



**FLEX MODEL OF BLENDED LEARNING DEVELOPMENT IN
ENHANCING EFL STUDENTS' CRITICAL
READING SKILLS**

ATCHARA LIMPAPATTARAKUL

**DOCTOR OF PHILOSOPHY
IN
ENGLISH FOR PROFESSIONAL DEVELOPMENT**

**SCHOOL OF LIBERAL ARTS
MAE FAH LUANG UNIVERSITY**

2025

©COPYRIGHT BY MAE FAH LUANG UNIVERSITY

**FLEX MODEL OF BLENDED LEARNING DEVELOPMENT IN
ENHANCING EFL STUDENTS' CRITICAL
READING SKILLS**

ATCHARA LIMPAPATTARAKUL

**THIS DISSERTATION IS A PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY
IN
ENGLISH FOR PROFESSIONAL DEVELOPMENT**

**SCHOOL OF LIBERAL ARTS
MAE FAH LUANG UNIVERSITY**

2025

©COPYRIGHT BY MAE FAH LUANG UNIVERSITY



**DISSERTATION APPROVAL
MAE FAH LUANG UNIVERSITY
FOR
DOCTOR OF PHILOSOPHY
IN**

ENGLISH FOR PROFESSIONAL DEVELOPMENT

Dissertation Title: Flex Model of Blended Learning Development in Enhancing EFL
Students' Critical Reading Skills

Author: Atchara Limpapattarakul

Examination Committee:

Assistant Professor Denchai Prabjandee, Ed. D.	Chairperson
Bhornsawan Inpin, Ph. D.	Member
Assistant Professor Wilawan Champakaew, Ed. D.	Member
Maneerat Chuaychoowong, Ed. D.	Member
Phirunkhana Phichiensathien, Ph. D.	Member

Advisor:


.....Advisor
(Bhornsawan Inpin, Ph. D.)

Dean:


.....
(Associate Professor Sorabud Rungrojsuwan, Ph. D.)

ACKNOWLEDGEMENTS

I would like to express my appreciation to those who have supported me throughout my Ph.D. studies. Without these people, my dissertation would not have been accomplished.

First and foremost, I would like to express my sincere gratitude to Dr. Bhornsawan Inpin, my advisor, for her invaluable suggestions, encouragement, and unwavering support. Her guidance has been instrumental in the completion of my dissertation.

In addition, I sincerely thank all experts who evaluated the research instruments for their valuable comments and suggestions. I am also grateful to the chairman and committee of my Ph.D. defense examination: Assistant Professor Dr. Denchai Prabjandee, Assistant Professor Dr. Wilawan Champakaew, Dr. Maneerat Chuaychoowong, and Dr. Phirunkhana Phichiensathien for their insightful advice and thorough review during the examination.

I also extend my sincere gratitude to Chiangrai Rajabhat University for providing the Ph.D. scholarship. I am grateful to my dedicated colleagues for their support throughout various stages of the research process. Additionally, I appreciate the cooperation and engagement of all research participants.

This study would not have been possible without the generous financial support of Mae Fah Luang University through the Dissertation Support Grant. I gratefully acknowledge this support, which was essential for the successful completion of this research.

Lastly, I sincerely thank my family for their unwavering love and support. I am also deeply grateful to my true friends, who have consistently stood by me and offered their time and understanding whenever I needed them.

Atchara Limpapattarakul

Dissertation Title	Flex Model of Blended Learning Development in Enhancing EFL Students' Critical Reading Skills
Author	Atchara Limpapattarakul
Degree	Doctoral of Philosophy (English for Professional Development)
Advisor	Bhornsawan Inpin, Ph. D.

ABSTRACT

The objectives of the study were (1) to develop and validate the quality of the Flex model of blended learning in enhancing EFL students' critical reading skills, (2) to implement and identify the effectiveness of the Flex model of blended learning in enhancing EFL students' critical reading skills, and (3) to explore the students' attitudes toward the Flex model of blended learning. The participants of the study were fifty-five second-year English education students who were enrolled in a critical reading course at the Faculty of Education, Chiangrai Rajabhat University, in the first semester of academic year 2025. Data were collected using a mixed-method approach. The research instrument includes a semi-structured interview, a critical reading pre-test and post-test, an in-depth interview, and a student attitudes questionnaire. The instructional instruments include the Flex model of blended learning, lesson plans, and critical reading lessons. Data were analyzed using means, standard deviations, paired t-tests, Cohen's d effect sizes, and thematic analysis. The research findings revealed that:

1. The consistency of the instructional model components was very high ($\bar{X} = 0.93$), and the model components' descriptions were very appropriate ($\bar{X} = 0.88$).
2. The mean score of the critical reading post-test ($\bar{X} = 14.55$, $SD = 3.04$) was higher than the pre-test mean score ($\bar{X} = 9.89$, $SD = 4.91$). The difference between the two mean scores was statistically significant at the .05 significance level. Additionally, Cohen's d effect size indicated a very large effect ($d = 1.46$).
3. The in-depth interview findings indicated that the students employed five critical reading strategies: previewing, analyzing, questioning, summarizing, and

reflecting during the implementation, which demonstrated the development of their critical reading skills.

4. The students expressed positive attitudes toward the Flex model of blended learning mean score of 4.40 (S.D. = 0.46), signifying that students' attitudes were at the high level. The findings revealed that the students recognized the Flex model of blended learning as the most efficient for enhancing their critical reading skills.

Keywords: Flex Model of Blended Learning, Critical Reading Skills, SAMR Model, Instructional Model, EFL Students



TABLE OF CONTENTS

CHAPTER	Page
1 INTRODUCTION	1
1.1 Background of the Study	1
1.2 Statement of the Problems	2
1.3 Conceptual Framework of the Study	6
1.4 Research Objectives	8
1.5 Research Questions	8
1.6 Significance of the Study	8
1.7 Scope of the Study	9
1.8 Definitions of Key Terms	10
1.9 Limitations of the Study	11
2 LITERATURE REVIEW	13
2.1 Critical Reading	14
2.2 Blended Learning	24
2.3 Instructional Design Models	57
2.4 Technology Integration Models	67
2.5 Related Research	80
3 METHODOLOGY	85
3.1 Research Design	85
3.2 Participants	85
3.3 Research Setting	87
3.4 Ethical Considerations	87
3.5 Research Instruments	87
3.6 Validity and Reliability of the Instruments	105
3.7 Research Procedure	107
3.8 Data Analysis	113

TABLE OF CONTENTS

CHAPTER	Page
4 RESULTS	115
4.1 Finding One: The Development and Validation of the Quality of the Flex Model of Blended Learning in Enhancing EFL Students’ Critical Reading Skills	115
4.2 Finding Two: The Effectiveness of the Flex Model of Blended Learning in Enhancing EFL Students’ Critical Reading Skills	153
4.3 Finding Three: The Students’ Attitudes Toward the Flex Model of Blended Learning	159
5 CONCLUSION AND DISCUSSION	162
5.1 Summary of Findings	162
5.2 Discussion	164
5.3 Implications for Practice	174
5.4 Suggestions for Future Research	176
REFERENCES	177
APPENDICES	192
APPENDIX A CERTIFICATE OF EXAMPTION	192
APPENDIX B LIST OF EXPERTS	193
APPENDIX C THE FLEX MODEL OF BLENDED LEARNING	194
APPENDIX D INSTRUCTIONAL MANUAL	222
APPENDIX E SAMPLE OF LESSON PLAN	235
APPENDIX F SAMPLE OF LESSON	240
APPENDIX G CRITICAL READING TEST	284
APPENDIX H SEMI-STRUCTURE INTERVIEW	292
APPENDIX I IN-DEPTH INTERVIEW	294
APPENDIX J STUDENT ATTITUDES QUESTIONNAIR	295
APPENDIX K EVALUATION FORM FOR THE FLEX MODEL OF BLENDED LEARNING	297

