2012

The development and evaluation of a professional development arrangement for technology integration to enhance communicative approach in English language teaching

A master thesis

Muhammad Fauzan Ansyari

Faculty of Behavioural Science, University of Twente.

8/30/2012

The development and evaluation of a professional development
arrangement for technology integration to enhance communicative
approach in English language teaching

THESIS

By

Muhammad Fauzan Ansyari

Supervisors:

Dr. J. M. Voogt
Dr. P. H. G. Fisser

Submitted as partial fulfilment for the award of Master of Science (MSc) in
Educational Science and Technology (EST) specialised in Curriculum,
Instruction, and Media Application (CIMA),
upon approval of supervisors in consultation with all members of the
graduation Committee and the Educational Affairs Office to publicly defended
on 30th of August 2012 at 11.30

Faculty of Behavioural Sciences, Educational Science and Technology
University of Twente, The Netherlands

AKNOWLEDGEMENT

In the Name of God, the Most Beneficent, the Most Merciful

As a Muslim, I thank the Almighty God who has given me blessings, insight, and strength to study and finish this thesis project successfully in time.

I would like to thank my supervisors, Dr. Joke Voogt and Dr. Petra Fisser, for their assistance and guidance during my study, particularly during the process of this thesis. I am really indebted to them for their bright insights, fruitful ideas and professional supports.

I would also like to thank my wife, Masni Kamallia, and my sons, Afiq, Nabil, and Faiz, who always motivated and supported me during my study.

Finally, I would like to extend my thanks to the lecturers and Mr. Hasibuan who had made this project accomplished. Similarly, I would like to give my thanks to my friends, Isnaeni, Zeno, and Bertha for their supports during my study.

Muhammad Fauzan Ansyari
Enschede, The Netherlands

CONTENTS

ABBREVIATIONS

CK	Content Knowledge
PK	Pedagogical Knowledge
TK	Technological Knowledge
PCK	Pedagogical Content Knowledge
TCK	Technological Content Knowledge
TPK	Technological Pedagogical Knowledge
TPCK/TPACK	Technological Pedagogical Content Knowledge
TEFL	Teaching English as a Foreign Language
EFL	English as a Foreign Language
ELT	English Language Teaching
CLT	Communicative Language Teaching
IT	Information and Technology
CALL	Computer Assisted Language Learning
UIN SUSKA	Universitas Islam Negeri Sultan Syarif Kasim

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

This study aims at developing and evaluating a professional development programme for technology integration in English language teaching setting in an Indonesian higher education. The study mainly explores the characteristics of such programme to English lecturers' TPACK development. This study is a design-based research, which, in collecting the data, employs TPACK survey, TAC survey, technology integration assessment rubric, interview, and logbook.

The findings suggest that all participants reported that they had positive experiences with the professional development programmes. The weaknesses of the programmes were viewed on limited time, technology exploration, and students' active engagement. Suggestions were given related to three major aspects: terms of facilities, follow-up, and support. TPACK is also enhanced after the professional development programme based on self-reported TPACK. The findings from lesson plan assessment demonstrate that the professional development programme also had a sound impact based on the overall result of the lecturers' lesson plan designs in all components of TPACK, except in CK. Finally, the results from TAC questionnaire show that only enjoyment variable is significant, while anxiety is not significant.

Overall, on the bases of evidence from all data sources it can be concluded that the professional development arrangement for technology integration at the language centre improves the English lecturers' TPACK. Crucial aspects of the professional development programme include TPACK framework as a knowledge base, learning technology by design approach, active engagement, authentic learning experiences in a collaborative environment, guidance, support, and feedback, curriculum coherency, and intensive programme.

Keywords:

Professional development; Technological Pedagogical Content Knowledge (TPACK); learning technology by design

CHAPTER ONE: INTRODUCTION

This chapter describes the rationale of the study. It begins to address the aim of the study, followed by a short description where the study was undertaken. Finally, it gives the overview of the organisation of this thesis writing.

In the digital age, the competency of teachers in educational uses of technology seemingly appears to be one of the key components in some improvement arrangements for educational reform efforts (Pineida, 2011). It is believed that such competency can improve teachers' quality and better student learning outcomes as a response to the need for true learning in the 21st century which entails students' ability in using ICT for better learning (Jimoyiannis, 2010). In the context of English Language Teaching (ELT), although the impacts of technology on student outcomes are not univocal, for instance, when technology is appropriately and effectively integrated, it makes language learning either more authentic or meaningful for students (Warschauer & Kern, 2000; Warschauer & Meskill, 2000; Young, 2003).

In response to this issue, State Islamic University of Sultan Syarif Kasim Riau Indonesia also made some improvement strategies. It released its Information Technology (IT) Strategic Planning in 2007 as one result from the development programmes financed by Islamic Development Bank (IDB). One of its main targets is to improve lecturers' understanding and help them integrate among subject matters, pedagogy, and technology (Universitas Islam Negeri Sultan Syarif Kasim Riau, 2007). This policy at the university language centre, however, is hardly implemented in supporting English Language Teaching (ELT) in a student-centered learning environment under the umbrella of Communicative Language Teaching (CLT) philosophy. Some of the language lecturers still use technologies in isolation to support communicative English language teaching, while some others do not use it at all.

This is probably due to the fact that the lecturers might find technology integration uneasy in many cases due to several reasons. First, it is argued that the lack of knowledge and skills is one barrier to technology integration (Haydn & Barton, 2008; Hew & Brush, 2007; Tondeur, van Keer, van Braak, & Valcke, 2008). According to Harris and Hofer (2009), planning an appropriate and pedagogically powerful use of educational technologies into instruction is demanding. This is because such integration does not simply use technology itself without considering the content being delivered and the pedagogy being used to facilitate learning. Second, teachers' attitude toward technology also plays a role. In this case, teachers' strong resistance to change might be also one of the reasons why educational institutions have been slow to embrace technology as an innovation (Hew & Brush, 2007; Ottenbreit-Leftwich, 2007). Finally, other barriers include lack of access to resources, of adequate skilled personnel to coordinate and support the adoption of ICT (Tondeur, et al., 2008), resources, institution, assessment, and subject culture (Hew & Brush, 2007).

1.1. Aim of the study

As was previously stated, the implementation of the policies related to IT strategic planning and CLT, requiring the English lecturers to integrate technologies in English language teaching to support communicative approach, are not well implemented yet in the practice of foreign language teaching at the university language centre. On the basis of context analysis, the lecturers lack knowledge and skills for technology integration. As a result, students are not well supported to authentic language uses and have few opportunities to practice the

language. In some cases the lecturers only teach English without any technology support to enhance students' learning as well. For example, when the lecturers teach listening, many did not use any relevant technology which is very important to expose authentic spoken language by native speakers of English to students. From this evidence, the researcher argues that there are some contributing factors, one of which is the lecturers' lack of knowledge and skills in integrating technology into their English language teaching, which is one of the main barriers to technology integration. This thus indicates a need for an effective professional development programme to cope with such problem. Therefore, this study was aimed at developing and evaluating a professional development programme for technology integration for the English lecturers at the language centre, State Islamic University of Sultan Syarif Kasim Riau Indonesia.

1.2. Context of the study

One of the institutions under Universitas Islam Negeri Sultan Syarif Kasim Riau or State Islamic University of Sultan Syarif Kasim Riau is the language centre and it is an independent institution under the university. The role of the language centre becomes vital as to support the university vision to be a world-class university in 2023 in which English undeniably becomes a means of communication. To achieve such goal, English language teaching is primarily tasked to the language centre.

Currently, this centre has organized English and Arabic language instruction as foreign languages for all students from all faculties at the university since 2003. These languages are compulsory subjects for all students. Every student must complete three levels for each subject. The centre currently has around 50 English lecturers, and serves more than 6,000 students every year for English language. For lecturers, some are permanent and some others are non-permanent and are new to the profession.

With regard to English language teaching curriculum, the main targets are to prepare students to communicate both in spoken and written English for survival English competency, and upon the completion of three levels students must obtain TOEC or TOEFL score at least 350. The language curriculum suggests that English language teaching should be organised in student-centred learning environment supported by relevant technology and Communicative Language Teaching (CLT) (Pusat Bahasa, 2004). As it is suggested, CLT is the current trend for teaching English as a foreign language which focuses on how students learn to use language in real situation (Richards, 2001). In this view, the accuracy or usage is only taught to support students' communicative competence. Therefore, the mastery of language is ultimately measured from how well students can use it for various survival purposes in real-world contexts, such as shopping in markets, asking for direction during travelling, etc.

In achieving such targets, the language centre is no way free from any barriers. Since not all of the lecturers are not permanent lecturers at the university, some do not have a sense of ownership to the institution. Some lecturers still also adopt traditional teaching approaches and too much focus on the usage rather than the language use, with which students are not well encouraged to practice and use the language. Furthermore, the number of administrators which is not equivalent with the number of students being handled also becomes a great challenge. Another critical problem is students' motivation to learn the language. Many students learn English only to obtain the certificates as one of their graduation requirements. Although wireless internet connection is available at the language centre environment, other supporting facilities are still ill-facilitated. Not all of the classrooms are equipped with supporting technologies, such as computers, projectors, etc.

Additionally, traditional approaches to professional development arrangements for the lecturers are still salient where the lecturers always become passive learners and knowledge consumers. For example, expert-led training is always carried out, but it is mainly a theoretical explanation and teacher-centred in nature by which the potentials of the lecturers are rarely explored and benefitted for their learning. They just become active listeners, but not creative doers or creative designers. As a result, they do not have opportunities with authentic learning experiences that make their learning more useful and meaningful.

1.3. Overview of the study

This thesis is organised into six chapters. Chapter One contains an introduction consisting of the aim of the study, the context of the study and the overview of the study. Chapter Two, with the intention of establishing a theoretical basis for developing a professional development for technology integration in this study, provides the summary of the literature review and a model generated from TPACK framework for Teaching English as a Foreign Language (TEFL). Chapter Three presents the design of the intervention of the study as a guideline for proceeding through this investigation. This chapter also addresses the research questions of this study. Chapter Four details the methodology: procedures and methods employed in the study. Chapter Five presents the findings of the study, and finally Chapter Six concludes, discusses and provides limitations of the study and some recommendations related to the findings of the study.

CHAPTER TWO: LITERATURE REVIEW

This chapter provides a summary of the literature review intended for developing a professional development for technology integration as an intervention of this study. This exploration centres on the implementation of in-service teachers' professional development arrangements for technology integration, focusing on the framework for teacher knowledge base, the different instructional methods employed, factors characterising successful professional development programmes, and in-service teachers' experiences with such programmes.

In addressing this research problem, the writer argues that teacher professional development arrangement is required to prepare and help English lecturers integrate technology into their teaching. However, several questions on how to design a successful teacher professional development arrangements for technology integration arise, including which framework can best describe teachers' knowledge domains for technology integration, what instructional approaches were employed, what contributing factors were taken into considerations, and how teachers experienced with such successful professional development programmes. To answer such questions, a literature review was conducted to better understand important guidelines for the organisation of successful teacher professional development arrangements for technology integration as summarised in the following sections.

2.1. Professional development arrangement for technology integration

As technology develops so rapidly, teacher professional development arrangements on how to integrate technology into instruction or teaching becomes essential nowadays. Lawless and Pellegrino (2007, p. 575) argued that such professional development is critical to ensuring that teachers keep up with changes in student performance standards, become familiar with new methods of teaching in the content areas, learn how to make the most effective instructional use of new technologies for teaching and learning, and adapt their teaching to shifting school environments and an increasingly diverse student population. For teachers to be able to integrate technology, Kereluik, Mishra, and Koehler (2010, p. 3892) suggested that they need to know how to integrate technologies into their teaching in ways that are flexible, tolerate ambiguity, and connect to deep subject matter learning, and a considerable interest has emerged recently on Technological Pedagogical Content Knowledge (TPACK) as a framework for technology integration (Koehler & Mishra, 2008; Mishra & Koehler, 2006b). According to Mishra and Koehler (2006b), this framework is best learnt through learning-technology-by-design approach that helps teachers integrate technology effectively and appropriately into instruction.

2.1.1. The framework for teacher knowledge base in technology integration

This section presents the framework for describing teacher knowledge base for technology integration resulted from the literature review, that is Technological Pedagogical Content Knowledge (TPCK or TPACK).

The complexity of TPCK or TPACK as a conceptual framework for teacher knowledge base is that it does not have a universally accepted conceptualisation yet. This is indicated by three conceptualisations of TPACK found in the literature. The first conceptualisation from Mishra and Koehler (2008; 2007; 2006a) centres on TPACK as teachers' understanding of the

integrated knowledge domains of technological, pedagogical, and content knowledge in specific contexts. Moreover, the ICT-TPACK developed by Angeli and Valanides (2009) views TPACK as consisting of separate knowledge domains that can be developed and measured in isolation from one another. Finally, an elaborated TPACK as conceptualised by Cox and Graham (2009) has simply expanded each definition of TPACK components. In this view, TPACK refers to the knowledge of how to coordinate the use of subject-specific activities or topic-specific activities with topic-specific representations using emerging technologies to facilitate student learning (Cox & Graham, 2009, p. 64).

Among the three conceptualisations, TPACK framework (Mishra & Koehler, 2006a) appears to a good knowledge base for teachers in integrating technology into teaching because many studies (e.g., Blocher, Armfield, Sujo–Montes, Tucker, & Willis, 2011; Jimoyiannis, 2010; Tee & Lee, 2011) reporting successful implementation of professional development arrangements adopted this TPACK framework to represent teacher knowledge base for technology integration.

This TPACK framework, firstly termed as TPCK, was initially developed from Pedagogical Content Knowledge (PCK) by Shulman (1986; 1987). In this TPCK framework, Koehler and Mishra (2005b; 2006a), centred it on the understanding of teaching as a highly complex activity represented from many kinds of knowledge. This framework forms interplay of three knowledge domains, consisting of technological knowledge, pedagogical knowledge, and content knowledge as the core components of teacher knowledge which they consider fundamental for effective instructional practices. This initial conception of TPCK is illustrated in figure 2.1 below.
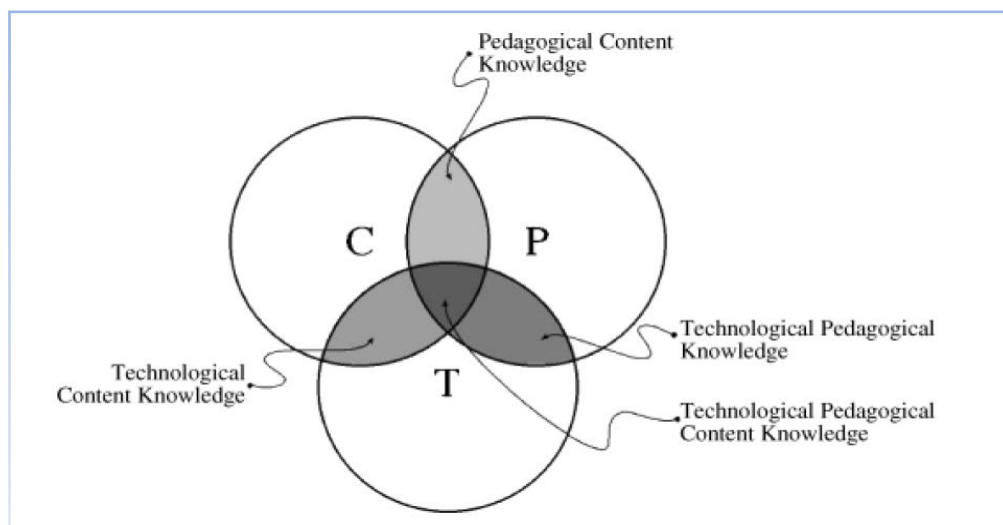
Figure 2.1: The initial model of TPCK (Mishra & Koehler, 2006)

The first domain is *content knowledge* (CK). It represents teachers' knowledge and understanding of the subject matter or course being taught to students, e.g., English, Math, Natural Science, etc. In the absence of this aspect, teachers probably would have difficulties in teaching.

