a significant research area of teacher education and educational technology (Liu, 2004). The research and practice of the integration has even become an indispensable part of the New Curriculum Reform[2] (Chen, 2009). Under the circumstances, EFL teachers' ability to integrate ICT into the curriculum plays an important role.

As an independent discipline, foreign language methodology contains rich linguistic features and unique principles in methodology of teaching and learning. Moreover, the popularity of modern educational technology promotes the alteration of EFL teaching models. The investigation of insights from multimedia-based learning, through multimodality, corpus linguistics and multiple intelligence to connectionism leads Foreign Language Teaching into a stage of continual interdisciplinarity. Therefore, E-Educology of Foreign Languages (EEFL) is the inevitable outcome of interdisciplinarity between e-educology and foreign language education.

In fact, extensive attention has been paid to exploitation and effective use of ICT in foreign language teaching. It is especially stated in *English Curriculum Standard in Compulsory Educational Stage* (Compulsory education English curriculum standard, 2011:30) that in the teaching process teachers should make full use of modern educational technology, exploit English teaching materials, broaden learning channels for students, ameliorate students' learning style as well as enhance teaching efficiency. Improving the proficiency of EEFL among EFL teachers thereby becomes of paramount importance.

Based on the framework of the TPACK theory, the present study aims at

[2] In the late 1990s, Ministry of Education of People's Republic of China carried on a preliminary round of exploratory discussions on the 8th Elementary Education Curriculum Reform. Thus in 2001 *Senior High School English curriculum standards (experimental version)* was issued, and then in 2011 *English Curriculum Standard in Compulsory Educational Stage* was formally promulgated. The present English Curriculum Reform focuses on enhancing students' integrated linguistic proficiency, designs new English Curriculum based on objective-hierarchy mode, highlights the practicality of language, establishes a new evaluation system and emphasizes making use of modern teaching materials to broaden learning sources (He, 2011),

investigating the practical application status of Educology of Foreign Languages among English teachers involved in National English Teachers Training Project and offers strategies and suggestions for trainings on Educology of Foreign Languages.

2. Literature review

Modern technology has greatly changed the way of instruction. Teachers' abilities to apply the EEFL have become the key factor in improving the quality of education and fostering the educational reform, while the present situation is far from satisfaction. In the recent years, despite the great effort that researchers and educators have made in teacher training, many instructors still lack the skills and knowledge needed to be able to teach with technology successfully (Mishra &Yahya, 2007). Hence, based on PCK[3] (Pedagogical Content Knowledge) raised by Shulman (1986), Mishra and Koehler (2006) came up with TPACK, which has added technical elements and emphasised the role of technology application in subject knowledge and instructional methods as well as stressed the equality and unity of the three core elements: Technology Knowledge, Pedagogical Knowledge and Content Knowledge. This framework has overcome the limitations of regarding technology as isolated when thinking about the integration of ICT into teaching in the past. Effective teaching in TPACK means that teachers should not only know the technological operation, but also the reasons why they apply the specific technology and how they should use it (Zhan & Ren, 2010).

The TPACK framework contains seven elements. Out of these seven elements, TK (Technology Knowledge), PK (Pedagogical Knowledge), CK (Content Knowledge) are the three key elements. Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK) and Technological Pedagogical Content Knowledge (TPCK) are four composite elements interwoven by three single elements. In this article, C refers to the content knowledge of English Curriculum, thus, TPACK can be understood as Integrating ICT into English Curriculum.

[3] PCK was first put forward in a research report published by American Educational Research Association by Shulman in 1986, who defined PCK as a special integration of teachers' personal teaching experience, subject content knowledge and pedagogy.

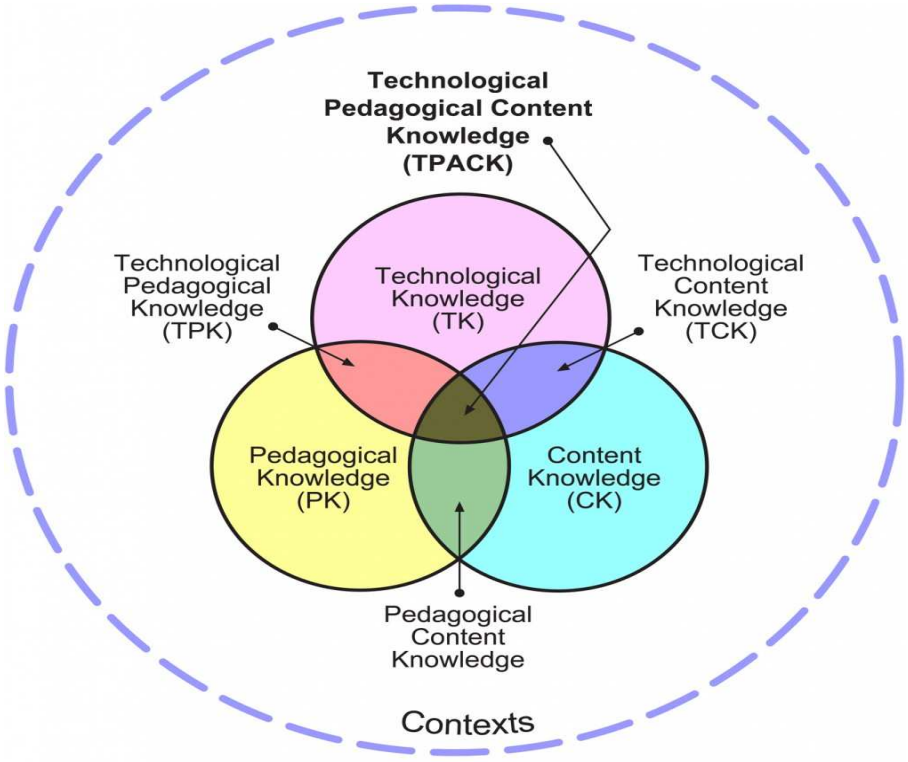

Figure 1. The Framework of TPACK and its essential knowledge factors.

As Mishra, Koehler (2006: 1017-1057) point out, "[t]he practice of integrating ICT into curriculum should be based on the interaction between these three basic elements." And the foundation of this framework is to understand that teaching is a blend of highly complex activities that are concerned about diversified knowledge and the interaction between them (Mishra, Koehler, 2006; cited in Ruan & Li, 2012). In order to apply ICT into teaching effectively, teachers should not only be clear that where, how and why they should integrate ICT into instruction, but also need to have a deep understanding of ICT, subject content and teaching methodology and mutual influences between them (Zhan, 2011).

TPACK has the following features:

1. Comprehensiveness: Although TPACK is the product of Technology Knowledge, Pedagogical Knowledge and Content Knowledge, it is a knowledge structure higher than these three items of knowledge. Therefore, it's comprehensive, complex, multi-faceted knowledge (Mishra & Koehler，2006).