TABLE OF CONTENTS

CHAPTER	Page
APPENDIX L EVALUATION FORM FOR THE INSTRUCTIONAL DOCUMENT	299
APPENDIX M EVALUATION FORM FOR THE RESEARCH INSTRUMENTS	309
CURRICULUM VITAE	329



LIST OF TABLES

Table	Page
2.1 Critical Reading Strategies	18
2.2 Types of Course Classifications	27
2.3 Types of Course Classifications	28
2.4 Blended Learning Design	30
2.5 The Strengths and Weaknesses of Blended Learning Models	42
2.6 The Classification of the Components of Different K–12 Blended Learning Model	53
2.7 The Classification of the Components of Different Instructional Models	65
2.8 Summary of Pedagogy and Technology, Capabilities, and Limitations of the Technology Integration Models	77
3.1 Characteristics of the Flexibility Mode	94
3.2 Characteristics of the Learning Mode	94
3.3 Characteristics of the Enhancement Mode	95
3.4 Characteristics of the Experience Mode	96
3.5 The Instructional Procedures with Brief Descriptions, Learning Environment, Teacher’s Role, and Students’ Role	98
3.6 Research Design	110
4.1 Characteristics of the Flexibility Mode	135
4.2 Characteristics of the Learning Mode	135
4.3 Characteristics of the Enhancement Mode	136
4.4 Characteristics of the Experience Mode	137
4.5 Presents the Explanations of the Instructional Procedures for Each Learning Mode, with Brief Descriptions as Follows	139
4.6 The Consistency of the Components of the Flex Model of Blended Learning and the Appropriateness of the Component Descriptions	144
4.7 The Appropriateness of the Instructional Manual	146
4.8 The Appropriateness of the Lesson Plans	147

LIST OF TABLES

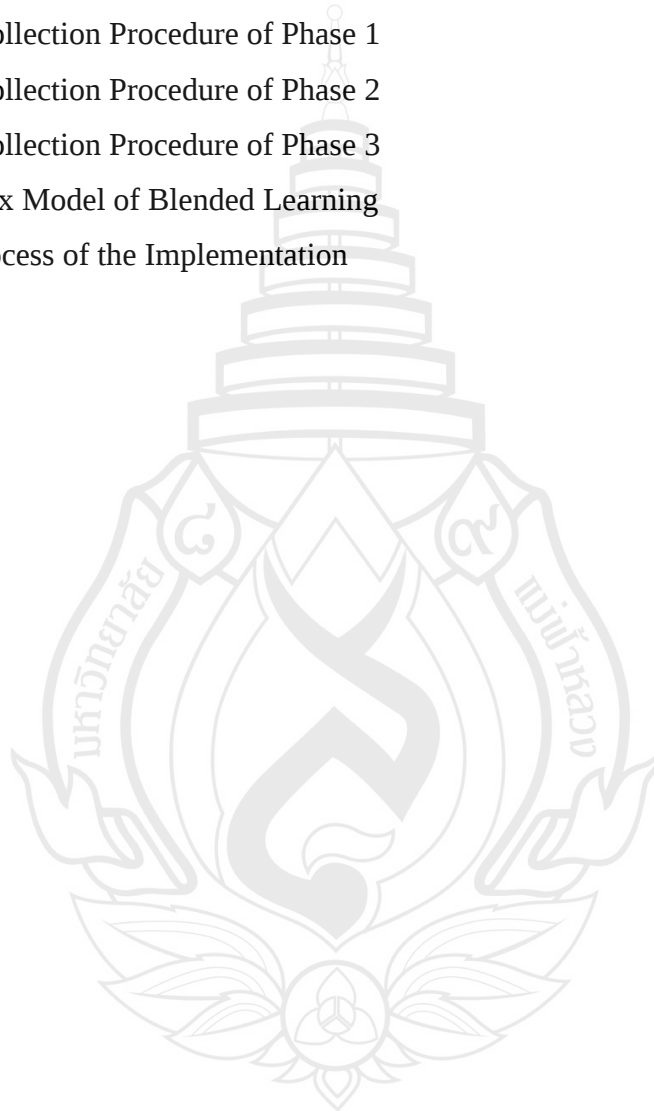
Table	Page
4.9 The Appropriateness of the Distinguishing between Facts and Opinions Lesson	148
4.10 The Appropriateness of the Identifying the Author's Purpose Lesson	149
4.11 The Appropriateness of the Making Inferences Lesson	150
4.12 The Appropriateness of the Evaluating the Arguments Lesson	152
4.13 The Critical Reading Pre-Test and Post-Test Mean Scores of the Pilot Group	153
4.14 The Average Score for the Comparison of Critical Reading Skills of EFL Students by Using the Flex model of blended learning by Pre-Test and Post-Test Scores	154
4.15 Students' Critical Reading Strategies Employed During the Implementation	159
4.16 Students' Attitudes Towards the Flex Model of Blended Learning	160

LIST OF FIGURES

Figure	Page
1.1 Conceptual Framework of the Study	7
2.1 Useful Questions Framework for Critical Reading	20
2.2 Revised Bloom Taxonomy	24
2.3 Blended Learning Model	25
2.4 The Trends of Blended Learning	32
2.5 Khan's Octagonal Framework	33
2.6 The Community of Inquiry Framework	34
2.7 K-12 Blended Learning Model	36
2.8 Station-Rotation Model	37
2.9 Lab-Rotation Model	37
2.10 Flipped-Classroom Model	38
2.11 Individual-Rotation Model	39
2.12 Flex Model	40
2.13 Self-Blend Model	40
2.14 Enriched-Virtual Model	41
2.15 The Flex Model	48
2.16 Flex Model	49
2.17 ADDIE Model	60
2.18 Morrison, Kemp, and Ross Instructional Design Model	61
2.19 The Dick and Carey Instructional Design Model	62
2.20 The Dynamic Instructional Design Model	64
2.21 TPACK Model	68
2.22 The RAT Model	70
2.23 The Technology Integration Matrix	72
2.24 The SAMR Model	73
2.25 SAMR and Bloom's Taxonomy	76

LIST OF FIGURES

Figure	Page
3.1 Flex Model of Blended Learning	89
3.2 The Process of the Implementation	97
3.3 Data Collection Procedure of Phase 1	107
3.4 Data Collection Procedure of Phase 2	110
3.5 Data Collection Procedure of Phase 3	112
4.1 The Flex Model of Blended Learning	130
4.2 The Process of the Implementation	138



CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Globalization and rapid technological advancement have rendered English proficiency and digital literacy indispensable for learners in the twenty-first century. As a global language, English enables communication across diverse linguistic and cultural contexts. Its impact extends to education, technology, science, business, and tourism (Jenkins, 2015; Kurniawan, 2024). Concurrently, digital transformation has fundamentally altered educational practices, particularly in language learning. Technology now occupies a central position in communication, learning, and information access, resulting in increased dependence on digital tools in everyday life.

Within educational contexts, digital resources have become integral to English instruction, prompting institutions to incorporate technology to improve academic achievement and foster higher-order thinking. Students, as digital natives, increasingly rely on technology, which often renders traditional teaching methods inadequate. The use of digital tools enhances student engagement and participation. This transformation encompasses not only the adoption of new technologies but also the redesign of teaching models and learning experiences, with significant implications for educational systems (Cai et al., 2024; Hu et al., 2024).