The second domain is *pedagogical knowledge* (PK). Having a great deal of content knowledge is not enough for effective instruction. If content knowledge answers the question of *what* teachers teach, then pedagogical knowledge responds to the question of *how* teachers

teach the content. This knowledge refers to teachers' understanding of instructional approaches, methods, and classroom techniques with which teachers would be able to provide powerful learning environment.

The last domain is *technological knowledge* (PK). Technology here means standard technologies, such as books, chalk and blackboard, and more advanced technologies, such as the Internet and digital video (Mishra & Koehler, 2006a, p. 1027). Therefore, technological knowledge refers to teachers' capacity to appropriately select and use technology that best support and promote effective instruction. This capacity allows teachers to integrate technology into their classrooms in which teachers can benefit technology for their own classroom practices. This knowledge also requires teachers' skills to operate technology they use. For example, teachers may have to be able to operate a computer and other technology devices.

Furthermore, all these three bodies of teachers' knowledge can be connected in pairs as Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), and Technological Pedagogical Knowledge (TPK). *Pedagogical Content Knowledge* refers to how teachers teach particular content-based material to students. *Technological Content Knowledge* is how teachers select and then use technologies to communicate particular content knowledge, while *Technological Pedagogical Knowledge* mainly addresses how teachers use particular technologies when they are teaching a certain subject matter. Finally, according to Mishra and Koehler (2005b; 2006a), the intersection of the three circles or knowledge domains forms a combination of three knowledge domains, the so-called Technological Pedagogical Content Knowledge (TPCK) as depicted in figure 2.2 below.

The acronym of TPCK as mentioned above was updated in the winter 2007-2008 on the issue in the *Journal of Computing in Teacher Education.* The updated version of the TPCK acronym became TPACK (Thompson & Mishra, 2007). For this update, they argued that the addition of the letter A in the updated acronym better represents the interdependence of the three knowledge domains (T, P, C), thus explaining the "Total PACKage" of teacher knowledge. This updated model is depicted in the figure 2.2 below.

Figure 2.2: TPACK Framework and its knowledge domains
(Koehler & Mishra, 2008)

Later in 2008, Koehler and Mishra (2008) added context (e.g., students characteristics, school/institution cultures, facilities, etc) to the seven knowledge domains as an indispensab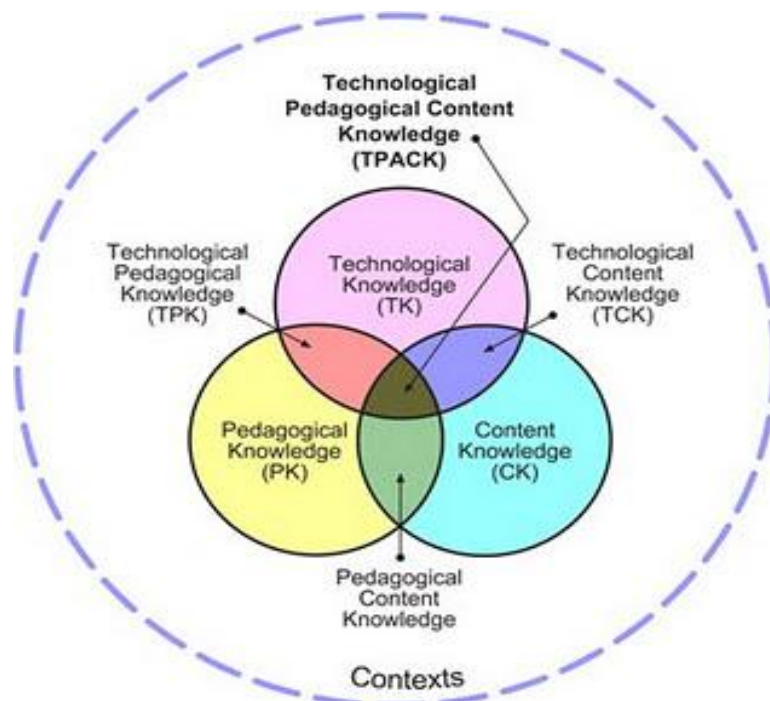le part of TPACK framework. They argued that context is important to learning and situating teacher knowledge and for better understanding and application of the framework; teachers need flexibility in order to succeed. For the purpose of developing a professional development programme as the intervention in this study, this model was used as the framework for teacher knowledge base for technology integration.

2.1.2. Learning technology by design approach

Empirical studies have found that successful TPACK professional development arrangements for in-service teachers are driven by constructivist approach to teacher learning. The assumptions lay on the theoretical principle of social constructivism, asserting that knowledge is constructed through social interaction and is a shared rather than an individual experience; knowledge acquisition is an adaptive function designed to organize experiences; and knowledge is the result of active mental processing by the individual in a social environment (Prawat, 1996; Prawat & Floden, 1994; Vygotsky, 1978). It is thus argued that this social constructivist theory is an appropriate approach to help teachers learn to integrate technology, and is believed to stimulate deep learning and useful experiences.

Learning-technology-by-design approach (Mishra & Koehler, 2006a) is one of the constructivist approach for teacher learning. Koehler and Mishra (2005a) recommend such approach to TPACK development in which teachers, content experts, and technology specialists design instruction collaboratively, building TPACK together. As described by Mishra and Koehler (2006a), this approach emphasises on learning by doing, but not so much focus lecturing and traditional teaching practices, and learning design through being practitioners, Since the design process is crucial in this approach, Mishra and Koehler (2006a) argued that design should be understood in dialogue and action, and involves reflection in action that provide learners with authentic and engaging ill-structured problems that reflect the complexity of the real world.

Concerning the organisation of professional development arrangements, literature suggested to two formats of successful TPACK professional development programmes. These are projects (e.g., Allan, Erickson, Brookhouse, & Johnson, 2010; Blocher, et al., 2011; Doering, Veletsianos, Scharber, & Miller, 2009; Guzey & Roehrig, 2009; Nicholas & Ng, 2012; Polly, 2011) and courses (e.g., Jang, 2010; Jimoyiannis, 2010; Jimoyiannis, Tsiotakis, & Roussinos, 2011; Niess, Zee, & Gillow-Wiles, 2010; Tee & Lee, 2011; Trautmann & MaKinster, 2010). In this study, the professional development arrangement is organised through project because it is easier for the lecturers in participating in the programme.

2.1.3. Factors characterising successful TPACK PD programmes

Research has suggested several critical features with regard to the characteristics or factors contributing to successful implementation of TPACK programmes. These include *active involvement* (Blocher, et al., 2011; Jimoyiannis, et al., 2011), *authentic learning experiences* (Doering, et al., 2009; Jimoyiannis, 2010; Tee & Lee, 2011), *collaboration (Allan, et al., 2010; Jimoyiannis, et al., 2011)*, *guidance and support* (Blocher, et al., 2011; Doering, et al., 2009; Guzey & Roehrig, 2009; Oster-Levinz & Klieger, 2010; Trautmann & MaKinster, 2010), *curriculum coherency* (Nicholas & Ng, 2012), *reflection* (Allan, et al., 2010; Guzey & Roehrig, 2009; J. B. Harris & Hofer, 2011; Jimoyiannis, 2010; Tee & Lee, 2011), *feedback*

(Jimoyiannis, 2010; Niess, et al., 2010), *intensive training* (Trautmann & MaKinster, 2010), and *time* (Jimoyiannis, 2010; Nicholas & Ng, 2012; Oster-Levinz & Klieger, 2010).

In the same tone, Lawless and Pellegrino also supported these consideration by stating that professional development programmes are usually organised in a longer duration, to provide access to new technologies for teaching and learning, to actively engage teachers in meaningful and relevant activities for their individual contexts, to promote peer collaboration and community building, and to possess a clearly articulated and a common vision for student achievement (Lawless & Pellegrino, 2007, p. 579; Todorova & Osburg, 2010). In addition, for English language teaching setting, Richards and Farrell also indicated that teacher development serves a longer-term goal and seeks to facilitate growth of teachers' understanding of teaching and of themselves as teachers (2005, p. 4). With regard to collaborative learning, Darling-Hammond (2003, p. 278) emphasised that teachers learn best if they study, do, and reflect; if they collaborate with other teachers; if they look closely at students and their work; and if they share what they see. This indicates that teachers should be provided with a collaborative environment for authentic learning that promotes and encourages them to practice it in real classrooms.

Furthermore, providing some learning phases for teachers' development of TPACK is necessary as well. Introducing the concept through workshops, for instance, helped teachers develop an understanding of practical skills they need for integrating technology. Following this, teachers were required to apply such concept by which they experienced authentic design tasks in collaboration, for example curriculum materials or contents. In some studies teachers enacted the designed materials with students. To enhance these stages, teachers were given opportunities to reflect on. Also importantly, feedback and support were given to sustain the implication of the programme. As was found, support was given after the programme to ensure that teachers continued the change. In line with Joyce and Showers (1995) who suggested four development stages for professional development programmes that should be taken into account, include the presentation of theory; theory and demonstration; theory, demonstration, and practice; and theory, demonstration, practice, and follow-up. As reported by Bradshaw (2002), positive effects by applying this approach with which teachers involved in professional development activities that include theory, demonstration, practice, and follow-up are more likely to transfer technology skills into teaching than those who participated in professional development activities that did not include all four dimensions. Although not completely followed the stages as mentioned by Joyce and Shower, the above-reviewed studies at least adopted similar sequencing activities for teachers' TPACK development.

Studies have also revealed that teachers had positive experiences with participating in TPACK professional development programmes. These positive experiences had been shown in terms of comfort, confidence, willingness, and satisfaction. Blocher, et al. (2011) claimed that one-half of their participating teachers reported their improvement in their comfort and confidence in using technology by participating in the programme. Another study also showed that all teachers reported their increased willingness and confidence, particularly in their ability to apply ICT in their own instruction (Jimoyiannis, 2010; Jimoyiannis, et al., 2011). Furthermore, Doering, et al. (2009) asserted that in-service teachers who went through the TPACK-based program experienced considerable movement within the TPACK diagrammatic knowledge domains and expressed positive and encouraging comments regarding their knowledge domains portrayed within the TPACK framework. The last, but not the least, teachers were also reported being satisfied with the programme and perceived that the programme had a positive impact on their development (Jimoyiannis, et al., 2011).

2.2.   The model of TPACK framework

Since the current trend in English language teaching focuses on students' ability to communicate effectively in meaningful ways, Communicative Language Teaching (CLT) appears as a pedagogical approach to achieve such communicative purposes. According to Parrish (2006), CLT is regarded as an approach or philosophy to teaching. It focuses much on fluency and the ability to communicate in a variety of settings and in a variety of ways (verbal and non-verbal, written) at the core of teaching and learning rather than language accuracy. Richard (2001, p. 36) also argues that CLT is a broad approach to teaching resulted from a focus on communication as the organizing principle for teaching rather than a focus on mastery of grammatical system of the language. Furthermore, Nunan (1999) emphasises that in the contemporary language education, students are not primarily taught about language rules anymore, but language use. In this regard, students are expected to use the language naturally in a meaningful way; this language competency is thus measured from how well students can use it for various purposes in real contexts. In short, the target of teaching English focuses on fluency rather than accuracy only.

Moreover, as technology develops rapidly CLT can also be supported by technology, such as by computers. This indeed requires teachers' knowledge and skills in order that they can integrate it effectively to improve students' communicative competence. Therefore, the general proposed model of technology integration in teaching English as a foreign language (TEFL) generated from TPACK framework as conceptualised by Koehler and Mishra (2008) which is used in this study can be formulated as follows:
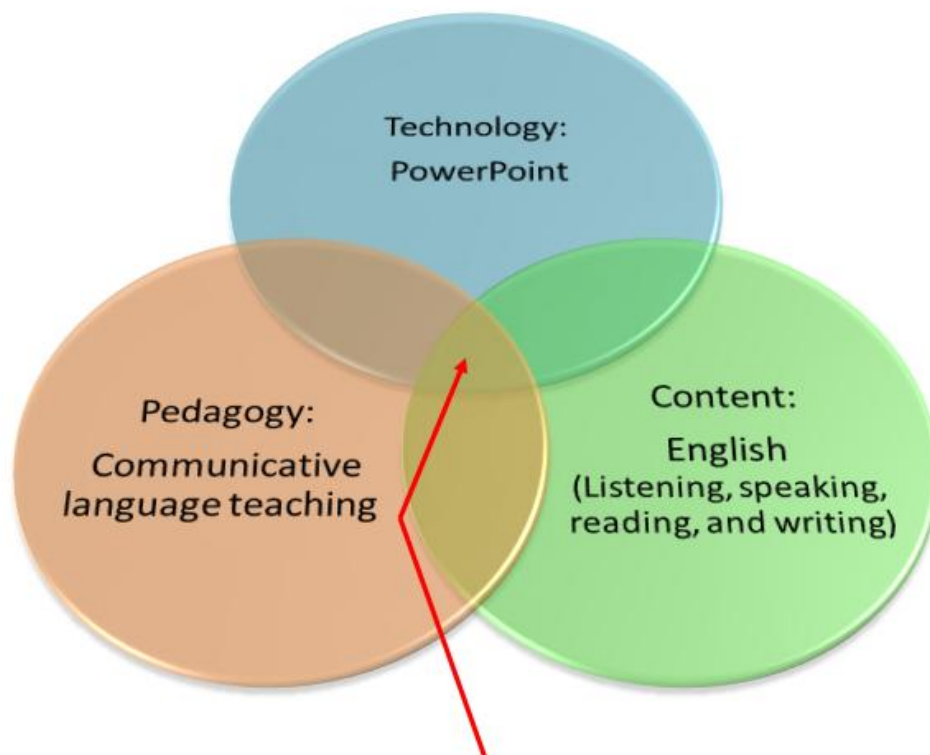
Figure 2.3: Technological Pedagogical Content Knowledge (TPACK): PowerPoint supported Communicative Language Teaching for survival English Knowledge

Table 2.1: The specifications for the proposed TPACK framework

Knowledge domain	Description
Content knowledge (*CK English*):	*the knowledge and skills in listening, speaking, reading and writing for survival English*
Pedagogical Knowledge *(PK CLT)*	*knowledge and skills about applying Communicative Language Teaching (CLT)*
Technological Knowledge (TK PowerPoint)	*knowledge and skills about use of PowerPoint and its affordances and constraints*
Pedagogical content knowledge (*PCK CLT-English*)	*the knowledge and skills of how to apply Communicative Language Teaching (CLT) in teaching English as a foreign language*
Technological content knowledge *(TCK PowerPoint -English)*	*the knowledge and skills of representing listening, speaking, reading, and writing using PowerPoint*
Technological Pedagogical Knowledge *(TPK PowerPoint -CLT)*	*The knowledge and skills of how to use PowerPoint in Communicative Language Teaching (CLT)*
Technological pedagogical content knowledge (TPACK PowerPoint -CLT-English)	*the knowledge and skills of representing English with PowerPoint using Communicative Language Teaching)*

CHAPTER THREE: DESIGN OF THE INTERVENTION

This chapter describes the development processes of professional development arrangement for technology integration as the intervention of this study based on the guidelines generated from the context analysis and literature review. It also figures out the phases through which the English lecturers experience learning. Research questions of this study are also addressed in last section of this chapter

During this study, context analysis and literature review were conducted. The results from context analysis gave insights to understand contextual factors which were further taken into considerations to develop an effective professional development programme. In addition, literature review provided empirical insights concerning the characteristics of an effective professional development programme. In conclusion, both context analysis and literature review provided useful insights for the formulation of design guidelines for an effective professional development arrangement for technology integration.

