

CHAPTER 1

INTRODUCTION AND PROBLEM STATEMENT

This chapter presents general information about the study. It consists of ten sections: introduction, problem statement, the purposes of the research, research questions, research hypotheses, significance of the research, scope and limitations of the research, definitions of terms, summary and structure of the research.

Introduction

There are some reasons for the ineffective English language teaching in Thailand which are the causes of problems in English language teaching and learning especially in the primary and secondary schools. Noopong (2002) also reported that more than half of primary school teachers who were teaching English had not taken English as their major of their studies, and only around two-third of secondary school English teachers graduated with a bachelor's degree in English. In addition, the study conducted by Wiriyaichitra (2002, as cited in Noom-ura, 2013) revealed that some of problems in English language teaching and learning were teachers' heavy teaching loads, the lack of equipped classrooms and education technology, teachers' insufficient English language skills in terms of reading, writing, speaking and listening and cultural knowledge.

Geringer (2003) stated that a good teacher is a crucial factor in learners' learning process, and teacher quality outweighs the factors of funding, and class size. In addition, he further mentioned that professional development is one of an important factor for improving teaching quality. Joel, et. al. (2008) agreed that improving teacher

quality depends on improving professional development and improving professional development depends on creating meaningful learning experiences for teachers.

Thus, many factors seem to be responsible for the failure in English teaching and learning in Thailand. Obviously, the most critical problems that need to be solved are improving their knowledge of English language because this is an important determining factor in the success of professional development.

With the tremendous advances and popularity of the technology, computer-assisted instruction has become the method of choice for instructional development due to its potential for delivering better learning outcomes. It facilitates the handling and retrieval of teaching material by storage in a database which anyone can access via the internet. Learners can interact with fellow students and their teachers in different locations through the communication service provided by the internet.

Computer-assisted instruction can be designed to implement the theory of the whole language approach in the classroom. Studies have shown the benefits of using CALL to improve learners' four English language skills, although learners' improvement is clearly revealed in receptive skills (e.g. reading and listening) (Stepp-Greany, 2002; Lunde, 1990 as cited in Wang, 2011).

The whole language approach is one of the interesting methodologies to solve this problem. According to Goodman (1986 as cited in Wang, 2011), language ability develops naturally as a result of experiences with language. He argued that the teaching of language as isolated skills was inappropriate and not likely to achieve as the focus of segregated-skill instruction is not on learning language for authentic communication. This is in line with what Anderson (1984) stated, as learners should be provided with the opportunity to use and explore language in contextually meaningful because speaking and writing skills are all inter-related. If language is taught as isolated skills, it is difficult because the human brain cannot store bits and pieces of information for a long time.

According to Alkan (1997), the whole language approach emphasize that human language learning moves from the whole to the parts rather than building sub-skills (e.g. grammar, spelling, vocabulary, and pronunciation) to lead toward higher abilities (e.g. reading comprehension). He further states that the four skills are interrelated. Freeman & Freeman (1994) further supports that instructors need to provide natural reading, writing, speaking and listening teaching environments where learners can practice discrete language components. In addition, this approach enhances learners to work collaboratively with others, to create, and to take risks during instruction. Although the whole language approach has been popular in western countries, Thai lecturers need to understand how to employ integrated-skill teaching technique in a large class within limited class time. Previous research reveal the benefits related to CALL instruction, most research was conducted in western countries, and some computer-assisted instruction did not take into consideration of whole language principles (Wang, 2011).

Based on the information described above, technology appears to play a crucial role in helping learners develop their pronunciation, reading and writing competency. It would therefore be useful if a study of e-learning instruction and teaching of pronunciation, reading and writing were conducted together. A study emphasizing the use of e-learning course in the field of these three English skills would strengthen the understanding of how it affects the teaching of pronunciation, reading and writing and would explain its implications for teaching the three English skills.

Purposes of the Research

The study aims to:

1. develop an e-learning course for enhancing English pronunciation, reading and writing skills of Thai primary school teachers based on the 80/80 efficiency criterion. as subsequently defined.
2. compare the learning achievement on English pronunciation, reading and writing of participants who received tutoring via e-learning instruction with the achievements of participants who received tutoring via conventional face-to-face instruction.
3. examine the primary school teachers' motivation between participants who received tutoring via e-learning instruction with the motivation of participants who received tutoring via conventional face-to-face instruction.
4. examine the difference between effects of the e-learning instruction on participants who possess different a) computer skill b) prior English pronunciation, reading and writing knowledge.

Research Questions

In order to achieve the purposes mentioned above, this research focuses on the following questions:

1. Is there higher learning efficiency of English pronunciation, reading and writing using the e-learning instructional method based on the 80/80 standard?
2. Are there any significant differences in learning outcomes on English pronunciation, reading and writing between the experimental and control groups?

3. Are there any significant differences in motivation towards learning via the e-learning instruction between the experimental and control groups?

4. Are there any significant differences between effects of the e-learning instruction on participants who possess different a) computer skill b) prior English pronunciation, reading and writing knowledge?

Research Hypotheses

1. The value of efficiency achieved with the developed e-learning course in English pronunciation, reading and writing meets the 80/80 standard.

2. The learning achievement on English pronunciation, reading and writing of participants using e-learning course is higher than that for those who received tutoring via conventional face-to-face instruction at the 0.05 level of significance.

3. The motivation of the participants using e-learning instruction is higher than that for those who received tutoring via conventional face-to-face instruction.

4. There are significant differences between effects of the e-learning instruction on participants who possess different a) computer skill b) prior English pronunciation, reading and writing knowledge?

Significance of the Research

There has been the increasing number of Thai educational institutions adopting the e-learning tools to support student learning. Most educational institutions in Thailand adopt the e-learning learning to fully or partially support their learners. This is because several studies have revealed the usefulness of teaching and learning via the e-learning instruction. This learning tool is discussed as one of the feasible delivery

methods for learning activities. With flexibility and convenience, e-learning tools offer instructors and learners with a much easier access to resources.

This research contributes to the evaluation of the effectiveness of the e-learning instruction in academic setting. Evaluations are taken from feedback on usability, suitability for the teaching context, and learner-friendliness of the e-learning learning tool. The potential educational benefits described, educational usage summarized and suggestions provided are useful for other education institutions which expect to offer future primary school teachers with supportive, effective and meaningful e-learning instructional tools.

Scope and Limitations of the Research

This study aims to develop an e-learning instruction in English pronunciation, reading and writing for primary school teachers in Songkhla province, to compare learning achievements and motivation on English pronunciation, reading and writing of primary school teachers who received tutoring via e-learning instruction with the achievements of participants who received tutoring via conventional face-to-face instruction and to investigate the difference between effects of the e-learning instruction on participants who possess different a) computer skill b) prior English pronunciation, reading and writing knowledge. The subjects of this study may not be representative of the primary school teachers who enrolled in other English courses as they may have different backgrounds, learning contexts and needs.

Definitions of Terms

1. Writing process refers to the different stages of writing which writers should follow in order to write efficiently. This writing process consists of 3 stages: prewriting, drafting and revising, and editing.

2. E-learning course refers to the study of the learning content on “English Pronunciation, Reading and Writing” constructed by the researcher. The participants studied in the classroom and/or computer room.

3. The development of e-learning course is the use of instructional theory, instructional methodology, computer program and learning contents on English pronunciation reading and writing in order to write a lesson plan template. The template is made up of frames comprising animated images, narration, music background, and sound effects, with linkages between frames. The e-learning lessons are constructed from the template according to the defined objectives.

4. Conventional face-to-face instruction refers to learning in the classroom where primary school teachers are in the presence of a teacher. Teaching activities are organized on the basis of a lesson plan using conventional teaching instruments consisting of contents from the lesson plan, worksheets and unit exercises.

5. Learning contents focus on English pronunciation, reading and writing in 3 main units that were Unit 1: Pronunciation, Unit 2: Reading and Unit 3: Paragraph Writing. The sub-topics of unit 1 consisted of Organ of speech, Consonant sound, Vowel sound and Stress and Intonation. Unit 2 has three sub-topics: Skimming, Scanning and Guessing word meaning from context clues. The 4 sub-topics of unit 3 include: Introduction to a paragraph, Writing process, Paragraph unity and Paragraph coherence.

6. Periods of study refer to periods that were spent in conducting this study in the first and second semesters of the academic year 2014. The experiment was

conducted in scheduled instructional periods using normal classrooms for the control group and the school laboratory for the experimental group. One computer was assigned to each participant.

7. The efficiency value of e-learning course refers to the quality of the e-learning lesson based on the 80/80 efficiency criteria.

- The first 80 means the students' scores of the tests after finishing each lesson on e-learning course, expressed as a percentage. The score must not be less than 80.

- The second 80 means the post-test score after finishing all lessons, expressed as a percentage. The score must not be less than 80.

8. Learning achievement on English pronunciation, reading and writing is the primary school teachers' scores calculated from the post-test that was constructed based on the defined objectives, after finishing all lessons.

9. Participants in the study refer to 156 primary school teachers in Songkhla Province.

10. Questionnaire refers to the question items formulated based on Keller's ARCS Motivational Design Model in order to determine and study the primary school teachers' motivation towards learning English pronunciation, reading and writing with e-learning instruction and conventional face-to-face methods. This model measures four attributes: Attention, Relevance, Confidence and Satisfaction.

Summary

Chapter 1 has presented the rationale and problem statement of the study. The content covers the overview of the importance of teaching and learning problems faced by Thai primary schools teachers and their barriers to learning English language, the benefits of implementing e-learning instruction in the teaching of English

pronunciation, reading and writing, and an attempt to provide an understanding of the nature of whole language approach. Lastly, the purpose of the research, the research hypotheses and scope of the study are provided.

Structure of Research

This research follows a logical structure and is presented in five chapters.

Chapter 1 serves as an introductory chapter and describes the fields of interest, objectives, hypotheses, significance of the study, scope and limitation of the study, and defines the terms used.

Chapter 2 provides details of literature related to the objectives of this research. This chapter explores the existing body of knowledge in the areas of e-learning instruction, instructional design, ADDIE Model, Gagné's nine events of instruction, ARCS Model, Whole Language Approach, pronunciation, reading, writing, and related research.

Chapter 3 provides an overview of the research methodology. The research objectives are to develop an e-learning course for enhancing English pronunciation, reading and writing skills of Thai primary school teachers based on the 80/80 efficiency criterion. as subsequently defined, to compare the learning achievement on English pronunciation, reading and writing of participants who received tutoring via e-learning instruction with the achievements of participants who received tutoring via conventional face-to-face instruction, to examine the primary school teachers' motivation between participants who received tutoring via e-learning instruction with the motivation of participants who received tutoring via conventional face-to-face instruction, and to examine the difference between effects of the e-learning instruction on participants who possess different a) computer skill b) prior English pronunciation,

reading and writing knowledge. The detailed discussion of the methodology applied, sample selection, data collection and data analysis is also presented.

Chapter 4 reports the major findings and discusses the results obtained from the research.

Chapter 5 provides a synopsis of the current research, conclusions and recommendations based on the theoretical and results.

CHAPTER 2

LITERATURE REVIEW

This chapter is divided into ten sections that are e-learning instruction, instructional design, ADDIE Model, Gagné's nine events of instruction, ARCS Model, Whole Language Approach, pronunciation, reading, writing, and related research.

E-learning Instruction

The internet is becoming increasingly important in higher education, seemingly dominating the attention of all instructors and learners over recent years while traditional instruction methods are considered obsolete in the view of some researchers of educational systems (Banathy, 1994 and Leong, 2006). They state that institutions of higher education seem to be lagging behind in the implementation of ICT in their organizations when compared with business organizations. In education, adopting ICT in teaching is increasingly important. By utilizing ICT, teachers become more effective in their job in many ways. Besides technology, teachers are embracing other new techniques which are transforming the learning process from teacher-centered to learner-centered instruction.

The Definition of E-Learning

E-learning is seen as supporting and enhancing the traditional teaching methods as well as creating learning opportunities for students on and off the campus. A common definition of e-learning is, however, lacking (Oblinger & Hawkins, 2005). This can be attributed to different contexts in which e-learning is implemented and

meanings different people attach to it as exemplified in the definitions presented herewith.

According to Narasimhulu et al. (2010, p. 3886), e-learning "is the delivery of a learning, training or education program by electronic means". For Driscoll (2010, p.1), e-learning "is the process of designing, delivering and managing instructions using computers". Clark and Mayer (2011 p. 7) define e-learning "as training delivered on a digital device such as a smart phone or laptop computer that is designed to support individual learning or organizational performance goals". Garrison (2011, p.2) views e-learning as "electronically mediated asynchronous and synchronous communication for purpose of constructing and confirming knowledge". On the other hand Alkhatabi et al. (2011, p.2) define e-learning as "the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchange and collaborations".

From the discussion above, it is evidently difficult to provide a generalized definition of e-learning as various perspectives are adopted by different individuals depending on the context in which e-learning is implemented. It should, however, be noted that the definitions focus on the intersection of education, teaching, and learning with ICT (Friesen, 2009). In relation to the study presented in this thesis, it is worth noting that the context (i.e. a developing country context) in which e-learning adoption and use aspects are explored is characterized by inadequate and unreliable ICT infrastructure among other challenges. It is therefore not applicable to view e-learning from a fully online course perspective, but rather from a broader perspective that combines traditional approaches to learning that facilitate face-to-face contact with students; and the application of various ICT tools (i.e. mobile phones, PDAs, computer/Internet, PowerPoint projectors, televisions, radios, etc.) to equip students with learning materials and to coordinate their learning activities (Ellis et al., 2007; Usoro & Abid, 2007).

E-learning in the Higher Education Process

Technology advancement in recent years has precipitated transformation in the higher education sector. Several factors make e-learning appealing to education institution and learners. For instance, the availability of the Internet means that e-learning eliminates learning barriers of time and distance, while at the same time allowing students to take charge of their learning (Mills & Fadel, 2012). Students are now presented with opportunities to join the knowledge society and knowledge-based economy as they have access to and benefit from a variety of learning resources and expert advice. E-learning has created opportunities to meet the increasing student learning needs. For instance, course materials can be delivered in a timely manner and at a reduced cost, making e-learning an economically viable option (Usono & Abid, 2007). The collaborative research and learning opportunities presented through e-learning are desirable attributes required to facilitate the growing demand for knowledgeable and skilled personnel in the global labour market. E-learning is essential for providing avenues for human development, bridges the digital divide and enables students to fit into the global economy (Hollow & ICWE, 2009). Although e-learning offers numerous opportunities to support learning, Garrison (2007) notes that we have yet to experience fully the transformative effect of e-learning. Creating an e-learning experience involves “serious commitment to understanding the different features of this medium and the ways it can be used most advantageously to impart learning” (Garrison & Anderson, 2003, p.53). Friesen and Lock (2010) further affirm that there is no quantifiable correlation between the application of technology and improved learning outcomes. It is for this reason, and it is particularly interesting to note, that even in supposedly mature contexts, such as university education, there are wide discrepancies. Whereas some universities have derived considerable benefits from the adoption of e-learning (Meredith & Newton, 2003), others are still struggling to realize minimal educational value (Marshall & Mitchell, 2002). Such is the case

because skilled and interested staff as well as increasing number of students in many cases force universities to embrace this educational venture.

On the other hand, the adoption of e-learning has been reported to have created new educational issues for teachers and increased the cost of teaching. Mapuva (2009) points out that teaching methods used in traditional courses may need to be reviewed if they are not transferable to e-learning environments. Changing work patterns have translated into more course preparation time and skills to run online courses. As a result, the perceived increasing workload, mindset and the lack of skills in some cases has resulted in the reluctance to adopt and use e-learning (Hennessy et al., 2010; Huan & McKay, 2011). Additionally, the paradigm shift from teacher-centredness to student-centredness has greatly impacted on the adoption and use of e-learning (Kahiigi et al., 2008a). In this case, the teacher takes on a facilitator role while the students take ownership of their learning and personal development. The effect of this role change continues to make teachers apprehensive about adopting and using e-learning as they fear losing control over their students.

Furthermore, the adoption and use of e-learning has resulted from the rush to embrace the opportunities e-learning presents while some important issues have been overlooked. Alexander (2001) affirms that achieving the desired learning outcome is more than the mere integration of technology into the teaching and learning process; it emanates from a complex system, composed of many inter-related parts, where the failure of only one part of that system can cause the entire initiative to fail. Indeed Alexander (2001) reports that in 104 e-learning projects in Australia the use of technology did not in itself result in improved quality of learning. With substantive funding, technology acquisition is the easiest part. There is, however, a need to consider aspects such as pedagogy, curriculum, institutional readiness, ICT skills and teacher competencies (Chaudhary & Sharma, 2012). This clearly indicates that successful e-learning implementation should move beyond the ideology of simply

integrating technology to include external aspects that influence its effective adoption and use.

Factors Affecting E-learning Implementation in Developing Country Contexts

Many researchers have identified important factors that impact on e-learning implementation in developing country contexts over the past years; this section presents some of them. The methodology undertaken explored and reviewed articles related to e-learning in developing countries between 2010 and 2012. It was also envisaged that citations featured in these articles would have captured factors in studies carried out in earlier years, and thus it was not necessary to review the latter. The aim was to identify current factors impacting on e-learning development. Studies carried between 2010 and 2012 were regarded as representing the current state of factors impacting on e-learning in this thesis. That being so, it was assumed that these studies presented factors that could be sensibly compared with those identified in this thesis. The review mainly focused on studies relating to integration of e-learning in a blended learning approach in a university setting. This was motivated by the fact that major implementations of e-learning are supposedly designed to enhance the traditional face-to-face learning environment, especially in a university setting.

The articles were searched for on Google (<https://www.google.com/>) and Google scholar (<http://scholar.google.com/>). The search terms specifically used were e-learning in developing countries, factors affecting e-learning in developing countries, and benefits and challenges of e-learning in developing countries. The articles selected were peer reviewed journal articles and conference proceedings with representations of various developing countries across the world. An avalanche effect was used to select and review articles generated by the search engines; references in a given article led to other articles. Saturation was used as the stop criterion when new articles did not yield new factors (Andersson & Grönlund, 2009).

Mahmud (2010) carried out a study that illustrated technological, psychological, socio-cultural and economic factors affecting successful implementation of e-learning for higher education in Bangladesh. Unwillingness to change the learning atmosphere, poor level of competence in English, lack of funds and technical resources in universities, lack of confidence to practice computer applications and absence of infrastructures such as electricity and telephone lines are some of the factors that were identified as affecting e-learning implementation in Bangladesh.

Nawaz et al. (2011) provide a review of the current e-learning implementation trends at the university level in Pakistan. The study identifies the following factors as having an impact on e-learning development: teachers' ability to integrate technology into teaching and learning activities, development approaches and attitudes, project management techniques, user participation, user training, change management.

Bhuasiri et al. (2012) carried out a study in four developing countries, i.e. Indonesia, Laos, Thailand, and the Philippines, with the aim of identifying factors that influence the acceptance of e-learning. The study derived six dimensions (learner characteristics, instructor characteristics, institution and service quality, infrastructure and systems quality, course and information quality, extrinsic motivation) with over 20 critical success factors for e-learning implementation, as presented in Table 1.

Table 1

Related studies about factors affecting e-learning in developing country contexts

No.	No. Author(s)	Context of Study	Factors
1	Bhuasiri et al. (2012)	Indonesia Laos Thailand Philippines	Learner characteristics (computer self-efficacy, Internet self-efficacy, attitude towards e-learning), Instructor characteristics (time response, self efficacy, technology control, attitude towards students, interaction fairness),

			Institution and service quality (computer training, program flexibility), Infrastructure and systems quality (Internet access quality, reliability, ease of use, system functionality, system interactivity, system response), Course and information quality (course quality, relevant content, course flexibility), Extrinsic motivation (perceived usefulness, clear direction)
2	Mahmud (2010)	Bangladesh	Lack of computers and Internet connectivity, Inadequate bandwidth, lack of students' selfmotivation, lack of confidence in using computers, poor competence in English, difficulty in engaging learners online, lack of awareness of e-learning, unwillingness to change learning environment, ethically harmful Internet contents, load shedding of electricity, lack of training material, software piracy, plagiarism

Advantages and Disadvantages of E-Learning

This section aims to introduce some of the general advantages and disadvantages connected with e-learning. Electronic learning or e-learning has become a promising alternative to traditional classroom learning. It has also become one of the fastest moving trends in education (Zhang et al. 2004). The advantages of e-learning include the facts that:

1. it is a self paced, flexible, accessible, convenient learning process,
2. it offers savings in cost and time (particularly for students),
3. it is focused on learning through more active participation,
4. it has easier content management, simpler data management and is easy to update,
5. it offers the possibility of linking the content with other learning resources,

6. it offers integrated assessment and testing facilities, and
7. it offers a variety of methods for measuring the learning success.

However, among the many disadvantages are the facts that:

1. e-learning cannot happen without supporting technologies,
2. the technologies and tools are not always sufficiently reliable, and
3. there is a distance between the teacher and students.

Instructional Design

Instructional design refers to a system of how to plan, develop, evaluate and manage the instructional process systematically to ensure that students learn effectively (Smith & Ragan, 1999). Instructional design integrates a broad range of strategies into digital learning tools, such as structuring, organizing and sequencing teaching content in particular ways, based on an identified set of learning outcomes (Gagné & Briggs, 1974). Crawford (2004) describes instructional design as a systematic procedure which is used to develop superior instructional material. It offers designers a means of working more efficiently when constructing more effective instruction practices appropriate for different learning environments and a diverse range of learners. Instructional design emphasizes the learner's needs and goals, and consists of processes for designing instructional materials and activities that are based on step-by-step procedures (Morrison, Ross & Kemp, 2001). Instructional design is used by practitioners who employ direct applications of technology in any aspect of teaching and learning (Ely, 1996). These practices are based on studies concerning learning theory and instructional technology (Rouet, 2002 as cited in Cohen, 2005, p. 27).

Instructional Design and Technology

Technology is changing the way our society communicates and creates connections with one another. The plethora of online courses equipped with new technologies such as virtual worlds, blogs or wikis may be helpful tools that encourage student participation in the learning process including supporting learning theory and instruction.

While the use of these new technologies is on the rise, yet it should be recognized that it is not the technology that effects the actual teaching any more than does instruction conducted in the traditional classroom. Rather, it is how these technologies are employed that is the key. By carefully analyzing how they should be integrated with the curriculum and whether or not they really enhance learning, instructors can achieve superior learning outcomes (Garland & Martin, 2005).

Online content development needs to be based on the principles of effective instructional design. These principles should be in line with sound teaching practices and built from solid educational learning theory. Cassarino (2003) asserts that effective online learning is based on the principles of instructional design and development. The design of e-learning instruction must consider cognitive processing of information, learning tasks, the needs of the learner, and the selection of instructional material. Based on studies conducted recently, when incorporating new technologies into a curriculum such as e-learning learning tools or computer games, the most important consideration to enhance learning is the instructional design and the instructional strategies used in the online course (Clark, 2007; O'Neil, Wainess & Baker, 2005).

Studies reveal that the principles of instructional design are dependent on educational paradigms of the period in which these theories were proposed, so the models may not be adaptable in the current context of developing instruction for online educational settings. Despite there being no best practice in the use of available models for developing online instruction, designers of online instruction tend to employ

conventional instructional design models that meet learners' expectations in the educational setting (Chen, 2010).

Instructional Design Models

An instructional design model presents a framework for the systematic approach to instruction. Instructional design models guide practitioners in constructing instruction by helping them to visualize and manage the steps necessary to execute a high quality instructional design process. They serve as tools to conduct the instructional design task (Gustafson & Branch, 2002, p. 1).

All instructional design models share the common stages of analysis, design, development, and evaluation (Reiser & Dempsey, 2007). However, they differ in the structuring of the stages and sub-stages including the terminology used (Gustafson & Branch, 2007).