In Thailand, educational reform initiatives such as Thailand 4.0 are designed to advance the nation into the digital era, address global challenges, and prepare students to become global citizens. This policy necessitates changes in curricula and teaching methodologies (Royal Thai Embassy, 2015). In response, many schools have implemented digital resources, including virtual classrooms and interactive platforms, to enhance student engagement and personalize learning experiences. Lai (2011) underscores the importance of updating traditional teaching practices in both schools and universities. Collaboration among educational institutions to facilitate knowledge sharing is essential for the successful implementation of Thailand 4.0 (Puncreobutr,

2017). These reforms have substantially transformed teaching and learning, redefined the roles of teachers and students, and underscored the significance of innovative instructional approaches in the digital age.

Critical reading skills are indispensable for students in higher education globally. Within the English as a foreign language (EFL) context, learners must progress beyond basic comprehension to engage critically with texts. Proficiency in English contributes to vocabulary expansion, improved writing, and enhanced overall language competence. Reading proficiency is required across academic levels and professional fields. Critical reading enables students to analyze texts, evaluate arguments, identify bias, synthesize information, and question underlying assumptions (Barnett, 1997; Paul & Elder, 2008; Hudson, 2007). To cultivate these skills, students should examine the purpose of readings, assess authors' perspectives, evaluate the credibility of sources, and reflect critically after reading (Anuar et al., 2023; Ratanaruamkarn et al., 2023). Instructors can facilitate this development through classroom strategies such as guided questioning, which prompts students to analyze main ideas, supporting evidence, and foundational assumptions.

1.2 Statement of the Problems

In higher education, university students are expected to learn more than basic reading comprehension skills; they need to understand the text fully and critically. Wallace and Wray (2021) emphasized that critical reading is an essential academic skill for university students because it enables them to construct knowledge and participate effectively in scholarly discourse. With this, Wallace (2003) supported critical reading as the learners' abilities to comprehend not only the literal meaning but also the word choice and style of language.

Many EFL students, especially in Asian countries, still have trouble learning how to read critically (Barnet et al., 2020; Khamkhong, 2018; Le et al., 2024). Many Thai researchers have found the English reading ability of Thai students urgently need to be improved. In Thailand, university students face significant challenges in reading instruction, which has traditionally focused on memorization and repetition rather than

the development of higher-order thinking skills. Although many Thai universities require compulsory critical reading courses, students frequently struggle to critically analyze, evaluate, and synthesize information from texts. At the public university examined in this study, the critical reading course is a core component of the curriculum. However, students demonstrated unsatisfactory English reading achievement, with final exam scores indicating that their critical reading skills range from low to middle levels. These students experienced difficulties in comprehending texts, identifying main ideas, and interpreting the underlying meaning of reading materials.

Many studies have documented the significant problems of Thai students. Accordingly, Thongsan and Anderson (2025) indicated that conventional reading instructions frequently prioritize basic comprehension, which restricts students' opportunities to cultivate analytical skills and critical inquiry. Bharuthram (2012) found that many university students had insufficient abilities, students can read and comprehend the text, but they cannot read it critically. Moreover, the study by Chawwang (2008) indicated that Thai learners encounter difficulties related to vocabulary, sentences structure, reading strategies, and inadequate reading resources. Khamkong's (2018) study also revealed the performance of Thai university students in Northeastern Thailand on English critical reading and thinking assessments. The majority performed inadequately on English reading comprehension, especially with interpretative and critical inquiries. These challenges indicate that insufficient critical reading skills may negatively affect students' academic achievement and their abilities to engage with reading materials critically.

At the same time, the Thai educational system is undergoing rapid digital transformation, which has significantly influenced teaching and learning practices in higher education. Educational institutions are increasingly integrating digital technologies into classrooms to support flexible learning and develop students' 21st-century skills. However, challenges such as limited technological infrastructure, insufficient curriculum development, and inadequate teacher preparation continue to hinder effective technology integration in education. Consequently, there is a growing need for innovative instructional approaches that can simultaneously enhance students'

critical reading skills and support meaningful technology integration in language learning classrooms.

To enhance the critical reading skills of EFL students within the context of the digital transformation era, using traditional instructions and materials are no longer sufficient to meet the diverse characteristics of today's students. To address these challenges, it may be necessary to modify the traditional lecture format and physical arrangement of the classroom by integrating technology tools into the teaching and learning process. A possible solution might be an instructional model that is significantly more effective. This study introduces the "Flex model of blended learning" as a critical reading instructional model incorporating the Flex model (Staker & Horn, 2012), the SAMR model (Puentedura, 2014), and critical reading strategies (Axelrod & Cooper, 2002; Nasrollahi et al., 2015; Tovani, 2000). This instructional model promotes the development of critical reading skills by providing students with flexible and personalized learning experiences. The Flex model, an expansion of the blended learning proposed by Staker and Horn (2012), is described as instructional programs in which online learning serves as the basis for students' learning, occasionally leading them to offline activities. Students primarily learn on campus and transition between learning modalities through customized, flexible schedules. The teacher is on-site and provides individual support through activities.

Numerous studies highlighted the benefits of blended learning. Lu's (2021) research indicated that students perceived blended learning as a substantial enhancement to their critical thinking abilities, facilitating their analysis and synthesis of knowledge during classroom discussions. Furthermore, the study by Yang et al. (2022) found that mobile blended active language learning significantly improved Thai high school students' English critical reading skills and was positively perceived for its flexibility, engagement, and motivation.

The incorporation of technological tools can substantially advance the evolution of blended learning and transform the educational process, rather than simply replacing traditional instruction. Puentedura (2014) developed the SAMR model as a framework to describe the levels of selecting, using, and evaluating technology integration in the classroom. The SAMR model has four levels, (Substitution, Augmentation,

Modification, and Redefinition), which are shown as steps on a ladder from lower to higher levels of technology integration.

The previous study of Liu and Tsai (2012) provided an example of the Redefinition level of the SAMR model using m-learning by developing an augmented-reality mobile application to help Chinese students learn English. The finding revealed that augmented-reality mobile learning may increase the effectiveness of language learning. Therefore, this incorporation of the Flex model of blended learning and the SAMR model may facilitate a paradigm shift in learning that fosters the development of critical reading skills. As the education system continues to reform, it is evident that teachers may require diverse educational strategies and take the opportunity to implement digital technologies.

When the Flex model of blended learning of the study is combined with the SAMR model, it has the potential to foster transformative learning by offering the sense of community and additional learning possibilities beyond the traditional classroom. Transformative learning is a learning process that actively engages students through critical reflection and discussion. Students are encouraged to question their assumptions and expectations to deepen their understanding of the knowledge gained (Mezirow, 1997). Moreover, transformative learning occurs in an environment that fosters a strong sense of community through activities such as small group work, class discussions, and group assignments (Davies et al., 2020). Thereby, teachers need to encourage students to maintain frequent communication with their peers and coordinate activities that promote cooperation and a sense of community.

As blended learning becomes increasingly prevalent in higher education, there is a growing need for theoretically grounded research to inform instructional practice. Existing research has not sufficiently articulated the theoretical relationships among blended learning, the SAMR model, and the development of critical reading skills. Although blended learning and technology integration have been widely examined, empirical studies focusing on SAMR-based blended learning within the English as a Foreign Language (EFL) context remain limited. Graham (2021) observed that blended learning research continues to lack unified conceptual frameworks that explain how technology-supported environments facilitate higher-order cognitive processes. Similarly, Garrison and Kanuka (2004) highlighted the transformative and reflective

potential of blended learning but provided limited explanation of how instructional technology integration supports specific cognitive skills, such as critical reading.

This study aims to develop the Flex model of blended learning as an instructional model to enhance students' critical reading skills. Four main theories and concepts inform the development of this instructional model: the Flex model, the SAMR model, critical reading strategies, and the instructional design model.