2. Dynamic: TPACK is not static knowledge; instead, it's dynamic and changing (Cox & Graham，2009).
3. Situationality: TPACK contains the complex relationship among specific content, instructions and technology in specific teaching situation. Besides, TPACK can not be acquired through isolated technology curriculum which is separated from a specific context (Chen, 2009).
4. Uniqueness: to have a good command of TPACK one should first understand the dynamic, transactional relationship between these three components — pedagogical knowledge, subject content (English) and ICT. As the mastery level of each English teacher towards these three items of knowledge is different, especially towards technology knowledge, hence, the TPACK knowledge of each teacher is very different.
5. Practicality: it has two main meanings, within the first one, TPACK originates from teaching practice or the reflection of others' practice. The second one is that teachers' TPACK is embodied in the process of teaching practice and plays a role in the process of practice, which has a strong influence on the teaching process.

Hence, TPACK is an important part of modern teachers' knowledge since it provides a theoretical framework for the ways of integration of ICT into teaching. TPACK not only serves as the direction for teachers on how to apply technology into their teaching effectively, but also acts as a set of evaluation standards to measure teachers' competence of doing that.

3. The study

3.1. Research questions

The present study tries to investigate the following questions:

(i) What is the knowledge structure of EEFL among primary and middle school EFL teachers under the Educational Informatization teaching circumstances?

(ii) What are EFL teachers' attitudes and consciousness of applying EEFL in English teaching with the rapid development of technology?

(iii) What are the current practices and applications of EEFL in the teaching process, as well as what is the proficiency system of integrating ICT into curriculum among EFL teachers?

(iv) What are the current training situations and teachers' referential suggestions towards EEFL in order to meet the requirements of the current educational reforms?

3.2. Participants

The subjects are a total number of 147 teachers who took part in the "National Training Project[4] (2012) — Exemplary Project for Primary and Middle School EFL teachers", which was held in School of Foreign Studies, South China Normal University. The training activity includes three classes - members from Class One and Class Two are English backbone teachers from nationwide middle schools, who participated in Advanced Study and Training Project for primary and middle school backbone teachers. On the other hand, members in Class Three were young EFL teachers from nationwide rural primary and middle schools, who participated in training project for English normal college graduates without charge.

3.3. The instrument

The research tool is a questionnaire on "Current Practice and Application of EEFL among EFL teachers", which is based on TPACK-deep measuring scale developed by Isil Kabakci Yurkakul el. (2012).

The questionnaire about the application status of foreign language education technology among EFL teachers in this survey consists of four parts. The structure of the questionnaire is shown in Table 1.

[4] National Training Project is short for "National Training Project for Primary and Middle School teachers", which was implemented by Ministry of Education and Finance of People's Republic of China in 2010. It aimed to improve overall literacy of primary and middle school teachers. 550 million were invested to train 1.15 million teachers in 2010 and then file was issued by Ministry of Education in 2011 that the trainings are classified into groups in terms of different categories, levels and positions.

Table 1. The structure of the questionnaire on application of EEFL among EFL teachers

Part	Content	Distribution
1	The knowledge structure of EEFL among teachers	Questions 1-5
2	The attitude and awareness of teaching application of EEFL among teachers	Questions 6-13
3	The practical teaching application of EEFL among teachers	Questions 14-17
4	Some advice on the training of EEFL	Questions 18-19

The third part of this questionnaire is redesigned according to the core element list of TPACK, thus, the author has done internal consistency test within the same dimension. The results are presented in Table 2. The results show that Cronbach's alpha coefficient in each dimension is above 0.6, which indicates that this part is reasonably inter-consistent and the questionnaire applied in the present study is fairly reliable. However, because the training time was so limited, the authors failed to done measurements on the same subjects twice, therefore, the Kappa value was not obtained.

Table 2. Cronbach's alpha coefficient of the third part in the questionnaire.

Item	Dimension	Cronbach's alpha coefficient
18-21	Design dimension	0.622
22-30	Application dimension	0.793
31-33	Ethic dimension	0.691
34-36	Proficiency dimension	0.614

3.4 Design and procedure

Before the training course, 108 questionnaires are delivered to teachers from the three classes to investigate their proficiency and application of EEFL. Finally, 104 questionnaires were reclaimed and all of them were valid.

After the training courses on the topic of Teaching Resources and Technology,

50 teachers were selected randomly for the interviews on their learning feedback and self-evaluation.

Eventually, the data of the questionnaires were sorted with the help of *questionnaire star* network system (a network platform that helps to make detailed statistics of questionnaire) and Microsoft Office Excel. Then the results of questionnaires and interviews were analyzed.

4. Results and discussion

Out of the 104 valid questionnaires, there were 29 men teachers, which accounts for 27.88%; there were 75 women teachers, which accounts for 72.12%; there were 89 high school teachers and 15 middle school and primary school teachers. The analyzing results of each module are shown in the following parts.

4.1. The knowledge structure and perception of EEFL of teachers

4.1.1 Teachers' Knowledge Structure of EEFL

The perception of e-educology is the most fundamental premise of the application of modern e-educology. As seen in Table 3, we can see that 70.19% of the teachers had just heard of the conception of "modern e-educology", but they did not have a specific and systematic learning, which suggests that their mastery of "modern e-educology" is still in need of improvement.

Table 3. Conception of "educational technology" or EEFL among EFL teachers.

	I have learned something about it.	I have heard of it but never have a detailed learning.	I have never heard of it.
Number	29	73	2
Proportion	27.88%	70.19%	1.92%

The knowledge system of EEFL knowledge, language-teaching methodology and learning theories is the theoretical basis of EEFL. A good command of these theories will not only serve as a theoretical basis for foreign language teachers to

design various multimedia learning resources according to the subject matter, but will also constitute a guide for the improvement of teachers' application of EEFL. Therefore, a good command of the related theoretical knowledge is one of the premises to improve the quality of teaching of foreign language teachers.

As evidenced in Figure 2, most EFL teachers had learnt multimedia teaching courseware design, basic knowledge of computer and network application as well as application of modern teaching media. However, a large number of the teachers had no idea about theories on EEFL, especially theory and method of teaching systematic design and knowledge of integrating ICT into the curriculum.

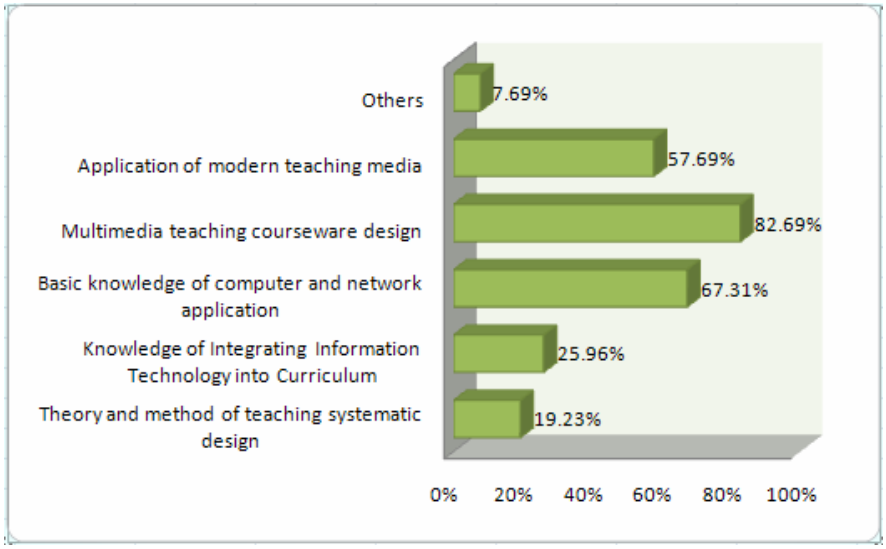

Figure 2. FL teachers' mastery of EEFL knowledge and skills.