Instructional design models are beneficial since they facilitate the work of practitioners in terms of conceptualizing representations of reality. However, when implemented in instructional design practice, the models have some limitations that need to be addressed. According to Gustafson & Branch (2002 as cited in Cohen, 2005), only a small proportion of the results of model testing has been revealed in the literature, so it is likely that a number of models have never actually been executed. Several professional instructional practitioners employed instructional design models to a very limited extent in their instructional design practice. They also introduce different versions of the models in their application to the instructional design process and may opt to leave out or change one or more stages of the process presented by the models.

Therefore, the application and selection of a model is dependent upon the designers' understanding of the context, learning theories, obstacles or task since the models are situational and not universal. They offer a step-by-step approach to plan the

instructional design process for specific learning and teaching initiatives (Morrison, Ross & Kemp, 2004; Siemens, 2002).

Gustafson & Branch (2002) proposed that instructional design models fall into one of three categories depending on their application as described below:

- Classroom-oriented models are appropriate for employing in a classroom context with suitably experienced teachers.
- Product-oriented models are useful for development of technically sophisticated materials that will require the learner to spend several hours or even days on the learning activities for a specific topic.
- System-oriented models are of use when a large amount of technically sophisticated materials will be created by a professional design team with access to a wide variety of resources.

Several researchers are currently developing the processes for instructional design. There are also several existing instructional design models that are beneficial for course development, but selection of the one to follow to create effective instruction is not a simple matter. This is because of the differences in approach of the various models. Hence it is necessary to select a model which is the most relevant in relation to the context of the particular course of instruction. Alternatively, a better choice is a generic instructional design model.

The ADDIE Model

The ADDIE model describes a framework of interlinking phases: analysis, design, development, implementation and evaluation (Gagné, Wager, Golas & Keller, 2005). It basically presents a generic and systematic framework which embodies the fundamental structure of the numerous other instructional design models (Lohr, 2003).

Two major characteristics of this model commonly found in other Instructional Design models are that the process includes an analysis phase and that it is carried out in a cyclical design activity. These characteristics are generally found in the core components of all models, adapted to a particular context which is basically a variation of the ADDIE core feature (Botturi, 2003). It is deployed by instructional designers, developers and practitioners to ensure course development and learning are conducted in a structured way (Castagnolo, 2008, p. 3).

The ADDIE Model is one of the most widely employed instructional design models for developing online instruction (Fresen, 2007), as affirmed by the study conducted by Soto (2013). In his study, the 366 participants were experienced instructional designers, university faculty and qualified individuals in the field of teaching. All had at least five years of experience in the field of instructional design or in developing instructional design models or instructional design for virtual world or online learning. Based on the study, 75.4 % of the participants used the ADDIE process and believed the ADDIE model to be the most appropriate choice for development work in virtual world or online learning. In addition, 52 % of the participants believed that a new model designed specifically for e-learning instruction was not needed for various reasons. Firstly, it would be difficult to develop a new model that was better than ADDIE Model because of the nature of the instructional disciplines. Secondly, there are already several pertinent models available and the

instructor could select different elements from them and adapt them for an e-learning setting.

Although the ADDIE process has been employed as a fundamental model by several instructional designers, researchers suggested that it should be adapted to serve the changing needs of the online learning environment including virtual classroom (Fresen, 2007; Wang & Hsu, 2009; Irlbeck, Kays, Jones & Sims, 2006). This concurs with Branch (2009) who points out that there is not a precise procedure for applying the ADDIE model nor is there a correct sequence of steps to be followed in its application, so each phase will differ depending on the designer's opinion, the backgrounds of the design team members and the learning context in which this model is being implemented.

The process prescribed by the model can be illustrated by the diagram shown in Figure 1.

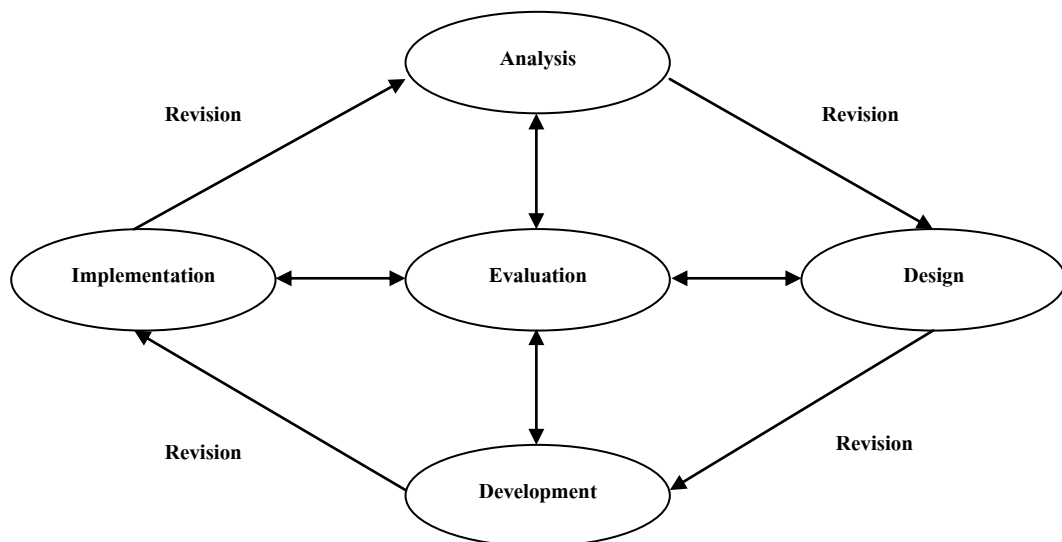


Figure 1 The Five elements of ADDIE Model (Reiser & Dampsey, 2002).

The five phases are described in the following paragraphs.

Analysis phase

This phase involves a needs analysis of the performance problem and covers the determination of the learner characteristics, the learning environment and the expected learning activity. The elements to be considered are the learning goal(s), learner characteristics (e.g. their previous learning experience and their attitudes towards learning) and the learning environment (e.g. accessibility to technology, time schedule). Such analysis is conducted in connection with the skills and tools available to practitioners and learners.

Design phase

The Design phase utilizes the information from the Analysis phase. This information is employed to create a plan and strategy that defines the information that will serve as the foundation for the Design phase. Design is the phase where the objectives, learning activities, instructional strategies and the media and media characteristics are defined in order to be deployed for instruction. Learning objectives and learning outcomes are clearly identified regarding capabilities that learners should achieve by the instruction. This phase can be considered as the blueprint for the course development. Learning objectives can be identified at the course, unit and lesson levels.

Gagné (1985) proposed a theory of instruction which can be classified into three areas: the taxonomy of learning outcomes, the conditions of learning, and the events of instruction. There are nine such events and these allow the theory to be readily put into practice and offer practitioners a framework by which to design learning materials. Gagné's Nine Events of Instruction (1985) was utilized in this study in order to ensure that the most effective teaching materials were prepared and that all stages of the learning process were covered by the materials.

In developing an instructional strategy or instructional method, consideration should be given to how information is best delivered. The construction should be based on the contents to be delivered, how it should be delivered, and the logical sequencing of the contents (Smith & Ragan, 1999). The selected strategy should be based on the assessment of the performance problem, learner characteristics, the learning environment and the expected learning activity collected from the Analysis phase. The most important issue in selecting instructional strategy is that it must best enhance the learners' comprehension within the learning context.

In this phase, the delivery mode of the media such as computer-based multimedia, video-based instruction or teacher-based instruction, and the learning materials are selected. In the context of online courses, the design phase considers detailed storyboards and prototype. The look and feel, visual design, user-interface and the content are also identified (Dick, Carey & Carey, 2001). The three components of design that are content, strategy and media should be matched and rearranged to suit the characteristic of the learning context decision made in the Analysis phase.

Development phase

Decisions and specifications made from the Analysis and Design phases are clearly perceived in constructing learning materials in the Development phase. This phase is the process of developing and testing of the learning experience in all its components. That is to say, developers organize the selected learning materials and the instructional strategy which is applied based on the intended outcome, integrate them into the activities, create new materials and then evaluate the learning outcome (Botturi, 2003). In the context of e-learning courseware, the steps in this phase include: development of instructional materials; creation of storyboard and prototype; design of the user interface and user experience; and finally application of visual design. In a situation where an instructional designer is providing technical assistance with content

format and the learning management system, this phase involves the interaction between instructor and instructional designer (Stevens, 2012).

Tryout of the materials with representative learners, namely formative evaluation, is necessary to be performed in this phase (Reynolds & Anderson, 1992). The materials are reviewed and revised based on feedback given.

Implementation phase

This phase delivers course content to the learner. The delivery may come in different formats and degrees of sophistication. However, it is commonly the mechanism in which the students receive course materials and participate in the learning process. Preparation of the learners is required in order to train them on the new tool and on registration for the course. Decisions are made in terms of delivery platforms and resources, allocation of rooms and assignment of instructors or facilitators. The purpose of this phase is to ensure that the instruction is appropriately utilized by individuals involved in the implementation. In the context of e-learning courseware, this is the phase where designers ensure that tools and software are in place and that the learning application or website is functional.

Evaluation phase

Evaluation is an important element in the whole process, and this is done by measuring and checking the efficiency and effectiveness of the instruction (Taylor, 2004, p. 4). Evaluation is crucial as it is the phase that makes the model cyclic by closing the loop (Botturi, 2003). The purpose of this phase is to evaluate teaching and learning activities and intended learning outcomes which are considered as the main factors for evaluating the effectiveness of the design of course. This phase includes soliciting feedback from users to improve the course.

There are two types of evaluations that can be implemented at different times during course development: formative and summative evaluations. Formative evaluation occurs in each stage of the phase. Summative evaluation occurs at the

completion of the phase and consists of tests designed for individual items including providing opportunities for feedback from the learners and evaluating learning outcomes of learners (Strickland, 2006). The summative evaluation follows the implementation phase to identify its effectiveness and to meet the stated instructional objectives. It measures knowledge transfer, learning outcomes and attitude of learners. The objective of formative evaluation is to gather information especially in the early phase in order to find out problems and to develop solutions for the purpose of improving the effectiveness of the learning course. Summative evaluation aims at evaluating the effectiveness of the learning course such as how much users favored the course, or how much they learned.

Dick, Carey and Carey (2000) suggest a technique of formative evaluation involving three steps: one-to-one, small group, and field trials. One-to-one involves working with individual learners. For one-to-one evaluation, the designer collects feedback from each student to revise the learning materials. The data collected are deployed for revision (Dick, Carey & Carey, 2011, p. 262). While selecting participants for the one-to-one evaluation, the researcher should aim for those who represent the low, middle, and high ability groups. When all data has been collected, the designer will make appropriate changes in the teaching materials based on the findings from this evaluation. However it is important not to infer that these findings are representative of the target population. Individual differences of the target population must be considered prior to making changes.

The next step is small group evaluation in which eight to twenty people who are representative of the target population studying the learning materials are selected. This phase aims at helping the instructor determine the effectiveness of the changes made after the one-to-one evaluation. A field trial is then undertaken which involves the testing of the instruction in a real-world situation with a particular group of learners (Dick, Carey & Carey, 2011, p. 267-268). Its purpose is to ensure that all of the

deficiencies or errors from the two other evaluations have been corrected and to check whether the instruction works as intended in the context. Then, any final revisions can be made.

In conclusion, the ADDIE Model does not restrict how developers can build an instructional system in detail. It explains the stages and procedures in generic terms, which can be flexibly adapted to various settings such as in making quality checks in the various phases of the process. All ADDIE phases must be designed based on consideration of the needs of the learners and the applicability of the content.

Gagné's Nine Events of Instruction

The instructional design for e-learning courses is not an easy task since instruction is not conducted in a traditional classroom setting with an instructor to facilitate the learning process, learner motivation, attention to learning content, and learners' understanding of the learning content. Gagné's nine events of instruction, Piaget's theory of cognitive development, and Vygotsky's social cognitive development theory are the most relevant learning theories for e-learning courses that are likely to be employed to construct learning materials (Wang, Brown and Jason, 2012, p. 4).

The e-learning lessons of this study were designed and constructed based on the framework of Gagné's nine events of instruction (1985). Gagné's instructional theory was selected for this study because it has been recognized as a sound foundational instructional theory over several decades (Richey, 2000). In addition, the nine events of instruction are extensively deployed as one of the main components in all levels of instructional design (Mckinney, 2012).

Gagné believes that learning is cumulative and can be assessed, and he has offered specific techniques to convert several learning theories into effective learning methods. The fundamental principles of his work can be applied in education and be widely utilized as the key elements in all levels of instructional design. Wayne (2000, p. 246) mentioned that it is crucial to deploy sound principles such as those proposed by Gagné in developing instructional technology to serve the needs of generations of learners. Gagné's nine instructional events have contributed significantly to the field of instructional technology and they are commonly applied in designing e-learning course.

Using this framework, more detailed design was applied to construct the materials to ensure that an adequate number of process writing activities were included. The design of an e-learning course that focuses on the transfer phases of Gagné's nine events of instruction enhances the associations between new information and skill (Cassarino, 2003). Gagné explained them as external stimulations, or events, and constructed a nine-step process, namely the events of instruction, which address the learning conditions. Based on this framework, a theory of instruction should try to relate the external events of instruction to the learning outcomes through presenting how these events lead to appropriate support of internal learning processes (Gagné, 1985, p. 244). The nine steps are detailed below (Vincent, 2008, p. 21-22 and Mckinney, 2012, p. 4-6):

1. *Gaining attention (reception)*. For learning to occur, it is first important to capture the attention of the learners. This step may be achieved through the use of audio, animation and demonstrations or asking an unusual question of the learners. It is not only necessary to gain the attention of the learners, but also to induce their curiosity so that they will be engaged in the topic or concept.

2. *Informing learners of the objective (expectancy)*. This helps the learners to

organise their thoughts around what they are about to see, hear, and do. It is human nature to want to know what to expect. Therefore, it is constructive to inform the learner about what the expected outcome of the learning activity will be. This should be accomplished by describing the goal of a lesson, stating what the learners will be able to achieve and how they will be able to apply their knowledge.

3. *Stimulating recall of prior knowledge (retrieval)*. This step allows the learners to build on their previous knowledge or skills. It is logical that learners are motivated when they build on existing knowledge relative to learning completely new facts. It is easier for the learner to encode and store information in long term memory when new information is linked to prior knowledge (Gagné, 1985).

4. *Presenting the material (selective perception)*. The content of the lesson should be presented by using several instructional methods to suit different learning styles. The instructor should focus on seeking out new content as well as presenting the content in a manner that is engaging to the learner.

5. *Providing learning guidance (semantic encoding)*. Providing guidance for the learners along with the presentation of new content will encourage them to retain information for long-term storage. The rate of learning increases because the learners are less likely to become frustrated by imprecise facts or misunderstood concepts.

6. *Eliciting performance (responding)*. After providing guided instruction, the learner is expected to apply the newly acquired skills or knowledge. Guided instruction enables the learner to respond to the new information and will increase the likelihood of retention.

7. *Providing feedback (reinforcement)*. It is constructive for the teacher to provide feedback to the learner and provide any additional guidance. This feedback is formative in nature and is not to be confused with formal evaluation. This can be a test or quiz, either oral or written. Learners need to be informed of the correctness of their performance in order to retain interest and to continually improve. Each time new

content is provided, these three previous steps, providing guidance, allowing students to apply knowledge, and providing feedback, may occur many times depending on the difficulty of assimilating the new concepts being presented.

8. *Assessing performance (retrieval)*. The students must be provided with some type of final evaluation. Learner's performance can be evaluated by requesting a repeat of an activity that was part of the learning process. This final evaluation will help the teacher to assess what the learner has grasped of the new concept and in which area the learner requires more instruction. This is to ensure that the learner fully understands the concepts.

9. *Enhancing retention and transfer (generalization)*. The last step is to enhance retention and transfer of knowledge. This step is similar to a review but also provides the students with methods for transferring what they have learned to similar situations. For example, the instructor can inform the learner about similar problem situations, provide additional practice, put the learner in a transfer situation and review the lesson with the learner.

In addition, Gagné proposes that utilizing multimedia in instruction ensures that intended information is effectively retained. Presenting the information in a variety of different methods is effective in achieving a range of required learning outcomes. Mayer (2001) and Sweller (1999) agree with Gagné's claim on the use of various media in an educational setting. The result of their study has some important implications for multimedia learning. It revealed that incorporating both verbal and visual information in the learner's memory is the one of the important steps in the process of how learners construct a mental representation of multimedia instruction (Tabbers, 2002, p. 32). If the instruction is made up of a picture and explanatory text, the learner has to switch back and forth between these two media elements and integrate them mentally. This process increases the working memory load, so the total working memory capacity is not exploited efficiently. If the text is replaced with

auditory information, and visual information is added in multimedia instructions, it will improve learning results because less mental effort is required for processing the text. Both Mayer and Sweller summarized that this overload can be reduced through presenting the text as a narration so that both the visual and the auditory channels are exploited. (Mayer, 2001; Sweller, 1999).

Both studies support Gagné's suggestion in applying multimedia for instruction. Employing multimedia in teaching as recommended by Gagné makes optimal use of the technology when exploited for e-learning course because it greatly enhances the utilization of learning content. In particular, multimedia programs offer variety in the presentation of instructional content to learners.

ARCS Model

The ARCS model (Keller, 1987a, 1987b) is a macro model and theory of motivation that draws upon many motivation research areas (Keller, 1983) and encompasses four components of motivation: attention, relevance, confidence, and satisfaction. Respectively, the four components refer to: getting and sustaining learner attention (e.g., by enhancing curiosity in a task); the personal importance and meaningfulness of a task to an individual (e.g., a task that is aligned with personal goals or needs would tend to be highly relevant); an individual's perceived probability of success at a task; an individual's perception of how well personal effort yielded expected and desired outcomes (Keller, 1987a, 1987b). Each ARCS component describes a major condition that must be met in order for learners to be motivated to learn. For example, for the ARCS component of confidence learners "must have the personal conviction that they will be able to succeed" (Keller, 1979). Further, each ARCS component is composed of subcomponents that describe more specific conditions and also provide process questions and supporting strategies that can help to

address the major condition described in the component (Keller, 1987a). For example, the subcomponents of confidence are learning requirements, success opportunities, and personal control (Keller, 1987a). These subcomponents and strategies will be discussed later after a discussion of learner confidence and related motivation concepts and theories.

Like other theories of achievement motivation, one aim of the ARCS model is to describe learner motivation and behavior in learning contexts. Unlike other theories of motivation, the ARCS model provides a systematic process for analyzing motivational problems in learning contexts, and designing and implementing motivation solutions to those problems, e.g., motivation strategies that enhance or sustain learner motivation (Keller, 1987a, 1987b). This problem-solving process for diagnosing motivation problems and prescribing motivation strategies has been successfully used for designing and implementing solutions to motivational problems in various contexts including CAI (Keller, 2008), and is one of the reasons for adopting the ARCS model for this study.

For attention, Gagne and Driscoll (1988) detail three actions that can be used to enhance learner attention. These are: • vary the appearance or sound of instructional materials; • use concrete examples for every abstraction that is presented; and • surprise the learner with novelty and incongruity (p. 72). The intent of these actions is to avoid designing instruction that becomes mundane or predictable for the learner. Many authors caution, however, of becoming too creative to the point the learner becomes confused with too much “flash,” particularly with actions intended to stimulate the perceptual curiosity of the learner. Keller (1983) notes that while some perceptual curiosity intended to create a sensory-level reaction is useful, it does not have as meaningful an effect as does raising epistemic curiosity. Epistemic curiosity refers to information seeking and problem-solving behaviour that result when the learner's cognitive, rather than sensory, path is stimulated. Keller notes that epistemic

curiosity is more difficult for the educator to sustain, but is far more educationally meaningful than is perceptual curiosity. Gagne and Medsker (1996) suggest that the first consideration for establishing epistemic curiosity is the development of clear outcomes, objectives, and success criteria. Clarity, they point out, "reduces fear born of ambiguity" (p. 177). They suggest breaking complex objectives into more manageable sub objectives, which are then associated with chunked parcels of learning. Strategies recommended by Keller (1983) to gain learner attention and raise curiosity include asking questions or making a statement that creates an unusual perspective in the mind of the learner. The intent of the question or statement is to put the learner in a problem-solving mode that raises cognitive activity. He also suggests using anecdotes to create an emotional element in what would otherwise be purely intellectual material. People, Keller notes, are more interested in the concrete than the abstract, and prefer personal language that gives the impression the lesson is talking directly to the learner rather than to some innocuous individual. Another strategy recommended by Keller is the use of some material familiar to the learner that can be extended into the unfamiliar. He notes that people like to learn more about things already familiar to them. He also suggests developing epistemic curiosity through the use of synectics. Synectics is defined as "the free and unrestrained exchange of ideas among a group of people used as a method of developing new ideas" (Barnhart & Barnhart, 1986, p. 2128). Discussion forums and chat rooms ideally lend themselves to synectic interactions under the watchful eye of the instructor. Keller (1983) suggests that synectics can be used to help make the "strange familiar and the familiar strange" (p. 403). The final strategy for maintaining learner attention suggested by Keller (1983) is to use inquiry as a means of fostering epistemic curiosity. Inquiry learning is intended to help learners further develop cognitive skills by having them seek out answers to questions themselves rather than having the answers provided. With this strategy, learners are provided with some investigative techniques and then allowed to search for answers to

specific questions with the instructor's guidance. The instructor's role is to maintain learner curiosity and to resolve learner frustration in the event the learner becomes confused or overwhelmed while searching for answers to questions presented.

The intent of gaining and maintaining learner attention is to stimulate and challenge the learner's cognitive functions -- to not just inform the learner, but to help the learner learn how to learn. Using techniques intended to maintain learner curiosity help learners discover new ideas and knowledge, and improve their critical thinking skills.

For Relevance, Keller (1983) suggests that learners need to perceive that important personal needs are being met by the learning situation if motivation is to be sustained over the long term. Important personal needs translate into the relevance of the current learning experience to past experiences and to what learners consider worthwhile in the future. Strategies suggested by Gagné and Driscoll (1988) for assuring instructional relevance include the following:

- ensuring that content relates to the learner's past experience and stored knowledge;
- explaining the present worth of the skills, knowledge, and attitudes being learned; and
- taking steps to convince the learner of the value of what is learned for future activities that are valued (p. 73)

Personal needs related to relevance can be enhanced by showing learners that their success is a direct consequence of their efforts when a moderate degree of risk is involved in the learning process and adequate feedback is provided attesting to the learners' efforts. Slight competition can also help heighten the learner's sense of accomplishment (Keller, 1983), and by extension, intrinsic motivation. Care needs to be taken with the introduction of competition, however, to ensure much stronger students do not disenfranchise weaker students during the learning experience.

Providing students with a measure of control over their learning can also help increase the relevance of what is being learned. Providing choice and allowing students to take responsibility for their learning gives them a sense of pride for accomplishments and achievement. Learner control, however, conjures up different meanings depending on the perspective of the individual designer. Merrill (1994) defines content control as the selection and sequencing of externally stated objectives while display control is the selection and sequencing of externally presented displays. He suggests that the term “learner control” also involves the ability of the learner to select and use a variety of internal processing strategies that permit interaction with the instructional product.

Learners appreciate having power over their learning although educators have been careful not to introduce power struggles through inappropriate use of authority on the part of the designer or instructor (Keller, 1983). Examples of excessive power are the provision of unsolicited help or influence exerted on learners by designers and instructors that runs counter to established learning outcomes and objectives.

The final strategy suggested by Keller (1983) to enhance relevance is to provide opportunities for no-risk, cooperative interaction. Learners need to feel a sense of affiliation with the course materials and other students in the course. Affiliation can be achieved by introducing non-competitive activities that help students establish friendly relationships with other students and the instructor. Although perhaps in conflict with establishing the slight competitive approach to learning suggested earlier, opportunities and techniques can be used that cater to both strategies without creating undue conflict among students or between student and instructor.