1.3 Conceptual Framework of the Study

The Flex model of blended learning was developed based on three interrelated theories and concepts: the Flex model (Staker & Horn, 2012), the SAMR model (Puentedura, 2014), and critical reading strategies (Axelrod & Cooper, 2002; Nasrollahi et al., 2015). Its components were synthesized from four instructional design models: Dick et al. (2022), Kemp and Dwyer (2001), Lever-Duffy and McDonald (2011), and Morrison (2010). The development process also incorporated an analysis of teachers' and students' needs and challenges in teaching and learning the critical reading course. An instructional model was developed to enhance EFL students' critical reading skills within a dedicated critical reading course, as illustrated in Figure 1.1.

The Flex model of blended learning comprises four distinct modes: Flexibility (in-class), Learning (online), Enhancement (on-campus), and Experience (on-campus). Each mode requires a minimum of two hours for completion. Students participate in 2 hours of in-class instruction (25%), 2 hours of online self-study (25%), and 4 hours of independent learning outside class (50%). Program and course learning outcomes and descriptions were analyzed to inform the development of objectives and lesson content. The course is organized into four chapters, each dedicated to a specific critical reading skill: distinguishing facts from opinions, making inferences, identifying the author's purpose, and evaluating arguments. Each learning mode incorporates the stages of previewing, questioning, analyzing, and reflecting.

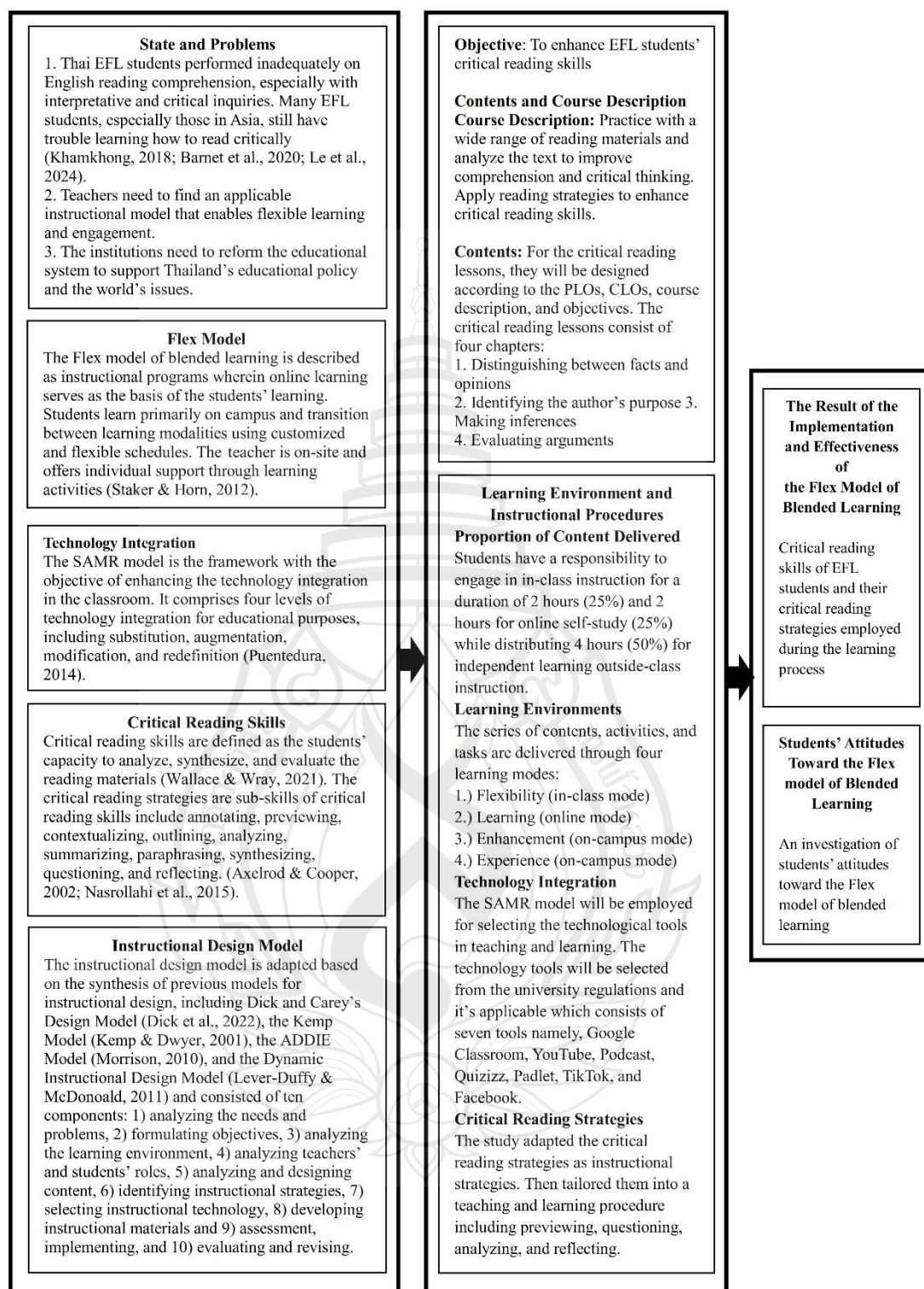


Figure 1.1 Conceptual Framework of the Study

1.4 Research Objectives

1.4.1 To develop and validate the quality of the Flex model of blended learning in enhancing EFL students' critical reading skill

1.4.2 To implement and identify the effectiveness of the Flex model of blended learning in enhancing EFL students' critical reading skills

1.4.3 To explore the students' attitudes toward the Flex model of blended learning

1.5 Research Questions

1.5.1 What are the components of the Flex model of blended learning designed to enhance EFL students' critical reading skills, and what are the results of the model validation?

1.5.2 To what extent does the Flex model of blended learning enhance EFL students' critical reading skills?

1.5.3 What are students' attitudes toward the Flex model of blended learning?

1.6 Significance of the Study

This study holds significance for several reasons. First, it aims to enhance EFL students' critical reading skills through the implementation of the Flex model of blended learning. By integrating face-to-face and technology-enhanced instruction, the research seeks to foster critical reading skills, including analysis, interpretation, and evaluation. Second, the study offers English teachers an alternative instructional approach for designing interactive and student-centered reading activities within blended learning environments. Third, the findings are intended to assist higher education institutions in adopting flexible, technology-based instruction to improve teaching effectiveness and advance digital transformation in language education. Additionally, this research contributes to the theoretical literature on blended learning by investigating the role of the Flex model in critical reading instruction within EFL

contexts. Finally, the results may serve as a reference for future researchers interested in blended learning, technology integration, and the development of critical reading skills.

1.7 Scope of the Study

The scope of the study was divided into three main stages based on the research objectives as follows:

1.7.1 Scope of Population

The study was taken place in an EFL classroom in a public university in Thailand. Participants of the current study consisted of 55 second-year English education program students who rolled into critical reading course in the academic year of 2025. This study employed a purposive sampling approach to select participants, who were divided into two sections, and their level of English proficiency ranged from A2 to B1 according to the CEFR.

1.7.2 Scope of Content

The contents were retrieved from the different analytic research instruments including Specific information concerning the students' needs and problems, and analysis of the PLOs, CLOs, the course description, and the objectives of the critical reading course. Then the critical reading texts were selected from a variety of sources, including online magazines, news articles, advertisements, and stories. They were selected to correspond to the CEFR B1 level as measured by Flesch-Kincaid. The Flesch-Kincaid Grade Level scores range from 30 to 50. Then, they were delivered via Google Classroom. The critical reading lessons were divided into four lessons consisting of distinguish between facts and opinions, identify the author's purpose, make inferences, and evaluate the author's argument.