3.1. Initial design guidelines

On the basis of contextual analysis and literature review on successful TPACK professional development arrangements for technology integration, several key design guidelines are produced and taken into account to develop a professional development programme for technology integration aimed for the English lecturers at the language centre, State Islamic University of Sultan Syarif Kasim Riau-Indonesia.

1. Technology integration into teaching needs a clearly articulated framework, providing teachers with a clear representation on required aspects to integrate technology; therefore, TPACK framework as suggested by Mishra and Koehler (2008; 2006a) is deemed appropriate for describing the knowledge domains needed by the English lecturers for technology integration in teaching survival English as a foreign language.
2. Koehler and Mishra's Learning technology by design approach (2005a) is then argued to put the English lecturers in roles as the designers of the curriculum by which they work in a collaborative environment with a small group to develop solutions to their real instructional problems.
3. The English lecturers should be engaged in their professional development programmes in order that they become the main players in the programme and go through several authentic learning experiences in a collaborative environment: workshop, course design, enactment of the designed course, and finally reflection and revision in a sufficient time.
4. Practical and technical supports should be given during the programme to enhance learning.
5. The contents of the programme should be based on the curriculum contents at the language centre.

3.2. The development of the professional development programme

Considering the ineffectiveness of one-shot programme and expert-led training, the professional development programme for technology integration was designed in a three-week programme in order to strengthen their learning and performance on technology integration. It was conducted in April 2012 at the language centre, State Islamic University of Sultan Syarif Kasim Riau, Indonesia. This programme was integrated with the English lecturers' teaching activities as to improve their current teaching practices, and was organised under the language centre administration.

Furthermore, the context analysis conducted for this study indicated that technology was used in separation from content being taught and pedagogy being used. This was because the lecturers did not have a framework which best describes their knowledge domains needed for technology integration. In other words, integrating technology into teaching requires a clearly articulated framework which provide the lecturers with a clear representation on required knowledge domains to integrate technology, and TPACK framework as suggested by Mishra and Koehler (2008; 2006a) is deemed appropriate for describing the required knowledge domains needed by the English lecturers in teaching survival English as a foreign language. For the purpose of this professional development programme, *PowerPoint supported Communicative approach for survival English (listening, speaking, reading, and writing) knowledge* was generated from TPACK framework as described previously in Chapter two.

With regard to active engagement and authentic learning, the English lecturers became the main designers who actively participated in developing or designing technology-rich lesson plans. They were also provided with several authentic learning stages in a collaborative environment. The programme started with workshop, followed by course design. It then required the lecturers to implement the designed lesson plans, and finally reflect and revise them. The organisation of these activities was approached with learning technology by design to provide meaningful experiences for the lecturers. With this approach, the English lecturers played roles as the designers of the curriculum by which they worked in a collaborative environment with a small group to develop solutions to their real instructional problems.

To enhance learning, practical and technical supports were given during the programme, and the contents were inherent in the curriculum. The supports on performance during the programme as learning guidance were given by two facilitators: content and pedagogy facilitators. Moreover, the contents of the programme were based on the curriculum contents from the language centre represented in the textbook. Based on the agreement between the language centre management and the developer (the researcher), the contents were focused on English level II entitled *Reach English Level 2*. This textbook comprises of seven units, but the contents explored during the programme were only four chapters: *People and physical appearance*, *City life*, *Welfare*, and *preserving environment*.

3.3. Phases of the professional development programme

Four phases were undertaken to provide the English lecturers with authentic learning experiences during the professional development programme for technology integration. Each phase is shortly detailed below.

Introductory workshop

The first phase was a two-day workshop on TPACK, involving 12 English lecturers as co-developers who participated in this research project. The 12 lecturers were divided into 4 groups as they also worked in design teams during all four phases. This workshop was meant to provide them with knowledge and skills on how to design TPACK-based English lesson plans.

Two instructors for the workshop were involved. The first instructor was the researcher who introduced TPACK and technologies for ELT- PowerPoint, while the second instructor, the head of the language centre who has specialisation in Teaching English to Speakers of Other Languages (TESOL), presented curriculum contents and Communicative Language Teaching (CLT). The contents of this introductory workshop are listed in the table below.

Table 3.1: Overview of the professional development programme

Day	Topics
1	• Introduction to TPACK • Technology for English Language Teaching and CALL: MS. PowerPoint • Communicative Language Teaching (CLT): Approaches, methods and techniques in English Language Teaching • Demonstration of TPACK model for English Language Teaching (ELT) and the discussion concerning the potentials of TPACK model in the language centre
2	• Analysing the contents and the learning challenges for students • Designing TPACK-based lessons • Micro Teaching

Lesson plan design

The English lecturers designed lesson plans in design teams for 1 week in a group of three, while the researcher was only to facilitate and gave supports during the process. The instructor for curriculum content and pedagogy, the head of the centre, also facilitated the process to ensure if the designed lessons fit with the curriculum. This phase was aimed at providing them with the opportunity and experiences to design TPACK-based English lesson plans to be implemented in their classrooms. The lesson plan format was decided together by the language centre and the lecturers before the design. This was meant in order to have a fix format that can be used at the language centre for all language lecturers.

This lesson plan design was organised in a flexible time due to the lecturers' other activities and conflicting teaching schedules at the centre. Mostly, they sat together at least once every two days in the afternoon at the language centre office. The lessons they designed were based on the curriculum contents represented in the textbook used by students at the language centre. The lessons were based upon the topics to be taught in their own classrooms.

Examples of the topics were *people and physical appearance*, *city life*, and *preserving environment*.

Implementation of the TPACK-based lesson plans

This implementation took place for 1 week. Each lecturer performed the designed TPACK lessons with students in the real classrooms. The English classes were held two times in a week; therefore, there were six opportunities for the lecturers to act the TPACK lesson plans out in the classrooms. As a result, the lecturers tried out their lesson plans in those times, and each class in general consisted of 30 to 35 students from different fields of study.

Reflection and revision

Finally, upon the completion of this activity, the English lecturers reflected on the lesson plans that had been implemented. At this point, the English instructors had an opportunity to exchange ideas within a caring and sharing atmosphere. This phase focused on contents, technologies, and pedagogies that helped students to reach the goals, how both students and the lecturers achieved or failed to participate in the activities, what problems they face and how they solve the problems. This reflective practice was conducted in a round-table meeting attended by all lecturers and the two facilitators. Afterwards, the English lecturers revised the lesson plans based on the problems and suggestions. Another round-table discussion was held to discuss and appraise the final designs from all lecturers. This whole phase lasted one week.

3.4. Evaluation questions

This study lays on the premise that the English lecturers do not use relevant technologies to support English language teaching in an integrated manner with content and pedagogy. To help the language centre and the English lecturers at State Islamic University of Sultan Syarif Kasim Riau-Indonesia address this challenge, it can be argued that the lecturers need a professional development programme for technology integration in order to develop their competences in teaching English. In this study, a professional development programme for technology integration is developed as the intervention of this study as was described previously. To evaluate the programme, the primary question of this study addresses "*What are the characteristics of an effective professional development programme for technology integration at the language centre of State Islamic University of Sultan Syarif Kasim Riau, Indonesia?* " This main question is divided into the following sub-questions:

1. What are the English lecturers' experiences with participating in the professional programme for technology integration?
2. Does the lecturers' knowledge improve as the results of participation in the professional development programme for technology integration?

CHAPTER FOUR: METHODOLOGY

This chapter outlines the methodology used in the study. It covers the rationale for choosing design-based research as the methodology, the product quality, and the participants. This chapter also discusses the procedures used in analysing the gathered data.

4.1. Research method

This study employs design-based research. The nature of this study is based on the concept of developing and evaluating a professional development programme intended to develop teachers' knowledge and skills in technology integration in TEFL. Furthermore, the outcomes of this study would be in terms of several design guidelines for a professional development programme which could serve a basis for future professional development arrangements at the language centre. It is also believed that the intervention (the professional development programme) given was designed and evaluated with English lecturers at the language centre in which the English lecturers become co-participants in the design and analysis for an effective professional development programme (Barab & Squire, 2004). Then, the intervention of this study is context-dependent. In other words, it could not be fully understood in separation from the language centre where the programme took place. In addition, it has a strong link with practice of English language teaching, and also has the potential to help develop more effective educational interventions and offers chances for professional learning for the lecturers during the research process (McKenney, Nieveen, & van den Akker, 2006, p. 72). Therefore, as strongly recommended, the characteristics inherent in this study are deemed appropriate with design-based research.

In addition, since design-based research has an iterative process including analysis, design and evaluation (McKenney, et al., 2006), context analysis and literature study were conducted as part of the analysis. This was done to understand conditions for effective professional development arrangements for technology integration. As a result, initial guidelines were produced for the organisation of the professional development arrangement. Design in this study is a plan for the professional development arrangement based on the design guidelines. This study had two design cycles. The first cycle involved designing and developing an initial prototype of the professional development programme based on design guidelines generated from the context analysis and literature study. The second cycle involved systematic revision and improvement of the first prototype based on results from the first formative evaluation. Formative evaluation was conducted to improve the programme, while summative evaluation was done to indentify the impact of the programme. Both evaluations were conducted during this study.

4.2. Product quality

In design-based research, the quality in terms of validity, practicality and effectiveness should be established (Nieveen, 1999). In order to have a high-quality professional development, the validity of the design and development of TPACK professional development programme in this study was employed through contextual analysis and the review of the state-of-the art literature about successful in-service teacher professional development programmes for technology integration.

The practicality of the programme was also investigated by formative evaluation of the programme with the English lecturers to find out their needs, suggestions, difficulties, and

improvement that they experienced during the programme. This practicality of the programme was measured in relation to the lecturers' experiences with the professional development programme as the first sub-research question addresses in cycle one.

Finally, the effectiveness of the programme was evaluated through improvement of the instructors' TPACK knowledge, attitude toward technology, and how well the English instructors were able to design technology rich lesson plans which then helped them in further real enactment in the language classrooms. The second sub-research question deals with this purpose in the cycle two.

4.3. Participant

This study involved 12 out of 50 English instructors from the language centre with 7 males and 5 females. This study hardly engaged more lecturers because many lecturers have tough activities which made them difficult to participate in the programme. These participants were selected by the language centre; they were chosen based on their sufficient knowledge and skills on computer applications and internet as well as better ownership to the language centre. In this study, those participants were divided into 4 groups consisting of 3 members for each, and this applied in all research activities. The demography information about the participants is depicted in the table 4.1 below.

Table 4.1: Demography of the participants

Participant	Educational Background		Gender		Age		Years of experience	
	Level	Total No.	Male	Female	Range	Total No.	Range	Total No.
English language lecturers	Bachelor	9	7	5	21-25	3	1-5	8
					26-30	6	6-10	2
	Master	3			31-35	1	11-15	1
					36+	2	16+	1

4.4. Participants' technology profile

Fifteen types of technology were identified before and after the programmes. The data concerning the technology the lecturers had at home shows that there is no big difference between the technology possessed by the lecturers before and after the programme. Of the 15 items, the increase was on 4 technologies (printer, MP3 Player, digital camera picture, and tape recorder) in reported technology possession after post-survey. The comparison of technology possession is illustrated in the table 4.2 below.

Table 4.2: Technology available at home
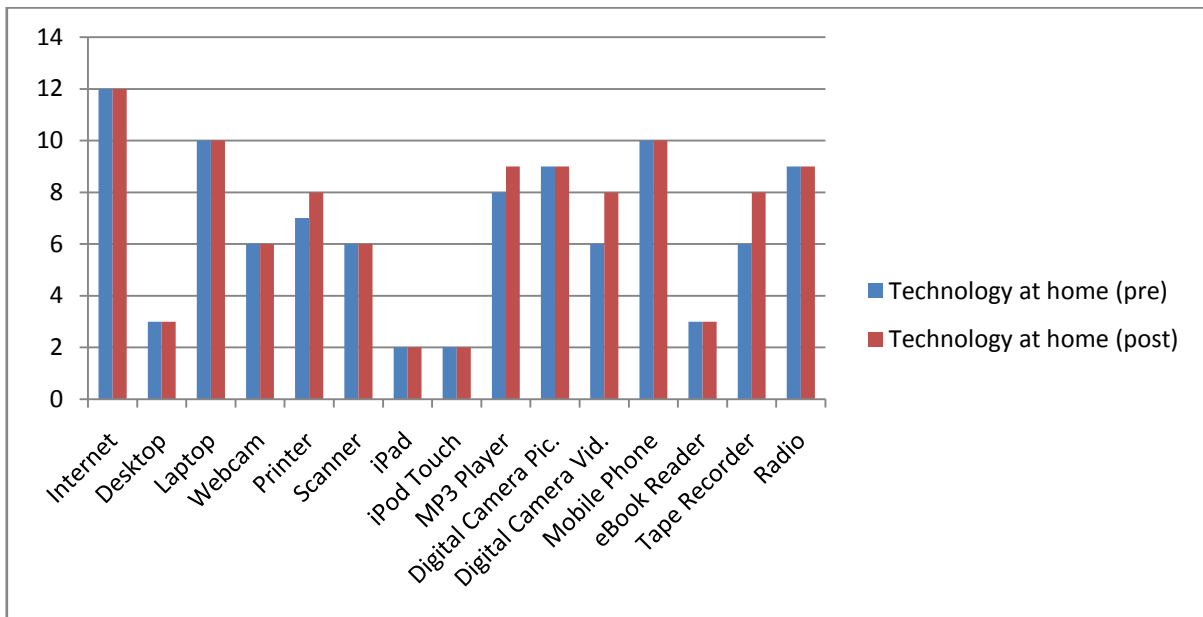
N=12

Concerning the technology used at home, as presented in Figure 4.3, the data shows that all of the lecturers have access to internet (100%). The use of laptop was relatively higher than desktop computer. Other significantly used technologies were mobile phones and MP3 Player respectively. Very few lecturers used iPad (16.6%) or iPod Touch (8.3%). In addition, results also indicate that there is no much, only slightly difference on the use of technology between before and after the programme as shown in the table 4.3 below.