Regarding confidence, to build learner confidence, Gagné and Medsker (1996) advocate attribution moulding intended to reinforce the notion that successful learning depends, in large part, on effort and learning strategies as opposed to external forces. They suggest allowing learners to assume a certain measure of control over their

learning as a means of enhancing self-attribution and, by extension, promoting an internal locus of control and self-efficacy. Gagné and Driscoll (1988) suggest the following strategies to promote learner confidence:

- communicate clear and definite learning objectives;
- sequence successive lessons or learning tasks so that each can be readily mastered; and
- permit learners to take an increasing degree of control over the sequence of learning and over the attainment of successful outcomes (p. 75).

Gagné and Medsker (1996) also suggest creating a challenging setting in which learners "perform something that they are not quite capable of performing on their own, but can perform with assistance or practice" (p. 177). Keller (1983) cautions, however, that the learning situation should begin with activities that relax students and build confidence early in the learning process. He also suggests instructors make an effort at the outset of a learning situation to establish personal contact with the learner as a means of putting the learner at ease. Personal motivation increases with personal expectancy for success, a character trait that is affected in large part by success or failure with previous learning experiences, locus of control, and personal causation (Keller, 1983).

Instructional design strategies intended to enhance the learners' confidence and sense of control include the provision of advance organizers and clear learning objectives. Comparative organizers can be used to integrate new material with familiar material so that learners are able to draw relationships between the two and better comprehend the new material and also see the relevance of the new material. Expository organizers are used to address unfamiliar material by examining its structure, and breaking it down into component parts, each of which is explained and related to adjoining parts of the overall structure (Keller, 1983).

Feedback is an important element for building learner confidence, but not just any feedback. Feedback must emphasize the relationship between learner effort and the results achieved. If it is evident the learner put great effort into a particular assessment vehicle, but achieved poor results, the feedback resulting from this assessment must balance the need for critique with acknowledgement of the effort expended by the learner. Keller (1983) points out that the feedback should endeavour to increase learner expectancy for success by providing suggestions on how the same amount of effort can improve results by using certain techniques unknown to the learner.

As for satisfaction, Gagné and Driscoll (1988) suggest that attainment of learner satisfaction is perhaps the easiest of the ARCS components to achieve. Satisfaction is attained using feedback to bring about reinforcement. By using a thorough feedback process with many learning iterations, satisfaction with a single learning experience "develops into a selfmanagement skill (actually, a cognitive strategy) that gives support to learner confidence, maintains attention, and the relation of learning activities to long-term goals" (Gagné & Driscoll, 1988, p. 77). Gagné and Medsker (1996) again note the importance of establishing clear learning objectives at the outset of learning and the negative impact on learner motivation that can occur if those objectives are inconsistent with what is provided in the accompanying instruction. They also suggest providing instruction as close as possible to the direct application of that instruction so the knowledge or training gained can be employed immediately.

Intrinsic satisfaction with learning occurs if instruction uses task-endogenous, rather than task-exogenous, rewards. Keller (1983) citing Condry (1977) and Bates (1979) notes that endogenous rewards tend not to be seen as manipulating the learner and therefore cater to the learner's intrinsic motivation. Endogenous rewards flow naturally from instruction, such as would typically be found with feedback provided

for an assignment included with the instruction. Exogenous rewards, on the other hand, are not directly related to the task and are generally provided as a method of coercion to elicit certain behaviour from the learner. An example of an exogenous reward would be promising participation in a field trip if a certain grade were achieved on a test.

Keller (1983) also suggests using "verbal praise and informative feedback rather than threats, surveillance, or external performance evaluation" (p. 426) in order to maintain intrinsic motivation and satisfaction. Verbal praise and informative feedback tend to increase the learners' appreciation of what they are learning and reduces the threat of implied punitive action should performance not meet instructor expectations. Keller also suggests that informative feedback be provided as close as possible to the response to which it applies in order to give greater meaning and influence to the feedback.

Whole Language Approach

Concepts of the Whole Language Approach

According to the proponents of the WL research, WL involves the process of interacting with authentic materials for communicative purposes in order that students can develop their abilities to listen, speak, read, and write in a natural way and that students can understand the skills of language (Lems, 1995; Remond, 1994). There is considerable variability among the answers about what Whole Language is. The WL philosophy derives from different kinds of research, including cognitive psychology and learning theory, psycholinguistics and social linguistics (Weaver, 1990). Although WL is recognized as a philosophy rather than an approach, the term the Whole Language Approach is used to represent instructional practice that stem from WL philosophy. According to Goodman (1986), "It's a way of bringing together a view of language, a view of learning, and a view of people, in particular two special groups of

people: kids and teacher” (p. 5). Some of the precepts of Whole Language (Worthman & Matlin, 1995) are as follows:

1. Listening, speaking, reading and writing are interrelated language processes that are learned in the same ways.
2. Understanding and comprehension are always the goals of language learning.
3. Language learning and thinking occur through social interactions that have personal meaning and purpose for each student.
4. Oral and written language develop from whole to part and include the concepts of sounds, letters sentence patterns and meaning.
5. Language loses meaning when it is taken out of context.
6. Students learn when they are in an atmosphere that allows them to take risks and learn from their mistakes.
7. There is not guaranteed one-to-one correspondence between what an adult teachers and what students learn; students construct their own understanding built on their past experience and knowledge (p.18).

Vygotsky (1978 cited in Lin 1997) provides WL educators with a key understanding of the relationship between the learning of individual learners and influence of the social environment. As noted earlier, he believes that learning is social and further stresses that people learn best when they learn through social interaction. Guided by Vygotsky’s (1978) emphasis on adult guidance in students’ learning encapsulated with the term “zone of proximal development”, WL teachers view themselves as facilitators who support and help learners’ transactions with the world. They support learning but they do not control learning. They create various opportunities for learners to explore prior experience or their existing background knowledge to construct an understanding of the world. Simultaneously, they provide students with strong support and facilitate the learner’s taking responsibilities for their

own learning (Weaver, 1990). In conclusion, based on Vygotsky's (1978) view about social interaction in the learning process, WL stresses the importance of collaboration between students and teachers.

There are also links between the WL philosophy and some of those of the Piagetian School. Piaget (Piaget & Inhelder, 1969 as cited in Lin, 1997) viewed learners as active participants in their own learning rather than recipients of information and knowledge. They acquire knowledge by means of interacting with the environment and then constructing their own vision of the world that may or may not conform to the adults' vision. These various views of the world held by the children are very important, because children bring them to the classroom (Duckworth, 1987). WL teachers facilitate students' learning by building on the strength that the learners have brought with them. Whole Language builds on Piaget's (1969) constructionist theories of learning. Constructionists describe learning as an active process in which children interact with other children or adult in authentic setting.

Research Support for WLA

There is some research that support Whole Language Approach. Adair-Hauck (1996) conducted a three-month research project by using WLA to teach intermediate-level French to twenty L2 learners. He found students' response to WLA to be rather positive and most students claimed that they liked WLA activities and learned better when they enjoyed their class. Tseng (1997) explored a successful Whole Language class in a college. She described her successful experiences in an EFL program at Hua-Lien Teacher College, where Whole Language theory was supported in students' learning process. This study confirmed the belief that Whole Language works in ESL/EFL setting, and the EFL Whole Language curriculum proved to be an effective environment. Cheng (1998) conducted a research project of 64hours within 16weeks to investigate the effects of the adapted WLA to an English class in a junior high school

in Taiwan. The subjects included 36 second-grade students. The researcher designed the teaching activities and discussed them with the class teacher to improve the curriculum. She found that the adapted WLA motivated the students to learn English and most of the students expressed that they became interested in learning English at the end of the study.

Pronunciation

English is generally the first foreign language that students must study in schools (O'Sullivan & Tajaroensuk, 1977). Thais' level of English proficiency is low in comparison with many countries in Asia e.g. Malaysia, Philippines, and Singapore. According to the Ministry of University Affairs, in March 2000 the average Test of English as a Foreign Language (TOEFL) scores of Thais were the same as for Mongolians but higher than for North Koreans and Japanese (Wiriyachitra, 2004). The revised proficiency-based curriculum will provide students with the opportunity to continue their English education without interruption and to facilitate life-long learning (Ministry of Education, 1996).

From studies of the levels of Thai students' English ability in speaking and listening between 1972 and 1988, Sukamolson (1989) concluded that students' listening skill in Grade 7- 9 was very poor. Students had problems in listening to dialogues and texts as well as problems of pronunciation. Wiriyachitra (2001) asserted that researchers have also suggested that the English curriculum in the Thai university cannot meet the demands of English used in the workplace. The skills used most are listening and speaking, which are not the focus skills in the Thai tertiary education English curriculum.

English problem sounds for Thai students

Language is a cognitive skill, which includes productive skills of writing and speaking and receptive skills of reading and writing as well as language components, namely vocabulary, structure and phonology (Wongsothorn & Pongsurapipat, 1992).

Jotikasthira (1999) stated that the English sounds which are considered problem sounds for Thai students can be divided into three categories:

- Sounds that do not occur in Thai: These sounds are / Θ / e.g. van, every; / Γ / or /th/ e.g. thin, breath; / Δ / or /th/ e.g. mother, then; / ζ / e.g. zero, nasal; / Σ / or /sh/ e.g. share, notion; / Z / or /zh/ e.g. casual, beige; / $t\Sigma$ / or /ch/ e.g. future, cherry; / dZ / or /j/ e.g. gentle, jelly and / γ / e.g. gamble, legal. Normally Thai students cannot pronounce these sounds because they do not exist in the Thai language

- Sounds that do not occur at the final position (They are different from Thai equivalents as to distribution, though existing in Thai). Although some English sounds exist in Thai, they do not occur at the final position in Thai and most Thai students fail to pronounce them when they appear finally in English words (Jotikasathira, 1999):

a. /l/ substituted by /n/

b. /f/ substituted by unreleased / β /

c. /s/ substituted by unreleased / δ /

d. /s/ may be omitted when occurs after diphthongs /ai/ e.g. nice, /au/ i.e. house, / Oi / e.g. rejoice. This is because in Thai there is no consonant sound following these diphthongs.

e. /p/, /b/, /t/, /d/, and /k/ are pronounced as unreleased instead of released sounds because these sounds are pronounced unreleased when they occur in final position in Thai words.

- Sounds that are phonetically different from Thai equivalents: /r/, /i/, /e/, /u/, and /o/; that is, their production is not the same. The English /r/ sound can be formed in the ways depending upon different speakers and dialects. For example, retroflex and

bent back is common throughout the Midland area (Francis, 1958). This retroflex /r/ is made by moving the sides of the tongue against the back teeth. The front of the tongue is lowered but the tip is turned upward and 16 withdrawn towards the back of the mouth, whereas the Thai /r/ sound is just a trilled /r/. Tense vowels such as /i/, /e/, /u/, and /o/ are slight diphthongs; that is, they are pronounced with a diphthongal quality. The degree of diphthongization is greatest when these slight diphthongs occur in a stressed syllable. On the other hand, the Thai vowels of /i/, /e/, /u/, and /o/ do not have this diphthongal quality.

The strategies for overcoming incomprehension are simply another aspect of the total communication-language learning process. Teachers need to help learners become aware of strategies they need for effective communication, whether in making themselves understood, or in understanding what another speaker has said (Avery & Ehrlich, 1992).

Language features involved in pronunciation

Pronunciation training includes micro-level skill (accuracy-based learning), macro-level skill (fluency-based learning) and awareness-raising classroom activities. At the micro-level skill, learners should be trained both in segmental (a study of sounds) and suprasegmental features (training in stress, intonation, rhythm, linking) (Morley, 1979 and Gilbert 1984). Celce-Murcia, Brinton and Goodwin (1996), Gilbert (1990), and Morley (1991) describe segmentals as the basic inventory of distinctive sounds and show the way that they combine to form a spoken language. In the case of North American English, this inventory comprises 40 phonemes (15 vowels and 25 consonants), which are the basic sounds that serve to distinguish words from one another. Pronunciation instruction has often concentrated on the mastery of segmentals through discrimination and production of target sounds via drills consisting of minimal pairs.

Segmentals and suprasegmentals transcend the level of individual sound production and are produced unconsciously by native speakers. But suprasegmentals extend across segmentals. Since suprasegmental elements provide crucial context and support (they determine meaning) for segmental production, they are given a more prominent place in pronunciation instruction.

Suprasegmentals include stress, rhythm, adjustments in connected speech, prominence, and intonation. Stress is a combination of length, loudness, and pitch applied to syllables in a word e.g. HAPpy, FOOTball. Rhythm is the regular, patterned beat of stressed and unstressed syllables and pauses e.g. with weak syllables in lower case and stressed syllables in upper case: they WANT to GO later.

Adjustment in connected speech is modification of sounds within and between words in streams of speech

e.g. ask him /ask him/ becomes /æskɪm/.

Prominence is the speaker's act of highlighting words to emphasise meaning or intent

e.g. give me the BLUE one (not the yellow one).

Intonation is the rising and falling of voice pitch across phrases and sentences

e.g. are you REAdy?

There are, also, strong differences in inflection, stress and intonation among the various regional varieties of English e.g. American, Australian, Indian, and local UK dialects. Internationally, English teachers refer in their teaching to the sounds, stress and intonation of The International Phonetic Association (IPA).

Speech can be broken down into pronunciation and intonation, accuracy and fluency or can be categorised in terms of strategies or it can be regarded as a form of interaction and analysed using the methods of pragmatics or discourse analysis. This means that the accurate speaker may communicate effectively (Skehan, 1998). It

should include all aspects of English pronunciation and the goal of pronunciation teaching is to foster communicative effectiveness (Wong, 1987).

Reading

Reading is a basic life-skill which is a cornerstone for success. It has often been said that the one language skill that students retain throughout their lives is reading. However, most students who learn English as a foreign language (Anderson, 1984, p.1) and second language readers cannot perform reading at the levels required in order to succeed (Carrell, 1988, p.1). Fluent reading entails heavy demands on the reader's attention and relies on the automatic processes of decoding and comprehension (Samuels, 1994). In the case of ESL/EFL students who are trying to comprehend a text in a language not yet mastered, the task inevitably requires more attention than is available, as their L2 reading is often slower, more laborious and frustrating compared to their L1 reading (Fung, 2003). Indeed, in order to help ESL/EFL students to read more effectively they need reading strategies training.

Nature of Reading

Nature of reading comprehension There are three reading models: bottom-up (Carrell, 1987, p.416), top-down (Smith, 1979), and interactive (Stannovich: 1980, cited in Cohen, 1991, p.86). However, in real reading readers use interactive models for comprehending texts. The three reading models will be explained briefly.

Traditionally, ESL reading instruction has followed the "bottom-up" model of reading (Carrell, 1987: p.416). In this model, reading was viewed as a passive process. The readers decode and reconstruct the author's meaning through recognizing the printed letters and words, then, build up meaning from the smallest textual units at the "bottom" (letters and words) to larger and larger units (phrases, clauses, intersentential

linkages) at the top (Carrell, 1988: p.2). Stanovich (1980, cited in Cohen, 1991:p.86) called these models of reading “text-based” or “data-driven” reading. In this case “data” refers to the letters and words on the page. ESL/EFL readers may use bottom-up reading activities such as using a dictionary and analyzing words or sentence structure in order to get meaning. Cohen (1991: p.86) suggested that the readers avoid this situation by choosing texts which are appropriate for their level of proficiency.

In 1979, a top-down model of reading was proposed which assume that readers get meaning from the text by using their prior knowledge and experience. Smith (1979) stated that, “the more you already know, the less you need to find out.” In other words, the more the readers know about the topic beforehand, the less they use the graphic symbols to help them get meaning or comprehend the text. However, Samuels and Kamil (1984: p.212), claimed that top down model also have problems, as do the bottom-up model. One of the problems is that, for some texts, the reader may have little knowledge about the topic, thus, making predictions is very difficult. A more serious problem is that prediction takes a large amount of time even for a skilled reader. That is to say, it is easier for a skilled reader to recognize the words in the test than to attempt to make predictions.

However, successful readers learn to combine both models while they are reading. The combination of the two models is called the “interactive model of reading” (Stannovich: 1980, cited in Cohen, 1991: p.86). The word “interactive” refers to the interaction of the reader’s several kinds of knowledge and the interaction of the reader and the text (Dubin & Eskey, 1986: p.16). According to the interactive model, the reader begins the process by making predictions about the meaning of the topic, then confirming and/or rejecting the predictions (Anderson & Pearson, 1984:255-291), and/or decoding letters and words. Some interactive theorists believed that top-down and bottom-up processes occur almost simultaneously (Hayes, 1991: p.7). This means that readers play an active role if they have a lot of prior knowledge about what they

read for information cues (Kamil & Pearson: 1979). On the other hand, passive reading occurs if the readers have little experience or prior knowledge about the topic.

In the present study, the interactive model was used in the design of the reading strategies lessons.

Activities used in Three Strategies of Teaching Reading

In general, a language lesson consists of 3 main stages: presentation, practice and production. In presentation, the language input is given, in practice, the language is practiced and then put into use in the production stage. Reading lessons also fall into this 3-stage arrangement: pre-reading, while-reading and post-reading, each of which needs different types of activities to achieve its purposes.

Barnett (1988) suggests that students can be encouraged to use effective reading strategies by using the activities below for each stage of pre-reading, while-reading and post-reading.

In pre-reading stage, activities that help readers access their prior knowledge about the reading topic can be utilized. These activities include answering pre-text questions before going through the text such as answering questions based on the title/topic, making predictions based on previewing, skimming for general ideas, reading the introduction and conclusion and scanning for specific information (Auerbach and Paxton, 1997). Barnett (1988) suggests that pre-reading activities can be used to introduced students to a particular text, to elicit or provide suitable background knowledge, and to activate necessary background knowledge about what they are going to read.

In the while-reading stage, activities that call for readers to obtain more information to understand the text content and to further develop their reading strategy are utilized. These activities include guessing meaning of vocabulary by using context clues, analyzing reference words, reading for specific pieces of information and

understanding text content Barnett (1988). Williams (1994) suggests that the purpose of the while-reading stage is to promote the understanding of the text content and text structure, and to comprehend the writer's purpose.

In the post-reading stage, activities that help readers check their comprehension and lead them to a deeper understanding of the text are used. These activities include revising pre-reading expectations, checking what the reader thinks the author is saying, relating the text content to his/her own experience and responding to the text or criticizing it (Auerbach and Paxton, 1997). Williams (1994) suggests that the post-reading stage helps consolidate or reflect upon what has been read to relate the text to the learners' own knowledge, interests, or views.

Reading strategy instruction

In order to read English hypertext successfully, L2 learners need printed text and hypertext reading strategies training.

There are two ways of giving reading strategy instruction - embedded and direct (Chamot, 1990). In embedded instruction, a teacher guides the learners through activities that require the use of a particular strategy, but the teacher does not inform the learners that they are utilizing the strategies being practiced and generalize it to other usages outside that particular lesson. On the other hand, in direct instruction, the teacher informs the learners about the anticipated benefits of utilizing the particular strategy before the training then gives explicit instruction on how to apply and transfer that particular strategy. Previous research on strategy instruction pointed out that embedded strategy instruction did not lead to transfer but direct instruction led to the transfer and maintenance of the trained strategies to new tasks (Chamot, 1990).

Duffy et al. (1986) supported the use of direct strategy instruction for first language reading. Their studies (Duffy et al., 1986 and 1987) indicated that direct

instruction in reading strategies were useful to readers in giving them more awareness of the strategies used and how to apply those strategies in the reading practice.

Moreover, Salataci & Akyel (2002) investigated the reading strategies used by Turkish EFL students in Turkish and English. The study also investigated the possible effects of direct reading instruction on reading in Turkish and English. The participants were eight Turkish students enrolled in a pre-intermediate level class. The data were drawn from five sources: think-aloud protocols; observation; a background questionnaire; a semi-structured interview; and the reading component of the PET (Preliminary English Test). The researchers concluded that targeted reading strategy instruction had positive effects on both the students' Turkish and English reading comprehension.

Based on the findings discussed above the direct reading strategy training was used in this present study because it has been found to be more effective than the embedded strategy instruction.

Writing

Writing is one of the most complicated language skills for both native and non-native speakers. Learning to write is a complex task requiring considerable effort, sufficient time, and much practice to achieve an acceptable piece of written work, implying that teaching such a skill is an exacting endeavour. Several ESL/EFL researchers and instructors have attempted to search for the most effective approaches and models of teaching L2 writing.

The Process Approach to Writing

The process-oriented writing strategy has come into favor in recent years due to the limited success of the product approach. The writing process is a method of looking at the teaching of writing in which the focus has changed from the students' finished products (patterns of organization, spelling and grammar) to what students think and do as they write (planning, revising, and the like) (Tompkins, 2004, p. 9 and Applebee, 1986, p. 96). The focus of this theory is on the writer as an independent producer of text. The most essential part of this approach is the process that the writer goes through to generate written text. The cycle of composing activities, from producing ideas and collecting data through to the publication of a complete text, is the main focus, and this enhances writing skill as a result (Silva, 1990, p. 14; Tribble, 1996, p. 37). Tribble (1996) proposed the following stages: prewriting (planning and outlining/collecting data), composing/drafting, revising (reorganizing/arranging information, adjusting or refining ideas or style for the benefit of readers) and editing (finding surface language errors and features).

Based on this approach, writing is therefore considered as a generative process through which the writers discover, organize, and reformulate the ideas they want to convey. The writers look for appropriate language to adequately convey the intended content, transposing their thoughts into written text, and revising what they have written in order to effectively express what they want to say to the intended reader. Facilitation by an instructor to provide input and stimulus to the writer during the composing process is largely unnecessary since the writer's full potential has been more fully tapped. This approach enables writers to control their own way of expressing themselves and then to work through their writing by discussing, reflecting and reworking until they complete a draft (Nunan, 1999, p. 272). This means that the emphasis is placed on the development of writing rather than on the final draft.

Steele (2002) concluded her analysis of the differences between process and product approach as follows:

Process Writing	Product Writing
1. Text as a resource for comparison	1. Imitation model text
2. Ideas as starting point	2. Organization of ideas more important than ideas themselves
3. More than one draft	3. One draft
4. More global, focus on purpose, theme, including text type	4. Features highlighted, controlled practice of those features
5. Collaboration	5. Individual
6. Emphasis on creative process	6. Emphasis on end product

Based on the information above, the successful written work is not only in the technical precision of the resultant product, but also the way the writer elaborates on the topic and the appropriateness of the related information as described. This can be achieved in the different stages of the writing process. Thus, in developing writing skill, the process approach should be given due recognition.

Definition and Features of Process Writing

Tribble defines the 'process approach' as 'an approach to the teaching of writing which focuses on the creativity of each writer, and which pays attention to the development of good writing practices more than the imitation of models' (Tribble, 1996). Thus, the focus has changed from the final product itself to the different stages the writer goes through in order to create the product.

Flower and Hayes (1980) described this model as the process of creating ideas that employs students' background knowledge. This model required students to

consider carefully the selection of information prior to writing, revising, and editing language and content, in order to produce an effective composition.

The Stages of Process Writing

Although writing theorists have agreed that writers go through stages as described previously in every instance of writing, they have not agreed on the labeling of the stages. The following is an overview of these stages proposed by several writing specialists.

Hedge (1988, p. 21-23) and Raimes (1985, p. 235-245) described the process of writing as consisting of three major activities or groups of activities: pre-writing, writing and post-writing (revising and editing). Various terms have been given to these stages by some researchers: planning, translating and reviewing (Flower & Hayes, 1981). White and Arndt (1991, p. 6) described each phase in the writing process as generating, focusing, structuring and drafting, evaluating and reviewing. Czerniewska (1992) says that all process theorists stress that the stages in the writing process are recursive rather than linear. She adds that it would be inappropriate to go through all these stages in every instance of writing – the nature of the ‘process’ depends on the purpose for writing, the length of the text, the complexity of the ideas and the time available to the writer. Moreover, Parrott (1993, p. 224) explains that in practice these stages will rarely be discrete – there may be considerable overlap between them and there may be ‘regressions’ to earlier stages.