1.7.3 Scope of Instruction

The Flex model of blended learning was implemented over an eight-week period in a critical reading course during the 2025 academic year. This model integrates four distinct learning modes: Flexibility mode (in-class), Learning mode (online), Enhancement mode (on-campus), and Experience mode (on-campus), with each mode

requiring a minimum of two periods for completion. Instructional time was allocated as follows: two hours of in-class instruction (25%), two hours of online self-study (25%), and four hours of independent learning outside of class (50%). Additionally, the study incorporated four critical reading strategies—previewing, questioning, analyzing, and reflecting—into the instructional procedure.

1.8 Definitions of Key Terms

1.8.1 The Flex model of blended learning is characterized by critical reading instruction delivered primarily online, with the majority of activities conducted on campus. Students participate in 2 hours (25%) of classroom instruction, 2 hours (25%) of online self-study, and 4 hours (50%) of independent learning outside of class. Learners are responsible for designing their own learning plans and progressing through the prescribed learning modes. Teacher meetings are available upon request to provide support. Instructors offer feedback following each lesson. Google Classroom serves as the primary instructional platform, while supplementary tools such as YouTube, Quizizz, Padlet, Facebook, and TikTok facilitate diverse learning activities. Instructors also facilitate group discussions and collaborative projects.

The four learning modes are as follows:

Flexibility mode aims to create learning flexibility. The teaching and learning take place in a traditional classroom where technology is used to substitute for traditional learning materials. The contents and instructions will be delivered online via YouTube and Google Classroom.

Learning mode aims to foster students' self-practice. Students could learn the lessons wherever and whenever, and the Quizizz website is used to augment an individual learning experience and foster self-directed progress by giving interactive feedback.

Enhancement mode aims to redesign the learning process through the integration of digital tools. Students participate in the small discussion room using Padlet to discuss the viewpoints with their peers in real time.

Experience mode aims to transform the learning experience. Students participate in a community space on campus. Facebook and TikTok will be employed for creating a learning community through the exchange of ideas.

1.8.2 Critical reading skills are a higher-level reading skill that involves students' ability to analyze, synthesize, and evaluate the material. Critical reading encompasses the ability to deduce implicit meanings, evaluate the author's intent, identify bias, and distinguish between fact and opinion. Students are encouraged to use different reading strategies to critically analyze the reading materials and to employ cognitive processes within the three highest levels of Bloom's Taxonomy through critical reading strategies, which are typically associated with critical thinking skills.

1.8.3 EFL students refers to 55 second-year university students majoring in English education who were enrolled in a critical reading course during the 2025 academic year. Their English proficiency levels ranged from A2 to B1 according to the Common European Framework of Reference for Languages (CEFR). These participants are identified as Thai EFL students or Thai university students interchangeably throughout the study.

1.8.4 Students' attitudes refer to the perspectives of Thai EFL students regarding the implementation of the Flex model of blended learning. These attitudes were evaluated by examining their satisfaction and opinions through the use of an attitude questionnaire.

1.9 Limitations of the Study

The scope of this study is limited to the English as a Foreign Language (EFL) context at Chiang Rai Rajabhat University in Thailand. Participants possess English proficiency levels ranging from A2 to B1, as defined by the Common European Framework of Reference for Languages (CEFR).

The research focuses on four critical reading skills specified in the course description: distinguishing between facts and opinions, identifying the author's purpose, making inferences, and evaluating arguments. Moreover, the instructional

strategies are limited to previewing, aligned analysis, and reflection, aligned with students' proficiency levels and instructional objectives.

The technological equipment and learning management system utilized in the study are determined by the university's infrastructure and students' access to technology. Consequently, the findings may not be generalizable to learners in other educational contexts, proficiency levels, or institutional settings. Moreover, the study addresses only selected aspects of critical reading and does not include broader elements of critical literacy.



CHAPTER 2

LITERATURE REVIEW

This study focuses on the development of the Flex model of blended learning in enhancing critical reading skills of EFL university students. This chapter is organized into five sections namely, critical reading skills, blended learning, instructional design models, technology integration models, and related research.

2.1 Critical Reading

- 2.1.1 Definition of Critical Reading
- 2.1.2 Importance of Critical Reading
- 2.1.3 Components of Critical Reading
- 2.1.4 Critical Reading Strategies
- 2.1.5 How to Teach Critical Reading
- 2.1.6 Integrating Critical Thinking in Critical Reading

2.2 Blended Learning

- 2.2.1 The Definitions of Blended Learning
- 2.2.2 The Importance of Blended Learning
- 2.2.3 The Proportion of Blended Learning
- 2.2.4 Blended Learning Design
- 2.2.5 Blended Learning Conceptual Frameworks
- 2.2.6 Flex model of Blended Learning
- 2.2.7 Students Engagement in Blended Learning

2.3 Instructional Design Models

- 2.3.1 The Definitions of Instructional Design Model
- 2.3.2 Characteristics of Instructional Design Model
- 2.3.3 Models of Instructional Design

2.4 Technology Integration Models

- 2.4.1 Technological, Pedagogical, Content Knowledge (TPACK)
- 2.4.2 The RAT Model
- 2.4.3 The Technology Integration Matrix (TIM)

2.4.4 The SAMR Model

2.5 Related Research

2.5.1 Research on Flex Model of Blended Learning

2.5.2 Research on Critical Reading Skills

Addressing the needs of diverse student populations requires educational institutions and instructors to adapt instructional design and educational systems in response to technological advancements. Critical reading is a fundamental skill in higher education and is essential for academic achievement. This chapter synthesizes existing literature and current research to provide a comprehensive understanding of critical reading and its impact on teaching and learning processes.

2.1 Critical Reading

Critical reading involves more than understanding explicit information; it requires analytical engagement with the text. Through this process, students evaluate arguments, interpret implicit meanings, assess credibility, and develop well-reasoned judgments based on textual evidence. Such practices foster a deeper understanding of the material.

2.1.1 Definition of Critical Reading

Critical reading skills are described as “a high-level reading process that entails the ability to read with analysis and judgment” (Huijie, 2010). According to Hudson (2007), critical reading skills help students analyze, synthesize, and evaluate what they read. Richards and Schmidt (2013) defined critical reading as the process in which the reader engages with the text by evaluating its content against individual preferences, values, attitudes, or beliefs.

Moreover, Wallace (2003) showed that critical reading enables students to analyze information, examine context from a broad perspective, connect it to their comprehension, and evaluate situations. Pirozzi (2003) noted that critical reading requires advanced understanding, interpretative, and evaluative skills, enabling readers to distinguish between fact and opinion and to identify the author's intent. Kurland (2000) defined the goal of critical reading as forming judgments about how a text functions. Critical readers go beyond absorbing the text to interpret, analyze, and evaluate content. Wallace and Wray

(2021) stated that critical reading involves questioning how the author supports arguments and whether the reader possesses further information on the subject.

Critical reading should be introduced in formal education, particularly at the university level. Its value is especially recognized in foreign language classrooms, such as English as a Foreign Language (EFL) class, because it helps learners move beyond literal understanding to analyze, evaluate, interpret, and question information. Scholars note that critical reading extends beyond basic comprehension. It involves identifying the author's purpose, recognizing bias, distinguishing fact from opinion, making inferences, and evaluating arguments. Many experts argue that critical reading is not an isolated skill, but rather interacts with other competencies, notably critical thinking. Pardede (2007) describes critical reading as a process involving both thinking and reading, requiring adequate understanding. Hughes (2014) highlights six benefits of teaching critical thinking in language classes: improving communication, fostering engagement with authentic texts, promoting whole-brain learning, strengthening exam preparation, and equipping students with analytical skills for employment. Wallace (1999) states that second language development occurs through analytical reading, critical discussion, and proper interpretation, all of which rely on solid language understanding.