Furthermore, teachers view the teaching method as the foundation for completing teaching tasks and realizing instructional objectives, cultivating students' learning competence as well as promoting teachers' professional development. As can be seen in Figure 3, most of the teachers have a certain understanding of foreign language teaching methods such as the Task-based Approach, the Communicative Approach or the Audio-lingual Method, while some other teachers know nothing about some teaching methods like the Direct Method.

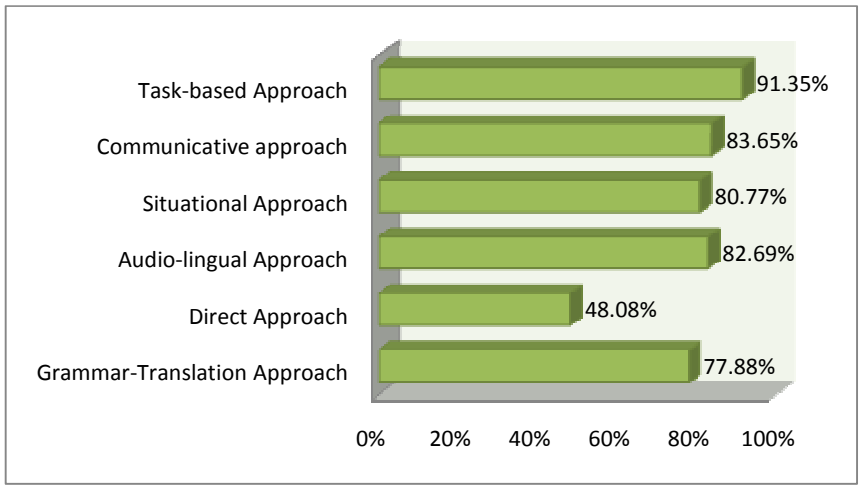

Figure 3: EFL teachers' mastery of foreign language teaching methods.

Hu Jiasheng (2010) pointed out that the theoretical basis of EEFL is the ecological integration theory that develops and evolves on the basis of behaviorism, cognitivism, constructivism, the Communicative Approach and the integration theory. Therefore, studying learning theories like behaviorism can help teachers have a deeper understanding of EEFL and apply it into their teaching effectively. Figure 4 shows that most of the EFL teachers do not know some certain learning theories, especially behaviorism and the humanistic learning approach. Worse still, 10.58% of the EFL teachers state that they had not learned any learning theories before.

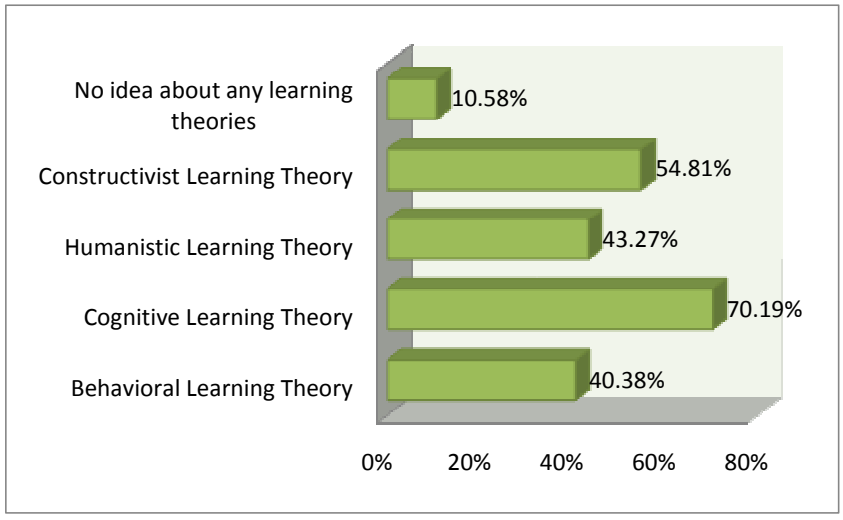

Figure 4. EFL teachers' mastery of learning theories.

4.1.2 Teachers' perception of TPACK

Although integrating ICT into curriculum has become a hotspot in the elementary education reform as well as an important field in which teacher training is conducted, only 23.08% of the teachers knew a little about TPACK, while nearly 80% of the subject said that they knew nothing about TPACK.

It can be seen in the first part of the questionnaire results that basic theoretical knowledge of EEFL had not been spread among EFL teachers. The training of basic theoretical knowledge of EEFL among the majority of primary and secondary school teachers still needs to be strengthened. EFL teachers should be encouraged to study basic theoretical knowledge of EEFL deeply and widely so that they can apply EEFL more effectively. On the other hand, teachers can improve their concept of teaching method.

4.2. Teachers' attitudes and consciousness towards EEFL

The trained EFL teachers held a positive attitude towards EEFL and most teachers' English teaching concepts have also been deeply affected by the application of EEFL. In addition, the assistant effect of EEFL in practice has been reaffirmed. However, 30% of the EFL teachers stated that their own mastery of the technology is not enough and a handful of them had a negative attitude towards technology.

Table 4. EFL teachers' attitudes towards EEFL.

Items	Options	Number	Proportion
6. What's your attitude towards applying EEFL (like multimedia or network technology) in teaching process?	Have a try actively	66	63.46%
	Accepted passively	1	0.96%
	Nice, but not good at it	36	34.62%
	It interrupts my teaching process	1	0.96%
7. How much influence does EEFL exercise on your teaching notions?	Very influential	67	64.42%
	Normal	37	35.58%

	Not very influential	0	0
	No influence at all	0	0
8. What do you think is the crucial part of appropriate application of EEFL?	Teaching materials	33	31.73%
	Teaching media approach	28	26.92%
	Teacher's ability in controlling class teaching	57	54.81%
	Teaching design	46	44.23%
9. What is the status of multimedia or multimodal courseware in class teaching?	Leading function	1	0.96%
	Assisting function	101	97.12%
	A common teaching tool	1	0.96%
	Others	1	0.96%

Most EFL teachers believe that the key to apply EEFL successfully is teachers' ability to control the class and their teaching design. Teachers' ability to blend the application of ICT and teaching concepts shows their point of view on the bidirectional effect between technology and teaching, which means that EEFL affects teachers' teaching concepts and successful application of EEFL should be based on the teachers' command of teaching.

To confirm the above, data in Figure 5 show that multi-modal courseware has some advantages in the classroom, especially its novel form and intuitive mode of display of knowledge. On the whole, adaptation and acceptance of EEFL gradually increase with the continuous development of educational technology, thus, EEFL has made impact on EFL teachers' teaching concepts to varying degrees.