Several scholars and experts have conducted research concerning the writing process and have recognized that writing is a complex, recursive, dynamic nonlinear process (Cotton, 1988). The writing process can be broken down into a series of stages which have been given different names by different specialists as shown in the Table 2 below.

Table 2*Stages of Writing Proposed by Different Specialists*

References	Writing stages			
	Stage 1	Stage 2	Stage 3	Stage 4
Flower and Hayes (1981)	Planning	Translating	Reviewing	-
Raimes (1985)	Prewriting / Planning	Writing	Revising	Editing
Hedge (1988)	Prewriting	Writing and Rewriting	Editing	-
White and Arndt (1991)	Generating ideas, Focusing, Structuring	Drafting	Evaluating, Re-viewing	-
Harris (1993)	Assembling strategies	Creating and developing the text	Editing	-
Brown (1994)	Prewriting	Drafting	Revising	-
Maxwell (1996)	Discovering	Drafting	Revising	-
Seow (2002)	Discovering	Drafting	Revising	Editing

Based on the table above, four stages have been proposed in specialists' models of writing process.

Stage 1: In this stage, the writers generate ideas by retrieving them from their existing knowledge. It helps writers to explore possible content and plan outlines. It consists of brainstorming, listing, freewriting and the like.

Stage 2: In this stage, writers translate their ideas into sentences and paragraphs. They focus on the messages they would like to convey. This is called different names by different researchers: writing and rewriting (Hedge, 1988), drafting (White & Arndt, 1991), or creating and developing (Harris, 1993).

Stage 3: This stage is when writers consider the content and organization of their writing. They rethink and rewrite what they have written for the purpose of improving the draft. They sometimes add, delete, rearrange or clarify the content if they feel that it is incorrect or unclear. Some writers include editing in this stage so that they can concentrate on accuracy of grammar, punctuation, mechanics and the like.

Stage 4: This stage is called post-writing. Writers engage in tidying up their contents as they prepare the final draft. They check and edit for surface-level issues such as accuracy of grammar, punctuation and spelling. According to table 1, some researchers have merged Stages 3 and 4 into one. In some models, the editing process is employed as a final stage for checking accuracy of grammar.

According to the writing process above, it can be concluded that it can help train learners and provide an opportunity for them to write according to a prescribed process rather than to the traditional instruction model. It consists of planning, writing, revising and editing the composition. The four stages in this process are undertaken iteratively and will develop and increase the learners' writing competence. The stages in the process-oriented approach to writing can be summarized as follows:

1. Prewriting is the planning of writing or preparing information prior to writing.
2. Writing is the stage that uses the prepared data from the first stage to compose a draft in which the content is organized. At this stage, the learners will pay attention only to content, not the accuracy of language used, in order to minimize their anxiety.
3. Rewriting is the stage that occurs after learners uncover their weak points in the composition and revise the content and language with more appropriate choice of words. The learners must rewrite their drafts

4. Evaluation is the stage that helps learners to recognize the quality of their work after they have improved and rewritten their first drafts.

Related Research

Several studies were found in the literature review relating to the use of e-learning in the language classroom to enhance students' learning competencies of English skills, and to encourage them to be self-learners and to participate more actively in the learning process.

Lasagabaster and Sierra (2003) stated that although several studies have explored the attitudes of teachers and students towards CALL, there has been little research regarding students' insights and impressions. Kessler and Plakans (2001) stated that in the process of evaluating materials "learners must be included, as they are also experts of their learning as well as benefactors of well-developed materials. Lasagabaster and Sierra (2003) undertook a study in which students were given the opportunity to express their opinions about the software they used in the multimedia laboratory. Participants of the study were 59 undergraduates who completed a questionnaire, and the conclusion was that students clearly see software programs as a complementary tool in the foreign language classroom.

Within the field of Computer-Mediated Communication (CMC), it is also considered that successful implementation of computer-based, interactive, communicative tasks, can yield numerous benefits for L2 learners. De la Fuente's (2003) study examined the differential effects of computer-mediated interactions and face-to-face interactions in the acquisition of L2 word meanings by learners of Spanish. Receptive and productive, oral and written measures were used to assess both task participation and assessment performance. Interactionist, task-based research has recently examined the potential effects of negotiation of meaning on L2 vocabulary

development, and the role of pushed output production within the negotiation process (De la Fuente, 2003). Current cognitive psychological knowledge on L2 vocabulary (Ellis, 1995) served as the framework to explain results.

Kim's (2009) study examined the effectiveness of the types of feedback that vary in its explicitness in a computer-assisted language learning (CALL) environment as well as adaptive methods of feedback delivery based on learners' performance. Both issues were examined within the context of a computer-based tutorial designed to help advanced Korean learners of English reduce overpassivization errors in academic writing. The results suggested that among the types of corrective feedback provided (traditional, prompt, contrastive, and adaptive), the contrastive type of feedback, which contained the target structure, seemed to be the most effective feedback type for increasing the adult Korean ESL learners' ability to recognize and correct overpassivization errors.

Dejthongpong (2002) developed a web-based instruction in English writing through the use of web collaborative tools consisting of e-mail, web board and chat room. The study examined the effect of these tools in web-based instruction on metacognition and English writing competency and the differences in effect between Thai and Chinese University students. The 60 subjects were a group of Thai students studying at Rajamangala Institute of Technology, Thailand and a group of Chinese students studying at Guangxi Normal University, China. The result revealed that the Thai and Chinese students who studied from web-based instruction using web board and communicated with email had higher scores than those who studied from web-based instruction utilizing internet chat applications. This is because web board and email are asynchronous and students had more time to write, recheck, evaluate and revise their written work before submitting it. For those who learned through using chat room, they had to think and write on-the-spot so they had less time to recheck their written work.

In a case study conducted by Kim and Rissel (2008), three language instructors' beliefs about how language teaching and learning affected their use of computers in teaching in a postsecondary context were examined. Data consisted of six weeks of observations of classrooms and computer labs and interviews with the three instructors. The findings suggest that the instructors' belief about interaction affected their use of computer more significantly than their ability to use computer technology and imply that for computers to be more widely used, instructors' belief and approaches to language teaching needs to be taken into consideration.

Summary

This chapter presents a review of the existing literature on e-learning instruction, instructional design, ADDIE Model, Gagné's nine events of instruction, ARCS Model, Whole Language Approach, pronunciation, reading, writing, and related research.

The important features of e-learning instruction are presented. It is considered as one of the potential tools for enhancing teaching and the learning process in university education as it can provide teachers and learners with a wide variety of new experiences that may be lacking in a traditional classroom.

Then the theories and conceptual frameworks of instructional design, the ADDIE model, ARCS model, Gagné's nine events and strategies and related features including how they can be translated and applied in practice in this study are further described.

This overview also includes whole language approach and supported research for this approach.

In addition, this chapter addressed the key aspects of teaching pronunciation, reading and writing and explored the principles and practices of language approaches

to teaching these three English skills. Finally, a review of research conducted in the relevant field is presented. The findings reveal important information which is beneficial for the use of e-learning instruction in ESL and EFL learning and teaching.

It is hoped that the review of the relevant literature presented herein will provide an understanding which can be set as a foundation for further study and the analysis of research findings found in this study.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter provides an overview of the research methodology for this study. It is divided into four sections. The first section is an introduction. Secondly, the research methodology is explained in detail concerning research design, research treatments, population and sampling and research procedure. Then, the research instrument is established. Finally, the data collection procedure is presented.

Introduction

ADDIE Model

In this study, the ADDIE Model was adopted as a conceptual framework to translate the research process in detail. The model consists of five phases: Analysis, Design, Development, Implementation and Evaluation. The steps below were followed in order to adapt the model for implementation in this study.

1. Study the concept of instructional design.
2. Study the instructional design process from several models and select the model that would be the most feasible one to be employed in this study.
3. Study the instructional design process from the five phases of the ADDIE Model
4. Identify the components in each stage in order to include activities for developing the e-learning lesson on English pronunciation, reading and writing.

5. Evaluate the activities in each phase by three experts in English language teaching.
6. Revise the activities in each phase based on feedback from the 3 experts.

The criteria used for evaluation were detailed below:

Scores	Meaning
5	very strongly agree
4	strongly agree
3	agree
2	slightly agree
1	disagree

The criteria of means was taken from a range divided by number of level created. This is $(5-1)/3 = 1.33$, for each level the means was added up with 1.33. The results of the analysis are shown in Chapter 4. The value of mean scores for opinion level was interpreted according to the following criteria:

Value of mean scores	Meaning
3.68-5.00	very strongly agree
2.34-3.67	agree
1.00-2.33	disagree

Through the ADDIE phases, the overall research process was conducted and the activities implemented in each phase were explained. Further explanations of the sub-sections within each phase of the model are presented in section of research treatment.

Research Methodology

Research design

In order to achieve the research objectives, the study utilized an experimental design known as pre-test/post-test control group design as illustrated in Figure 6.

A mixed method of the combination of quantitative and qualitative instruments and interviews was used in this study as illustrated in Table 1.

Table 1 *Research Design for this Study*

Group	1 st twelve weeks		2 nd twelve weeks	
	Beginning	During	During	End
Experiment (N = 91)	O1 O2 O3	x	x	O2 O3 O4
Control (N = 65)	O1 O2 O3	-	-	O2 O3

Note: O1 = Demographic Questionnaire

O2 = Achievement test

O3 = Instructional Material Motivation Questionnaire

O4 = Interview

X = Treatment

- = No treatment

All the participants were randomly assigned to an experimental group and a control group via a ballot drawing method. Both experimental and control groups took English Pronunciation, reading and writing classes as scheduled. However, the

experimental group also studied with the e-learning course individually. The control group studied with the conventional face-to-face instruction. These instruments were employed to both groups prior to the treatment: 1) demographic questionnaire to identify the participants' demographic data, 2) a paper-based pretest to identify the participants' English pronunciation, reading and writing proficiency levels, and 3) instructional material motivation questionnaire to identify the participants' motivation levels on English pronunciation, reading and writing skills. The participants in the both groups took a post-test which lasted 3 hours. Immediately after the post-test, the motivation questionnaire was administered to the participants in both groups. Then, nine participants in the experimental group together with three participated university lecturers were interviewed for their opinions towards the participants' English pronunciation, reading and writing achievement and motivations.

Population and sampling

The population consisted of primary school teachers and language university lecturers from local universities in Songkhla province. The group of primary school teachers was purposively selected from 10 primary schools located in Songkhla Province. The primary schools had a mixed population with different language backgrounds: low, average and high proficiency levels, which provides an opportunity to investigate the effects of the e-learning course on participants with different language backgrounds and achievement levels. They were classified as high, medium and low EFL participants based on their pre-test scores. For the language university lecturers who were interested in participating in the study, they were informed about the study and the e-learning course during a training conducted in August, 2014. The participated language university lecturers introduced the study to the primary school teachers and invited them to join the study. A total of 5 language university lecturers and 156 primary school teachers were participated in this study.

Research Procedure

1. The e-learning course learning procedures and learning objectives were described to the participants step-by-step.

2. The participants were divided into two groups: the control group which would study by conventional face-to-face instruction and the experimental group which would study via the e-learning instruction.

3. The participants in the sample groups were asked to complete the demographic questionnaire first. Then, they took the pre-test and filled in the instructional material motivation questionnaire.

4. The control group learned with the teacher and the experimental group studied with the e-learning course.

5. After completion of each unit, each group was assigned to do a unit test.

6. When finishing the course, two groups were assigned to do a post-test.

7. Pre-test and post-test scores of each group were obtained to evaluate the learning progress and to compare post-test scores of the control group and the experimental group to determine the effectiveness of e-learning course.

8. After completing the course, the experimental and control groups were assigned to respond to a questionnaire regarding motivation towards the effect of usage of e-learning course and motivation.

9. The interview was then administered to the experimental group and the language university lecturers.

10. Students' scores and opinions obtained in steps 3, 7 and 8 were analyzed statistically in order to obtain a quantitative assessment of their attitude towards the e-learning course.

Variables

Independent variables: The primary school teachers' a) e-learning course use/ non use b) prior English pronunciation, reading and writing knowledge measured by the paper-based pre-test, and c) computer skills identified by the Demographic Questionnaire.

Dependent variable: The primary school teachers' a) learning achievement on English pronunciation, reading and writing skills measured by the post-test, and b) their motivation measured by the instructional material motivation questionnaire.

Research Treatments

The research treatments used for this study included the e-learning lessons. E-learning lessons consisted of a tutorial designed to teach participants on three skills of English language: pronunciation, reading and writing. The overall design of the e-learning lessons in terms of instructional soundness is described below:

Instructionally sound e-learning: to better ensure that the e-learning was effective in teaching the intended three skills of English language and reflects best practices with the field of instructional design, the overall design of this e-learning employed processes and principles in instructional design suggested by Branch (2009) and construction of e-learning lesson was in line with the recommendation described by Gagné et al. (1985) and Alessi and Trollip (as cited in Tongpoon, 2001). In this study, the ADDIE Model served as the conceptual framework as detailed in the following sub-sections:

Analysis phase

In the analysis phase, participants' needs and problems in English pronunciation, reading and writing are examined. According to the preliminary phase of this study, the result reveals that primary school teachers in Songkhla have problems in dealing with English pronunciation, reading and writing. Most of them do not

understand how to pronounce, read and write effectively and they do not possess the strategies for improving the three skills independently. Moreover, they lack confidence in speaking, reading and writing English on their own, leading to low motivation to speak, reading and writing English.

Design phase

At this stage, strategies, learning objectives, teaching method and learning content, instructional material and assessment of competency are designed for the teaching of these three language skills. Based on the preliminary study, primary school teachers do not possess the strategies for three language skills independently. When asked to identify the techniques that are required for effective English pronunciation they marked three elements provided in the questionnaire: consonant sound, vowel sound, stress and intonation. For English reading skill, they rated on understanding the main idea and vocabulary as the crucial strategies for successful reading, whereas grammar, organization, and content were the top list of writing elements.

For the learning objectives, it is anticipated that participants' English pronunciation, reading and writing competency can be promoted to achieve proficiency in their learning. Regarding pronunciation teaching method and learning content, the results of the preliminary study demonstrate that participants who possessed technical knowledge about the placement of mouth had higher scores than those who did not have background knowledge about it. Based on the results described, the researcher concluded that the higher pronunciation scores of students are due to English pronunciation techniques. Thus, the pronunciation strategies regarding organ of speech, consonant sound, vowel sound, stress and intonation are selected as a teaching method in this study. For writing skill, learners who visibly planned their writing had higher scores than those who did no planning prior to writing. According to the results, it has been shown that the higher writing scores of students are due to writing techniques, otherwise known as the writing process. Therefore, the writing

process is selected as a teaching method in this study. In terms of reading skill, those who paid attention to the connections between sentences or tried to understand the passage as a whole were learners who received higher scores than those who tried to understand a text by understanding words and sentences in the text. As a result, the teaching method for developing reading skill focused on reading strategies: skimming, scanning and guessing word meaning from context clues.

For instructional material, e-learning instruction was selected to deliver the lessons. Based on the findings of the needs-analysis study, participants need to spend more time practicing English speaking, reading and writing at their own pace and in their own time outside classroom.

For the assessment of participants' English pronunciation, reading and writing competency, pre-testing and post-testing were undertaken to evaluate and compare their English pronunciation, reading and writing competency.

Development phase

The e-learning instructional material was developed in this phase. The try-outs of materials with representative students, also known as formative evaluation, were utilized during this stage to ensure that they meet the objectives and will be effective.

Implementation phase

During this stage, the e-learning lesson was conducted in teaching English pronunciation, reading and writing. A total of 91 primary school teachers in Songkhla Province participated in studying English pronunciation, reading and writing through e-learning instruction. The purpose of this stage is to ensure appropriate use of the instructional media by participants.

Evaluation phase

The summative evaluation was conducted after the implementation of e-learning instructional material to check its effectiveness.

In this study, the ADDIE Model served as the conceptual framework as detailed in the following figure:

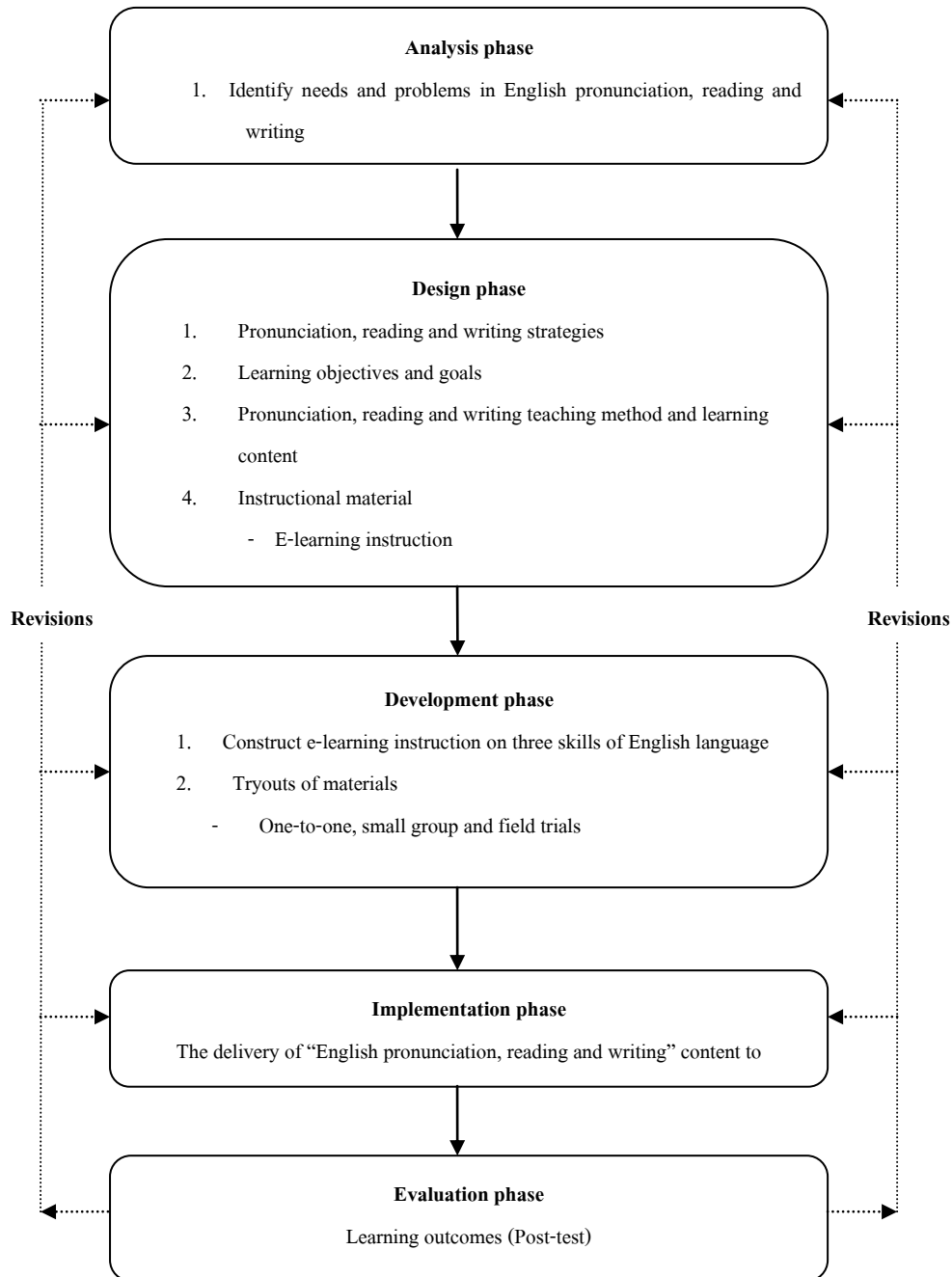


Figure 2 Activities of the e-learning development process in each phase of the ADDIE Model.

In the design phase of the ADDIE Instructional Model, Gagné's nine events of instruction were applied to design the e-learning lessons to enhance the effectiveness as described in the table summarized strategies and approaches relevant to each of the events of instruction applied to the e-learning of this study.

Gagné's nine events of instruction

In the design phase of the ADDIE Instructional Model, Gagné's nine events of instruction were applied to design the e-learning lesson to enhance the effectiveness as described in the table summarized strategies and approaches relevant to each of the events of instruction applied to the e-learning of this study below:

Table 2

Events of Instruction in the E-learning Lessons

Event of Instruction	Examples in E-learning Lesson
Pre-instructional phase	
1. Gaining attention	The activities in the Warm-up session of each unit were designed to stimulate student involvement and to capture their attention before the beginning of the lesson.
2. Informing learners of the objectives	A list of learning objectives or what the students will be able to achieve is presented on the first page of each unit.
3. Stimulating recall of prior knowledge	A quick primer about the previous lesson and a brief summary were included at the beginning and end of some units to avoid confusion with the content of the previous unit. Additionally, activities in this E-learning lesson help learners to associate new information with prior knowledge and to better understand previous concepts or content. These activities were included in a Explore session and a Practice session for each unit.
Instructional Phase	

4. Presenting the material	Learning content in the Explore session was organized and displayed in small segments to avoid memory overload and to facilitate learning and information recall. Techniques such as highlighting specific words and sentences in bold or color were used to help in differentiating content. A variety of media such as explanatory texts, graphics, audio, narration or spoken explanation is exploited to enhance the appeal to students
5. Providing learning guidance	The instruction on how to learn to pronounce, read and write is presented.
6. Eliciting performance	After completing the above activities, students were guided to a Practice session in order to confirm their understanding of the content and to increase their retention rate.
7. Providing feedback	At the end of each exercise, guidance and answers to questions were provided in real time to students regarding their performance.
Post-instructional Phase	
8. Assessing performance	Having completed all sessions in each unit, learners were to take the tests at the end of each unit. In these tests, learning guidance is not provided. The post-test which students were required to do after completing all units will provide an indication of the degree of enhancement achieved.
9. Enhance retention and transfer	Lesson summary that includes “Extra practice” which link to 3D Virtual World to teach English language skills associated with the three skills: pronunciation, reading and writing. This is not a section of the e-learning lesson, nor did the researcher construct the content on the websites containing additional practice.

Research Instruments

The instruments used in this research are:

1. E-learning lessons for enhancing English pronunciation, reading and writing skills.
2. Demographic questionnaire.
3. The achievement test which was used as a pre-test and post-test to contrast the progress of participants' learning achievement on English pronunciation, reading and writing skills.
4. Instructional material motivation questionnaire.
5. A semi-structured interview in Thai.

The Construction of 3 Main Units of 11 Lesson Plans for Conventional Face-to-Face Instruction

1. Studying the concept of how to develop eleven lesson plans of pronunciation, reading and writing skills in terms of terminal objective, learning objectives and contents.
2. Constructing the lesson plans for developing English pronunciation, reading and writing abilities.
3. Examining the lessons plans by 3 language specialists in English teaching.
4. Improving and revising the lesson plans prior to implementing with the control group.

The steps in the construction of lesson plans for the control group are shown in the Figure 3 below.