Thus, critical reading possesses distinct attributes that differentiate it from general reading. As an advanced reading method, it develops students' ability to understand, evaluate, analyze, interpret, and question texts.

2.1.2 Components of Critical Reading Skills

To develop students' critical reading skills, it is essential to familiarize them with the components of critical reading. We must assign tasks that help them identify and apply these skills to real texts. Scholars have suggested various critical reading skills and activities to evaluate readers' abilities to analyze, evaluate, and create within critical reading materials.

According to Pirozzi et al. (2008), they also provided three reading skills to comprehend text critically, which are (1) making inferences, (2) identifying texts' facts and opinions, and (3) identifying the author's purpose and tone. Moreover, Adams and Patterson (2008) proposed five critical reading skills, including (1) Distinguishing facts from opinion, (2) Identifying the author's purpose, (3) Making inferences, (4) Formulating Conclusions, and (5) Evaluating arguments.

Furthermore, Larking (2017) presented ten critical reading skills as illustrated below:

1. Distinguish main and supporting ideas
2. Evaluate the credibility of the claims
3. Make relevant inferences about the text
4. Make judgments about how the text is argued
5. Question the author's assumptions
6. Decide how to use the text for your own study
7. Identify rhetorical devices
8. Identify power relations
9. Evaluate the quality of the text
10. Distinguish between fact and opinion

Suratha (2019) highlights key skills for critical reading, which are essential for skill development, as follows:

1. Making inferences involves the ability to link the information given in the passage to fully comprehend or deduce the implicit meaning of the text
2. Evaluating arguments and evidence refers to the capacity to assess and form judgments regarding the credibility of presented arguments and evidence
3. Distinguish between facts and opinions. Show the reader's ability to tell facts from opinions combined in the text.
4. Identifying the author's tone and purpose refers to finding the author's intended meaning and attitude by analyzing clues in the text.
5. Identifying point of view means recognizing the writer's perspective, which shapes the passage's theme.
6. Identifying the main idea is locating the central point of a passage and distinguishing it from supporting ideas.
7. Identifying bias means spotting biased statements in a passage and recognizing them as such.
8. Identifying organization is distinguishing the text's structure and the proper placement of ideas.
9. Identifying an assumption means finding the author's main hidden assumption in the text.

10. Evaluating an author's credibility involves judging the author's qualities that affect the text's reliability.

Therefore, various scholars offered different critical reading skills necessary for achieving in-depth comprehension of texts. However, based on the examination of the critical reading skills discussed earlier and the review of the course description and objectives, four critical reading skills have been chosen for the purpose of conducting the research, as outlined below:

1. Distinguishing between facts and opinions
2. Identifying the author's purpose
3. Making inferences
4. Evaluating arguments

2.1.3 Critical Reading Strategies

Critical reading skills are complex and require the reader to interpret the text literally, inferentially, and contextually, and to use various strategies to engage with the material. The sub-skills of critical reading are critical reading strategies, the methods employed to systematically analyze and evaluate texts, forming the basis for the development of critical reading skills. Critical reading strategies enable students to engage systematically and analytically with their textbooks and other reading materials.

Numerous scholars have proposed strategies to support critical reading that help students read critically. As Wallace (2003) stated, critical reading strategies encompass the specific actions readers employ to thoroughly comprehend a text. Sousa (2014) proposed critical reading strategies that include previewing, contextualizing, outlining and summarizing, questioning, reflecting, evaluating an argument, and comparing and contrasting related readings.

Additionally, there are ten essential critical reading strategies derived from the works of Kuta (2008) and Tovani (2000) as indicated in Table 2.1.

Table 2.1 Critical Reading Strategies

Critical Reading Strategies	A summary of the Strategies
Annotating	Reading responses to and inquiries regarding a text directly from the page.
Previewing	Acquiring an understanding of text structure, textual cues, visuals, and individual experiences before engaging with a text.
Scan vs. Skimming	Identifying the essential elements of the reading and comprehending the text's main idea.
Facts vs. Opinions	Opinion refers to a belief or value that is subject to debate, whereas facts are verifiable, uncontested, and supported by tangible evidence.
Drawing Conclusions	Examining textual evidence, considering their implications for existing information, and formulating an assumption.
Monitoring	The process of evaluating comprehension includes confirming the coherence of the information.
Summarizing	Give a brief summary of the text's key points. Write at least one paragraph outlining the key points in your own words.
Paraphrasing	Summarize a few sentences from the text and explain their meaning. To paraphrase the passage, read it again and look up any unfamiliar terms. Rephrase material to fit your style.
Synthesizing	Synthesize concepts and data extracted from various texts. Examine the patterns within your sources that may corroborate or contradict your beliefs or those presented by other sources.
Questioning	Create questions while reading a work for the first time; this practice enhances comprehension and retention by prompting you to create a question for each paragraph or concise part.

Moreover, Axelrod and Cooper (2002) and Nasrollahi et al. (2015) suggested that the critical reading strategies are as follows:

1. Annotating: writing notes, circling important words, and adding remarks
2. Previewing: acquiring information about a text prior to reading it
3. Contextualizing: placing a text in its cultural contexts, biographical contexts, and historical contexts
4. Outlining: identifying the main ideas
5. Analyzing: an analysis of the main idea and its supporting elements
6. Summarizing: rephrasing the main idea in their language

- 7. Paraphrasing: the act of rephrasing the main idea without altering its meaning
- 8. Synthesizing: the process of generating a new entity by combining different parts
- 9. Inquiring: asking questions regarding the topic
- 10. Reflecting: evaluating the credibility, emotional impact, and logic of a text

In brief, critical reading strategies constitute sub-skills of critical reading. These strategies encompass active engagement techniques designed to analyze, evaluate, and interpret a text's deeper meaning, arguments, and validity, rather than merely passively receiving information. This method improves comprehension and cultivates a deeper connection with the content.

2.1.4 How to Teach Critical Reading Skills

To cultivate critical reading skills, teachers may need to investigate various instructional strategies. Hudson (2007) explained that it is imperative to instruct students in the development of critical reading skills because we aim for them to possess not only the ability to convert orthographic symbols into language, known as word attack skills, but also to utilize context and background knowledge to comprehend written material, referred to as comprehension skills. Students should be able to perceive complete sentences as cohesive units, a cognitive process that facilitates fluent reading, commonly known as fluency skills. According to Wallace (2003), critical reading skills generally analyze the following aspects: (1) Linguistic concerns, including lexicon and syntax; (2) Rhetorical considerations regarding the general structure and organization of the text; and (3) Issues related to text type and discourse conventions.

Additionally, Wallace and Wray (2021) proposed a set of 5 questions to assess students' critical reading abilities. The following are the five essential outline questions:

- 1. What's the purpose of my reading this?
- 2. What is the author's objective in composing this work?
- 3. What do the writers say that relates to my research question?
- 4. How compelling are the writers' arguments?
- 5. To sum up, how can I apply this?