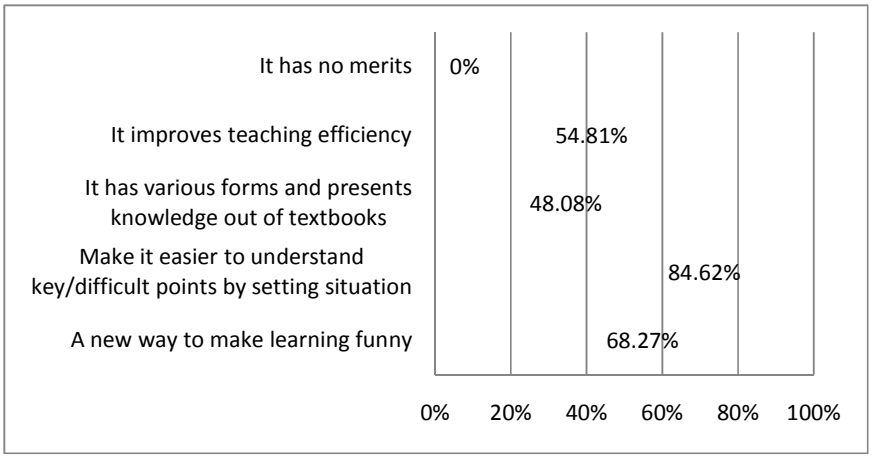

Figure 5. EFL teachers' opinions on the merits of EEFL.

Figure 6 indicates that EEFL had been applied in every aspects of teaching and trained EFL teachers were inclined to apply EEFL in illustrating difficulties and lead-in, which echoes the intuition and novelty of multi-modal teaching. The characteristics of multi-modal teaching played a decisive role in the application of educational technology during the whole teaching process while there were many teachers who hoped that they could apply the multi-modal teaching mode in various class settings.

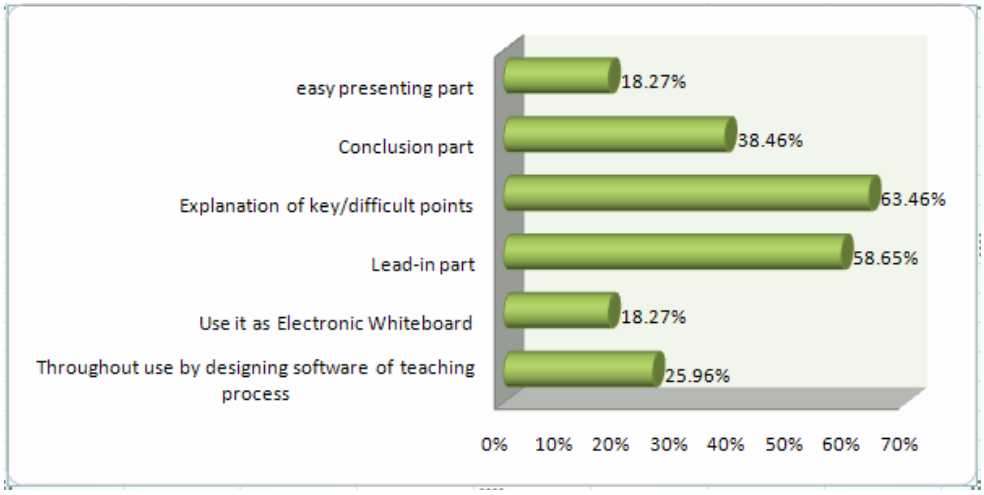

Figure 6. The application of EEFL in class among EFL teachers.

Nearly 90% of the EFL teachers highly valued the importance of multi-modal teaching in classroom teaching (Figure 7). However, a small number of teachers were worried that educational technology would disperse the students' attention and weaken the effect of language teaching. It indicates that EFL teachers are generally willing to give a full play to the auxiliary function of ICT in English class in order to enhance the teaching effect, while they still need to try to avoid the negative effects brought about by the application of ICT.

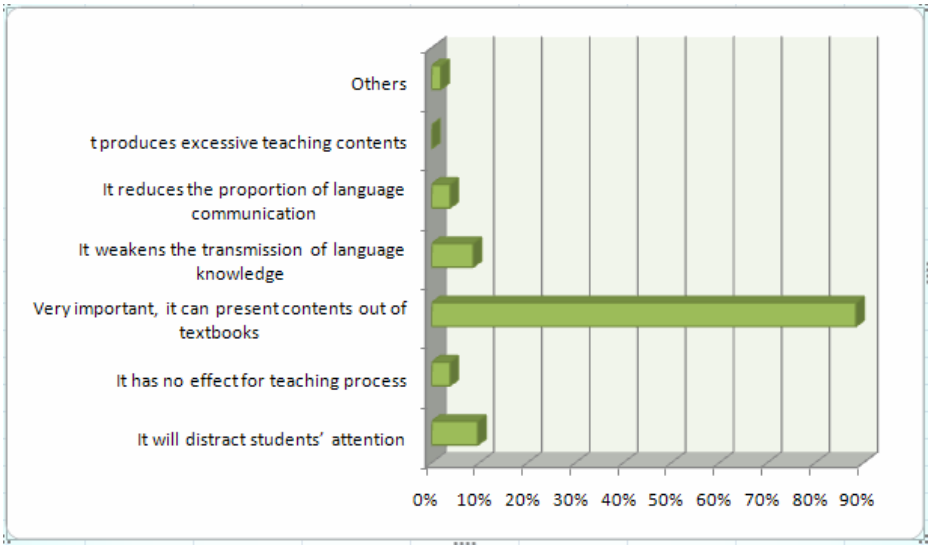

Figure 7. EFL teachers' opinions on EEFL's class effects.

4.3 The current practice, application and proficiency system of EEFL among English teachers

4.3.1. The factors that influence teachers' application of EEFL

Figure 8 shows that out of the factors that influence teachers' application of EEFL, the foremost reason is lack of knowledge of and experience in designing teaching software, followed by the lack of guidance of the EEFL theory. It indicates that EFL teachers think they are not equipped with the operational competence and they fail to have a good command of the EEFL theory.

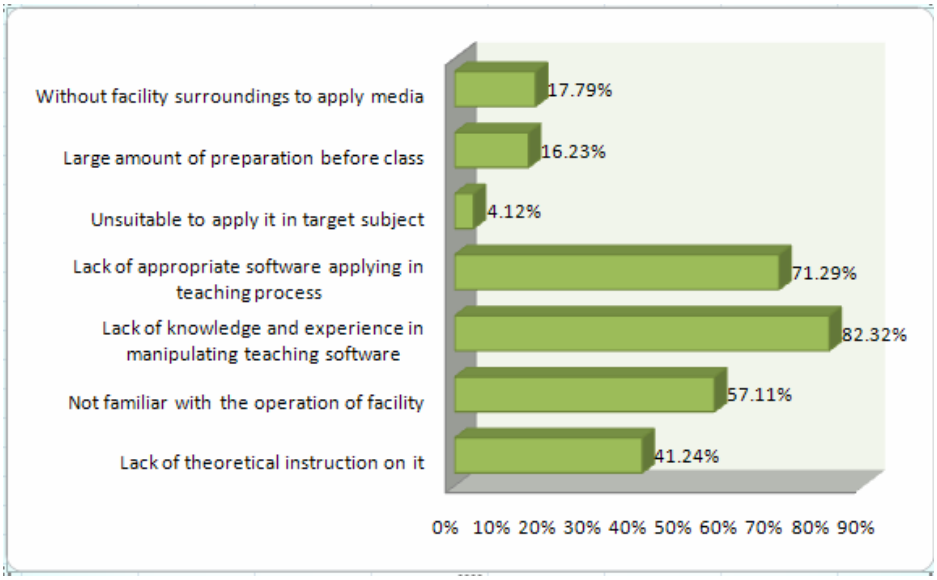

Figure 8. Factors influencing teachers' application of EEFL.