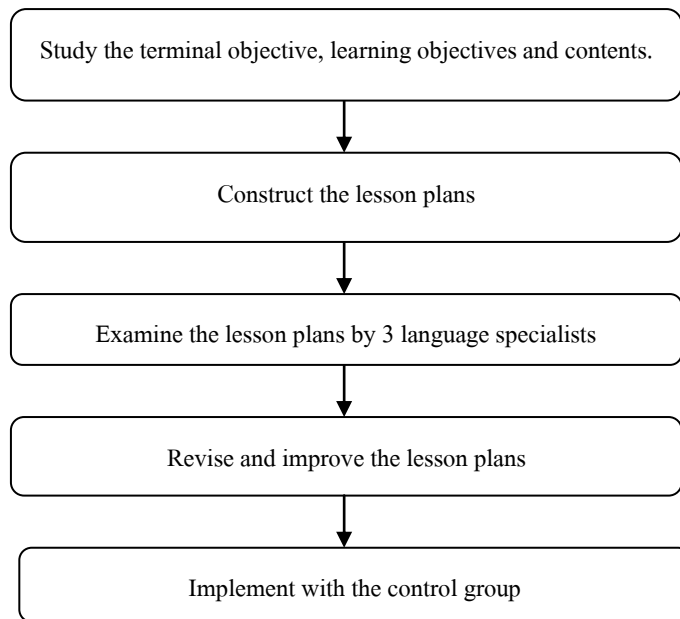


Figure 3 Steps of lesson plan construction for control group.

The Construction of E-Learning Course

The construction of the e-learning course was developed by the following methods:

1. The methods and principles of constructing e-learning course were studied from related articles, books and research.
2. The content and instructional objectives were analyzed, selected and outlined based on the findings from the writing textbooks.
3. The selected content from item 2 was used to construct the e-learning lessons focusing on 11 topics of teaching and learning elements which were similar to those topics in the lesson plans of the conventional face-to-face instruction.

4. The content of initial e-learning lessons was then approved and analyzed by 3 language specialists in English teaching. After approval, the lessons were revised and improved accordingly.

5. The e-learning lesson was designed and a storyboard was written. Each unit consisted of contents, exercises, pre-test and post-test, assembled in a series of frames. The frames contained animated images, a narration, background music, sound effects and buttons for interaction.

6. The storyboard was evaluated and approved by 5 media experts. The evaluation form of the Department of Curriculum and Instruction Development was used to examine the quality of the e-learning lessons in 4 aspects: content, instructional design, screen design and techniques (Department of Curriculum and Instruction Development, Ministry of Education, 2003, p. 123). The criteria used for evaluation were detailed below:

Score	Meaning
4	Very good
3	Good
2	Average
1	Poor

The ranges of the scores are described below:

Value of Mean Score	Meaning
3.26-4.00	Very good
2.51-3.25	Good
1.76-2.50	Average
1.00-1.75	Poor

7. Before first administering the experiment with students, feedback from five media experts was used to improve the e-learning lessons in terms of clarity and

appropriateness of explanations, the step-by-step lesson sequences, screen design, buttons and images. Then, the e-learning lessons were programmed.

8. The developed e-learning course was tested by the following methods:

- One-to-one step testing (1:1).
- Small group testing (1:10).
- Field testing (1:100).

These tests are referred to as try-outs. The details of these try-outs are described subsequently. The steps of construction and determination of the efficiency of English pronunciation, reading and writing lessons from these try-outs are shown in the Figure 4

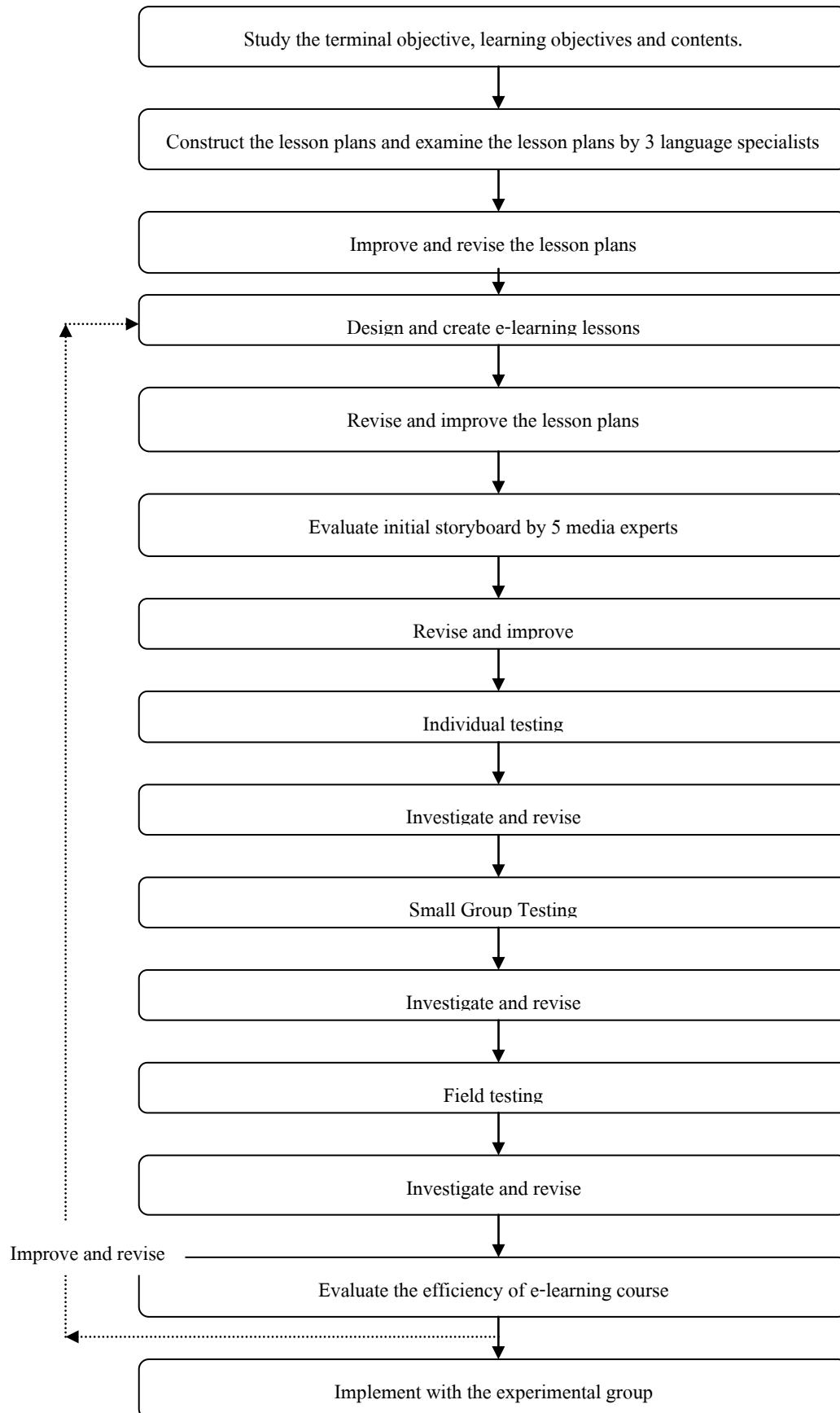


Figure 4 Steps of construction of English pronunciation, reading and writing lessons and try-outs for experimental group.

Try-outs of the Developed E-learning Course

One-to-one step testing (1:1). In this step, the developed e-learning course was tried out with three participating primary school teachers: one representative from each of three groupings: high potential, average and slow learner. Each of these three participants was selected at random from the three groupings of participants based on their scores in EN 500, Reading, in the previous semester. High achievers were the participants who received a score of 75 or above, average students had scores from 60 to 70, and slow learners attained scores of 55 or lower. The three participants were asked to take the pre-test on English pronunciation, reading and writing. They studied English pronunciation, reading and writing via e-learning course for 30 sixty-minute periods. After that, they took the post-test and were asked for feedback and opinions about the lessons in order to improve the quality of the lessons. The efficiency value was 71.10/74.44.

Small group testing (1:10). Small group testing (1:10): The revised e-learning course was tried out with a further nine students; three representatives from the high potential sample group of participants, three average participants, and three similar to slow learners, to check if the lesson met the needs of the entire target population. These participants were selected at random. They are different participants from those in the main sample group and in the group of one-to-one step testing. A similar procedure was followed with these participants as with the group of one-to-one step testing. The data obtained were used to revise the e-learning lessons. The efficiency value was 74.81/76.29.

Field testing (1:100). The methods used in this step were exactly the same as the ones described previously in the section on small group testing except that the

number of participating primary school teachers was 30. The revised version of the e-learning course was tested for its efficiency (E1/E2). An ideal E1/E2 should be based on the 80/80 efficiency criteria. The efficiency value was 80.33/81.10.

The Construction of Achievement Test

The procedure for constructing the pre and post achievement tests is as follows:

1. Construct the table of content analysis (learning unit objectives) in order to identify the numbers of items and how to measure the test content and the objectives.

2. The result of the analysis in step 1 was used to construct the items of objective test

3. Three English language specialists were consulted to check its content and validity. The content of the test was evaluated through Index of Item-Objective Congruence (IOC). In this study, the value of IOC is between 0.6-1.0, which was acceptable.

4. The revised tests were tried out with 50 fourth-year students who have ever studied English pronunciation, reading and writing in order to check the level of difficulty of test items and the discrimination index. These students were a different group from those in the sample group.

5. The test items with value of level of difficulty between .20 to .80 and the discrimination index higher than .20 were selected. The test scores were calculated to check for the reliability using the Kuder-Richardson Formula 20 (KR_{20}). The value of this reliability was 0.85.

6. The test items from item 5 were then employed in the study.

The following figure illustrates the steps of construction of achievement tests.

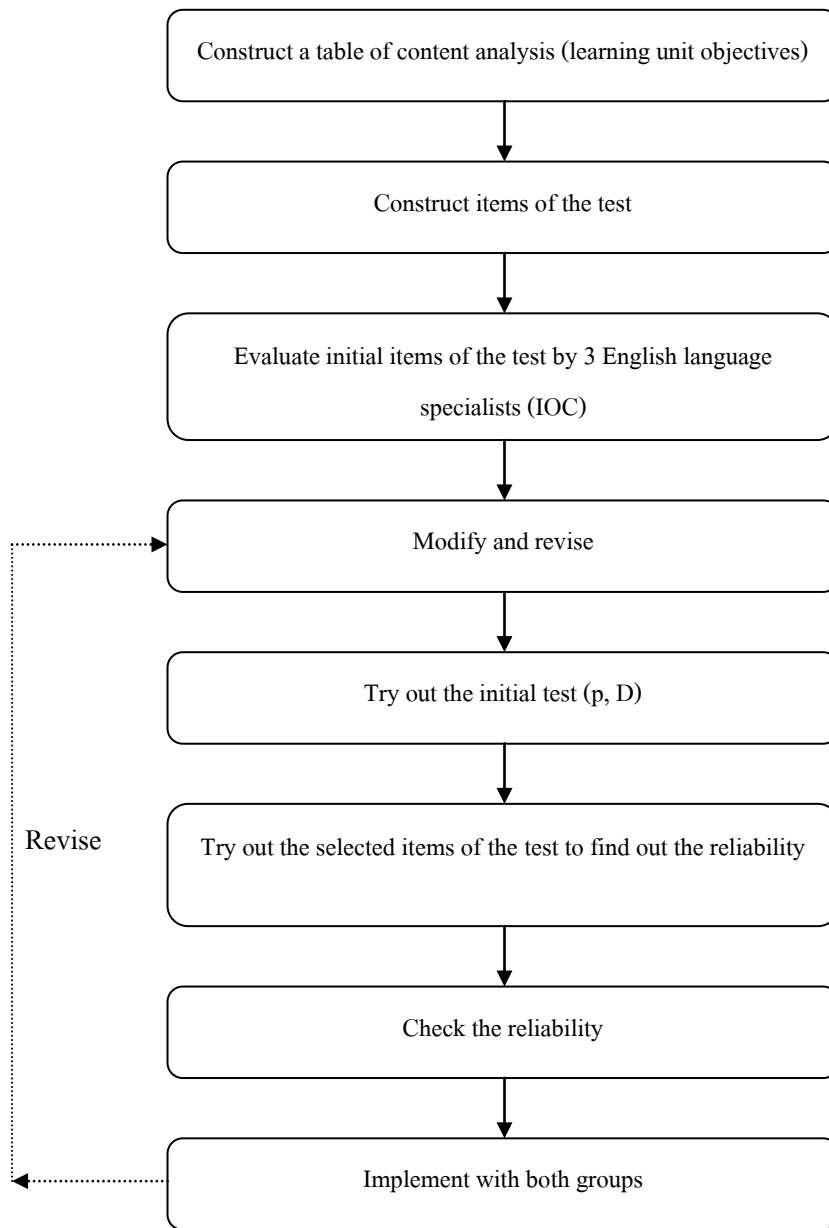


Figure 5 Steps of construction of achievement tests.

The Construction of the Instructional Material Motivation Questionnaire

The procedure for constructing the questionnaire is as follows:

1. Some related literature on motivation and methods in developing a questionnaire were reviewed to develop the initial questionnaire. 20 questions were

formulated based on Keller's ARCS Motivational Design Model. This model measures four attributes: Attention, Relevance, Confidence and Satisfaction.

2. The initial questionnaire was then tested with students who are in different group from the sample group. The results were used to improve the test by making it more comprehensive, reliable and valid for collecting data.

3. Experts were consulted to validate the questionnaire. The value of IOC was between 0.6-1.0. The participants were required to rate the statements on a five-point scale from "Not true" to "very true" where the answer represents their opinions. After that the initial questionnaire was tested and improved to make it more comprehensive, reliable and valid for collecting data.

4. The questionnaire was then administered with the experimental group of participants to study their motivations on learning English pronunciation, reading and writing skills via the e-learning course. The Cronbach's Alpha value of this questionnaire was 0.87, exceeding the acceptable standard of reliability analysis of 0.6 as recommended by (Nunnally, 1978; Wikipedia, 2011). It could be inferred that the questionnaire was acceptable to be employed in this study.

The steps in the construction of questionnaire are shown in the Figure 6

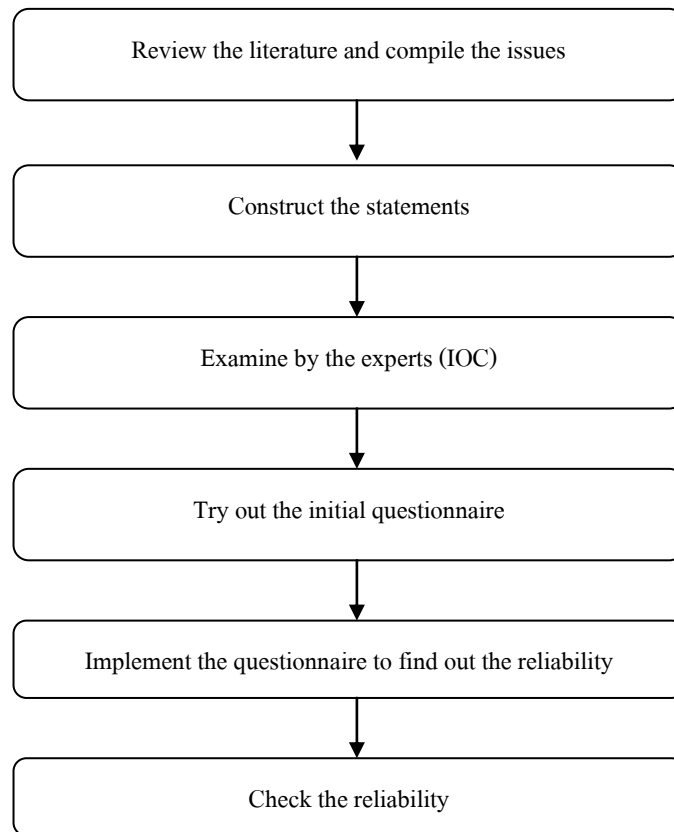


Figure 6 Steps of construction of instructional material motivation questionnaire.

The Construction of a Semi-Structured Interview in Thai

A semi-structured interview in Thai was administered to gain information on 1) the effect of the e-learning course on achievement and participants' motivations, and 2) to determine the reasons that cause those effects on the participants. The interview was administered based on the preset protocol and questions. The five participated university lecturers were interviewed regarding their opinions on the effects of the e-learning course on the participants. The stratified sampling was implemented to select nine participants of low achiever, average achiever and high achiever. The interviews were audio-recorded.

Data Collection

To achieve the objectives of this study, the data were collected as described in the following:

1. The students were divided into two groups: the control group received tutoring via conventional face-to-face instruction and the experimental group received tutoring via e-learning course.
2. The students in the sample groups first took the pre-test and pre-motivation survey.
3. The control and experimental groups learned with the teacher and the e-learning course respectively. After completion of each unit, the group was assigned to complete the unit tests.
4. When finishing the course, the two groups were assigned a test. This post-test took 3 hours.
5. Pre-test and post-test scores of each group were obtained to evaluate the learning progress and compare post-test scores of the control group and the experimental group to determine the effectiveness of e-learning course by using MANCOVA.
6. After completing the course, both experimental and control groups was assigned to respond to the questionnaire regarding motivation on usage of e-learning course and conventional face-to-face instruction, respectively.
7. Students' opinions obtained quantitatively from the questionnaire were evaluated statistically to calculate the mean score of a particular comment and of the overall comments.

Data Analysis

The data obtained from the testing of the different methods of learning were analyzed and interpreted in two main ways, by quantitative and qualitative analysis.

Quantitative Data Analysis

Quantitative data includes the data obtained from the pre- and post-achievement tests and instructional material motivation.

The data obtained from the pre- and post-achievement tests and instructional material motivation questionnaire

Statistical test of multivariate analysis of covariance (MANCOVA) was employed to analyze the achievement test scores and motivation questionnaire to confirm the effects of the e-learning course.

In this study, to answer the first and second research questions, the dependent variables were the achievement test score and motivation score. The independent variables were the two learning methods (tutoring through the e-learning course and the conventional face-to-face instruction on English pronunciation, reading and writing). The results of achievement and motivation pre-test scores at the beginning of the experiment were the covariates to control the effect of the participants' variance.

Qualitative Data Analysis

Quantitative data includes the data obtained from the interview data analysis. After the completion of language university lecturers and participating interviews, the collected qualitative data were analyzed as follows:

1. Participants' opinions towards the effects of learning English pronunciation, reading and writing via e-learning course were analyzed to describe how participants' opinions towards the e-learning course were.
2. Language university lecturers' opinions towards the effects of learning English pronunciation, reading and writing via e-learning course were analyzed to describe how participated lecturers' opinions towards the e-learning course were.

The data obtained from interview data analysis

The interview data were transcribed and then analyzed by using 1) open coding, and 2) axial coding. In open coding, the entire interview transcripts were read and reread to identify and tentatively name the salient themes which were later labeled and coded. These themes served as a framework for analysis. Words or phrases that were the same were classified into the same theme. These themes were modified during the subsequent steps of analysis.

Then, axial coding or re-examination of the themes that had previously been identified in order to determine whether they were linked was used. The purpose was to explain and acquire new comprehension of the data of interest. The themes determined in open coding were compared and combined to gain the big picture. The data analysis from the semi-structured interview was then shown.

Summary

This chapter discussed research methodology, research instrument, data collection, and statistical analysis. The research findings can be classified according to their result, logic, purpose and process. The data were collected from 156 primary school teachers. They were divided equally into two groups, by using simple random sampling. The first group, the control group, was assigned to study with conventional

face-to-face instruction. The second group, the experimental group, was assigned to study only with e-learning instruction. The research instruments were the 11 units of lesson plans for conventional face-to-face instruction, the e-learning course created by the researcher with the efficiency value of E1/E2, the achievement test, and the questionnaire to study participants' motivation towards learning pronunciation, reading and writing with e-learning course.

For the research procedure, both experimental and control groups undertook the pre-test constructed by the researcher. The experimental group studied with the e-learning instruction for English pronunciation, reading and writing. The researcher and participating university lecturers controlled the experimental group while they received tutoring via the e-learning instruction. For the control group, they were taught by conventional face-to-face instruction, unit by unit by the participated university lecturers. When all units were completed, students in both groups did the post-test. Then, the participants in both experimental and control groups completed a questionnaire concerning their motivation towards e-learning course. The results were then analyzed using the statistical techniques described in this chapter.

CHAPTER 4

FINDINGS AND DISCUSSIONS

The purpose of this chapter is to present and analyze the findings of the study and the correlational statistics. The findings are presented in 6 sections according to the objectives of the research: 1) the findings of modified activities in each phase of ADDIE Model evaluated by experts, 2) the findings of e-learning course for three English language skills evaluated by media experts, 3) the findings of effectiveness of the e-learning course, 4) the findings of participants' learning achievements and motivation on three English language skills for both groups, 5) the findings of effects of e-learning course on participants with different computer skill and prior English knowledge and 6) the findings of pos-hoc analysis

Findings

A. The Findings of First Hypothesis

The Findings of Modified Activities in Each Phase of ADDIE Model Evaluated by Experts

Based on the table 4 below, it has been found that the mean scores range between 4.00 to 4.33, which is at a level of very strongly agree. The data obtained reveal that, on the basis of mean scores of 4.00, the experts very strongly agree that the activities in each phase of the ADDIE Model have applicable connection, and the activities are appropriate for use in teaching three English language skills. Furthermore, the experts also very strongly agree that the activities in each stage of the

ADDIE Model are clear and easy to understand, and the activities in each stage of ADDIE Model are appropriate, based on the mean scores 4.33.

Overall, the activities in each stage of the ADDIE Model were rated by the three experts at the mean score of 4.16 which indicates that the activities are appropriate and satisfactory.

Table 4

Result of Findings of Modified Activities in Each Phase of ADDIE Model evaluated by Experts

Evaluation items		\bar{X}	SD	Result interpretation
1.	The modified activities in each stage of ADDIE Model have applicable connection.	4	.00	Very strongly agree
2.	The modified activities in each stage of ADDIE Model are clear and easy to understand.	4.33	.57	Very strongly agree
3.	The modified activities in each stage of ADDIE Model are appropriate for teaching three English language skills.	4	.00	Very strongly agree
4.	The modified activities in each stage of ADDIE Model are satisfied.	4.33	.57	Very strongly agree
Total		4.16	-	Very strongly agree

The findings of E-learning Course for English Pronunciation, Reading and Writing evaluated by Media Experts

The 23 items of evaluation contained in the form issued by the Department of Curriculum and Instruction Development were adapted for use in this study. A 4-point rating scale was used in this section to represent the media experts' opinion. Each criterion rating was identified as detailed below.

Table 5

Result of the Findings of E-learning Course for English Pronunciation, Reading and Writing evaluated by Five Media Experts

Evaluation items		\bar{X}	SD	Result interpretation
Contents				
1.	Content structure is clear and each element of content shows structural relationship.	3.4	.54	Very Good
2.	The presented content of instruction covers the learning objectives defined.	3.6	.54	Very good
3.	Language use is appropriate and correct.	3.2	.44	Good
4.	The learning content is appropriate for the participant's grade level	3.2	.44	Good
Instructional design				
5.	The objectives and the students' grade level are clearly identified.	3.4	.54	Very good
6.	The sequence of content presentation is appropriate according to types of media employed.	2.4	.54	Average
7.	Presentation techniques are attractive to	2.8	.44	Good

	learners.			
8.	E-learning course is creatively designed.	3.2	.44	Good
9.	The interactive function design in e-learning systems such as interaction between users and instructional content or teacher is effective.	2.8	.44	Good
10.	The instruction is designed for individual differences and responds to the diverse needs of participants	2.8	.44	Good
11.	Instructional design enhances the ability of students to control their pace of learning appropriately.	3.2	.44	Good
12.	Exercises and assessments cover all learning objectives defined.	3.4	.547	Very good
13.	Interaction and timely feedback are provided appropriately.	3.2	.44	Good
14.	The instructional design enhances students' analytical thinking.	3.2	.44	Good
15.	User's manual clearly describes how to use e-learning course and is appropriate for the level of participants.	3.2	.44	Good

Table 9 (continued)

Evaluation items		\bar{X}	SD	Result interpretation
Screen design				
16.	Page layout captures participants' attention, and facilitates ease of use.	2.8	.44	Good
17.	Choice of typeface, size and color facilitates ease of use and is appropriate	2.8	.44	Good

	for participants.			
18.	Choice of colors is appropriate and is applied consistently to specific types of on-screen information.	2.4	.54	Average
19.	Images presented are consistent with instructional content.	3.0	.70	Good
20.	Buttons, text displayed, visual message can be appropriately established and can convey a very clear and correct message to the viewers.	2.6	.54	Good
Techniques				
21.	The web program is employed correctly such as user's information system	3.4	.54	Very good
22.	The linkages to each frame or focal point can be correctly established.	3.0	.70	Good
23.	Images and audio functions correctly and rapidly.	3.0	.70	Good
	Total	3.04	-	Good

The average mean score of the e-learning course evaluated by media experts was 3.04, which was at a satisfactory level. Based on the result, there was an issue that must be improved before the implementation. It was rated in the average level: the choice of colors.