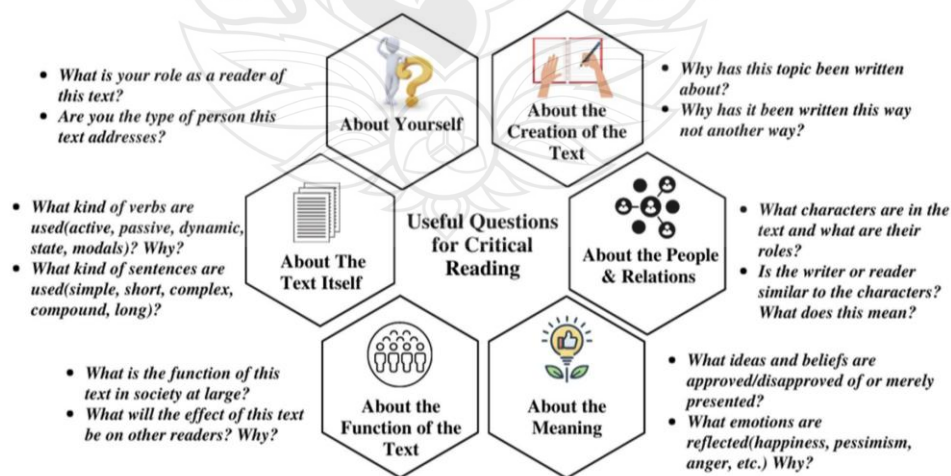
Moreover, Tomasek (2009) also asserted that educators could foster critical reading skills in students. This can be achieved through various strategies, such as prompting students to engage in questioning and problem-solving activities based on the text. Additionally,

students can enhance their critical reading abilities by evaluating their interpretations, considering their past and present experiences, examining their underlying assumptions and the potential consequences, and utilizing the knowledge gained from their reading to effectively communicate with others or devise solutions to complex problems.

Huijie (2010) proposed an organizational framework for critical reading comprising four distinct levels: analysis of structure, rhetorical examination, social impact, and holistic evaluation. The initial and subsequent stages of understanding the paragraph and assessing the text are comparable to those proposed by DiYanni (2017) and Carrigus (2002). The third level engages the text's social relevance with the reader's and writer's cultural background knowledge, as well as situational and intertextual contexts. The fourth aspect entails critical reading, which includes evaluating evidence, investigating sources and the text's underlying ideology, and distinguishing factual content from opinion-based material.

Bartu (2002) identified six categories of useful questions as a framework for critically reading a text, as presented in Figure 2.1 below. The six categories include;

1. Personal questions about the role of the reader
2. Specific questions according to particular characteristics of the text
3. Questions targeting how the text is created
4. Questions regarding the people and relations evident in the text
5. Questions posing questions aimed at understanding the meaning reflected.
6. Questions assessing how the text effects readers' lives and those of other readers.



Source Bartu (2002)

Figure 2.1 Useful Questions Framework for Critical Reading

Wallace (2003) provided an explanation of the text section method and task design that educators should consider when developing a reading lesson as follows:

2.6 Encourage students to engage in the selection or development of texts and assignments while being careful of their cultural content.

2.7 Promote students' self-awareness of their reading strategies and responsibilities, as well as the ways in which sociocultural factors affect them.

2.8 Provide students with critical reading skills that enable them to analyze the discourses within texts, challenge conventional methods of discussing individuals, locations, and events, and facilitate the development of alternative interpretations.

Furthermore, Wallace (2003) provided a deeper explanation of the various activities involved in teaching critical reading, which can be classified into three stages within the framework of reading instruction.

Pre-reading:

At this stage, teachers should motivate students to generate their own questions, arguments, or hypotheses, rather than responding to specific questions that guide the reading of the texts. In this critical reading approach, students are actively encouraged to formulate more questions during the reading process. This stage differs from traditional reading exercises, which emphasize students finding the answers.

While reading:

At this stage, teachers may present students with different interpretations of a reading text. Teachers should encourage students to engage in critical thinking and explore the diverse discourses derived from the text. Teachers must be creative in developing reading assignments that engage students with the material through diverse methods. The incorporation of literary works into reading lessons exemplifies a method for helping pupils cultivate diverse discourses.

Post-reading:

During this stage, teachers may engage students in activities that foster critical thinking by presenting them with different viewpoints on the reading text. In this activity, it is possible to employ two texts that address the same subject matter but employ distinct discourses and suggest different models of the reader. Teachers may ask students to identify the unique characteristics of the two texts.

Therefore, after synthesizing the information from many scholars, the study adapted the critical reading strategies as the reading instructions and then tailored them into a teaching and learning process step by step that consists of four steps, namely, previewing, questioning, analyzing, and reflecting, which aim to be the pedagogy used during the teaching and learning for enhancing students' critical reading skills, as explained below:

Step 1. Previewing: students' vocabulary mastery related to the story was built. Readers will be able to predict the text's content and structure before engaging in a thorough examination.

Step 2. Questioning: questions are intended to help readers comprehend the text and respond to it in greater detail. Since the objective of this study is to examine students' critical reading skills, greater emphasis is placed on higher-order thinking questions. Nevertheless, lower-order thinking is still required to assess students' understanding of the text.

Step 3. Analyzing: identifies the main idea and supporting ideas, then summarizes the text's main idea by writing or retelling it.

Step 4. Reflecting: evaluating a text's credibility, logical reasoning, and emotional impact. The work assigned in class occasionally prompts students to reflect on their attitudes, beliefs, and stances regarding contemporary issues.

2.1.5 Integrating Critical Thinking in Critical Reading Skills

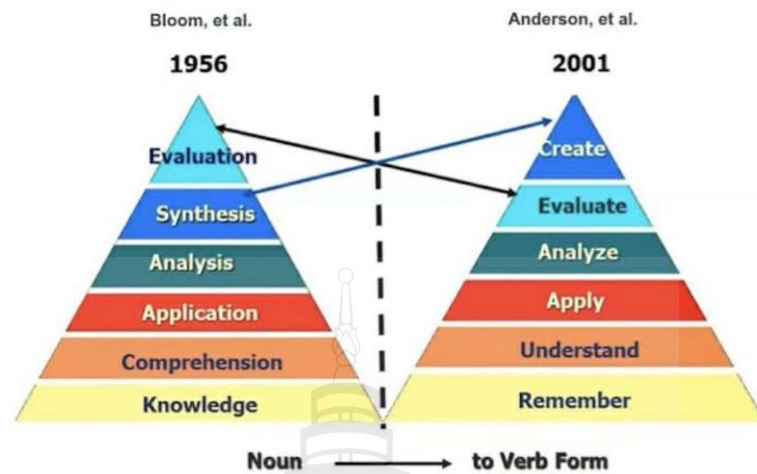
The concept of critical thinking has been extensively studied and acknowledged as a fundamental basis for developing critical reading skills. This means that critical reading skills can enhance both reading proficiency and cognitive abilities. Similarly, the capacity to effortlessly decode words by focusing on fundamental principles of reading instruction, rather than relying on a specific method, can also contribute to improved reading and thinking abilities. In addition to emphasizing the importance of critical reading, which regards critical thinking as a key skill in the learning process, it also highlights the capacity to acquire knowledge from written material and engage in analytical and critical thinking.

Critical thinking is claimed to be important in the acquisition of language skills, particularly writing and reading. Critical thinking is a form of thinking that is self-directed, self-disciplined, self-monitored, and self-corrective in the context of education

and a process that involves three interrelated stages: analyzing thinking, evaluating thinking, and improving thinking (Paul & Elder, 2006). Moreover, the educational system has placed a high importance on fostering the development of these cognitive abilities, recognizing that acquiring the skill of critical thinking is essential for individuals to secure their future success.

Although critical reading and critical thinking are closely interconnected, they are distinct concepts. The purpose of critical reading is to uncover and investigate the concepts and information in each text. However, critical thinking is the process of evaluating and assessing information and ideas to determine what to accept and believe. In a nutshell, critical reading can't be achieved without critical thinking. This means that critical thinking is considered a crucial component of critical reading skills. To engage in critical reading, an individual must also be able to think critically (Suratha, 2019). Critical reading involves applying cognitive processes such as analysis, synthesis, and evaluation (Lee, 2015). Wilson (2016) revealed that critical thinking processes can be utilized in the teaching of critical reading. Students must acquire the skills of both reading comprehension and critical and reflective thinking in order to succeed academically. Likewise, Hidayati et al. (2020) suggested that improving one's critical reading skills can help foster the development of critical thinking habits. Providing students with opportunities to develop critical reading skills allows them to identify cause and effect, examine relationships within the text, and cultivate a critical perspective.