It can be seen in the second part of the questionnaire that most teachers had a positive attitude towards the new technologies. Meanwhile, they realized the need of applying EEFL in foreign language teaching and also confirmed the advantages of EEFL that traditional teaching fails to achieve.

4.3.2. Teachers' current proficiency of EEFL

Figure 9 shows the teachers' mastery of commonly used software which allows reflection on teachers' mastery of ICT. Most of the teachers reported the operational ability to present teaching contents with words and images and could make simple courseware to present the teaching content. However, most teachers had not yet mastered the basic operational skills of audio processing, corpus and web design which have higher requirements upon teachers' ICT competence.

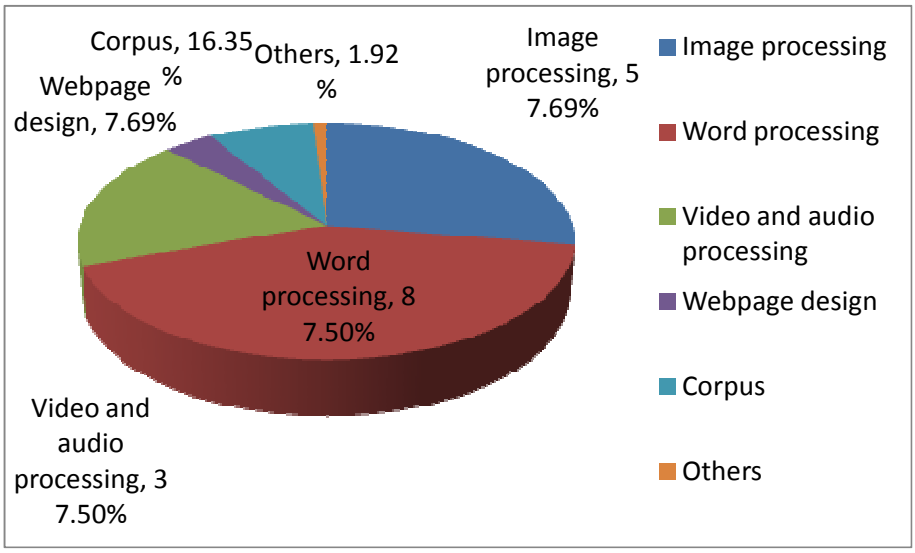

Figure 9. EFL teachers' mastery of skills with software.

85.58% of the teachers applied EEFL in open class, which suggests that EFL teachers generally think that the application of EEFL can improve the effectiveness of their teaching. However, only 68.27% of the EFL teachers applied EEFL in their daily classroom practice and other teachers only applied EEFL in certain limited contexts. Even though teachers have positive awareness of the importance of EEFL, the "bridge" between their concepts and behavior has been successfully established. On

the whole, there is still a lack of the comprehensive, systematic and long-term application of ICT in some teachers' professional practice.

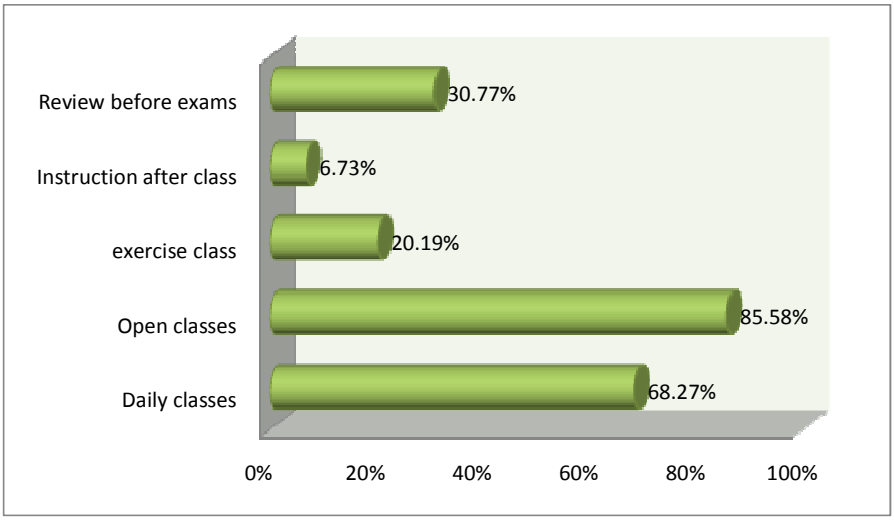

Figure 10. EFL teachers' application situation of EEFL.

4.3.3. Teachers' current proficiency of integrating ICT into curriculum

Teachers' ability to apply EEFL could be judged from the teachers' ability to integrate technology, subject knowledge and pedagogical knowledge. In order to fully understand the teachers' ability of integrating ICT into the curriculum, the author divided the questions into four evaluation dimensions according to the TPACK (TPACK-deep) core ingredients, namely design, application, ethics and proficiency.

The first one, the design dimension, refers to the creation and development of lesson plans, teaching and learning environment, and integration of appropriate technology tools and resources to maximize the learning effect. The dimension of application refers to how the teaching plan are carried out, promoting the application of technology to effectively assess students' progress. In addition, the ethical dimension means that in the teaching and learning environment educational technology is used in accordance with the technical specifications and teachers' ethics with the legal, ethical behavior. Finally, the proficiency dimension indicates promotion and reveals teachers' leadership and integration of technology in the teaching and learning process.

Most teachers claimed they only occasionally applied educational technology to update the teaching resources, design classroom activities as well as do requirement analysis of educational technology from the design point of view. At the same time, a small part of teachers pointed out that they had never applied educational technology. This indicates that teachers are relatively lacking in the ability to design and develop listening, speaking, reading and writing courses with educational technology.

From the view of application, only about 10% of the teachers would use educational technology to evaluate the knowledge and homework of students in the classroom while most of the teachers only occasionally used educational technology to produce assessment tools. In order to enrich the teaching contents, probably 70% teachers would apply educational technology based on communication tool while only twenty percent teachers never used communication tools. In addition, only 9.62% of the teachers would often give students necessary guidance when they were making PowerPoint presentations, audio or video. Therefore, it can be concluded that few students would use technology in study although trained teachers would occasionally use technology to help students understand English. In addition, about twenty percent teachers thought they would often use educational technology to update their English knowledge and teach reading and writing skills, but most teachers' choice is "occasionally" or even "never ". This shows that for technological content knowledge produced by the interaction of technology and English course knowledge, teachers' understanding level still needs to increase.