The findings of Evaluation of Effectiveness of E-learning Course for English Pronunciation, Reading and Writing

To evaluate the effectiveness of English pronunciation, reading and writing lessons via e-learning course, three steps of try-out in the developmental testing process were conducted. After each of these steps of try-out, the content in each lesson was revised and improved in order to ensure the design was appropriate for the primary school teachers.

The efficiency value of 80/80 of e-learning course on English pronunciation, reading and writing was defined by the researcher. The resultant efficiency value of the three try-outs: one-to-one testing (1:1), small group testing (1:10) and field group testing (1: 100) was as described below:

Table 6

Resultant Efficiency Value of the E-learning Course Try-outs

Try-out Group	Efficiency of Process (E1) (Defined efficiency value is 80)	Efficiency of Product (E2) (Defined efficiency value is 80)
One to one testing	71.10	74.44
Small group testing	74.81	76.29
Field group testing	80.33	81.10

Table 6 above showed that the value of efficiency of E1/E2 for one to one testing was 71.10/74.44. For small group testing, it was 74.81/76.29. Based on the results of both tests, it could be inferred that this e-learning lesson must be improved prior to further implementation. After it was revised and improved, it was tried out with 30 primary school teachers who were in different groups from the first and second testing stages. The result revealed that the value of efficiency of E1/E2 as 80.33/81.10.

To summarize, this e-learning lesson is developed according to the standard criteria 80/80 defined. This corresponded to the first hypothesis of this study.

B. The Findings of Second, Third and Fourth Hypotheses

Preliminary Data Analysis

A preliminary analysis of the data was first conducted to identify any missing cases and aberrant measures (i.e., misrecordings, outliers).

Missing Cases Analysis

There were no missing data for this study. Each item for all instruments was displayed one at a time and required a response from the participants prior to continuing on in any survey, test, or the lesson used for this study.

Case Analysis

An analysis to identify outliers in the data for the dependent variables revealed eight cases that were outside of the three standard deviation rule of thumb, or three-sigma rule, typically used to identify outliers. The outliers were confirmed through visual inspection of box plots as well as through calculations. Since MANCOVA tests can be highly sensitive to outliers (Huberty & Petoskey, 2000), these six cases were removed from further data analysis.

Analyses of the remaining 171 cases revealed that the response patterns of fifteen cases contained inconsistent responses to the items measuring participants' motivation in the exit survey. After reversing the raw scores to the reverse-coded item, it was found that in all fourteen of these cases, the offending response was always for the reverse-coded item (e.g., 5, 5, 1, 5).

Reverse-coded items are included on questionnaires in order to force respondents to read and process items more carefully and to reduce the likelihood of undesirable response tendencies, such as social desirability, acquiescence, or satisficing (Hughes, 2009), which can lead to measurement error and hugely affect the results of data analysis later. Study suggests that the scale means of instruments are statistically significantly impacted when as few as 5% of respondents provide incorrect responses to reverse-coded items on an instrument (Hughes, 2009). Although removal of offending cases has the disadvantage of reducing sample size, researchers suggest that removing these cases prior to any further analyses is vastly superior to not removing them (Cronbach, 1950; Schmitt & Stuits, 1985 as cited in Warren, 2012).

Regarding examination of the data, it appears that the participants corresponding to these fifteen offending cases did not fully read or understand the items on the exit survey. In any case, failure to remove these fifteen cases, which amount to over 8.77% of the 171 remaining cases, could lead to significant measurement error and impact further data analysis.

Test of Statistical Assumptions

For k groups and p dependent variables a MANCOVA should only be performed if the observations are independent, the k covariance matrices are approximately equal, and the dependent variable scores approximate a p -variate normal probability distribution (Hair et al., 2010). The three assumptions were tested for the MANCOVA test.

Assumption 1: Independence of Observations

Firstly, independence of observations was accomplished by randomly assigning participants to the two conditions and secondly ensuring that participants did not interact with each other while they were taking the e-learning lesson, surveys, and tests. Secondly, the messages were sent in the online lesson to inform participants that they could not receive any assistance, including through participated university lecturers who were trained by the researcher to not allow participants to receive any help.

Assumption 2: Equality of Variance-Covariance Matrices

To check whether the covariance matrices are approximately equal or not, the p-value for the Box's M test was compared with an alpha value of 0.005 which is typically employed for this test. Table 7 shows a p value of 0.935 from the Box's M test which is greater the alpha value of 0.005, showing a failure to reject the null hypothesis that there is no significant difference between the two variances. Therefore, the condition for the covariance-matrix equality is satisfied.

Table 7

Box's Test of Equality of Covariance Matrice for the Second and Third Hypotheses

Box' s M	.301
F	.099
df1	3
df2	1552746.992
Sig.	.961

Moreover, Levene's test (Table 8) was employed to evaluate the assumption of equal variances for each of the dependent variables across the two groups in this study. As illustrated in Table 8, the results for both dependent variables were not significant

at a p value of 0.05. Thus, the equal error variance hypothesis was not rejected and equal variances were assumed.

Table 8

Levene's Test of Equality of Error Variances Dependent Variables for the Second and Third Hypotheses

Dependent variables	F	df1	df2	Sig.
Post-test	.007	1	154	.934
Post-motivational survey	.256	1	154	.613

Assumption 3: Normality

To check whether the dependent variables follow a multivariate normal distribution or not, a visual inspection of quantile plots of each dependent variable and covariate were examined for each experimental group. Quantile plots are probability plots used to identify whether a distribution of a variable matches a given distribution, in this case the normal distribution. If the selected variable matches the distribution, then the points cluster around a straight line. A visual inspection of the graphs for the quantile plots of the dependent variables and covariates for each group indicated that the observed values generally clustered around the expected line, showing that the multivariate normality condition was satisfied.

Descriptive Statistics

The descriptive statistics for all dependent variables are shown in Table 9, which lists the means and standard deviations for each dependent variable. The range for the learning score was zero to one hundred. Each item measuring participants' motivation on the exit survey had a possible range of one to five. The raw scores for the reverse-coded item measuring participants' motivation on the exit survey were

reversed during analysis. Therefore, the possible range for participants' motivation was one to five with higher scores reflecting higher levels of motivation from learners.

Table 9

Descriptive Statistics—Post-test and Post-Motivational Survey by Group

Dependent variables	Group	Mean	Std. Deviation	N
Post-test	Control	46.51	6.951	65
	Experimental	53.53	6.927	91
Post-motivational survey	Control	61.55	6.260	65
	Experimental	69.16	6.221	91

Regarding participants' motivation, it is interesting to note that the standard deviation of the experimental group is somewhat smaller than the control group. This indicates that participants' motivation scores in the experimental group had less variation about the mean than participants' motivation score in the control group. One way to interpret this is that participants in the experimental group more consistently scored closer to the mean than participants in the control group, and by extension, since motivation scores were relatively high in both groups, participants in the experimental group more consistently reported high motivation.

Although not used in the subsequent data analysis, Tables 10 through Table 22 present other descriptive data for the sample of interest gathered from the entry survey and the exit survey in this study. This data was collected to gain more information about the sample used for this study and to validate the claim previously made that primary school teachers seem to have a broader range of characteristics (e.g., ages, education levels, motivational readiness, etc.) than participants in traditional secondary education settings, which in examining the data seems to be the case.

Table 10*Descriptive Statistics—Pre-E-learning Participants' Motivation by Group*

Group	Mean	Standard Deviation	Minimum	Maximum	N
Control group	59.86	7.338	42	74	65
Experimental group	58.47	7.540	41	82	91

An independent samples t-test conducted for pre-e-learning participants' motivation showed no statistically significant differences between both groups, suggesting that the participants in both groups possessed statistically equivalent motivation levels toward the described content in the e-learning lesson before receiving the instruction.

Table 11*Descriptive Statistics—Age by Group*

Group	Mean	Standard Deviation	Minimum	Maximum	N
Control group	38.54	7.458	26	53	65
Experimental group	37.88	7.573	25	58	91

Table 12*Descriptive Statistics—Gender Frequencies by Group*

Group	Females	Males	N
Control group	46	19	65
Experimental group	70	21	91

Table 13*Descriptive Statistics—Frequencies of Using Computer by Group*

Group	Every day	4-6 times per week	1-3 times per week	Not very often	Not at all	N
Control group	35	27	3	0	0	65
Experimental group	44	41	6	0	0	91

Table 14*Descriptive Statistics—Frequencies of Participants' Perceived their Computer Skills
by Group*

Group	Power user	Regular user	Infrequent user	Beginning user	Non-user	N
Control group	24	40	1	0	0	65
Experimental group	10	75	6	0	0	91

Table 15*Descriptive Statistics—Frequencies of Reasons for Taking English Language Course
by Group*

Group	Personal Achievement	A Job Promotion	Have a Better Life	Pursuing Higher Education Access and Achievement	N
Control group	33	7	0	25	65
Experimental group	46	12	0	33	91

Table 16

Descriptive Statistics—Frequencies of Participants having a Computer Connected to the Internet at Home by Group

Group	Yes	No	N
Control group	60	5	65
Experimental group	85	6	91

Table 17

Descriptive Statistics—Pre-Test Scores by Group

Group	Mean	Standard Deviation	Minimum	Maximum	N
Control group	36.20	4.483	26	43	65
Experimental group	35.29	4.061	24	43	91

Note: Full mark = 100

Table 18

Descriptive Statistics—Post-Test Scores by Group

Group	Mean	Standard Deviation	Minimum	Maximum	N
Control group	46.51	6.951	34	62	65
Experimental group	53.53	6.927	35	65	91

Note: Full mark = 100

Table 19*Descriptive Statistics—Pre-Test Scores of Control Group by English Language Skills**(N = 65)*

Skills	Mean	Standard Deviation	Minimum	Maximum
Pronunciation (30 marks)	11.38	1.646	7	15
Reading (35 marks)	14.85	2.048	10	19
Writing (35 marks)	9.98	1.980	5	14

Table 20*Descriptive Statistics—Pre-Test Scores of Experimental Group by English Language**Skills (N = 91)*

Skills	Mean	Standard Deviation	Minimum	Maximum
Pronunciation (30 marks)	10.67	2.285	6	15
Reading (35 marks)	14.30	1.426	10	18
Writing (35 marks)	10.32	1.725	5	13

Table 21*Descriptive Statistics—Post-Test Scores of Control Group by English Language Skills**(N = 65)*

Skills	Mean	Standard Deviation	Minimum	Maximum
Pronunciation (30 marks)	11.80	1.986	7	16
Reading (35 marks)	20.55	3.925	15	30
Writing (35 marks)	13.17	2.601	7	18

Table 22

Descriptive Statistics—Post-Test Scores of Experimental Group by English Language Skills (N = 91)

Skills	Mean	Standard Deviation	Minimum	Maximum
Pronunciation (30 marks)	16.15	2.399	11	20
Reading (35 marks)	22.25	3.405	15	30
Writing (35 marks)	15.22	2.939	9	21

Table 19 and Table 20 present descriptive data for the covariates used in this study. Since the mean pretest scores of the three English language skills for the experimental group were less than 36 (Table 20), it seems apparent that the e-learning course was in fact instructionally sound given that the mean posttest score for the experimental group was greater than 50 (Table 22). These facts verify the claims and assumptions made earlier that the e-learning course was indeed instructionally sound and fostered learning.

Omnibus MANCOVA Test for the Second and Third Research Hypotheses

An omnibus MANCOVA test was conducted to assess the overall effect of the developed e-learning course on the dependent variables achievement and motivations. The analysis (Table 23) showed overall statistically significant group differences ($p < 0.05$) as a result of using developed e-learning course in instruction (Wilks' lambda = 0.762, $F(2, 151) = 23.549$, $p = 0.000$).

Table 23*Omnibus MANCOVA Test for the Second and Third Research Hypotheses*

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.418	54.285 ^a	2.000	151.000	.000
	Wilks' Lambda	.582	54.285 ^a	2.000	151.000	.000
	Hotelling's Trace	.719	54.285 ^a	2.000	151.000	.000
	Roy's Largest Root	.719	54.285 ^a	2.000	151.000	.000
Pretest	Pillai's Trace	.099	8.257 ^a	2.000	151.000	.000
	Wilks' Lambda	.901	8.257 ^a	2.000	151.000	.000
	Hotelling's Trace	.109	8.257 ^a	2.000	151.000	.000
	Roy's Largest Root	.109	8.257 ^a	2.000	151.000	.000
Pre motivational survey	Pillai's Trace	.085	7.007 ^a	2.000	151.000	.001
	Wilks' Lambda	.915	7.007 ^a	2.000	151.000	.001
	Hotelling's Trace	.093	7.007 ^a	2.000	151.000	.001
	Roy's Largest Root	.093	7.007 ^a	2.000	151.000	.001
Group	Pillai's Trace	.238	23.549 ^a	2.000	151.000	.000
	Wilks' Lambda	.762	23.549 ^a	2.000	151.000	.000
	Hotelling's Trace	.312	23.549 ^a	2.000	151.000	.000
	Roy's Largest Root	.312	23.549 ^a	2.000	151.000	.000

Individual Hypothesis Test for the Second and Third Research Hypotheses

A better understanding of the source of the overall effect from the omnibus test is determined from the tests of between-subjects effects. The tests of between-subjects effects (Table 24) resulted in statistically significant effects for both posttest ($F(1, 152) = 38.454; P < 0.05$) and post motivational survey ($F(1, 152) = 14.028; P < 0.05$).

Table 24*Tests of Between-Subjects Effects for the Second and Third Research Hypotheses*

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Posttest	2180.344 ^a	3	726.781	16.138	.000
	Post Motivation Survey	945.896 ^c	3	315.299	8.524	.000
Intercept	Posttest	1691.289	1	1691.289	37.555	.000
	Post Motivation Survey	3110.541	1	3110.541	84.091	.000
Pretest	Posttest	710.531	1	710.531	15.777	.000
	Post Motivation Survey	73.462	1	73.462	1.986	.161
Pre motivational survey	Posttest	51.791	1	51.791	1.150	.285
	Post Motivation Survey	436.996	1	436.996	11.814	.001
Group	Posttest	1731.763	1	1731.763	38.454	.000
	Post Motivation Survey	518.907	1	518.907	14.028	.000
Error	Posttest	6845.246	152	45.035		
	Post Motivation Survey	5622.540	152	36.990		
Total	Posttest	413966.000	156			
	Post Motivation Survey	757310.000	156			
Corrected Total	Posttest	9025.590	155			
	Post Motivation Survey	6568.436	155			

Test of Statistical Assumptions for the Fourth Research Hypothesis

Table 25 contains the results of both the multivariate and univariate tests of homoscedasticity. The Box's M test indicated no presence of heteroscedasticity (significance = 0.830). In the Levene's tests for equality of error variances (Table 26), both of the outcomes showed nonsignificant results (significance = .077 and .193) and confirmed homoscedasticity. With the multivariate and univariate tests showing nonsignificance, the researcher can proceed knowing that the assumption of homoscedasticity has been fully met.

Moreover, a visual inspection of the graphs for the quantile plots of the dependent variables and covariates for each group indicated that the observed values generally clustered around the expected line, showing that the multivariate normality condition was satisfied.

Table 25

Box's Test of Equality of Covariance Matrices for the Fourth Hypothesis

Box' s M	39.397
F	.783
df1	39
df2	1312.818
Sig.	.830

Table 26

Levene's Test of Equality of Error Variances Dependent Variables for the Fourth Hypothesis

Dependent variables	F	df1	df2	Sig.
Post-test	1.503	24	131	.077
Post-motivational survey	1.276	24	131	.193

Omnibus MANCOVA Test for the Fourth Research Hypothesis

An omnibus MANCOVA test was conducted to assess the overall effect of the developed e-learning course on participants with differences in terms of prior English language knowledge and computer skills. The dependent variables were achievement and post motivation. Pre-motivation and pretest score were used as covariate, and group, prior English language knowledge and computer skills were the independent variables. The analysis (Table 27) showed no statistically significant differences ($p > 0.05$) on achievement and motivation of the control and experimental group with different prior English language knowledge and computer skills (Wilks' lambda = 0.467, $F(4, 256) = .896, p > .05$).

Table 27***Omnibus MANCOVA Test for the Fourth Research Hypothesis***

Effect	Statistical Test	Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.413	44.977 ^a	2.000	128.000	.000
	Wilks' Lambda	.587	44.977 ^a	2.000	128.000	.000
	Hotelling's Trace	.703	44.977 ^a	2.000	128.000	.000
	Roy's Largest Root	.703	44.977 ^a	2.000	128.000	.000
Pretest	Pillai's Trace	.083	5.799 ^a	2.000	128.000	.004
	Wilks' Lambda	.917	5.799 ^a	2.000	128.000	.004
	Hotelling's Trace	.091	5.799 ^a	2.000	128.000	.004
	Roy's Largest Root	.091	5.799 ^a	2.000	128.000	.004
Pre Motivation	Pillai's Trace	.098	6.943 ^a	2.000	128.000	.001
	Wilks' Lambda	.902	6.943 ^a	2.000	128.000	.001
	Hotelling's Trace	.108	6.943 ^a	2.000	128.000	.001
	Roy's Largest Root	.108	6.943 ^a	2.000	128.000	.001
Group	Pillai's Trace	.063	4.309 ^a	2.000	128.000	.015
	Wilks' Lambda	.937	4.309 ^a	2.000	128.000	.015
	Hotelling's Trace	.067	4.309 ^a	2.000	128.000	.015
	Roy's Largest Root	.067	4.309 ^a	2.000	128.000	.015
Prior	Pillai's Trace	.115	2.622	6.000	258.000	.017

English language knowledge	Wilks' Lambda	.886	2.652 ^a	6.000	256.000	.016
	Hotelling's Trace	.127	2.680	6.000	254.000	.015
	Roy's Largest Root	.113	4.859 ^c	3.000	129.000	.003
Computer skills	Pillai's Trace	.197	2.812	10.000	258.000	.003
	Wilks' Lambda	.811	2.830 ^a	10.000	256.000	.002
	Hotelling's Trace	.224	2.848	10.000	254.000	.002
	Roy's Largest Root	.171	4.407 ^c	5.000	129.000	.001
Group * Prior English language knowledge	Pillai's Trace	.081	1.825	6.000	258.000	.095
	Wilks' Lambda	.919	1.833 ^a	6.000	256.000	.093
	Hotelling's Trace	.087	1.842	6.000	254.000	.092
	Roy's Largest Root	.077	3.303 ^c	3.000	129.000	.022
Group * Computer skills	Pillai's Trace	.050	.824	8.000	258.000	.582
	Wilks' Lambda	.951	.818 ^a	8.000	256.000	.587
	Hotelling's Trace	.051	.813	8.000	254.000	.592
	Roy's Largest Root	.033	1.070 ^c	4.000	129.000	.374
Prior English language knowledge * Computer skills	Pillai's Trace	.110	1.250	12.000	258.000	.249
	Wilks' Lambda	.893	1.248 ^a	12.000	256.000	.251
	Hotelling's Trace	.118	1.245	12.000	254.000	.252
	Roy's Largest Root	.086	1.850 ^c	6.000	129.000	.094
Group * Prior English language knowledge * Computer skills	Pillai's Trace	.027	.897	4.000	258.000	.466
	Wilks' Lambda	.973	.896 ^a	4.000	256.000	.467
	Hotelling's Trace	.028	.894	4.000	254.000	.468
	Roy's Largest Root	.028	1.786 ^c	2.000	129.000	.172

Individual Hypothesis Test for the Fourth Research Hypothesis

The tests of between-subjects effects (Table 28) resulted in statistically significant effects for both posttest ($F(2, 129) = .332; P > 0.05$) and post motivational survey ($F(2, 129) = 1.612; P > 0.05$).

Table 28***Tests of Between-Subjects Effects for the Fourth Research Hypothesis***

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Posttest	4719.885 ^a	26	181.534	5.439	.000
	Post Motivation	2165.325 ^c	26	83.282	2.440	.001
Intercept	Posttest	875.698	1	875.698	26.236	.000
	Post Motivation	2481.980	1	2481.980	72.716	.000
Pretest	Posttest	379.586	1	379.586	11.373	.001
	Post Motivation	1.340	1	1.340	.039	.843
Pre Motivation	Posttest	12.523	1	12.523	.375	.541
	Post Motivation	443.352	1	443.352	12.989	.000
Group	Posttest	282.953	1	282.953	8.477	.004
	Post Motivation	.702	1	.702	.021	.886
Computer skills	Posttest	645.428	5	129.086	3.867	.003
	Post Motivation	289.004	5	57.801	1.693	.141
Prior English language knowledge	Posttest	65.276	3	21.759	.652	.583
	Post Motivation	474.424	3	158.141	4.633	.004
Group * Computer skills	Posttest	87.908	4	21.977	.658	.622
	Post Motivation	140.134	4	35.034	1.026	.396
Group * Prior English language	Posttest	102.753	3	34.251	1.026	.383
	Post Motivation	301.172	3	100.391	2.941	.036

knowledge						
Computer skills * Prior English language knowledge	Posttest	207.984	6	34.664	1.039	.403
	Post Motivation	327.856	6	54.643	1.601	.152
Group *	Posttest	22.192	2	11.096	.332	.718
Computer skills * Prior English language knowledge	Post Motivation	110.029	2	55.015	1.612	.204
Error	Posttest	4305.705	129	33.378		
	Post Motivation	4403.111	129	34.133		
Total	Posttest	413966.000	156			
	Post Motivation	757310.000	156			
Corrected Total	Posttest	9025.590	155			
	Post Motivation	6568.436	155			

The Post Hoc Questions

To further investigate the results and reach better conclusions, the following four post hoc questions were proposed.

1. Did participants in either the experimental or control group show significant improvement in the three English language skills of pronunciation, reading and writing, as measured by the post-test?
2. Did participants in either the experimental or control group show significant improvement in the motivation subscales of attention, relevance, confidence, and satisfaction, as measured by the motivation survey?

3. Did participants in the experimental group's report different achievement scores based on the amount of time and location that they learned via the e-learning instruction?
4. Did participants in the experimental group report different motivation scores based on the amount of time and location that they learned via the e-learning instruction?

To answer the first two questions, paired-samples t-tests were used to compare the scores of experimental versus control groups from four subscales of motivation survey, and pretest to posttest as shown in table 29 and table 30 below.

Table 29

Results of Paired-Samples T-Tests for Four Subscales of Motivation Survey

		Paired Differences		t	df	Sig.
		Mean	Std. Deviation			
Experimental group	Pretest - Posttest	-18.242	7.081	-24.575	90	.000
Control group	Pretest - Posttest	-11.138	6.023	-14.910	64	.000
Experimental group	Attention 1- Attention 2	-3.890	3.016	-12.302	90	.000
Control group	Attention 1- Attention 2	-.462	2.107	-1.766	64	.082
Experimental group	Relevance 1- Relevance 2	-4.132	2.857	-13.798	90	.000
Control group	Relevance 1- Relevance 2	-.815	2.669	-2.463	64	.016
Experimental group	Confidence 1- Confidence 2	-.484	2.478	-1.861	90	.066
Control group	Confidence 1- Confidence 2	-.338	2.594	-1.052	64	.297
Experimental group	Satisfaction 1- Satisfaction 2	-2.429	2.805	-8.258	90	.000
Control group	Satisfaction 1- Satisfaction 2	-.046	2.267	-.164	64	.870

Table 29 showed that the participants in both experimental group, $t(90) = -24.575, p < .05$, and control group, $t(64) = -14.910, p < .05$ achieved significant gains in scores from pretests to posttests. The experimental group reported a greater gain in the posttest as the mean differences of the achievement scores was 18.24 as compared to the mean difference of 11.13 for the control group.