Table 4.3: Technology used at home
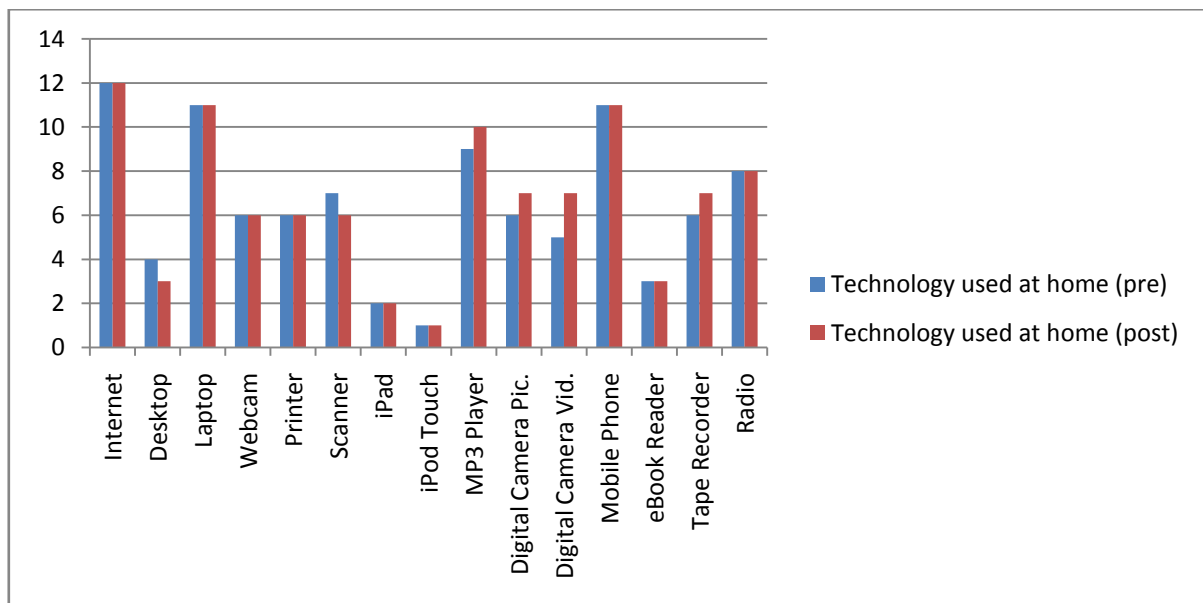
N=12

The awareness of technology availability at the language centre was higher after the professional development programme. For instance, out of 15 technologies listed in the table

4.4 below, only iPad, iPod Touch, and eBook reader were not available at the language centre. 4 lecturers (33.3%) also did not know if there is wireless internet connection and these lecturers reported that they never accessed such connection before the programme. In short, the TPACK professional development programme increased the lecturers' awareness of technology use for English language teaching as indicated in table 4.4 below.

Table 4.4: Technology available at the language centre
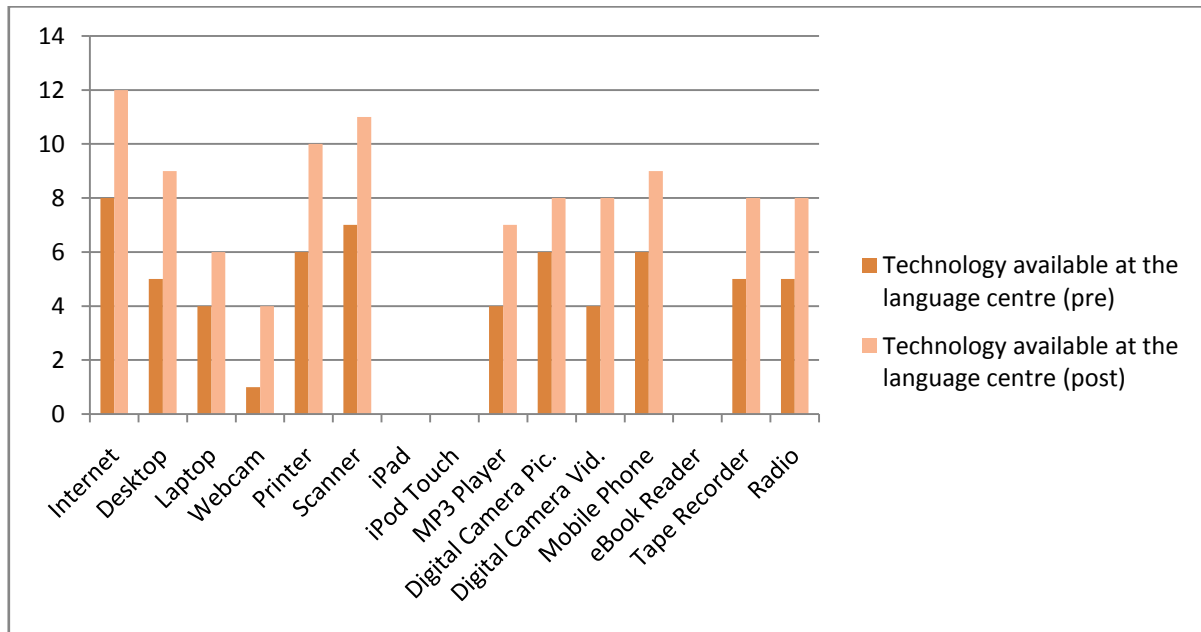
N=12

The use of technology in supporting English language teaching also increased as depicted in the table 4.5. Internet which was used only by 9 lecturers (74.7%) was then benefitted by all lecturers (100%) after participating in the programme. Laptop was also used by 11 lecturers (91.3%) before which only 8 lecturers (66.4%) used it for teaching English. Four lecturers (33.2%) who did not use MP3 player previously reported that they used it beforehand. Other increasingly used technologies were mobile phone (8.3%), tape recorder (16.6%), and radio (8.3%). However, the use of digital camera picture decreased very slightly by 8.3%. Overall, it can be concluded that the English lecturers used technology less frequently before the programme if compared to theirs uses after the programme. In other words, the lecturers' technology profile has changed after participating in the TPACK professional development programme.

Table 4.5: Technology used at the language centre
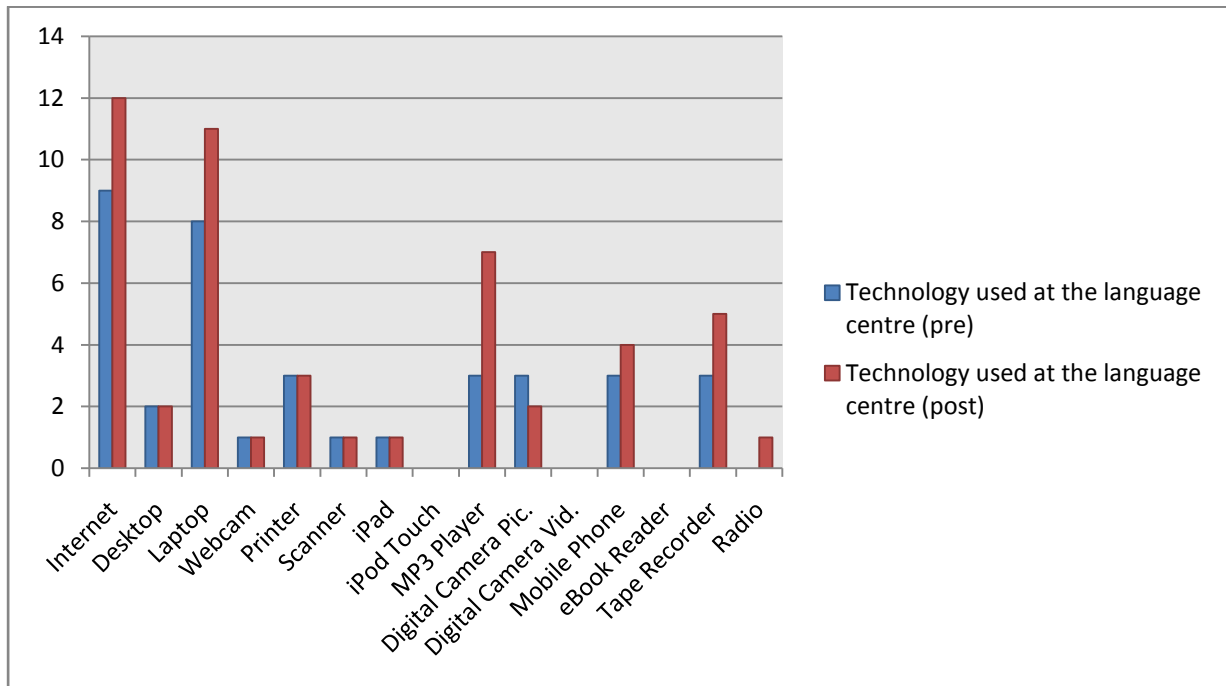
N=12

4.5. Instruments

This study used five data collection techniques. This is intended to reduce the limitations of a specific method to gather data from source participants to provide information (Maxwell, 1996). Two types of questionnaires, interviews, and TPACK rubric were the methods employed in this study. The researcher's logbook was also kept. Table 4.6 shows how the different instruments are related to the sub-questions.

Table 4.6: List of instruments and related foci

Research focus/instrument	TPACK survey	TAC survey	Rubric	Interview	Logbook
Lecturers' experiences (first cycle)				✔	✔
TPACK (second cycle)	✔	✔	✔		

For triangulation, the above-mentioned techniques for data collection in order to obtain needed information are considered sufficient to provide reliable information (Glesne & Peshkin, 1992).

4.5.1. Interviews

Maxwell (1996) argued that an interview is useful in gaining a description of what was observed. In this study, semi-structured interview (Merriem, 1998) or the interview guide approach (Johnson & Christensen, 2000) was used to interview the 12 English lecturers participated in the programme. The interview focused on questions about TPACK professional development programme. The guiding questions of this interview (*see appendix 3*) were piloted first in order to find out the reliability and whether the questions and or wording were understandable for the participants. After the pilot testing, the inter-rater reliability indicated an excellent agreement (.77) on data coding among two assessors. Besides, some overlapping questions and ambiguity were also found. The initial questions which consisted of 11 guiding questions then became 8 questions. Furthermore, in doing the interview it was conducted mainly in the local language, *Bahasa Indonesia*, to suit the lecturers' preferences and was tape-recorded with the participants' permission after the programme completed in the first cycle.

The interviews of the participants were different from one to another in terms of the length of time consumed. This difference depended on the participants in providing time for the interview. For example, some lecturers because of their activities could only provide about half hour for the interview, and to get this time was very difficult because they are very busy with their activities. The difference was also because mostly the participants did not give short answers for each question of the interview as Patton (1990) mentioned it as the nature of the interview guide approach is fairly conversational and situational. They sometimes told extended stories about their instructional practices*,* and due to the cultural constraints, the researcher could not cut short their conversations and move to the next question. If so, he might have been culturally regarded as being impolite to them. He had to keep a good relationship with them in order to gain as much information as possible. All interviews were conducted at the language centre during the office hours since the participants did not want to do it in other times.

4.5.2. Logbook

The researcher's logbook was kept by the researcher to document the lecturers' experiences with the programme in the first cycle. Therefore, field notes were taken from the early to the final stage of the programme. To make it easier for the researcher, the logbook was written in *Bahasa Indonesia* and then translated to English after coding.

4.5.3. Questionnaires

Two types of questionnaires were administered to all English lecturers participating in this study both before and after the programme (intervention). TPACK survey adapted from Schmidt, Baran, Thompson, Koehler, Mishra and Shin (2009) and Teacher Attitude toward Computers (TAC) adapted from Christensen and Knezek (1998) (*see appendix 1 and 2 respectively*) were distributed to the English lecturers to identify their self-reported TPACK and attitudes in the two conditions: before the programme in the first cycle and after the programme in the second cycle.

These questionnaires were first pilot-tested to find out their internal consistency reliability using Cronbach's alpha with the criteria: <0.60 = unacceptable; between 0.60 and 0.65 = undesirable; between 0.65 and 0.70 = minimally acceptable; >.70 = respectable; and >0.80

very good (DeVellis, 2003). The reliability of the TPACK survey and Teacher Attitude toward Computers (TAC) is detailed below.

TPACK questionnaire

The TPACK questionnaire has 40 items in total, consisting of 7 knowledge domains. The overview of this questionnaire is presented in the table 4.7 below.

Table 4.7: The overview of TPACK questionnaire

No	Domain	No. of item	Exemplary item
1.	TK	6	• I know how to solve my own technical problems. • I keep up with important new technologies.
2.	CK	6	• I have sufficient knowledge about speaking. • I have sufficient knowledge about writing.
3.	PK	7	• I can use a wide range of teaching approaches in a classroom setting. • I know how to organize and maintain classroom management.
4.	PCK	4	• I can select effective teaching strategies to guide student thinking and learning for listening skill. • I can select effective teaching strategies to guide student thinking and learning for reading skill.
5.	TCK	4	• I know about technologies that I can use for understanding and learning speaking skill. • I know about technologies that I can use for understanding and learning writing skill.
6.	TPK	9	• I can choose technologies that enhance the teaching approaches/strategies for a lesson. • I can adapt the use of the technologies that I am learning about to different teaching activities.
7.	TPCK	4	• I can teach lessons that appropriately combine listening, technologies and teaching approaches. • I can teach lessons that appropriately combine writing, technologies and teaching approaches.

In general, to find out the reliability of the TPACK survey it was pilot-tested with 10 English lecturers who did not participate in the professional development programme of this study. The reliability of the survey with its all components (40 items) was .96, indicating a highly reliable or very good questionnaire. The reliability of the sub-components is indicated in the table below.

Table 4.8: Reliability of sub-components of TPACK survey

Sub-variable	Number of items	Cronbach Alpha
Technological Knowledge (TK)	6	.96
Content Knowledge (CK)	6	.84
Pedagogical Knowledge (PK)	7	.85
Pedagogical Content Knowledge (PCK)	4	.87
Technological Content Knowledge (TCK)	4	.94
Technological Pedagogical Knowledge (TPK)	9	.95
Technological Pedagogical Content Knowledge (TPCK)	4	.79

TAC questionnaire

The TAC questionnaire has 22 items in total with two sub-variables: enjoyment and anxiety. The enjoyment sub-variable has 12 items, while the anxiety sub-variable has 10 items. The overview of this TAC questionnaire is presented in the table 4.9 below.

Table 4.9: The overview of TAC questionnaire

No	Domain	No. of item	Exemplary item
1.	Enjoyment	12	• I think that working with computers would be enjoyable and stimulating. • I enjoy lessons on the computer.
2.	Anxiety	10	• I get sinking feeling when I think of trying to use a computer. • Working with a computer makes me feel tense and uncomfortable.

Overall, this questionnaire with 22 items was also pilot-tested with the same participants as the TPACK questionnaire's participants. In general, the reliability of this questionnaire was .83 (very good). This indicates that the instrument is reliable. The reliability of the sub-components is listed in the table below.

Table 4.10: Reliability of sub-components of TAC

Sub-variable	Number of items	Cronbach Alpha
Enjoyment	12	.71
Anxiety	10	.73

This questionnaire was distributed to the lecturers before the programme in the first cycle and after the programme in the second cycle.