From the ethical point of view, most EFL teachers would use technology in accordance with the technical specifications and teachers' ethics. They also claimed they would guide students to apply modern educational technology under rules of ethics.

Within the proficiency dimension, most teachers reported proficiency in the use of modern teaching media in the teaching of foreign languages. About seventy percent teachers claimed they could occasionally solve possible problems during the teaching process while only about ten percent said they would not be able to do that. In addition, only about ten percent teachers would frequently be the leader of teaching

team when promoting technology innovation. To sum up, it seems teachers' knowledge in integration of technical teaching method is insufficient.

4.3.4. The reflection of subjective and objective environment in which educational technology develops

In order to carry out EEFL in foreign language teaching, the first urgent solution that a school needs to adopt is to strengthen the construction of teaching staff, followed by the importation of talents who have a good command of EEFL.

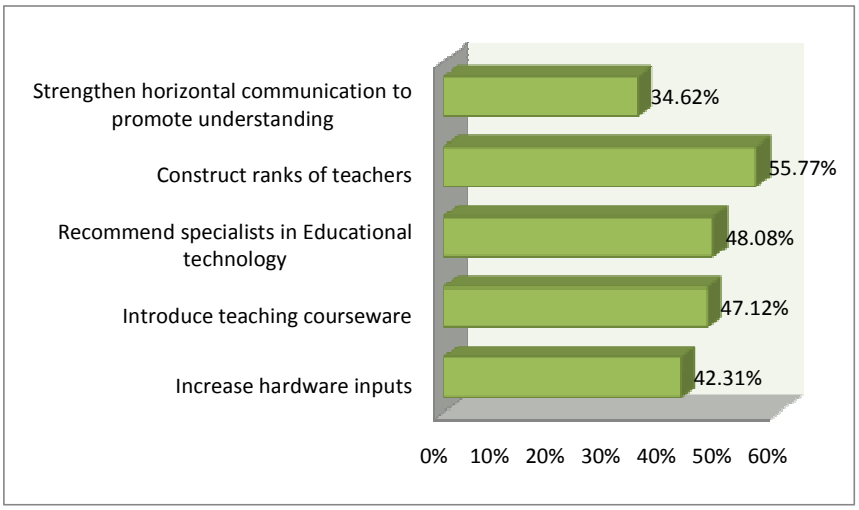

Figure 11. Emergent problems to be solved to develop EEFL.

The foremost barrier that prevents teachers from carrying out the EEFL is their heavy workload. That is because teachers are under great pressure in their teaching career, they do not have the time and effort to study and to improve the EEFL. The second barrier is teachers' backward teaching concepts, which keep them from changing the current traditional teaching method.

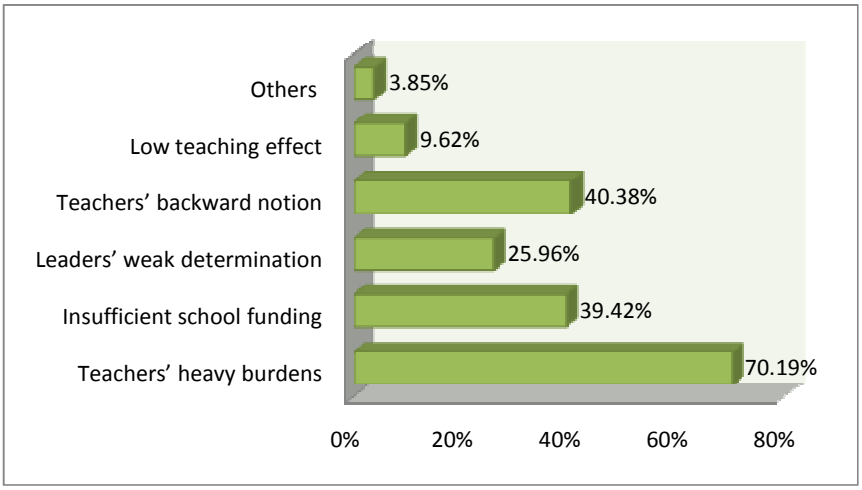

Figure 12. Main obstacles of popularizing EEFL.

4.4. The current situation of teacher trainings on EEFL and some suggestions for the future trainings

For the choice of training methods, more than half of the EFL teachers tend to favour in-service training, while another thirty percent of teachers prefer school-based training. In-service education has a strong academic nature, but the extensive learning content gives access to theoretical knowledge systematically with more learning guidance. Conversely, school-based training is based on university requirements and principles to train teachers with clear targets. Relatively speaking, even though the autonomy of distance learning is greater, it lacks in communication. Only less than ten percent of the EFL teachers prefer long-distance education. This shows that from an overall point of view, the most preferred ways of development are in-service education (more than a half of responses) and school-based training (around a third).

The top three training content areas of educational technology that teachers most desire is teaching design theory and method, multimedia courseware design and TPACK. With technology as support and the theory as guidance, EEFL takes teaching design theory as its soul. Only by mastering the ideology of teaching design can teachers combine the learned technology, theory and their own professional subject knowledge. Hence, they can integrate educational technology into a specific curriculum and bring out the potentials of educational technology in teaching (Tu, 2008). Based on the current situation, schools should launch the training course on

EEFL by taking teachers 'real needs into consideration.

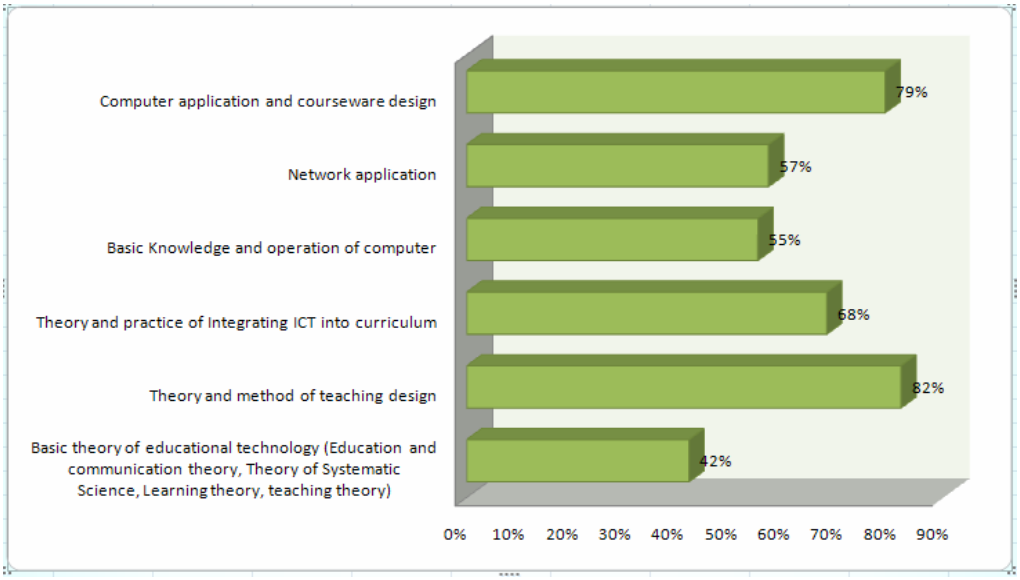

Figure 13. EFL teachers' necessary knowledge and abilities in trainings.