Table 29 indicated that for the four subscales of motivation of the experimental group, there was significant differences for the first three subscales: attention, relevance and satisfaction with $t(90) = -12.302, p < .05$, $t(90) = -13.798, p < .05$, $t(90) = -8.258, p < .05$, respectively. However, there was no statistically significant difference for the subscale of confidence with $t(90) = -1.861, p > .05$. For the control group, the result showed nonsignificant results (significance = .082, .297 and .870) for attention, confidence, and satisfaction. However, there was a statistically significant difference for the subscale of relevance with $t(64) = -2.463, p < .05$.

Table 30

Results of Paired-Samples T-Tests for Three Sub skills of English Language

		Paired Differences		t	df	Sig.
		Mean	Std. Deviation			
Experimental group	Pretest - Posttest	-18.242	7.081	-24.575	90	.000
Control group	Pretest - Posttest	-11.138	6.023	-14.910	64	.000
Experimental group	Pronunciation skill 1- Pronunciation skill 2	-5.484	2.183	-23.967	90	.000
Control group	Pronunciation skill 1- Pronunciation skill 2	-.415	2.061	-1.625	64	.109
Experimental group	Reading skill 1-Reading skill 2	-7.956	3.370	-22.524	90	.000

Control group	Reading skill 1-Reading skill 2	-5.708	3.263	-14.102	64	.000
Experimental group	Writing skill 1-Writing skill 2	-4.901	3.022	-15.469	90	.000
Control group	Writing skill 1-Writing skill 2	-3.185	2.744	-9.358	64	.000

Table 30 showed that the participants in both experimental group, $t(90) = -24.575, p < .05$, and control group, $t(64) = -14.910, p < .05$ achieved significant gains in scores from pretests to posttests. The experimental group reported a greater gain in the posttest as the mean differences of the achievement scores was 18.24 as compared to the mean difference of 11.13 for the control group.

From Table 30, the result showed significant results in the experimental group (significance = .000, .000 and .000) for the three sub skills of English language including pronunciation, reading, and writing skills.

To answer the third and fourth post hoc question related to the e-learning-use time/location, achievement and motivation, two analyses of variance (ANOVA) tests were conducted in which e-learning-use was an independent variable with five levels. The control group was categorized as zero and the experimental group was categorized from 1 with the lowest level of e-learning-use time to 5 with highest e-learning-use time. The e-learning-use time/location was reported by the university lecturers. In the first ANOVA test, achievement measured by posttest was considered as dependent variable, while in the second ANOVA test, the motivation measured by motivation post-survey was considered as dependent variable.

The result of the first ANOVA test showed significant differences in posttest scores based on e-learning time/location. As depicted in Table 31, the experimental participants who learned with e-learning often in the school computer laboratory and classroom ($M = 60.47, SD = 3.062$) scored significantly higher than the ones who

learned via e-learning course only three times in total in the school lab ($M = 49.67$, $SD = 4.32$). Table 32 showed that e-learning-use time/location had a significant effect on the posttest score, $F(5,150) = 734.41$, $p < .05$.

Table 31

Results of Descriptive Statistics on Post-test with Different E-learning-Use

Time/Location

E-learning use	Mean	Standard deviation	N
No e-learning use	46.51	6.951	65
2.5 months /15 times (2 hours each time) / Laboratory	49.67	4.320	6
3 months /18 times (2 hours each time) / Laboratory	47.92	7.697	13
3.5 months /Twice a week (2 hours each time) / Laboratory	48.00	7.422	12
3.5 months /Twice a week (2 hours each time) / Laboratory and classroom	54.27	4.837	41
4 months /Twice a week (2 hours each time) / Laboratory and classroom	60.47	3.062	19
Total	50.60	7.737	156

Table 32

Result of Statistical Difference of Post-test with Different E-learning-Use

Time/Location

Source	df	F	Mean square	Sig.
E-learning use	5	734.414	19.646	.000
Error	150			

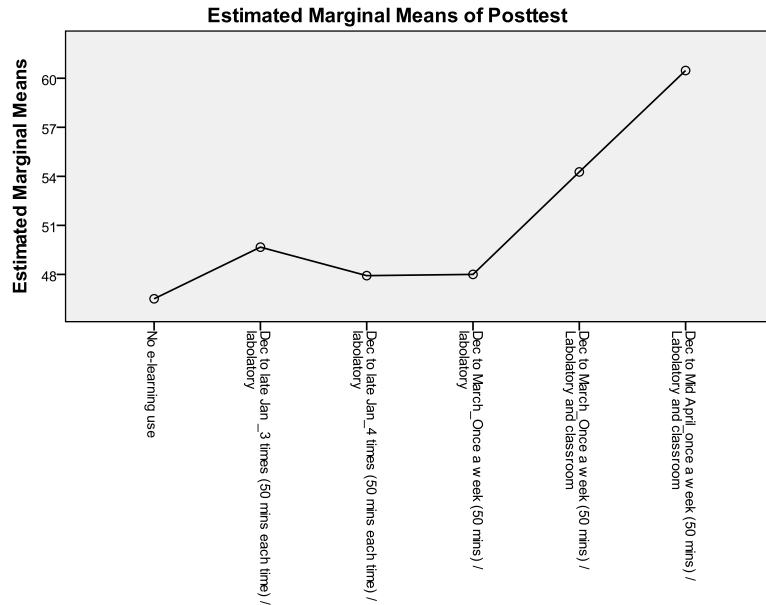


Figure 7 showed the estimated marginal means of the posttest score based on the amount of e-learning use time and location.

Regarding motivation post-survey, as shown in Table 33, the experimental participants who often learned via e-learning course at the school computer laboratory and classroom ($M = 72.79$, $SD = 5.07$) scored significantly higher than the ones who only learned via e-learning course three times at the computer laboratory ($M = 68.17$, $SD = 6.36$). Table 34 showed that e-learning-use time/location had a significant effect on the motivation scores, $F(5, 150) = 16.47$, $p < .05$.

Table 33*Descriptive Statistics on Motivation Post-Survey with Different E-learning-Use**Time/Location*

E-learning use	Mean	Standard deviation	N
No e-learning use	61.55	6.260	65
2.5 months /15 times (2 hours each time) / Laboratory	68.17	6.369	6
3 months /18 times (2 hours each time) / Laboratory	63.38	7.113	13
3.5 months /Twice a week (2 hours each time) / Laboratory	68.50	4.296	12
3.5 months /Twice a week (2 hours each time) / Laboratory and classroom	69.66	5.704	41
4 months /Twice a week (2 hours each time) / Laboratory and classroom	72.79	5.073	19
Total	65.99	7.268	156

Table 34*Result of Statistical Difference of Motivation Post-survey and Different E-learning-Use**time/Location*

Source	df	F	Mean square	Sig.
E-learning use	5	16.47	580.329	.000
Error	150			

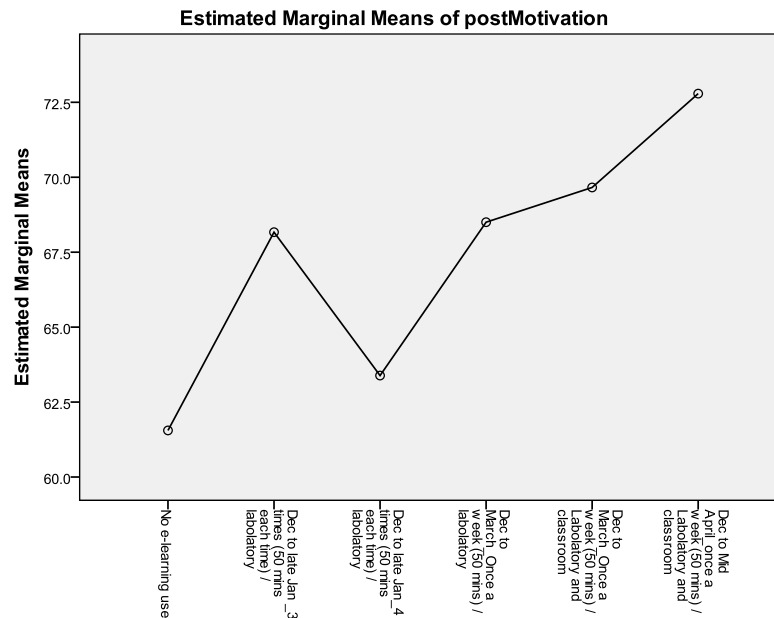


Figure 8 showed the estimated marginal means of the motivation scores based on the amount of e-learning use time and location.

Discussions

Based on the findings of the study described, discussions can be concluded as the following.

The Discussion on the Findings of Activities in Each Phase of ADDIE Model by three Experts

Regarding the findings of the modified activities in each phase of the ADDIE Model evaluated by three experts, all very strongly agreed that the modified activities were appropriate for teaching English pronunciation reading and writing, and they were clear and easy to understand. To develop effective teaching approaches, it was crucial to modify the activities in each phase in ADDIE Model. The findings of the study conducted by Soto (2013) suggested that modification of the ADDIE process

achieved important methods for guiding the design of elements needed for teaching with e-learning tools, to meet the specific learning needs. The ADDIE process can be adjusted to encompass specific learning environments. This finding was in line with several studies indicating that the existing instructional design models must be adapted, modified and expanded to better meet the specific needs and conditions of the online environment (Akbulut, 2007; Kenny, 2004; Sims, 2006).

The activities in the five phases of the ADDIE Model were modified to teach English pronunciation, reading and writing via e-learning course. The modified activities in each phase have applicable connection and they are clear and easy to understand. In addition, all modified activities are simple to implement. As a result, the experts very strongly agreed that they were appropriate to employ in teaching English pronunciation, reading and writing.

The Discussion on the Findings of Effectiveness of the E-learning Course for English pronunciation, reading and writing

The construction of the experiment on e-learning course on English pronunciation, reading and writing was divided into 3 separate stages in order to test whether the value of efficiency of E1/E2 according to the 80/80 efficiency criteria could be achieved prior to the implementation. In the first stage called one-to-one testing, the e-learning course on English pronunciation, reading and writing was trialed with 3 participants. The value of the efficiency was 71.10/74.44. In the second stage called small group testing, the value was 74.81/76.29. After the content of this e-learning course was revised and improved, the last stage called field testing was conducted. This was trialed with 30 students. The result revealed that the value of efficiency of E1/E2 was 80.33/81.10. The reasons that this e-learning course achieved 80/80 efficiency criteria are detailed below:

1. Appropriate learning content based on the participants' needs was selected for the e-learning course.

2. The e-learning lesson was developed with the approval of media experts and English language specialists. According to their suggestions, the e-learning lesson was significantly improved after each trial with the participants.

3. Evaluation of the e-learning lesson was conducted three times. After each trial, the evaluation score improved so that the criterion of efficiency set for the experiment was achieved, confirming the implementation would be successful.

The findings of this experiment concur with several related studies. The study on courseware development on research methods in educational technology through e-learning instructional systems conducted by Jirasathidpornpong (2004) also revealed that the efficiency of E1/E2 was 80/80. Saitakham (2010) developed a web-based instructional model for English vocabulary learning ability and the result showed that the level of efficiency of E1/E2 was 83.50/84.25 which met the standard criterion.

The Discussions on the Findings of Second and Third Hypotheses

A. English Achievement Measurement

The results of between-the-subjects test indicated that the experimental group scored significantly higher on the post-test, $F(1, 152) = 38.454, p < .005$ than the control group. The result did show significant improvement of the achievement post-test of those who learned with the e-learning course as compared to those who did not learn via the e-learning course. The results are further investigated and explained by interviews and post hoc analyses.

The majority of the interviewed university lecturers (2 of 3) and primary school teachers (10 of 10) reported that the participants' English understandings and skills improved due to the use of e-learning course. According to the interview, the effectiveness of the e-learning course was mainly as a result of the combination of fun

and learning and the interactive feature of the e-learning course. Thus, the university lecturers and primary school teachers' interview responses were consistent with the quantitative results.

To further explore the achievement results, two post hoc questions were proposed as follow.

1. Did participants in either the experimental or control group show significant improvement in the three English language skills of pronunciation, reading and writing, as measured by the post-test?

2. Did participants in the experimental group's report different achievement scores based on the amount of time and location that they learned via the e-learning instruction?

To answer the first questions, paired-samples t-tests were used to compare the scores of experimental versus control groups from pre-test to post-test. The participants in both experimental group, $t(90) = -24.575, p < .05$, and control group, $t(64) = -14.910, p < .05$ achieved significant gains in scores from pre-tests to post-tests. The experimental group reported a greater gain in the post-test as the mean differences of the achievement scores was 18.24 as compared to the mean difference of 11.13 for the control group. The result showed significant results in the experimental group for the three sub skills of English language including pronunciation, reading, and writing skills. For the control group, the result showed a statistically significant difference for the two sub skills of reading and writing skills. However, there was no statistically significant difference for pronunciation (significance = .109).

To answer the second post hoc question an ANOVA test was conducted. The test results indicated significant differences in post-test scores based on e-learning time/location, $F(5,150) = 734.41, p < .05$. The experimental participants who learned with e-learning often in the school computer laboratory and classroom ($M = 60.47, SD$

= 3.062) scored significantly higher than the ones who learned via e-learning course only eight times in total in the school laboratory ($M = 49.67$, $SD = 4.32$).

The reasons for positive effects of the e-learning course were reported by the participated university lecturers and participants. Based on the university lecturers' comments, the e-learning course provided an experiential nature and it was an alternative way of teaching and learning. In addition, the e-learning course transformed participants' the fear of English language. For the participants' comments, the e-learning course was effective as it integrated learning and fun together and challenged participants to learn English language. The overall results did indicate that the e-learning course was an effective teaching and learning tool to develop the three English language skills of the participants. Using the e-learning course to support the three English language skills was suggested by the participated university lecturers as an appropriate alternative way of teaching. The findings of this study agreed with the findings of several earlier studies. Bernard, Abrami and Lou (2004), Sherry, Jesse and Billing (2002), Hoffman (2002) and Persin (2002) all examined the effectiveness of internet-based courses by comparison with conventional instruction. The findings of these studies showed that many applications of internet-based learning outperformed traditional teaching methods.

The current study contributes further insights on the existing literature of the e-learning effectiveness as it differs from the previous studies in terms of the type of English skills, and the participants' level. This study tested the effects of e-learning course on three English language skills while pervious empirical studies used e-learning with only a sub skill of English language. In addition, the present study focused on effects of the games on a group of primary school teachers ($N = 156$) in Songkhla province, Thailand. A teacher population was not previously used in the experimental studies in the context of primary school settings.

Moreover, the positive achievement findings partially support the learning effectiveness of the experiential nature of the treatment activities which can be related to the experiential learning theory proposed by Dewey (1938). Although the e-learning course did not provide authentic language experiences as required by experiential theory, they did provide hands-on activities that involved learners in learning by doing and experiencing. Thus, the participants' score improvement may be as a result of the effectiveness of learning via interacting with the e-learning lessons.

B. Motivation Measurement

The results of between-the-subjects test revealed that the differences of the motivation post-survey scores between the participants in experimental group and control were significant, ($F(1, 152) = 14.028; P < 0.05$).

This result suggests that the e-learning course improve the participants' motivation toward learning English pronunciation, reading and writing. This finding is further examined and explained by interviews and post hoc analyses.

The majority of the interviewed university lecturers (3 of 3) agreed that the participants' motivation increased toward learning English pronunciation, reading and writing as a result of using the e-learning course. Moreover, the majority of the interviewed students (7 of 10) reported that they liked learning via e-learning course more than through the conventional face-to-face instruction. This finding supports the quantitative results which indicated that e-learning course positively affects the participants' motivation.

Therefore, to further explore the effects of e-learning course on the participants' motivation, two post hoc questions were proposed as follow.

1. Did participants in either the experimental or control group show significant improvement in the motivation subscales of attention, relevance, confidence, and satisfaction, as measured by the motivation survey?

2. Did participants in the experimental group report different motivation scores based on the amount of time and location that they learned via the e-learning instruction?

To test the first post hoc question, paired-samples *t* test was conducted. The results showed that for the four subscales of motivation of the experimental group, there was significant differences for the first three subscales: attention, relevance and satisfaction with $t(90) = -12.302, p < .05$, $t(90) = -13.798, p < .05$, $t(90) = -8.258, p < .05$, respectively. However, there was no statistically significant difference for the subscale of confidence with $t(90) = -1.861, p > .05$. For the control group, the result showed nonsignificant results (significance = .082, .297 and .870) for attention, confidence, and satisfaction. However, there was a statistically significant difference for the subscale of relevance with $t(64) = -2.463, p > .05$.

The results suggest that within the experimental group, the e-learning course had positive effects on three motivation subscales: attention, relevance and satisfaction, but they had a negative effect on the subscale of confidence of the participants who learned via the e-learning course. Thus, the increase in the three motivation subscales of the experimental group accounted for the increase in the overall motivation score shown in the results of the second hypothesis, and the increase in the three subscale scores explain why the majority of university lecturers and primary school teachers reported higher level of motivation during interviews.

To answer the second post hoc question related to the e-learning use time/location and motivation, Analysis of Variance (ANOVA) was conducted.

The results indicated that e-learning use time/location had a significant effect on the motivation scores, $F(5, 150) = 16.47, p < .05$. The experimental participants who often learned via e-learning course at the school computer laboratory and classroom ($M = 72.79, SD = 5.07$) scored significantly higher than the ones who only

learned via e-learning course eight times at the computer laboratory ($M = 68.17$, $SD = 6.36$). Moreover, with the similar learning period, the participants who learned via the e-learning course in the school laboratory and their classroom had higher motivation score ($M = 54.27$, $SD = 4.83$) than those who learned via the e-learning course only in school laboratory ($M = 48.00$, $SD = 7.42$). Based on the result, it can be referred that the e-learning course improved the participants' motivation when they learned via e-learning course for a long enough period of time (i.e., at least three months) in both the school laboratory and their classrooms.

The results of the second post hoc question help explain the significant motivation differences between the control and experimental group. The possible explanation for the positive results is that the motivation survey was designed based on the ARCS motivation model (Keller, 1987a), while ADDIE Model was employed as framework of the study and Gagné's nine events of instruction were applied to design the e-learning lesson to enhance its effectiveness in terms of participants' attention, relevance, confidence, and satisfaction.

Many similar studies support the findings of this study. Smita (2001) examined students' perceptions toward the e-learning and the result showed that 90% of them were satisfied with this learning tool and 75% would like to learn other subjects with e-learning instruction if offered. Howland and Moore (2002) investigated factors affecting undergraduate students' attitude towards e-learning courses. The results also revealed that most students were comfortable using the tool and had a positive attitude towards it. This is consistent with the findings of previous studies stating that accessing learning content easily and acquiring knowledge by exerting less effort can explain the difference in attitude towards e-learning instruction and are factors which favour the use of the tool (Manuel, 2001). However, online learners' motivation may decrease if the learning tools do not attract their attention, if they become disoriented

in navigating the instruction, or if they fail to follow the sequence of lessons in the correct order (Chang, 2002).

The Discussion on the Findings of Fourth Hypothesis

To test this hypothesis, an omnibus MANCOVA test was conducted to assess the overall effect of the developed e-learning course on participants with differences in terms of prior English language knowledge and computer skills. The analysis showed no statistically significant differences ($p > 0.05$) on achievement and motivation of the control and experimental group with different prior English language knowledge and computer skills ($F(4, 256) = .896, p > .05$). That is to say prior English language knowledge and computer skills did not play important roles in achievement and motivation among participants using the e-learning course compared to those who were tutored only by the conventional method. The findings are further investigated and explained by interview analyses.

Based on the interview, university lecturers and primary school teachers had consistent views on the impact of prior English language knowledge, but different opinions toward the effects of English language skills and computer skills on learning achievement and motivation of the participants.

All university lecturers (3 of 3) and primary school teachers (10 of 10) agreed that prior English language knowledge played important role on achievement and motivation. However, No university lecturers (0 of 3) but more than half of primary school teachers (6 of 10) believed on important effects of computer skills on participants' achievement and motivation. These mixed results are partially consistent with the quantitative results which indicated that the two individual differences did not have significant effect on the experimental participants' achievement and motivation. Parts of the interview results support the pervious empirical studies conducted by Soon, Sook, Jung and Im (2001), and Lopez- Moreto and Lopez (2007). Soon, Sook,

Jung and Im (2001) conducted a study on students' satisfaction towards online learning courses and reported that, in order for students to participate effectively in such courses, computer proficiency was necessary. 60 percent of the participants in their study were new to the online course, so they experienced difficulties in interfacing with the technology. This was a major obstacle to learning. The participants' opinions on importance of the computer skills support are in line with the study conducted by Lopez Moreto and Lopez's (2007). Based on the findings, participants with low computer skills were less motivated in playing computer games.

Based on the university lecturers' interviews, it showed that they helped participants who did not possess required levels of prior English language knowledge, and computer skills to increase the required skills. Therefore, these differences were not observed in the achievement and motivation tests taken at the end of the 24-weeks semester since by the time the participants took the post-tests they had already dealt with their difficulties and gained required skills to learn the e-learning course. This is in line with the result of study conducted by Kebritchi (2008) who explained that the prior English language knowledge and computer skills played a temporary role on the participants' achievement and motivation when they learned via the online computer game. The effect of these individual differences reduced and finally disappeared as the participants developed required computer playing skills.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

This chapter report conclusions and findings and to make recommendations based on the mentioned conclusions.

Conclusions

The four objectives of this experimental research are to develop an e-learning course for enhancing English pronunciation, reading and writing skills of Thai primary school teachers based on the 80/80 efficiency criterion as subsequently defined, to compare the learning achievement on English pronunciation, reading and writing of participants who received tutoring via e-learning instruction with the achievements of participants who received tutoring via conventional face-to-face instruction, to examine the primary school teachers' motivation between participants who received tutoring via e-learning instruction with the motivation of those who received tutoring via conventional face-to-face instruction, and to examine the difference between effects of the e-learning instruction on participants who possess different a) computer skill b) prior English pronunciation, reading and writing knowledge.

The data were collected from 156 primary school teachers. They were divided into two groups by using simple random sampling. The first group, the control group, was assigned conventional face-to-face instruction. The second group, the experimental group, was assigned to study only with e-learning course.

The research instruments were described as follows:

- 1) The 11 units of e-learning lessons for enhancing English pronunciation, reading and writing skills.
- 2) The e-learning course created by the researcher with the efficiency value for E1/E2 of 80.33/81.10.
- 3) Demographic questionnaire
- 4) The achievement test. The reliability of the test was 0.85.
- 5) The Instructional material motivation questionnaires questionnaire to study primary school teachers' motivation towards learning the three skills with e-learning course. The Cronbach's Alpha value of this questionnaire was 0.87.
- 6) A semi-structured interview in Thai.

For the research procedure, both experimental and control groups underwent the pre-test constructed by the researcher. The experimental group studied with the e-learning course for English pronunciation, reading and writing. The researcher and the participated university lecturers controlled the experimental group while they were studying with the e-learning course. For the control group, they were taught in the conventional instruction unit by unit by participated university lecturers. When all units were completed, participants in both groups underwent the post-test constructed by the researcher. They were given 3 hours to complete the test. Then the participants in both experimental and control groups completed a questionnaire of 20 items concerning their motivation towards e-learning course. The results were then analyzed. The findings indicated that:

1. The e-learning course's value of efficiency of E1/E2 was 80.33/81.10.
2. The learning achievement of the participants who studied English pronunciation, reading and writing via e-learning course was higher than that of those who studied by conventional face-to-face instruction, at a significance level of 0.05.