4.5.4. Rubric

Since TPACK and TAC questionnaires were self-reported in nature, it was not sufficient to determine the lecturers' knowledge. Therefore, lesson plan documents from all lecturers (12 lecturers) they designed before and after the second cycle of TPACK professional development programme were analysed using adapted *Technology Integration Assessment Rubric* from Harris, Grandgenett & Hofer (2010). This adapted rubric is attached in *appendix 4*. This rubric was meant to assess the designed lessons before and after the intervention to investigate the improvement of lesson plan design.

The assessment involved two assessors, the researcher as the first assessor and the instructor for content and pedagogy as the second assessor and was trained for this assessment by the researcher. The second assessor has specialisation in teaching English to speakers of other languages (TESOL) and is the head of the language centre where the programme was conducted. The rubric has seven components and the maximum point of the TPACK lesson plan rubric was 21 points with one to three points for each criterion.

The reliability of the rubric was also calculated by the two assessors upon 10 lesson plans taken from the language centre to find out inter-rater reliability or the variation of two independent assessors. As a result, referring to the Cohen Kappa criteria where $k > 0.75$: excellent; $0.40 \leq k \leq 0.75$: fair/good; $k < 0.40$: poor), the results showed excellent agreement (.87) between assessors. The reliabilities of the sub-components are shown in the table 4.11 below.

Table 4.11: Reliability of sub-components of lesson plan rubric

Sub-variable	Kappa
Technological Knowledge (TK)	.82
Content Knowledge (CK)	.82
Pedagogical Knowledge (PK)	.83
Pedagogical Content Knowledge (PCK)	.80
Technological Content Knowledge (TCK)	.80
Technological Pedagogical Knowledge (TPK)	.75
Technological Pedagogical and Content Knowledge (TPCK)	.83

4.6. Data analysis method

The data collected for this study was analysed quantitatively and qualitatively. Data from interview and logbook were analysed using data reduction technique: transcribing, generating categories through coding, and interpreting data. In the first process, the researcher transcribed the data that he collected especially from interviews. Both data were not translated in English yet to make it easy for the researcher. After reading and re-reading, or segmenting the transcriptions and the notes, data recorded in the logbook and transcriptions of the interviews were coded into some categories and translated to English. This coding was aimed at breaking the data into categories. The researcher then generated the categories based on emerging themes (Miles & Hubermen, 1994). Afterwards, the coded data were entered into matrices to help view and interpret them (Miles & Hubermen, 1994), and all matrices were titled in line with the main categories.

On the other hand, data from TPACK and TAC questionnaire as well as lesson plan documents were analysed with non-parametric method, Wilcoxon Signed Ranks Test because the samples in this study could not be assumed to be normally distributed. This method was used to investigate the differences in knowledge between before and after the intervention.

4.7. Trustworthiness

Since the developer and the researcher having double-role in design-based research may have been conflicted with each other (van den Akker, 1999), the researcher who is sufficiently familiar to the context of this study, recognised that he might have been subjective in his analysis and interpretations towards the data. However, the researcher minimised this conflict by being as objective as possible, the programme was comprehensively monitored by the language centre, and all data were copied and given to the language centre as evidence. In addition, the researcher also minimised the possibility if the lecturers responded positively because they knew that they were under study as the so-called *Hawthorne effect*. This might have influenced their responses for the purpose of helping the researcher. Hawthorne effect in this study was minimised by not telling the aim of the study although they were really curious about it.

CHAPTER FIVE: FINDINGS

This chapter presents the results from the two formative evaluations. This chapter is divided into three sections. The first two sections describe the results from the formative evaluation, while the last section discusses the overall results.

5.1. First evaluation

As the goal of this research project is to develop and evaluate a professional development programme for technology integration, the goal of the first evaluation (formative) is therefore to find out its practicality in terms of the lecturers' needs, suggestions, difficulties, and improvement that they experienced during the programme. In this case, it was measured in relation to the lecturers' experiences with the professional development programme. The question thus addresses:

> *"What are the English lecturers' experiences with participating in the professional programme for technology integration?"*

In collecting the data, semi-structure interview and logbook were used as previously explained in chapter four.

In order to understand the experiences, the 12 lecturers were interviewed. Subsequently, several themes emerged from analysis of the interview with the participants after the TPACK professional development programme. These general themes include perception, programme strength, programme weaknesses, learning gains (knowledge and beliefs), beneficial learning experiences, suggestion to improve the TPACK professional development programme, difficulties, and solution to such difficulties.

From the data, all participants reported that they had positive experiences with the TPACK professional development programmes. Seven lecturers (58.4%) believed that they are confident enough with teaching English after following the programme, while the rest (41.6%) said concerning the ease of teaching that their teaching practices become easier and comfortable. Many of them who also reported that they used to teach English with technology in isolation had better understanding about how to integrate among content, pedagogy and technology. Moreover, the professional development programme was also highly valued by the lecturers in relation to the university strategic planning. For instance, one lecturer said:

> *"Indeed, the professional development programme is relevant with the institutional needs to accelerate language teaching at the language centre, as a supporting institution, to support the university to be a world-class university where English is a primary means of communication. In such case, technology is inseparable from the mission, requiring lecturers' competency for technology integration, and this programme fulfills such need"*

Many lecturers (75%) appreciated the professional development programme while few considered it as a tiring programme. Many professional development programmes that the participants attended insofar did not explore their existing capacity and experiences; the programmes were much in spoon-feeding in nature. This is one reason why the lecturers were not interested in such programmes and acknowledged the professional development programme they participated. The flexibility in organizing the programme also suited the lecturers' condition. Due to their busy activities with teaching schedules, because some

participants are teaching in more than one institution and or schools, fitting that teaching duties with professional development needs was acknowledged positively. As reported, some lecturers missed the professional development programmes offered to them because of their conflicting schedules. This indicates that a button-up approach in which time for a professional development arrangement is set based on their needs shows a great importance for busy teachers.

Another emerging issue was related to interesting learning experiences during the programme where the lecturers were firstly modeled and did the lesson designs in groups based on the learning materials they were going to teach in their classrooms. This was really interesting and provided authentic learning experiences as reported by almost all of the lecturers. On the other hand, the programme was exhausting because three lecturers (25%) never experienced such longer and task-oriented programme previously.

Concerning the weaknesses of the programmes, the lecturers viewed three fundamental aspects, including limited time, technology exploration, and students' active engagement. Four lecturers (33.3%) argued that a three-week programme was not sufficient for them to better understand and implement TPACK-based English lessons. They also argued that English language teaching at the language centre is complex in terms of heavy teaching loads and large number of students, and unmotivated students, thus requiring more time for the lecturers' professional development. The exploration of computer capacity for language learning during the introductory workshop was also considered weak. For example, one lecturer expressed that he wanted a specialist to introduce a specific computer application in the light of computer-assisted language learning (CALL) so that he could have better understanding for technology integration into his instruction. The third aspect as mentioned by five lecturers (41.6%) was that the programme did not involve the main target of technology integration, students. Although the lecturers acted the designed lessons in their own classroom, the students did not actively participate in the design process. The lecturers argued that students could tell us what they like and dislike and this becomes a critical issue for an effective lesson design.

In relation to learning gains, two themes appeared, consisting of two sub-themes: TPACK along with its sub-components and belief. All lecturers believed that they gained much understanding and design capability of TPACK-based lessons. The most reported aspects were TK, PK, TCK, TPK, PCK, and TPACK, but not in CK. The way how the lecturers conceptualized their work also changed from technology as a separate component to an integrated one. As mentioned by four lecturers, their belief had shifted and one of them said:

> "This is what I am looking for so far... I focused too much on technology use, but forgot to consider the content and method...I thought all technologies could be used for all contents and teaching approaches… and this was not always effective. By effectively aligning the three components my teaching became more attractive and effective to my students and I think this would improve their learning"

Another statement was expressed in the light of willingness to use technology as to ease teaching and learning process.

> "I was lazy to use technology for my teaching because it took time and hard to prepare because I thought teaching could be effective as I was taught in schools and university. But now, I realize that the world changes, the society changes and of course students change as well. This phenomenon has made me aware of new teaching paradigm in

which I cannot teach like the way how I was taught. TPACK framework gives me a fruitful insight on how to integrate technology to suit with students' characteristics in this era of information and technology"

The aspect of the professional development programme which is the most beneficial for the lecturers' understanding and ability to design technology-rich lessons was during the design process as reported by eleven lecturers (91.6%). Most of them argued that the design phase in a collaborative way was profitable for their lesson plan design capability because during that moment they could share with one another and got authentic design experiences. They also maintained that the introduction to the concept of TPACK was still abstract and working in design team provided them with deep understanding and experiences. With regard to design team, they expressed their positive experiences by stating: "design is hard; therefore it needs collegiality. Designing lessons together gave us an opportunity to have a number of different perspectives on what constitutes good products".

As to improve the professional development programme, the lecturers were also asked to give suggestions. Three major themes in this aspect emerged in terms of facilities, follow-up, and support. The most prevalent response was related to follow-up (50%). The follow-up suggested was that the policy related to using TPACK framework for lesson designs by all lecturers and is evaluated every semester or year. To support this, other more intensive TPACK professional development arrangements need to be provided to all lecturers. In addition to the follow-up, 3 lecturers (25%) also suggested a need of support. This was expressed in two types: the institutional support and support from more knowledgeable people. The support from institution is believed to be able to sustain the innovation, whereas the latter can strengthen conceptual and practical supports in classrooms. Besides, facility was also suggested 3 (25%) lecturers. They recommended that sufficiently relevant technologies or supporting components be provided as to cope with limited access to technology. They might have good TPACK lesson designs, but because of no technology needed, it is worth nothing. For example, one lecturer said, we have internet connection here, but in some classes electricity is not available due to bad maintenance.

Difficulties were found in respect to limited facilities and students' ability. The English lecturers (58.3%) in this study first and foremost desired relevant facilities were provided, thus allowing them to creatively design and prepare an instruction with which they could have integrated more advanced technologies, whilst 41.6% indicated difficulties with students' technological capabilities. For example, a lecturer stated: "I could design an English lesson which require students' ability in using Photoshop or the like to design a brochure for their lesson project that can be advertised publicly. Because only very few students in my class are familiar with such programme, it is difficult for me to assign students in doing so with such software". To overcome such barriers, related to facilities the lecturers tried to self-facilitate. I brought my own projector and laptop to support my teaching, as mentioned by three lecturers. For students' limited knowledge, some lecturers (33.4%) reported that they introduced the technology they were going to use to support learning, while some others (66.6%) only asked them to learn about it.

On the basis of the lecturers' experiences, the professional development programme was improved by refining the design guidelines. The improved guidelines became:

1. Technology integration into teaching needs a clearly articulated framework, providing teachers with a clear representation on required aspects to integrate technology; therefore, TPACK framework as suggested by Mishra and Koehler (2008; 2006a) is deemed appropriate for describing the knowledge domains needed by the English lecturers for technology integration in teaching survival English as a foreign language.
2. The English lecturers' experiences should be highly valued for meaningful learning. Since constructivist views learning as starting from such experiences and authentic learning approach, this learning philosophy can be adopted to provide meaningful learning for teachers. Koehler and Mishra's Learning technology by design approach (2005a) is then argued to put the English lecturers in roles as the designers of the curriculum by which they work in a collaborative environment with a small group to develop solutions to their real instructional problems.
3. For more effective professional development programme, the English lecturers are actively engaged in their professional development programmes in order that they become the main players in the programme and go through several authentic learning experiences in a collaborative environment: workshop, course design, roundtable discussion, enactment of the designed course, and finally reflection and revision.
4. More practical and technical supports are given during the programme by technology, pedagogy, and technical computer experts.
5. The contents of the programme are based on the curriculum contents at the language centre which is represented in the textbook. Therefore, this textbook becomes the main source for the lecturers.
6. Feedback on lesson plans before the enactments is also provided as learning guidance and critical inputs. Students could be invited to give suggestions.
7. Besides, the programme is extended to a four-week professional development programme for the lecturers in order to strengthen their learning and performance on technology integration.

5.2. Second evaluation

This evaluation, summative evaluation, mainly addresses the effectiveness of the programme. The question being addressed for this goal is that:

"Does the lecturers' knowledge improve as the results of participation in the professional development programme for technology integration?"

Three instruments were used to collect the data needed for the purpose of answering such question: adapted TPACK survey, adapted technology integration assessment rubric, and TAC questionnaire.

Three main categories are presented in this section. They are the lecturers' responses through TPACK survey, lesson plan designs, and the lecturers' responses on teacher attitude towards computers (TAC). All these are discussed respectively in the following sub-sections.

5.2.1. Self-reported TPACK

The following table 5.1 presents the summary of the lecturers' responses on the TPACK survey as was conducted before the professional development programme.

Table 5.1: The summary of pre self-reported TPACK

Component	No. of items (Highest means)	Obtained Mean (percent)	SD
Technological Knowledge (TK)	6 (30)	23.25 (77%)	4.901
Content Knowledge (CK)	6 (30)	24.08 (80%)	2.503
Pedagogical Knowledge (PK)	7 (35)	28.91 (82%)	2.391
Technological Content Knowledge (TCK)	4 (20)	14.83 (74%)	3.069
Pedagogical Content Knowledge (PCK)	4 (20)	15.75 (78%)	0.866
Technological Pedagogical Knowledge (TPK)	9 (45)	34.16 (75%)	5.441
Technological Pedagogical Content Knowledge (TPCK)	4 (20)	15.16 (75%)	1.642
Scores on TPACK measures were given on a 5-point Likert scale; higher scores reflect higher appreciation: Strongly Disagree= 1, Disagree=2, neither agree nor disagree=3, Agree=4 and Strongly Agree=5			

The pre-survey conducted before the professional development programme shows that the lecturers (N=12) reported a means score of 68.7% in the mastery of all seven knowledge domains. The highest reported domain was in Pedagogical Knowledge (PK), accounting for 82%, while the lowest percentage was found in Technological Knowledge (TK), with 74%. Furthermore, they also reported their Technological Pedagogical Content Knowledge (TPCK) which constituted for 75%. In conclusion, it seems that the lecturers need to develop their TK in particular and other domains in general in order to be able to connect among content, pedagogy, and technology in an integrated manner.

On the other hand, the data from TPACK questionnaire distributed after the programme demonstrates some increases on the lecturers' knowledge domains. The lecturers (N=12) reported a means score of 87.7% in the mastery of all seven knowledge domains with an increase of 19% after the programme. The highest improvement was reported the domain of Technological knowledge (TK), constituting for 16% increase (with a means score of 31.91). Technological Pedagogical Knowledge (TPK) and Technological Pedagogical Content Knowledge (TPCK) (means scores of 39.33 and 17.41 respectively) had an increase of 12% for each, thus putting these two domains in the second highest improvement gains. The lowest percentage of improvement was found in Content Knowledge (TK), with only 6%. In summary, it can be concluded that there is an improvement of the lecturers' self-reported TPACK after participating in the professional development programme. The summary of the lecturers' self-reported TPACK after the professional development programme is depicted in the following table.