4.5. Learning feedback after the training on EEFL

During the training period, we participated in designing the course on EEFL and training the subjects. This course used classroom demonstrations and workshops on the topic of application of corpus in English teaching process as well as design of English Multimodal resources. After the training course, the selected subjects were interviewed.

The participants actively shared what they have learnt from the training. One of the subjects summarized her view in two words –"high efficiency", which means new technology helped to improve the efficiency of linguistic teaching and led it to a new level; as well as "practicability", which refers to the use of corpus to help avoid demonstrating mistakes in teaching process. Furthermore, the trainees not only learned the skill of corpus consultation and network technology, but also began to concentrate on multiple teaching modes and effective use of teaching materials to aid English teaching.

Most participants evaluated that the course on EEFL had abundant contents and high practical effects. However, on the other hand, learning time was too limited

to grasp all the techniques. Thus, more time would need to be spent on acquiring them during the teaching process. There are two major reasons to be concerned: firstly, time is not enough to master a large amount of operating techniques, especially for those trainees who seldom use educational technology. Secondly, teachers only learnt multimodal educational technology from trainer's presentation rather than operated it on the computer, therefore they could not predict problems they may encounter in practical operation.

To conclude, EFL teachers have learnt more about EEFL as well as about the ways of using technology and integrating teaching materials in instruction. Moreover, they have recognized the trends of integrating ICT into the curriculum and have learned to appreciate the importance of improving their own skills of applying educational technology. Thus, EFL teachers should enrich their CK, PK as well as TK, especially TPACK. In addition, the problems of operation and learning duration during the training process also have implications for the following training activities.

5. Conclusions

The present study demonstrated that teachers view EEFL as a useful tool towards enhancing classroom teaching. However, on the other hand, the practical application stays unsatisfactory in that teachers' incomplete knowledge structure is far from the criterion required in terms of TPACK. In fact, the subjects have realized their lack of ability in handling EEFL and expressed a strong will to take part in relevant training activities concerning their necessities in EEFL.

In accordance with the results, some suggestions are offered for domestic EFL teachers training activities on EEFL. First of all, schools should train proficiency of EEFL among their EFL teachers. From the above data, it can be seen that as far as teachers are concerned, in order to popularize EEFL, the most emergent problems to be solved are the proper construction of ranks of teachers, recommendation of specialists in educational technology, sufficient provision of hardware and teaching courseware. Therefore, schools have to place greater importance on teachers' proficiency of EEFL, not only provide equipment.

Furthermore, advanced learning and school-based training need to be offered to teachers to learn EEFL methodology so as to improve school's overall teaching as well as to communicate with teachers from other schools, enhance their academic ability, understand EEFL better and see its effective practical applications in teaching.

Second, plentiful contents of training on EEFL should be provided. In light of the results, teaching design and technology application should be combined in the training process. The teachers should be guided to reflect the balance of interaction and dynamics among English course content, pedagogy and technology while integrating technology into the curriculum.

Moreover, as due to EFL teachers' incomplete proficiency in TK, needless to say in TPACK, TPACK should be emphasized in the training process as a way of enhancing teaching efficiency. In addition, the training should offer practicable, effective and targeted contents as well as supply different demands of the teachers according to their own conditions.

Last, the training mode of EEFL should be ameliorated. For one thing, specific contexts should be provided to get teachers involved in solving problems themselves in the training. In this way, the separation of theory and practice can be avoided, the combination of teaching practice and teachers' own demands can be guaranteed, and the encouragement of teachers' immediate application of learnt skills in teaching practice can be realized.

Additionally, collaborative study should be promoted, within which teachers would cooperatively complete tasks of integrating ICT into curriculum. In this way, teachers can identify problems and make up for their deficiencies. Therefore, it is necessary to strengthen communication and cooperation among teachers during training courses.

Finally, the change of the training mode should be concerned with regard to limited training time, with which teachers try hard to master all the technology, not to mention the integration of useful materials. Moreover, a limited period of time cannot satisfy teachers' curiosity and guarantee communication among teachers. As a result, we recommend durative theme-based learning mode, with which training course can

be finished in long-term perspective rather than a concentrated period of time. Based on it, a network platform for EEFL can be established, which provides various topics on EEFL for teachers; or permeating knowledge of EEFL in advanced learning and school-based training process. In these ways, teachers can learn more about EEFL, raise their awareness as well as improve their ability in applying it into English language teaching.

References

Cox Suzy, & Graham, Charles R. (2009). Diagramming TPACK in practice：Using an elaborated model of the TPACK framework to analyze and depict teacher knowledge. *TechTrends*, 53, 60-69.

Chen, Jing (2009). The cultivation of teachers' educational technology under the guidance of TPACK. *E-education Research*, 6, 29-31.

He, Guangkeng (2010). *An Introduction to English Teaching Methodology*. Guangzhou: Jinan University Press.

Hu, Jiasheng, Fen, Qinglai, & Li, Yan (2010). An analysis of the role of Information Technology integrated into foreign language curriculum. *Modern Educational Technology*, 12, 72.

Hu, Jiasheng (2010). *Discipline Construction of EEFL from A Paradigm Transformation Perspective*. Shanghai: Shanghai International Studies University.

Isil Kabakci Yurdakul, Hatice Ferhan Odabasi, Kerem Kilicer, Ahmet Naci Coklar, Gurkay Birinci, Adile Askim Kurt (2012). The development, validity and reliability of TPACK-deep-A technological pedagogical content knowledge scale. *Computers & Education*, 58(3), 964-977.

Liu, Deru (2004). Considerations about Information Technology and curriculum integration. *Educational Research*, 2, 70-73.

Mishra, Punya, & Koehler, Matthew J. (2006). Technological Pedagogical Content Knowledge: A framework for teacher knowledge. *Teachers College Record*, 8(6), 1017-1054.

Ruan Shigui, Li Luyi, ZhengYanlin (2012). Under the TPACK Framework: Research on "Modern Educational Technology" Common Course Reform. *Modern Educational Technology*, 8, 36-39.

Shulman, Lee S. (1986). Those who understand knowledge growth in teaching. *Educational Researcher*, 15(2), 4-14.

Shulman, Lee S. (1987). Knowledge and teaching: Foundations of the New Reform. *Harvard Educational Review*, 57(1), 1-22.

Tu, Hongmei (2008). *The Investigations and Analysis on the Current Situation Using Modern Educational Technology in Key High School of Nanchang City*. Nanchang: Jiangxi Normal University.

Compulsory Education English Curriculum Standard. (2011). Beijing: The Ministry of Education of the People's Republic of China, Beijing Normal University Press.

Zhan, Yi, & Ren, Youqun (2010). The literature review of concept and current researches in Technological Pedagogical and Content Knowledge. *Journal of Distance Education*, 4, 78-84.