3. The motivation of the participants who studied English pronunciation, reading and writing via e-learning course was higher than that of those who studied by conventional face-to-face instruction.

4. Prior English language knowledge and computer skills did not play important roles in learning achievement and motivation among participants using the e-learning course.

Recommendations

Recommendations for further study and research fall into two areas: general recommendations and research recommendations.

Recommendations from the Result of the Study

The development of e-learning instruction should be conducted step-by-step based on best practice in this field, as this would help the researcher achieve the objectives of constructing e-learning lessons which result in a more successful implementation and higher efficiency of learning.

Based on this research, it has been found that the learning achievement of students who studied three English language skills with e-learning course is higher than that of those students who studied by the conventional instructional method. As a result, it should be widely applied as a learning and teaching method for certain subjects. Moreover, three English language skills are subjects that has been studied in several aspects of research and found to be successfully taught utilizing e-learning instruction, so the technique should be further studied for the learning and teaching other subjects.

The practice of technology-based instruction is one of the most effective

learning tools, so teachers should be trained in how to develop e-learning course for classroom teaching and how to effectively integrate it into everyday teaching activities.

Regarding learners' different learning styles, they should be given the opportunity to decide if they want to work on their own or in small groups when using e-learning course. In the latter case, this would enhance co-operative learning skills and peer correction.

Recommendations for Further Study

Every social research has its own limitations and shortcomings, and the current research is no exception as it focuses on the use of e-learning in relation to teaching English pronunciation, reading and writing for primary school teachers. However, for the continuation of the current study the researcher puts forward the following proposals:

First, it is helpful to examine the effects of the e-learning used in this study with different population who have different levels of English competency, gender or skills in using internet.

Further experimental studies need to be conducted to investigate the use of e-learning in different ways. For example, learning with e-learning in groups may yield more success than individual learning.

Finally, it is recommended that longitudinal study on how long Thai learners can improve their reading, writing and pronunciation of a particular sound should be conducted.

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APPENDIX A
Name list of experts

Table 1*Name List of Experts*

Names	Positions	Research instrument examined
1. Asst. Prof. Dr. Banlue Tinphanggha	A lecturer at Western Languages Program, Thaksin University	1. Motivation questionnaire 2. Lesson Plans for both control and experimental groups 3. Achievement tests
2. Dr. Sirirat Sinprachakphol	A lecturer at Faculty of Education, Thaksin University	1. Motivation questionnaire 2. Lesson Plans for both control and experimental groups 3. Achievement tests
3. Dr. Pittayathorn Kaewkong	A lecturer at Western Languages Program, Thaksin University	1. Motivation questionnaire 2. Lesson Plans for both control and experimental groups 3. Achievement tests
4. Dr. Kanlayanee Charoenchangnuchmee (Media expert)	A lecturer, Faculty of Education, Educational Technology and Communications, Thaksin University	1. E-learning course 2. Activities in each phase of ADDIE model
5. Ajarn Pennapa Chumuakchote (Media expert)	A lecturer, Faculty of Education, Educational Technology and Communications, Thaksin University	1. E-learning course 2. Activities in each phase of ADDIE model
6. Dr. Yaowaluck Pipatchamroenkool (Media expert)	A lecturer, Faculty of Technical Education, Educational Technology and Communications, Rajamangala University of	1. E-learning course 2. Activities in each phase of ADDIE model

	Technology Thanyaburi	
7. Dr. Chutima Chantarakij (Media expert)	A lecturer, Faculty of Education, Educational Technology and Communications, Songkhla Rajabhat University	1. E-learning course 2. Activities in each phase of ADDIE model
8. Mr. Suwan Chotikarn (Media expert)	Senior Academic staff, E-Learning Design and Development section, Computer Center, Thaksin University	1. E-learning course

APPENDIX B

**The Efficiency Value of Small Group Testing
and the Efficiency Value of Field Testing**

Table 2*The Efficiency Value of Small Group Testing*

Items	Efficiency of Process		Efficiency of Product	
	(E1)		(E2)	
	*Score (x)	Percentage	Score (y)	Percentage
1.	78	86.66	66	73.33
2.	63	70	60	66.66
3.	51	56.66	57	63.33
4.	75	83.33	72	80
5.	51	56.66	63	70
6.	51	56.66	66	73.33
7.	75	83.33	75	83.33
8.	81	90	81	90
9.	81	90	78	86.66
Efficiency value	74.81		76.29	

*Total score = 90

Table 3*The Efficiency Value of Field Testing*

Items	Efficiency of Process (E2)		Efficiency of Product (E1)	
	*Score (x)	Percentage	Score (y)	Percentage
1.	75	83.33	78	86.66
2.	57	63.33	66	73.33
3.	57	63.33	51	56.66
4.	66	73.33	75	83.33
5.	66	73.33	75	83.33
6.	69	76.66	69	76.66
7.	75	83.33	78	86.66
8.	72	80	81	90
9.	72	80	81	90
10.	75	83.33	78	86.66
11.	69	76.66	66	73.33
12.	78	86.66	57	63.33
13.	72	80	75	83.33
14.	69	76.66	69	76.66
15.	72	80	69	76.66
16.	72	80	78	86.66

Table 3 (continued)

Items	Efficiency of Process (E2)		Efficiency of Product (E1)	
	*Score (x)	Percentage	Score (y)	Percentage
17.	69	76.66	81	90
18.	69	76.66	84	93.33
19.	69	76.66	78	86.66
20.	75	83.33	66	73.33
21.	69	76.66	57	63.33
22.	81	90	75	83.33
23.	66	73.33	66	73.33
24.	75	83.33	69	76.66
25.	69	76.66	75	83.33
26.	81	90	84	93.33
27.	81	90	78	86.66
28.	84	93.33	75	83.33
29.	81	90	75	83.33
30.	84	93.33	81	90
Efficiency value	80.33		81.10	

*Total score = 90

Appendix C
Needs-Analysis Questionnaire

**แบบสอบถามความต้องการพัฒนาทักษะการออกเสียง การอ่านและเขียนภาษาอังกฤษผ่านบทเรียน
อิเล็กทรอนิกส์**

- คำชี้แจง**
1. แบบสอบถามนี้มีวัตถุประสงค์เพื่อศึกษาความต้องการพัฒนาทักษะการออกเสียง การอ่าน และการเขียนภาษาอังกฤษผ่านบทเรียนอิเล็กทรอนิกส์ของครูระดับประถมศึกษา
 2. แบบสอบถามมีทั้งหมด 9 ตอน กรุณาตอบแบบสอบถามตามความเป็นจริง

ตอนที่ 1: ข้อมูลทั่วไปของผู้ตอบแบบสอบถาม

1. เพศ: ชาย หญิง
2. อายุ:
3. สาขาที่เรียน:
4. จำนวนปีที่เคยเรียนทักษะการเขียนภาษาอังกฤษ
 6 7 8 9 10 11 12 อื่น ๆ:
5. ท่านทำงานเป็นครูระดับประถมศึกษามานานกี่ปี
 0 – 1 ปี 1 – 3 ปี 3 – 5 ปี 6 – 10 ปี 10 ปีขึ้นไป
6. ตอนนี้ท่านยังเรียนภาษาอังกฤษอยู่หรือไม่ เรียน ไม่ได้เรียน
7. ท่านคิดว่าความรู้ทักษะภาษาอังกฤษของท่านต่อไปนี้อยู่ในระดับใด
 - 7.1 ทักษะการออกเสียงภาษาอังกฤษ
 อ่อนมาก อ่อน พอใช้ ดี ดีมาก
 - 7.2 ทักษะการอ่านภาษาอังกฤษ
 อ่อนมาก อ่อน พอใช้ ดี ดีมาก
 - 7.3 ทักษะการเขียนภาษาอังกฤษ
 อ่อนมาก อ่อน พอใช้ ดี ดีมาก
8. เหตุผลที่ท่านยังเรียนภาษาอังกฤษเพิ่มเติมอีก คืออะไร กรุณาเรียงตามลำดับที่ท่านเห็นสำคัญ (1 = มากที่สุด, 4 = น้อยที่สุด)
 - เพื่อความก้าวหน้าในตำแหน่งงาน (Promotion)
 - เพื่อเงินพิเศษค่าความชำนาญด้านภาษาอังกฤษ (English Proficiency Allowance)
 - เพื่อเพิ่มพูนความรู้ (Education)
 - เพื่อใช้ในการสื่อสาร (Communication)
 - อื่นๆ (ระบุ.....)

9. ตั้งแต่เริ่มทำงานเป็นครูสอนระดับประถมศึกษา ท่านฝึกฝนภาษาอังกฤษเพิ่มเติมด้วยตนเองโดยวิธีใด (สามารถตอบได้มากกว่า 1 ข้อ)

- () อ่านหนังสือเรียนภาษาอังกฤษ
- () ฝึกฟังเทปสนทนาภาษาอังกฤษ
- () ฝึกพูดคุยกับชาวต่างชาติ
- () ฝึกอ่านหนังสือพิมพ์ภาษาอังกฤษ
- () ฝึกอ่านนิตยสารภาษาอังกฤษ
- () ฝึกอ่านนิยายภาษาอังกฤษ
- () ฟังเพลงภาษาอังกฤษ
- () ฟังรายการวิทยุภาคภาษาอังกฤษ
- () ดูภาพยนตร์เสียงภาษาอังกฤษ
- () อื่นๆ (ระบุ.....)

10. กรุณาเรียงลำดับทักษะการใช้ภาษาอังกฤษตามลำดับความจำเป็นที่ท่านจะต้องปรับปรุงการใช้ทักษะ นั้นๆ เพื่อประโยชน์ในการทำงาน (1 = มากที่สุด, 4 = น้อยที่สุด)

- () ทักษะการฟัง
- () ทักษะการพูด
- () ทักษะการอ่าน
- () ทักษะการเขียน

11. ทักษะการใช้ภาษาอังกฤษทักษะใด ที่เป็นปัญหาและอุปสรรคในการทำงานสำหรับท่าน กรุณาเรียงลำดับความสำคัญของปัญหา (1 = มากที่สุด, 4 = น้อยที่สุด)

- () ทักษะการฟัง
- () ทักษะการพูด
- () ทักษะการอ่าน
- () ทักษะการเขียน

ตอนที่ 2: ข้อมูลเกี่ยวกับนิสัยการเรียนรู้ของท่าน

โปรดแสดงความคิดเห็นของท่านโดย กาเครื่องหมาย (/) ในช่องที่ตรงกับความคิดเห็นของท่าน

ข้อความ	ระดับความเห็น				
	มากที่สุด	มาก	ปานกลาง	น้อย	น้อยที่สุด
	5	4	3	2	1
1. ท่านมีประสบการณ์ใช้อินเทอร์เน็ตในการเรียนภาษาอังกฤษ					

2. ท่านชอบเรียนรู้ด้วยตนเองโดยมีครูคอยให้ความช่วยเหลือ					
3. การเรียนกับบทเรียนอิเล็กทรอนิกส์ช่วยให้ท่านสามารถเรียนรู้ได้ตามศักยภาพที่ตนพึงมี					
4. ท่านชอบมีอิสระในการเลือกหัวข้อที่ต้องการเรียนรู้ได้เอง เช่น เลือกเรียนเพียงส่วนใดส่วนหนึ่งของบทเรียน					
5. ท่านไม่ชอบเรียนภาษาอังกฤษผ่านบทเรียนอิเล็กทรอนิกส์					

ตอนที่ 3: ข้อมูลเกี่ยวกับการเรียนทักษะการออกเสียง การอ่านและการเขียนภาษาอังกฤษผ่านบทเรียนอิเล็กทรอนิกส์

โปรดแสดงความคิดเห็นของท่านโดย ภาเครื่องหมาย (/) ในช่องที่ตรงกับความคิดเห็นของท่าน

ข้อความ	ระดับความเห็น				
	มากที่สุด	มาก	ปานกลาง	น้อย	น้อยที่สุด
	5	4	3	2	1
1. ผู้เรียนสนใจเรียนทักษะต่อไปนี้ผ่านบทเรียนอิเล็กทรอนิกส์: - การออกเสียงภาษาอังกฤษ - การอ่านภาษาอังกฤษ - การเขียนภาษาอังกฤษ					
2. ผู้เรียนชอบเรียนทักษะผ่านบทเรียนอิเล็กทรอนิกส์มากกว่าการเรียนในชั้นเรียน - การออกเสียงภาษาอังกฤษ - การอ่านภาษาอังกฤษ - การเขียนภาษาอังกฤษ					
3. ท่านสนใจทดลองเรียนทักษะต่อไปนี้ด้วยวิธีการสอนแบบใหม่ๆ					

- การออกเสียงภาษาอังกฤษ - การอ่านภาษาอังกฤษ - การเขียนภาษาอังกฤษ					
4. ท่านสามารถเรียนรู้ทักษะต่อไปนี้ได้ด้วยตนเองได้ - การออกเสียงภาษาอังกฤษ - การอ่านภาษาอังกฤษ - การเขียนภาษาอังกฤษ					

ตอนที่ 4: ข้อมูลเกี่ยวกับความคิดเห็นของท่านต่อการเรียนทักษะการออกเสียง การอ่านและการเขียนภาษาอังกฤษ

โปรดแสดงความคิดเห็นของท่านโดย กาเครื่องหมาย (/) ในช่องที่ตรงกับความคิดเห็นของท่าน

ข้อความ	ระดับความเห็น				
	มากที่สุด	มาก	ปานกลาง	น้อย	น้อยที่สุด
	5	4	3	2	1
1. การเรียนทักษะการออกเสียง การอ่านและการเขียนภาษาอังกฤษ ภาษาอังกฤษมีส่วนช่วยพัฒนา ศักยภาพทางวิชาการอื่น ๆ					
2. การใช้เวลา 1 ถึง 2 ชั่วโมงต่อสัปดาห์เพื่อฝึกฝนทักษะต่อไปนี้ในห้องเรียนเพียงพอ - การออกเสียงภาษาอังกฤษ - การอ่านภาษาอังกฤษ - การเขียนภาษาอังกฤษ					
3. ท่านต้องการฝึกฝนทักษะการออกเสียง การอ่านและเขียนภาษาอังกฤษเพิ่มเติมภายนอกห้องเรียน					
4. การเรียนผ่านบทเรียนอิเล็กทรอนิกส์สามารถนำไปใช้แทนที่สื่อการเรียนการสอนภายในห้องเรียน					

ตอนที่ 5: ข้อมูลเกี่ยวกับความต้องการพัฒนาทักษะการออกเสียง การอ่านและ การเขียนภาษาอังกฤษของท่าน

โปรดแสดงความคิดเห็นของท่านโดย กาเครื่องหมาย (/) ในช่องที่ตรงกับความคิดเห็นของท่าน

ข้อความ	ระดับความเห็น				
	มากที่สุด	มาก	ปานกลาง	น้อย	น้อยที่สุด
	5	4	3	2	1
1. คำศัพท์ภาษาอังกฤษ					
2. หลักไวยากรณ์ภาษาอังกฤษ					
3. หลักการออกเสียงภาษาอังกฤษที่ถูกต้อง					
4. หลักการอ่านภาษาอังกฤษที่ถูกต้อง					
5. หลักการเขียนภาษาอังกฤษที่ถูกต้อง					
6. หลักการเรียบเรียงเนื้อหาภาษาอังกฤษ					
7. ความรู้หรือข้อมูลในการเขียนภาษาอังกฤษ					

ตอนที่ 6: ข้อมูลเกี่ยวกับความจำเป็นในการใช้ทักษะการออกเสียง การอ่านและ การเขียนภาษาอังกฤษ

โปรดแสดงความคิดเห็นของท่านโดย กาเครื่องหมาย (/) ในช่องที่ตรงกับความคิดเห็นของท่าน

ข้อความ	ระดับความเห็น				
	มากที่สุด	มาก	ปานกลาง	น้อย	น้อยที่สุด
	5	4	3	2	1
การออกเสียงภาษาอังกฤษ					
1. การลงเสียงหนักเบาในระดับคำและระดับประโยค					
2. การออกเสียงสระ					
3. การออกเสียงพยัญชนะ					
4. การใช้ทำนองเสียง					
5. อื่นๆ (ระบุ.....)					

การอ่านภาษาอังกฤษ					
1. อ่านหนังสือ นิตยสาร หนังสือพิมพ์ และสิ่งพิมพ์ทั่วไป					
2. อ่านเรื่องย่อหนังสือ (Synopsis) หรือ ข้อมูล เกี่ยวกับหนังสือโดยย่อ					
3. อ่านข้อมูลหนังสือใน แคตตาล็อก หรือเว็บไซต์ เกี่ยวกับหนังสือ ภาษาอังกฤษ					
4. อ่านหนังสือ ทั้งประเภท นิยาย และ เรื่องจริง					
5. อ่านข้อมูลในโปสเตอร์ แผ่นพับ คู่มือ และสื่ออื่นๆ					
6. อ่านอีเมลจากเพื่อนร่วมงานใน องค์กร					
7. อื่นๆ (ระบุ.....)					
การเขียนภาษาอังกฤษ					
1. การเขียนรายงานภาษาอังกฤษ					
2. การเขียนอีเมลภาษาอังกฤษ					
3. การเขียนจดหมายภาษาอังกฤษ					
4. การเขียนบันทึกภาษาอังกฤษ					
5. อื่น ๆ (โปรดระบุ.....)					

ตอนที่ 7: ข้อมูลเกี่ยวกับการออกแบบ และการนำเสนอบทเรียนอิเล็กทรอนิกส์ที่น่าสนใจและเป็นประโยชน์ ต่อการเรียนรู้ทักษะการออกเสียง การอ่านและ การเขียนภาษาอังกฤษ

โปรดแสดงความคิดเห็นของท่านโดย กาเครื่องหมาย (/) ในช่องที่ตรงกับความคิดเห็นของท่าน

ข้อความ	ระดับความเห็น				
	มากที่สุด	มาก	ปานกลาง	น้อย	น้อยที่สุด
	5	4	3	2	1
1. การโต้ตอบกับผู้เรียน					
2. แอนิเมชัน, กิจกรรมการเรียนรู้ที่ สนุกสนานและดึงดูดใจผู้เรียน					

3. การปฏิสัมพันธ์กับผู้เรียน					
4. การออกแบบเส้นทางการเดินของ บทเรียนที่ง่ายต่อการใช้งาน					
5. แบบทดสอบย่อยในแต่ละหน่วย การเรียนรู้					
6. เนื้อหาที่เรียน + เสียงกมชัด + คำ แปลเนื้อหาหรือคำศัพท์					
7. คำอธิบายคำตอบที่ถูกต้อง หรือ คำอธิบายคำตอบในข้อที่ผู้เรียน เลือก					
8. ช่องทางการสนทนาออนไลน์ กับ ผู้เรียนอื่น ๆ					
9. เนื้อหาสรุป หรือการทบทวน บทเรียนในแต่ละหน่วยการเรียนรู้					

ตอนที่ 8: ข้อมูลเกี่ยวกับการจัดการเรียนการสอนภาษาอังกฤษ

โปรดแสดงความคิดเห็นของท่านโดย กาเครื่องหมาย (/) ในช่องที่ตรงกับความคิดเห็นของท่าน

ข้อความ	ระดับความเห็น				
	มากที่สุด	มาก	ปานกลาง	น้อย	น้อยที่สุด
	5	4	3	2	1
1. ท่านต้องการให้มีการสอนทักษะการ ฟัง พูด อ่าน เขียน ในอัตราส่วน เท่ากัน					
2. ท่านต้องการให้สอนโดยเน้นทักษะ การฟัง					
3. ท่านต้องการให้สอนโดยเน้นทักษะ การพูด					
4. ท่านต้องการให้สอนโดยเน้นทักษะ การอ่าน					
5. ท่านต้องการให้สอนโดยเน้นทัก ษการเขียน					

6. ท่านต้องการให้สอนเกี่ยวกับภาษาอังกฤษสำหรับใช้ทั่วไป					
7. ท่านต้องการให้เน้นการอบรมในด้านไวยากรณ์					
8. ท่านต้องการให้เน้นการอบรมในด้าน การออกเสียง/สำเนียง					
9. ท่านต้องการให้อาจารย์สอนแบบบรรยาย					
10. ท่านคิดว่าใช้สื่อที่เป็นตำราเรียนอย่างเดียวก็น่าเพียงพอ					
11. ท่านคิดว่าท่านต้องการเรียนโดยใช้สื่อที่หลากหลาย เช่น บทเรียน อิเล็กทรอนิกส์					
12. ท่านต้องการให้มีการประเมินผล การเรียนรู้					
13. อื่นๆ (โปรดระบุ)					

คำชี้แจงสำหรับคำถามข้อที่ 2 – 6 กาเครื่องหมาย (/) ในช่องที่ตรงกับความคิดเห็นของท่านมากที่สุด

2. ท่านต้องการให้การอบรมภาษาอังกฤษมีระยะเวลาที่ชั่วโมงต่อหลักสูตร

() น้อยกว่า 40 ชั่วโมง โปรดระบุจำนวนชั่วโมง.....

() 40 ชั่วโมง

() มากกว่า 40 ชั่วโมง โปรดระบุจำนวนชั่วโมง.....

3. ท่านต้องการเรียนครั้งละกี่ชั่วโมง

() 1 ชั่วโมงครึ่ง () 2 ชั่วโมง () 2 ชั่วโมงครึ่ง () 3 ชั่วโมง () อื่นๆ (โปรดระบุ).....

4. ท่านต้องการเรียนวันใด มากที่สุด

() วันทำงาน (ตอบคำถามข้อ 4.1. ข้ามข้อ 4.2.) () วันหยุด (ตอบคำถามข้อ 4.2. ข้ามข้อ 4.1.)

4.1. ท่านต้องการเรียนวันทำงานเวลาใด

() ช่วงเช้ามืดก่อนเข้างาน

() ใช้เวลาทำงานช่วงเช้ามืดมาเรียน

() ใช้เวลาทำงานช่วงบ่ายมาเรียน

() ตอนเย็นหลังเลิกงาน

() อื่นๆ (โปรดระบุ).....

4.2. ท่านต้องการเรียนวันหยุดเวลาใด

() ช่วงเช้า

() ช่วงบ่าย

() ช่วงเย็น

() อื่นๆ (โปรดระบุ)

5. ท่านต้องการให้ตารางเรียนเป็นอย่างไร

() เรียนสัปดาห์ละครั้ง จนครบจำนวนเวลาอบรม

() เรียนสัปดาห์ละ 2 ครั้ง จนครบจำนวนเวลาอบรม

() เรียนสัปดาห์ละ 3 ครั้ง จนครบจำนวนเวลาอบรม

() เรียนต่อเนื่องทุกวัน จนครบจำนวนเวลาอบรม

() อื่นๆ (โปรดระบุ)

6. ท่านต้องการเรียนกับใครมากที่สุด

() อาจารย์ต่างชาติ เจ้าของภาษาเท่านั้น

() อาจารย์ต่างชาติที่ใช้ภาษาอังกฤษในการเรียนการสอน ชาติใดก็ได้

() อาจารย์ชาวไทยเท่านั้น

() อาจารย์ชาวไทยที่ใช้ภาษาอังกฤษในการบรรยายการสอน

() อาจารย์ต่างชาติเจ้าของภาษา และอาจารย์ชาวไทย แบ่งหัวข้อกันสอน

() อาจารย์ต่างชาติเจ้าของภาษา โดยมีอาจารย์ชาวไทยเป็นผู้ช่วยสอน

ตอนที่ 9: ข้อคิดเห็นและข้อเสนอแนะ

ท่านสนใจเรียนทักษะการออกเสียง การอ่านและ การเขียนภาษาอังกฤษผ่านบทเรียนอิเล็กทรอนิกส์หรือไม่

สนใจ ()

เพราะ.....
.....
.....

ไม่สนใจ ()

เพราะ.....
.....
.....

ขอขอบคุณที่ให้ความร่วมมือ