Table 5.2: The summary of post self-reported TPACK

Component	No. of items (Highest means)	Obtained Means (percent)	SD
Technological Knowledge (TK)	6 (30)	25.58 (85%)	3.553
Content Knowledge (CK)	6 (30)	26.08 (86%)	2.391
Pedagogical Knowledge (PK)	7 (35)	31.91 (91%)	2.151
Technological Content Knowledge (TCK)	4 (20)	18.08 (90%)	1.880
Pedagogical Content Knowledge (PCK)	4 (20)	17.75 (88%)	1.288
Technological Pedagogical Knowledge (TPK)	9 (45)	39.33 (87%)	3.200
Technological Pedagogical Content Knowledge (TPCK)	4 (20)	17.41 (87%)	1.505
Scores on TPACK measures were given on a 5-point Likert scale; higher scores reflect higher appreciation: Strongly Disagree= 1, Disagree=2, neither agree nor disagree=3, Agree=4 and Strongly Agree=5			

Moreover, the data from pre and post TPACK surveys were compared to identify the difference. They were calculated using SPSS. Based on Wilcoxon Signed Ranks Test (non-parametric test), the pre-scores and the post-scores are significantly different. Therefore, it can be concluded that the post-scores of Technological Knowledge (TK), Content Knowledge (CK), Pedagogical Knowledge (PK), Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK) are significantly higher than the pre-scores with $p<0.025$ (one tailed). In other words, the results from pre and post TPACK questionnaires show that the lecturers' reported knowledge on TK, CK, PK, TCK, TPK, PCK, and TPCK, all of which increased after the TPACK professional development programme.

The effect sizes were then measured, and the data show that most effect sizes are above 0.50, except for TK which was only 0.48. Referring to Rosenthal (1984) benchmarks for interpreting effect sizes (r) (0.10 = small, 0.30 = medium, 0.50 = large); therefore, CK, PK, TCK, PCK, TPK, and TPCK had large effect sizes, while TK had medium effect size ($r = 0.48$). The highest effect size was found in TPK, accounting for 0.59 as depicted in the table 5.3 below.

Table 5.3: The summary statistics of the lecturers' pre and post self-reported TPACK[1]

Variable	N	Post-survey		Pre-survey		Z	Effect size	*P*
		Mean	SD	Mean	SD			
TK	12	25.58	3.553	23.25	4.901	-2.39	0.48	.008
CK	12	26.08	2.391	24.08	2.503	-2.53	0.51	.004
PK	12	31.91	2.151	28.91	2.391	-2.87	0.58	.001
PCK	12	17.75	1.288	15.75	0.866	-2.78	0.56	.002
TCK	12	18.08	1.880	14.83	3.069	-2.81	0.57	.001
TPK	12	39.33	3.200	34.16	5.441	-2.91	0.59	.001
TPCK	12	17.41	1.505	15.16	1.642	-2.79	0.56	.002

[1] Scores on TPACK measures were given on a 5-point Likert scale; higher scores reflect higher appreciation: Strongly Disagree= 1, Disagree=2, neither agree nor disagree=3, Agree=4 and Strongly Agree=5

To sum, the findings clearly support the prediction that the TPACK is enhanced by the presence of the intervention. The scores for the two conditions (before and after the professional development programme) suggest that the effect sizes are relatively large for most of the domains.

5.2.2. Lesson planning

In addition to the lecturers' self-reported TPACK, the lecturers' lesson plans were also collected before the professional development programme for technology integration. This is based on the assessment done by two evaluators on seven components addressing TK, CK, PK, TCK, TPK, PCK, and TPCK. Each component was scored ranged from 1 (not at all), 2 (minimal) to 3 (strong). The criteria were based on the adapted *Technology Integration Assessment Rubric* from Harris, Grandgenett & Hofer (2010). The description of the data is presented in the table below.

Table 5.4: The summary of the lecturers' pre lesson plan assessment

Component	Highest means	Obtained Means (Percent)	SD
Technological Knowledge (TK)	3	1.37 (45%)	0.678
Content Knowledge (CK)	3	2.83 (94%)	0.389
Pedagogical Knowledge (PK)	3	2.37 (79%)	0.226
Technological Content Knowledge (TCK)	3	1.00 (33%)	0.000
Pedagogical Content Knowledge (PCK)	3	1.58 (52%)	0.514
Technological Pedagogical Knowledge (TPK)	3	1.00 (33%)	0.000
Technological Pedagogical Content Knowledge (TPCK)	3	1.00 (33%)	0.000
Scores on lesson plan measures were given based on three criteria; higher scores reflect higher appreciation: Not at all = 1, Minimal = 2, and Strong = 3			

The table clearly indicates that the lecturers' initial lesson plan designs (N=12) mainly lacked of several knowledge domains. The weakest domains were found in Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPCK); each of which scored only one (33%). The knowledge domain of TCK, for example, was also shown in the self-reported TPACK. Content Knowledge (CK) demonstrated a highest means score of all (2.83), accounting for 94% in this assessment by two evaluators before the professional development was carried out.

In general, the data highlights that the lecturers still lacked knowledge of integrating an appropriate technology into certain content, of integrating relevant technology with a particular teaching approach, and of aligning among content, pedagogy, and technology into their lesson plans.

Moreover, the lecturers' lesson plans were also collected and assessed after they participated in the professional development programme. These lesson plans were also assessed by two evaluators. The description of the lecturers' post lesson plan designs is given below.

Table 5.5: The summary of the lecturers' post lesson plan assessment

Component	Highest means	Obtained Means (percent)	SD
Technological Knowledge (TK)	3	3.00 (100%)	0.000
Content Knowledge (CK)	3	3.00 (100%)	0.000
Pedagogical Knowledge (PK)	3	3.00 (100%)	0.000
Technological Content Knowledge (TCK)	3	2.75 (91%)	0.452
Pedagogical Content Knowledge (PCK)	3	2.75 (91%)	0.452
Technological Pedagogical Knowledge (TPK)	3	2.75 (91%)	0.452
Technological Pedagogical Content Knowledge (TPCK)	3	3.00 (100%)	0.000
Scores on lesson plan measures were given based on three criteria; higher scores reflect higher appreciation: Not at all = 1, Minimal = 2, and Strong = 3			

Table 5.5 above shows that four knowledge domains (TK, CK, PK, and TPCK) show perfect scores (a means score of 3 for each). The most significant improvement is demonstrated in Technological Pedagogical Content Knowledge (TPACK) with 67% compared with their initial lesson plan design scores. This is followed by Technological Content Knowledge (TCK) and Technological Pedagogical Knowledge (TPK), each constitutes for 58% improvement. Technological Knowledge (TK) also shows a good increase of 55% (where pre-score 1.37 and post-score 3.00). However, the lowest improvement can be seen in Content Knowledge, with only 6%. This is because the lecturers' pre-score is already higher, with pre-score 2.83 and post-score 3.00.

Finally, the comparison between pre and post scores of the lesson plan designs is calculated. The summary from Wilcoxon Signed Rank calculated with SPSS is presented in the table 5.6 below.

Table 5.6: The summary statistics of the lecturers' pre and post lesson plan design

Variable	N	Post-survey		Pre-survey		Z	Effect	P
		Mean	SD	Mean	SD		size	
TK	12	3.00	0.000	1.37	0.678	-3.21	0.65	.000
CK	12	3.00	0.000	2.83	0.389	-1.41	*[2]	.250
PK	12	3.00	0.000	2.37	0.226	-3.21	0.65	.000
PCK	12	2.75	0.452	1.58	0.514	-2.88	0.58	.001
TCK	12	2.75	0.452	1.00	0.000	-3.21	0.65	.000
TPK	12	2.75	0.452	1.00	0.000	-3.21	0.65	.000
TPCK	12	3.00	0.000	1.00	0.000	-3.46	0.70	.000

[1] Scores on lesson plan measures were given based on three criteria; higher scores reflect higher appreciation: Not at all = 1, Minimal = 2, and Strong = 3 ($p<0.025$)
[2] Not calculated because of insignificant p

The results indicate that both means of the pre and post results of TPACK lesson plan designs show different scores. Based on Wilcoxon Signed Ranks Test, from the result in the table, it can be concluded that most of the knowledge domains improved as the result of the intervention. However, only Content Knowledge (CK) is not significant with Z=-1.41 and *p* (0.250) > 0.025. Therefore, the effect size of this domain was not calculated. It is probably due to the fact that the lecturers did not focus much on the curriculum content anymore, but rather considering it for determining and aligning it with other knowledge domains, such as TK and PK.

With regard to other knowledge components, the post TK, PK, PCK, TCK, PCK, and TPCK scores are significantly higher than the pre TK, PK, PCK, TCK, PCK, and TPCK scores. The effect sizes were also calculated based on the value of Z from Wilcoxon Signed Ranks Test and the results of the calculation demonstrate that the highest effect size was gained in TPCK, accounting for 0.70. The effect size of 0.65 was obtained from four knowledge domains: TK, PK, TCK, and TPK. All of these effect sizes are categorised as large. Whilst PCK effect size was 0.58 with Z=-2.88 and *p*=0.001. All these six domains indicate large effect sizes (Rosenthal, 1984). Finally, the overall findings showed that the intervention given through the TPACK professional development programme for English language lecturers has a sound impact based on the overall result of the lecturers' TPACK lesson plan designs and is also indicated by their self-reported TPACK.

Below is an example of a simplified lesson plan which was coded by one evaluator.

Steps	Time	Interaction	Aids	Stage Aims	Procedure	
Lead-in	10	T-Ss S-S	Strips	To help students ready for the class	1. T asks several questions about their leisure activities to the students. 2. Students have "Simon says" **game**.	PK
Pre-activity	15	T-SS Ss-Ss S-S	Notebook, White Board, Audio Listening text (Mp3 player), Electronic dictionary Projector	To familiarize students to the topic and provide input for what they are going to listen	1. T tells students that they are going to listen to a conversation about "It looks like we have a band". 2. Before reading it, T and Ss **brainstorm and discuss about words** related to the conversation 3. T elicits and **pre-tech key words** which are presented in **PowerPoint slides**, including their **sounds with hyperlinks**. 4. **Using PowerPoint**, T asks students to listen to words related to "It looks like we have a band".	PCK TPK TK
While-activity	60	T-Ss S-S Ss-SS	Laptop Paper Audio Listening text (Mp3 player) Projector	To develop students' ability to listen and then understand the conversation.	5. T asks students to predict what the conversation could be about. Here, T **provides the students with key words and pictures on PowerPoint Slides.** 6. In groups, T asks students to exchange their prediction with others. 7. T asks students to carefully watch and listen to the conversation that is already hyperlinked in the slide. 8. T asks students to assess if their prediction is correct or not. 9. T replays the conversation for more comprehension. 10. T distributes the paper with several expression used in the conversation. 11. T asks students **in pairs to practice the expressions** presented in the slide. In this stage, each student should tell something that has recently happened to him/her and then his/her pair should use the appropriate expression to respond. 12. T highlights **students' inappropriate language usage.**	TCK TPCK CK
Post-activity	15	T-Ss S-S	Encarta	To relate students' experience to the topic.	13. Question and answer. 14. **Assessment: Listening test**	

Figure 5.1: An example of a coded lesson plan

5.2.3. Attitude toward computers

The data from pre-survey on the lecturers' attitude toward computers testifies that they had good attitude. This is indicated by their positive responses on the two sub-variables measured through TAC. It can be seen that the lecturers' enjoyment with computer had a means score of 53.58 out of 60, while their anxiety indicated a means score of 41.50 (83%). Therefore it seems that the lecturers were pleased to work with computers, and were not worried with them. The description of the pre-survey results is presented in the following table.

Table 5.7: The summary of the lecturers' pre attitude toward computers

Component	No. of item (Highest means)	Obtained Means (Percent)	SD
Enjoyment	12 (60)	53.58 (89%)	5.384
Anxiety	10 (50)	41.50 (83%)	5.000
Scores on TAC measures were also given on a 5-point Likert scale; higher scores reflect higher appreciation: Strongly Disagree= 1, Disagree=2, neither agree nor disagree=3, Agree=4 and Strongly Agree=5 ($p<0.025$)			

The data obtained after the professional development programme indicate slight increases in both sub-variables. The means score of enjoymeny accounts for 56.33 (93%), thus indicating only 4% increased if compared with their initial score (M=53.58). The lecturers' anxiety, on the other hand, only decreases by 5%. It can be conluded that the lecturers already have good attitude toward computers; they are also not anxious with the use of computers as also shown previously.

Table 5.8: The summary of the lecturers' post attitude toward computers

Component	No. of item (Highest means)	Obtained Means (Percent)	SD
Enjoyment	12 (60)	56.33 (93%)	2.708
Anxiety	10 (50)	44.16 (88%)	3.242
Scores on TAC measures were also given on a 5-point Likert scale; higher scores reflect higher appreciation: Strongly Disagree= 1, Disagree=2, neither agree nor disagree=3, Agree=4 and Strongly Agree=5 (p<0.025)			

Additionally, the comparison between the scores from both pre and post-survey was calculated with Wilcoxon Signed Rank test using SPSS. The results indicate that only enjoyment variable is significant (Z=-2.32 and p=0.010) with the effect size (0.47) which is categorised as medium. Anxiety, on the other hand, is insignificant with Z=-1.73 and p=0.42. This probably shows that the lecturers already have good prior-knowledge and experiences with computers (computer literacy) as one of the criteria to be selected for this programme.

Table 5.9: Summary statistics of the lecturers' pre and post attitude toward computers[1]

Variable	N	Post-survey		Pre-survey		Z	Effect size	*P*
		Mean	SD	Mean	SD			
Enjoyment	12	56.33	2.70	53.58	5.38	-2.32	0.47	.010
Anxiety	12	44.16	3.24	41.50	5.00	-1.73	*[2]	.042
[1] Scores on TAC measures were also given on a 5-point Likert scale; higher scores reflect higher appreciation: Strongly Disagree= 1, Disagree=2, neither agree nor disagree=3, Agree=4 and Strongly Agree=5 (p<0.025) [2] Not calculated because of insignificant p								

5.3. Overall results

The results of each finding from the interview, logbook, self-reported TPACK, lesson plan assessment, and TAC are summarised as follows.

The interview and logbook data reveal that all participants reported that they had positive experiences with the TPACK professional development programmes. 75% lecturers appreciated the programme while few considered it as a tiring programme. The weaknesses of the programmes were viewed from limited time, technology exploration, and students' active engagement. Moreover, all lecturers also reported that they gained much understanding and design capability of TPACK-based lesson plans and the way how the lecturers conceptualised their teaching also changed from technology as a separate component to an integrated one.

The most beneficial phase for the lecturers' understanding and ability to design technology-rich lessons was the design process as reported by eleven lecturers (91.6%). Suggestions were given related to three major aspects: terms of facilities, follow-up, and support. Difficulties were found in respect to limited facilities and students' ability. Finally, in copying with such barriers the lecturers self-facilitated, introduced the technology they used to support learning, and asked students to learn or explore the technology themselves.

Based on the self- reported TPACK, there was difference between pre and post-results, indicating significant improvement after the programme for all components of TPACK. The findings clearly show the prediction that the TPACK is enhanced by the presence of the TPACK professional development programme. The scores for the two conditions suggest that the effect sizes are relatively large for all domains, except in TK (medium).

The overall findings from lesson plan assessment demonstrate that the TPACK professional development programme for English language lecturers at the language centre had a sound impact based on the overall result of the lecturers' TPACK lesson plan designs in all components of TPACK. But, only Content Knowledge (CK) is not significant with Z=-1.41 and p (0.250) > 0.025. The only possible explanation for this is that it is probably due to the fact that the lecturers did not focus much on the curriculum content anymore, but rather considering it for determining and aligning it with other knowledge domains, such as TK and PK.