Zhan, Yi (2011). Discourse analysis basing on TPACK framework: What pre-service teachers focus on during instructional design? *Journal of Distance Education*, 6, 73-78.

Appendix A Questionnaires on practice and application of EEFL among EFL teachers

The knowledge structure of EEFL among teachers

1. Do you know the concept of “E-educology” or “E-educology of Foreign Languages (EEFL)”?

A. I have already learned something about it.

B. I have heard of it but never have a detailed learning.

C. I have never heard of it.

2. Before the training, what kind of EEFL knowledge have you learnt?

A. Theory and method of teaching systematic design

B. Knowledge of Integrating Information Technology into Curriculum

C. Basic knowledge of computer and network application

D. Multimedia teaching courseware design

E. Application of modern teaching media

F. Others_____

3. Which foreign language teaching approaches do you know?

A. Grammar-Translation Approach B. Direct Approach

C. Audio-lingual Approach D. Situational Approach

E. Communicative Approach F. Task-based Approach

4. Which learning theories do you know?

A. Behavioral Learning Theory B. Cognitive Learning Theory

C. Humanistic Learning Theory D. Constructivist Learning Theory

D. No idea about any learning theories

5. How familiar are you with "TPACK (Technological Pedagogical Content Knowledge)"?

A. Very familiar B. A little C. No idea

The attitude and awareness of teaching application of EEFL among teachers

6. What's your attitude towards applying EEFL (like multimedia or network technology) in the teaching process?

A. Have a try actively B. Accepted passively

C. Nice, but not good at it D. It interrupts my teaching process

7. What influence does EEFL have on your teaching notions?

A. Very influential B. Normal

C. Not very influential D. No influence

8. What do you think is the crucial part of appropriate application of EEFL?

A. Teaching materials B. Teaching media approach

C. Teacher's ability in controlling class teaching

D. Teaching design

9. What's the status of multimedia or multimodal courseware in class teaching?

A. Leading function B. Assisting function

C. A common teaching tool D. Others

10. What merits of multimedia or multimodal courseware teaching are important to you?

A. It is a new way to make learning funny

B. It allows students to understand key/difficult points by setting context

C. It has various forms and presents knowledge out of textbooks

D. It improves teaching efficiency

E. It has no merits

11. In which sections in class teaching do you wish to apply multimedia or multimodal teaching?

A. Throughout use by designing software of the teaching process

B. Use it as an Electronic Whiteboard

C. Lead-in part

D. Explanation of key/difficult points

E. Conclusion part

F. Easy presenting part

12. What is the status of EEFL in the English class?

A. It will distract students' attention

B. It has no effect for the teaching process

C. Very important, it can present contents out of textbooks

D. It weakens the transmission of language knowledge

E. It reduces the proportion of language communication

F. It produces excessive teaching contents

G. Others_____

13. What are the main reasons influencing your application of EEFL?

A. Lack of theoretical instruction on it

B. Lack of familiarity with the operation of facility

C. Lack of knowledge and experience in manipulating teaching software

D. Lack of appropriate software application in the teaching process

E. It is unsuitable to apply it in target contexts

F. It demands a large amount of preparation before class

G. There are no technical facilities to apply media

The practical teaching application of EEFL among teachers

14. What techniques have you mastered before the training?

A. Image processing B. Word processing

C. Video and audio processing D. Webpage design

E. Corpus F. Others_____

15. When do you usually apply EEFL?

A. Daily classes B. Open class C. Exercise class

D. Instruction after class E. Review before exams

16. What do you think are the most emergent problems to be solved in school in order to promote EEFL?

A. Increase hardware provision

B. Introduce teaching courseware

C. Recommend specialists in educational technology

D. Construct ranks of teachers

E. Strengthen horizontal communication to promote understanding

F. Others_____

17. What do you think are the main obstacles of popularizing EEFL?

A. Teachers' excessive workload B. Insufficient school funding

C. Leaders' weak determination D. Teachers' backward notion

E. Low teaching effect F. Others _____

Appropriate training mode and advice on the training of EEFL

18. What is your preferred training mode?

A. In-service training B. School-based training C. Remote self-study

19. What are your necessary knowledge and abilities if you participate in the training?

A. Basic theory of educational technology (Education and communication theory, theory of systematic science, Learning theory, teaching theory)

B. Theory and method of teaching design

C. Theory and practice of integrating ICT into curriculum

D. Basic knowledge and operation of computer

E. Network application

F. Computer application and courseware design

Appendix B TPACK (TPACK-deep) core ingredients measured list on EFL Teachers'

Current Proficiency of Integrating ICT into Curriculum

(The results are shown in that table)

Current Proficiency	never	sometimes	always
一、On design			
1 You will update an instructional material (paper based, electronic or multimedia materials, etc.) based on the needs (students, environment, duration, etc) by using technology.	0.96%	73.08%	25.96%
2. In order to improve students' English competence, you will apply educational technology into teaching according to students' needs.	2.88%	74.04%	23.08%
3. You will conduct a needs analysis for technologies to be used in the teaching and learning process to increase the quality of teaching.	8.65%	75.96%	15.38%
4. You can use technology to appropriately design or search for materials to the needs for an effective teaching and learning process.	2.88%	71.15%	25.96%
二、On application			
5. You can develop appropriate assessment tools by using technology (like assessing students' homework).	36.54%	56.73%	6.73%
6. You can combine appropriate methods, techniques and technologies by evaluating their attributes in order to present the content effectively.	29.81%	63.46%	6.73%
7. You can assess whether students have the appropriate content knowledge by using technology.	18.27%	73.08%	8.65%
8. You can apply instructional approaches and methods appropriate to individual differences with the help of technology.	12.5%	75%	12.5%
9. You can use technology-based communication tools (blog, email, etc) in the teaching process.	23.08%	68.27%	8.65%
10. You can guide students in the process of designing technology-based products (presentations, games, films, and etc).	37.5%	52.88%	9.62%
11. You can use technology to update your knowledge and skills in the area that you will teach.	7.69%	67.31%	25%
12. For those English knowledge and English basic skills that you are going to teach, you will update your content knowledge by using technology.	5.77%	66.35%	27.88%
13. You can update your technological knowledge for	3.85%	64.42%	31.73%

improving your English class.			
三、On ethics			
14. You can be an appropriate model for the students in following codes of ethics for the use of technology in your teaching.	12.5%	59.62%	27.88%
15. You can behave ethically in acquiring and using special/private information which will be used in teaching a subject area- via technology (audio records, visual materials, etc)	9.62%	53.85%	36.54%
16. You can follow the teaching profession's codes of ethics in online educational environments (WebCT, Moodle, etc)	0%	30.77%	69.23%
四、On proficiency			
17. You can expertly apply modern media tools in the teaching process.	0.96%	47.12%	51.92%
18. You can troubleshoot problems that could be encountered within online educational environments (WebCT, Moodle, etc)	10.58%	74.04%	15.38%
19. You can become a leader in spreading the use of technological innovations in your future teaching community.	25%	59.62%	15.38%