Moreover, the results from TAC questionnaire show that only enjoyment variable is significant (Z=-2.32 and p=0.010) with medium effect size (0.47). In contrary, anxiety is not significant with Z=-1.73 and p=0.42. This is probably because the lecturers already have good prior-knowledge and experiences with computers (computer literacy) as one of the criteria to be selected for this programme.

CHAPTER SIX: CONCLUSION, DISCUSSION, AND RECOMMENDATION

This chapter draws conclusions from what has been conveyed in all the previous chapters and discusses the findings of the study. This very last chapter also mentions limitations of the study and gives some recommendations to the language centre and for further research.

6.1. Conclusion

Teaching English as a foreign language at the language centre, State Islamic University of Sultan Syarif Kasim Riau is unique and complicated. The complexity can be viewed in terms of a great number of students (around 4 to 5 thousands per semester), large classes (30-35 students in one class), limited number of lecturers, and low motivation of the students. Therefore, this study was aimed at developing and evaluating a professional development programme for technology integration through a design-based research with the foci on 1) the lecturers' experience with the participation in the professional development programme, and 2) the lecturers' knowledge improvement as the results of participation in the professional development programme for technology integration as measured from their self-reported TPACK, attitudes toward technology, and lesson plans. The findings suggest that all participants reported having positive experiences with the TPACK professional development programmes, and weaknesses were found related to time, technology exploration, and students' engagement. Suggestions from the lecturers were given related to three major aspects: terms of facilities, follow-up, and support. These findings were then taken into consideration for the improvement of the program in the second cycle.

Furthermore, summative evaluation from TPACK questionnaire demonstrates a significant improvement after the programme for all components of TPACK. Besides this self-reported data, lesson plan assessment demonstrates a sound impact based on the overall result of the lecturers' TPACK lesson plan designs in all components of TPACK, but only Content Knowledge (CK) is not significant. Because the lecturers worked with computers as the technology used in this study, their attitude toward computers was also measured through a survey consisting of two sub-variables of enjoyment and anxiety. The results suggest that only enjoyment variable is significant, while anxiety is not significant. The lecturers were not anxious with computers when assessed before the programme and this remained until the end of the programme. On the basis of these findings from all data sources, it can be concluded that the professional development arrangement improved the English lecturers' TPACK knowledge as shown particularly by the increase of TPACK after the programme.

6.2. Discussion

This study was to put relevant theories and guidelines into practice for the development of a professional development programme for technology integration. The potentials of such professional development in which TPACK framework and learning technology by design approach for English lecturers in the context of Teaching English as a Foreign Language (TEFL) was then explored. The professional development programme incorporating the TPACK framework was meant to represent the lecturers' knowledge domains.

This study draws conclusions from different data sources to investigate the effectiveness of the programme as measured from the lecturers' TPACK development. In this case, self-report

TPACK was triangulated with the lecturers' performance on lesson plan designs that they used for their teaching in the classrooms. The results of this study suggest that the TPACK professional development programme was successful, viewed from the improvement of the lecturers' TPACK and their positive experiences. This study confirmed the findings of the previous studies (e.g., Allan, et al., 2010; Blocher, et al., 2011; Doering, et al., 2009; Jimoyiannis, et al., 2011; Tee & Lee, 2011). It can also be argued that learning technology-by-design approach adopted in the programme could help the lecturers develop TPACK in their English language teaching practices.

As the lecturers' professional development is crucial for foreign language teaching reform, thus learning tasks given to them should be well suited with their professional practices. The professional development programme in which its activities were based on the curriculum vision and contents showed a great importance. This provided the lecturers with the relevancy of the programme with the curriculum vision and curriculum contents. In this regard, it is also argued that teachers could see the relevance of their professional learning activities for teaching in their schools (Nicholas & Ng, 2012), and respect professional development with a coherent connection between their experiences and their actual classroom practice (Garet, Porter, Desimone, Birman, & Yoon, 2001). The curriculum coherency did not only attract the lecturers, but it also gained a very strong support from the language centre since the programme was initiated by external person, the researcher. This probably would be different if it were pioneered by the institution itself. Because the developer as the researcher of the programme is not from the management at the centre, it was necessary to deeply understand the curriculum as to establish relevancy.

By the adopting the development stages from Joyce and Showers (1995), the model had a sound learning activity sequencing. Similar finding was also reported by Bradshaw (2002), a positive effect was found by applying this model where teachers involved in professional development activities including theory, demonstration, practice, and follow-up. Teachers were more likely to transfer technology skills into teaching than those who participated in professional development activities that did not include all four dimensions.

Providing the introductory workshop with several learning activities, the introduction to the concepts such as TPACK, gave the lecturers a model on how to integrate technology into English language teaching, and this became a foundation for their new knowledge as found in this study. Following this, demonstration led to a clearer application of the TPACK concept. In the first principles of instruction, Merrill (2002) advocated that learning is facilitated when learning activities also demonstrate the new knowledge to be learned rather than merely telling about what is to be learned. The lecturers were also tasked to apply the TPACK model with which they practiced designing English lessons in groups. In this regard, it was beneficial for the lecturers' learning for technology integration as it is argued to facilitate learning if the activity provides opportunity for the lecturers to apply the new knowledge to new specific situations by designing specific concrete tasks (Merrill, 2002). Another important component was micro-teaching where the lecturers observed one another, and then discussed it (Joyce & Showers, 1980). All of these activities were organised in a collaborative learning environment. According to Joyce and Showers (1980), this learning environment is potential for teacher learning. Besides introducing the TPACK framework, the experiences with the enactment of the lessons had authenticated the lecturers' design products. The implementation allowed the lecturers to test the design products for further reflecting why such and such went so. Although students' performance was not measured, they at least showed enthusiasm with their lecturers' teaching. After the implementation, reflection on what had been done was conducted and it became the bases for redesigning the lessons in

order to help students learn better and more deeply. In sum, all these learning activities organised in a systematic way were critical for the lecturers' TPACK development for the purpose of fulfilling the English lecturers' lack of knowledge and skills on technology integration. The main challenge in this workshop was to gather the lecturers because many of them had different activities with different times. This was resolved by grouping the lecturers into two workshop groups.

In supporting such mentioned activities, supports from the facilitators and institution were also needed to enhance the lecturer learning processes. The institutional and more knowledgeable people support, as were suggested by the lecturers, could create a sustainable innovation and strengthen their conceptual and practical needs in the classrooms. Innovation initiated from external sources should convince and involve the key stakeholders in order that such innovation is institutionally accepted. During this study, guidance, feedback and support were given mostly in terms of pedagogical and technological supports and guidance during the lecturers' discussion and design process.

Collaborative lesson plan design promisingly could facilitate English lecturers in learning for technology integration and it showed a good learning strategy for the lecturers in integrating technology into teaching. As this study reveals, the collaboration had created an opportunities for the lecturers to develop good lessons based on various perspectives, and they benefitted from each other's knowledge and broad range of their experiences. Handelzalts (2009) maintained that interactions during collaborative design allow teachers to investigate challenges of their instructional practice. Additionally, collaborative work decreased the lecturers' load of accommodating both teaching duties and their professional development need. As was advocated by Jonnassen, Mayes, and McAleese (1993), one of the most effective learning contexts is collaborative environment. This is because teachers become team players and curriculum designers (Simmie, 2007).

Learning-technology-by-design approach indicated a good approach to preparing English lecturers to integrate technology. This approach is a constructivist approach that sees knowing as being situated in action and co-determined by individual environment interactions (cf. Koehler & Mishra, 2005a). Koehler and Mishra (2005a) argued that this approach is effective to develop deeper understanding of the complex interplay among technology, content, and pedagogy as well as the contexts where it is implemented. In the learning processes experienced by the lecturers with such approach engaged them more actively, putting them in the centre of the activities as the designers of the lesson plans who are familiar with the context.

Last, but not least, the design guidelines were salient as the foundational frameworks for the researcher in the development of the professional development arrangement for technology integration aimed for English lecturers. However, the design guidelines employed in this study should not be regarded as a recipe, but rather as to help others select and apply the most appropriate knowledge for specific design and development tasks in their own settings (McKenney, et al., 2006). As the findings suggest, this intervention had a sound impact on the lecturers' TPACK development.

6.3. Limitation and recommendation

This study was conducted through design-based research on the development and evaluation of a professional development arrangement for technology integration. However, some limitations are found and should be taken into consideration for further research.

The major limitations of the study are that it was carried out with a small number of participants with only 12 English lecturers in a seven week programme. Moreover, this study also did not measure the impacts of the programme based on students' language performance in both cycles and lecturers' TPACK development in the first cycle which are also essential for better synthesis for the programme improvement and research findings. Finally, only one technology application was used in the professional development arrangement.

On the bases of these limitations and the findings of this study, general and specific recommendations are given. In general, further research could be directed toward involving more participants and longer duration, employing more data collecting techniques, including assessments on students' performance, not merely on the lecturers, and using a variety of technology applications. Specifically, some suggestions are given as follows:

First, considering the complexity in teaching English at the language centre the role of technology becomes prominent in supporting teaching and learning process. As this study found, the professional development programme guided by the design guidelines explained previously were helpful for the lecturers' technology integration; therefore, sustaining such programme would be very essential for the other lecturers who did not participate in such programme by benefitting the available technologies, such as internet connection which is not maximally used to support language learning, computers, etc.

Secondly, since the most commonly used approaches at the language centre so far did not explore the very fundamental aspect of learning, experiences; teacher-centred approach through expert-led training in which the instructors are not familiar with the context also fails to bring innovation; and professional development programmes were not based on needs, or commonly the so-called *solutions-seeking-a-problem syndrome*. All of these should be directed towards more effective strategies or sound approaches, methods or techniques. Design approach employed in this study has proven to help the lecturers develop TPACK, and should be adopted in other professional development arrangements at the language centre.

Thirdly, learning communities with a focus on ELT improvement should also be established at the language centre where lecturers can share, learn from one another, understand and recognise their institution (because the findings found that some lecturers are not well familiar with the language centre in terms of available technology). The innovation is also easier to sustain with this learning culture.

Despite these limitations, this study at least contributes to the development of a professional development for technology integration into ELT in higher education. Finally, the results of this study could serve as a basis for professional development arrangements at the language centre and future research to enrich our knowledge and understanding about ELT professional development arrangements for technology integration in tertiary education settings in particular and primary and secondary education in general.

REFERENCES

Allan, W. C., Erickson, J. L., Brookhouse, P., & Johnson, J. L. (2010). EcoScienceWorks: teacher professional development through a collaborative curriculum project-an example of TPACK in Maine. *TechTrends, 54*(6), 36-43.

Angeli, C., & Valanides, N. (2009). Epistemological and methodological issues for the conceptualization, development, and assessment of ICT-TPCK: advances in technological pedagogical content knowledge (TPCK). *Computers and Education, 52*(1), 154-168.

Barab, S., & Squire, K. (2004). Design-based research: putting a stake in the ground. *Journal of the Learning Sciences, 13*(1), 1 - 14.

Blocher, J. M., Armfield, S. W., Sujo–Montes, L., Tucker, G., & Willis, E. (2011). Contextually based professional development. *Computers in the Schools, 28*(2), 158-169. doi: 10.1080/07380569.2011.577398

Bradshaw, L. K. (2002). Technology for teaching and learning: strategies for staff development and follow-up support. *Journal of Technology and Teacher Education, 10*(1), 131-150.

Christensen, R., & Knezek, G. (1998). *Parallel forms for measuring teachers' attitudes toward computers*. Paper presented at the Society of Information Technology & Teacher Education (SITE)'s 9th International Conference, Washington, DC.

Cox, S., & Graham, C. R. (2009). Diagramming TPACK in practice: using an elaborated model of the TPACK framework to analyze and depict teacher knowledge. *TechTrends, 53*(5), 60-69.

Darling-Hammond, L. (2003). Teacher learning that supports student learning. In A. Ornstein, L. S. Behar-Horenstein & E. Pajak (Eds.), *Contemporary Issues in Curriculum* (pp. 277-282). Boston, MA: Pearson Education, Inc.

DeVellis, R. F. (2003). *Scale development: theory and applications*. London: Sage Publications.

Doering, A., Veletsianos, G., Scharber, C., & Miller, C. (2009). Using the technological, pedagogical, and content knowledge framework to design online learning environments and professional development. *Journal of Educational Computing Research, 41*(3), 319-346.

Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What makes professional development effective? results from a national sample of teachers. *American Educational Research Journal 38*(4), 915-946.

Glesne, C., & Peshkin, A. (1992). *Becoming qualitative researchers: an introduction*. New York: Longman.

Guzey, S. S., & Roehrig, G. H. (2009). Teaching science with technology: case studies of science teachers' development of technology, pedagogy, and content knowledge. *Contemporary Issues in Technology and Teacher Education, 9*(1), 25-45.

Handelzalts, A. (2009). *Collaborative curriculum development in teacher design teams.* Doctoral Thesis, University of Twente, Enschede.

Harris, J., Grandgenett, N., & Hofer, M. (2010). Testing a TPACK-based technology integration assessment instrument. In C. D. Maddux, D. Gibson & B. Dodge (Eds.), *Research highlights in technology and teacher education 2010* (pp. 323-331). Chesapeake, VA: Society for Information Technology and Teacher Education (SITE).

Harris, J., & Hofer, M. (2009). Instructional planning activity types as vehicles for curriculum-based TPACK development. In C. D. Maddux (Ed.), *Research highlights in technology and teacher education* (pp. 99-108). Chesapeake, VA: Society for Information Technology in Teacher Education (SITE).

Harris, J. B., & Hofer, M. J. (2011). Technological Pedagogical Content Knowledge (TPACK) in action: a descriptive study of secondary teachers' curriculum-based, technology-related instructional planning. *Journal of Research on Technology in Education, 43*(3), 211-229.

Haydn, T., & Barton, R. (2008). 'First do no harm': factors influencing teachers' ability and willingness to use ICT in their subject teaching. *Computers & Education, 51*(1), 439-447. doi: 10.1016/j.compedu.2007.06.001

Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: current knowledge gaps and recommendations for future research. *Education Tech Research Dev, 55*, 223–252. doi: 10.1007/s11423-006-9022-5

Jang, S. J. (2010). Integrating the interactive whiteboard and peer coaching to develop the TPACK of secondary science teachers. *Computers and Education, 55*(4), 1744-1751.

Jimoyiannis, A. (2010). Designing and implementing an integrated technological pedagogical science knowledge framework for science teachers professional development. *Computers and Education, 55*(3), 1259-1269.

Jimoyiannis, A., Tsiotakis, P., & Roussinos, D. (2011). *Pedagogical and instructional design issues towards the integration of Web 2.0 tools in instruction-Implications of teachers' training pilot courses in Greece.* Paper presented at the 7th International Conference on Next Generation Web Services Practices.

Johnson, B., & Christensen, L. (2000). *Educational research: quantitative and qualitative approaches*. Boston: Allyn and Bacon.

Jonnassen, D. H., Mayes, T., & McAleese, R. (1993). A manifesto for a constructivist approach to uses of technology in higher education. In T. M. Duffy, J. Lowyck & D. H. Jonassen (Eds.), *Designing environments for constructivist learning* (pp. 231-247). Berlin: Springer-Verlag.

Joyce, B., & Showers, B. (1980). Improving in-service training: the messages of research. *Educational Leadership 37*(5), 379-385.

Joyce, B., & Showers, B. (1995). *Student achievement through staff development: fundamentals of school renewal* (2 ed.). New York: Longman.

Kereluik, K., Mishra, P., & Koehler, M. J. (2010). *Reconsidering the T and C in TPACK: repurposing technologies for interdisciplinary knowledge*. Paper presented at the The Society for Information Technology & Teacher Education International Conference 2010, San Diego, USA. www.editlib.org/p/33987

Koehler, M. J., & Mishra, P. (2005a). Teachers learning technology by design. *Journal of Computing in Teacher Education, 21*(3), 94-102.

Koehler, M. J., & Mishra, P. (2005b). What happens when teachers design educational technology? the development of Technological Pedagogical Content Knowledge. *Journal of Educational Computing Research, 32*(2), 131-152.

Koehler, M. J., & Mishra, P. (2008). Introducing technological pedagogical content knowledge. In A. C. o. I. a. Technology (Ed.), *Handbook of technological pedagogical content knowledge (TPCK) for educators*. New York, NY: Routledge.

Koehler, M. J., Mishra, P., & Yahya, K. (2007). Tracing the development of teacher knowledge in a design seminar: integrating content, pedagogy and technology. *Computers & Education, 49*(3), 740-762.

Lawless, K. A., & Pellegrino, J. W. (2007). Professional development in integrating technology into teaching and learning: knowns, unknowns, and ways to pursue better questions and answers. *Review of Educational Research, 77*(4), 575-614.

Maxwell, J. A. (1996). *Qualitative research design*. Thousands Oaks: SAGE Publications, Inc.

McKenney, S., Nieveen, N., & van den Akker, J. (2006). Design research from a curriculum perspective. In J. van den Akker, K. Gravemeijer, S. McKenney & N. Nieveen (Eds.), *Educational design research*. London: Routledge.

Merriem, S. B. (1998). *Case study research in education: a qualitative approach*. San Francisco: Jossey-Bass, Inc.

Merrill, M. D. (2002). First principles of instruction. *ETR&D, 50*(3), 43-59.

Miles, M. B., & Hubermen, A. M. (1994). *Qualitative data analysis*. Thousands Oaks: SAGE Publications.

Mishra, P., & Koehler, M. J. (2006a). Technological pedagogical content knowledge: a framework for teacher knowledge. *Teachers College Record, 108*(6), 1017-1054.

Mishra, P., & Koehler, M. J. (2006b). Technological pedagogical content knowledge: A new framework for teacher knowledge. *Teachers College Record, 108*(6), 1017-1054.

Nicholas, H., & Ng, W. (2012). Factors influencing the uptake of a mechatronics curriculum initiative in five Australian secondary schools. *International Journal of Technology and Design Education, 22*(1), 65-90.

Niess, M. L., Zee, E. H., & Gillow-Wiles, H. (2010). Knowledge growth in teaching Mathematics/Science with spreadsheets: moving PCK to TPACK through online professional development. *Journal of Digital Learning in Teacher Education, 27*(2), 42-52.

Nieveen, N. (1999). Prototyping to reach product quality. In J. van den Akker, R. M. Branch, K. Gustafson, N. Nieveen & T. Plomp (Eds.), *Design approaches and tools in education and training* (pp. 125-135). Dordrecht, the Netherlands: Kluwer Academic Publishers.

Nunan, D. (1999). *Second language teaching and learning*. Boston: Heinle & Heinle Publishers.

Oster-Levinz, A., & Klieger, A. (2010). Online tasks as a tool to promote teachers' expertise within the Technological Pedagogical Content Knowledge (TPACK). *Procedia Social and Behavioral Sciences, 2*, 354-358.

Ottenbreit-Leftwich, A. T. (2007). *Expert technology-using teachers: visions, strategies, and development*. West Lafayette, Indiana: Purdue University.

Parrish, B. (2006). *Teaching adult ESL*. Singapore: McGraw-Hill Education.

Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park: SAGE Publications.

Pineida, F. O. (2011). Competencies for the 21st century: integrating ICT to life, school and economical development. *Procedia - Social and Behavioral Sciences, 28*(0), 54-57. doi: 10.1016/j.sbspro.2011.11.011

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

Prawat, R. S. (1996). Constructivism, modern and postmodern. *Educational Psychologist, 31*(3/4), 215-225.

Prawat, R. S., & Floden, R. E. (1994). Philosophical perspectives on constructivist views of learning. *Educational Psychology, 29*(1), 37-48.

Pusat Bahasa. (2004). *Panduan pengajaran bahasa asing*. Pekanbaru: Pusat Bahasa UIN SUSKA Riau.

Richards, J. C. (2001). *Curriculum development in language teaching*. Cambridge: Cambridge University Press.

Richards, J. C., & Farrell, T. S. C. (2005). *Professional development for language teachers*. New York: Cambridge University Press.

Rosenthal, R. (1984). *Applied Social Research Methods Series, Vol. 6. Meta-analytic procedures for social research*. Newbury Park, CA: Sage Publications.

Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, T. S. (2009). Technological pedagogical content knowledge (TPACK): the development and validation of an assessment instrument for preservice teachers. *Journal of Research on Technology in Education, 42*(2), 123-149.

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

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*, 1-22.

Simmie, G. M. (2007). Teacher design teams (TDTs)—building capacity for innovation, learning and curriculum implementation in the continuing professional development of in career teachers *Irish Educational Studies, 26*(2), 163-176.

Tee, M. Y., & Lee, S. S. (2011). From socialisation to internalisation: cultivating technological pedagogical content knowledge through problem-based learning. *Australasian Journal of Educational Technology, 27*(1), 89-104.

Thompson, A. D., & Mishra, P. (2007). Breaking news: TPCK becomes TPACK! . *Journal of Computing in Teacher Education, 24*(2), 38-64.

Todorova, A., & Osburg, T. (2010). Professional development program for technology integration: facilitators and barriers to sustainable implementation. *Literacy Information and Computer Education Journal (LICEJ), 1*(1), 59-66.

Tondeur, J., van Keer, H., van Braak, J., & Valcke, M. (2008). ICT integration in the classroom: challenging the potential of a school policy. *Computers and Education, 51*(1), 212-223.

Trautmann, N. M., & MaKinster, J. G. (2010). Flexibly adaptive professional development in support of teaching science with geospatial technology. *Journal of Science Teacher Education, 21*(3), 351-370.

Universitas Islam Negeri Sultan Syarif Kasim Riau. (2007). *Rencana induk pengembangan teknologi informasi (IT strategic planning).* Pekanbaru: Universitas Islam Negeri Sultan Syarif Kasim Riau.

van den Akker, J. (1999). Principles and methods of development research. In J. van den Akker, R. Maribe Branch, K. Gustafson, N. Nieveen & T. Plomp (Eds.), *Design approaches and tools in education and training* (pp. 1-14). Dordrech: Kluwer Academic Publishers.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological process.* Cambridge, MA: Harvard University Press.

Warschauer, M., & Kern, R. (2000). *Network-based language teaching: concepts and practice.* New York, USA: Cambridge University Press.

Warschauer, M., & Meskill, C. (2000). Technology and second language teaching and learning. In J. W. Rosenthal (Ed.), *Handbook of Undergraduate Second Language Education* (pp. 303-318). Mahwah, NJ: Lawrence Erlbaum Associates.

Young, S. S. C. (2003). Integrating ICT into second language education in a vocational high school. *Journal of Computer Assisted Learning, 19*(4), 447-461.

APPENDICES

Appendix 1: Adapted TPACK survey

Instruction

Technology is a broad concept that can mean a lot of different things. For the purpose of this questionnaire, technology is referring to digital technology/technologies. That is, the digital tools we use such as computers, laptops, iPods, handhelds, interactive whiteboards, software programs, etc. Please fill in the demographic information, and then read carefully each of the statements and then indicate your answers based on the five alternative options below:

SD = Strongly Disagree

D = Disagree

N = Neutral

A = Agree

SA = Strongly Agree

Give a checkmark (√) on the chosen answer. There are no wrong answers in this questionnaire as long as you answer it based on your feeling and opinion. Your privacy is kept.

Demography information

Name   : …………………………………………………………..

Age   : ……………

Gender   : ☐ male ☐ female

Educational background   : ☐ Bachelor
                                  ☐ Master
                                  ☐ Other……………………………………………
Teaching experience   :……………year/s

Please, indicate (✓) which technology is available to you at home and at the language centre and which technology is in use by yourself. If there are other technologies that you use, please mention them in the column provided.

Technology	Available at home	I use this at home	Available at the Language Centre	I use this at the Language Centre
Internet connection				
Desktop computer				
Laptop				
Webcam				
Printer				
Scanner				
iPad				
iPod Touch				
MP3 player				
Digital camera (picture)				
Digital camera (video)				
Mobile phone				
eBook reader				
Tape recorder				
Radio				
……………………………………..				
……………………………………..				
……………………………………..				

Items	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
TK (Technology Knowledge)					
1. I know how to solve my own technical problems.					
2. I can learn technology easily.					
3. I keep up with important new technologies.					
4. I frequently play around the technology.					
5. I know about a lot of different technologies.					
6. I have the technical skills I need to use technology.					
CK (Content Knowledge)					
7. I have sufficient knowledge about listening.					
8. I have sufficient knowledge about speaking.					
9. I have sufficient knowledge about reading.					
10. I have sufficient knowledge about writing.					
11. I can use a literary way of thinking.					
12. I have various ways and strategies of developing my English competency.					

PK (Pedagogical Knowledge)					
PK (Pedagogical Knowledge)					
13. I know how to assess student language performance in a classroom.					
14. I can adapt my teaching based-upon what students currently understand or do not understand.					
15. I can adapt my teaching style to different learners.					
16. I can assess student learning in multiple ways.					
17. I can use a wide range of teaching approaches in a classroom setting.					
18. I am familiar with common student understandings and misconceptions.					
19. I know how to organize and maintain classroom management.					

PCK (Pedagogical Content Knowledge)					
20. I can select effective teaching strategies to guide student thinking and learning for listening skill.					
21. I can select effective teaching strategies to guide student thinking and learning for speaking skill.					
22. I can select effective teaching strategies to guide student thinking and learning for reading skill.					
23. I can select effective teaching strategies to guide student thinking and learning for writing skill.					
TCK (Technological Content Knowledge)					
24. I know about technologies that I can use for understanding and learning listening skill.					
25. I know about technologies that I can use for understanding and learning speaking skill.					
26. I know about technologies that I can use for understanding and learning reading skill.					
27. I know about technologies that I can use for understanding and learning writing skill.					

TPK (Technological Pedagogical Knowledge)					
28. I can choose technologies that enhance the teaching approaches/strategies for a lesson.					
29. I can choose technologies that enhance students' learning for a lesson.					
30. The language centre has caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom.					
31. I am thinking critically about how to use technology in my classroom.					
32. I can adapt the use of the technologies that I am learning about to different teaching activities.					
33. I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn.					

34. I can use strategies that combine content, technologies and teaching approaches that I learned about in my previous education in my classroom.					
35. I can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches at the language centre.					
36. I can choose technologies that enhance the content for a lesson.					

TPACK (Technology Pedagogy and Content Knowledge)					
37. I can teach lessons that appropriately combine listening, technologies and teaching approaches.					
38. I can teach lessons that appropriately combine speaking, technologies and teaching approaches.					
39. I can teach lessons that appropriately combine reading, technologies and teaching approaches.					
40. I can teach lessons that appropriately combine writing, technologies and teaching approaches.					

Thank you very much for your participation

Appendix 2: TAC survey

Instruction

Please fill in the demographic information, and then read carefully each of the statements and then indicate your answers based on the five alternative options below:

SD = Strongly Disagree

D = Disagree

N = Neutral

A = Agree

SA = Strongly Agree

Give a checkmark (√) on the chosen answer. There are no wrong answers in this questionnaire as long as you answer it based on your feeling and opinion. Your privacy is kept.

Demography information

Name : …………………………………………………………………..

Age : ……………

Gender : ☐ male ☐ female

Educational background : ☐ Bachelor
☐ Master
☐ Other…………………………………………………………
Teaching experience :…………….year/s

No.	Statement	Alternative options				
		SD	D	N	A	SA
1.	I think that working with computers would be enjoyable and stimulating.					
2.	I want to learn a lot about computers.					
3.	The challenge of learning about computers is exciting.					
4.	Learning about computers is boring to me.					
5.	I like learning on a computer.					
6.	I enjoy lessons on the computer.					
7.	I can learn many things when I use a computer.					
8.	I believe that it is very important for me to learn how to use a computer.					
9.	A job using computers would be very interesting.					
10.	The people who give me the best ideas for improving teaching also tend to know a lot about computers.					
11.	I concentrate on a computer when I use one.					
12.	I believe that I am a better teacher with technology.					
13.	I get sinking feeling when I think of trying to use a computer.					
14.	Working with a computer makes me feel tense and uncomfortable.					
15.	Working with a computer makes me nervous.					
16.	Computers intimidate me.					
17.	Using a computer is very frustrating.					
18.	I feel comfortable working with a computer.					
19.	Computers are difficult to use.					
20.	I think that computers are very easy to use.					
21.	I have a lot of self-confidence when it comes to working with computers.					
22.	Computers are hard to figure out how to use.					

Thank you very much for your participation

Appendix 3: Guiding questions of the interview

1. How did you find the TPACK programme?
2. What are the strong points about the TPACK programme?
3. What are the weak points about the TPACK programme?
4. What did you learn from the programme (e.g., knowledge, skills, attitude, and beliefs)?
5. Which aspect/phase of the professional development programme is the most beneficial for your understanding and ability of designing technology-rich lessons? Why?
6. What would you like to suggest to improving the TPACK professional development programme?
7. What difficulties did you find in designing lessons based on TPACK framework? In what way do they influence?
8. How do you solve such difficulties?

Appendix 4: Adapted Technology Integration Assessment Rubric

No.	Aspect	Descriptor	Assessment	
			Criteria	**Score obtained**
1.	Content Knowledge (CK)	Correctly and appropriately spelling out the subject matter of English lesson	1. Not at all 2. Minimal 3. Strong	
2.	Pedagogical Knowledge (PK)	Appropriately using CLT approaches to support English learning	1. Not at all 2. Minimal 3. Strong	
3.	Technological Knowledge (TK)	Clearly designing or using computer application/s that support communicative competence	1. Not at all 2. Minimal 3. Strong	
4.	Pedagogical Content Knowledge (PCK)	Appropriately using CLT approaches to achieve the goals of the English lesson	1. Not at all 2. Minimal 3. Strong	
5.	Technological Content Knowledge (TCK)	Aligning computer application/s with the goal/s of the English lesson	1. Not at all 2. Minimal 3. Strong	
6.	Technological Pedagogical Knowledge (TPK)	Appropriately using computer application/s to support CLT approach	1. Not at all 2. Minimal 3. Strong	
7.	Technological Pedagogical Content Knowledge (TPACK)	Fitting among English content, CLT, and computer application/s within the lesson plan	1. Not at all 2. Minimal 3. Strong	