Besides, Bloom's Taxonomy is a widely recognized theory that is regarded as a representative of an educational perspective on critical thinking. Bloom's Taxonomy provided a definition of critical thinking as the ability to acquire knowledge through the examination of ideas across six progressive levels: knowledge, comprehension, application, analysis, synthesis, and evaluation. Knowledge, comprehension, and application are classified as lower-order thinking skills, while the other levels are considered higher-order. However, in Bloom's revised version (Krathwohl, 2002), there are six hierarchies: remember, understand, apply, analyze, evaluate, and create (Figure 2.2).



Source Anderson and Krathwohl (2001)

Figure 2.2 Revised Bloom Taxonomy

Scholars agree that critical thinking is a complex and multifaceted process. The critical thinking pedagogy incorporates Bloom's taxonomy, allowing students to engage in lower-level cognitive tasks before progressing to higher-level ones (Krathwohl, 2002). This suggests that readers must navigate a series of stages to effectively analyze, evaluate, and comprehend scholarly materials. To achieve this, they must utilize the higher-order thinking skills outlined in Bloom's revised taxonomy. This is supported by the study by Lanchwathanakorn and Na-Songkhla (2018), which found that when engaging in critical reading, readers apply their critical thinking abilities to examine both the text's content and their interpretation of it.

Thus, critical reading involves a deeper, more intricate interaction with a text, requiring readers to analyze and evaluate it thoroughly.

2.2 Blended Learning

Blended learning represents a significant development in contemporary education. This approach integrates traditional face-to-face instruction with online learning activities, resulting in a more flexible and effective learning environment. The increasing adoption of digital technologies has transformed teaching and learning practices, contributing to the widespread acceptance of blended learning across educational institutions.

2.2.1 Definition of Blended Learning

Blended learning is a transformative instructional approach that has driven its widespread adoption in education (Allen & Seaman, 2013). Blended learning is the integration of face-to-face and online learning, where face-to-face refers to in-person classroom instruction and online learning denotes education delivered via digital platforms, as shown in Figure 2.3 (Bonk & Graham, 2012; Driscoll, 2002; Garrison & Kanuka, 2004; Garrison & Vaughan, 2008).

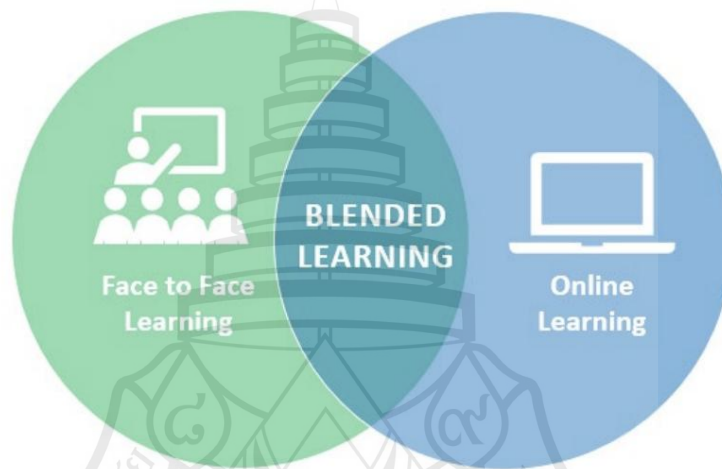


Figure 2.3 Blended Learning Model

Allan (2007) explained that blended learning involves using internet-based tools, such as chat rooms, discussion groups, podcasts, and self-assessment tools, to complement face-to-face learning. Similarly, Sharma and Barrett (2007) defined blended learning as a language course that combines traditional classroom instruction with digital tools, including the Internet and interactive whiteboards. The concept also includes computers as communication media, such as chat and email, as well as platforms that help educators improve teaching, such as virtual learning, blogs, and wikis.

Moreover, Staker and Horn (2012) stated that “blended learning is any formal education program in which a student learns at least in part through online learning, with some element of student control over time, place, path, and pace.” According to Carman (2002), blended learning offers students the flexibility to learn at any time and place, thereby potentially reducing the limitations of both online and traditional learning systems in a cohesive manner.

Blended learning can promote personalized and competency-based learning. It allows students to pursue different paths toward shared goals and enables educators to act as designers, mentors, facilitators, tutors, evaluators, and counselors, engaging with students in new ways.

Staker and Horn (2012) identify four distinct components that define the control elements of the blended learning model as follows:

1. Time refers to learning, which is no longer limited to the school day; students can learn based on the time they have available.
2. Place – learning is not limited to the classroom; students can learn anywhere, including at home or in libraries.
3. Path means learning is no longer limited to the classroom; interactive and adaptive software enables students to learn in ways tailored to their needs.
4. Pace – learning matches each student's speed; students can take more time if needed.

In summary, blended learning combines traditional and online methods to transform modern teaching and learning, supported by technology.

2.2.2 Importance of Blended Learning

The importance of blended learning lies in its ability to boost learning effectiveness and outcomes by aligning student needs with the learning program and providing diverse educational resources. By incorporating adaptive learning and technology tools, blended learning helps educators deliver personalized content tailored to each student's needs and timing. It also fosters collaborative learning, supporting joint efforts among students and teachers even across geographic distances. Additionally, blended learning accommodates unique learning styles and supports independent learning (Graham et al., 2019).

Additionally, blended learning offers opportunities to create transformative environments that effectively facilitate learning and foster critical and reflective thinking (Garrison & Kanuka, 2004). According to Allan (2007), blended learning can enhance accessibility, engagement, and relevance across all facets of education. The adoption of this methodology will offer students flexible learning opportunities, thereby alleviating time constraints by removing additional tasks that support their educational growth. In addition, blended learning holds promise for expanding opportunities in traditional classroom-based education by offering advantages such as reduced travel expenses, increased course

availability, enhanced learning outcomes, and reduced social and psychological obstacles (Beard & Harper, 2002). The application of blended learning in the actual classroom demands several aspects that can collectively and collaboratively contribute to achieving the learning outcomes. Osguthorpe and Graham (2003) suggested six reasons for implementing blended learning which are pedagogical richness, access to knowledge, social interaction, personal agency, cost-effectiveness, and ease of revision. In addition, blended learning, as a teaching methodology, has the potential to foster students' confidence and creativity and to promote self-directed learning (Alam et al., 2022).

In conclusion, blended education holds significant value, as many educational experts note. The spread of online learning and the growing need to incorporate it in education underscore this. Blended learning offers greater flexibility, diverse student demographics, and cost-effectiveness.

2.2.3 Proportion of Blended Learning

Blended learning integrates face-to-face and online instruction. Much debate surrounds how much time schools should allocate to in-person versus online learning. Bernard et al. (2009) suggest a 50-50 % between online and face-to-face activities. In contrast, Allen and Seaman (2013) identified three main categories: blended learning (30-79% of course material online, with both online and traditional methods), face-to-face instruction (0-29% of course content online), and online courses (at least 80% of content online). Table 2.2 shows how content is distributed among these categories.

Table 2.2 Types of Course Classifications

Proportion of Content Delivered Online	Type of Course	Typical Description
0%	Traditional	The course does not utilize any online technology and instead relies on written or oral methods for content delivery.
1 to 29%	Web Facilitated	The course employs web-based technology to enhance the delivery of a predominantly in-person instructional experience. Utilizes a course management system (CMS) or web pages as a means for distributing the syllabus and assignments.

Table 2.2 (continued)

Proportion of Content Delivered Online	Type of Course	Typical Description
30 to 79%	Blended/Hybrid	A course that integrates both online and face-to-face instructional methods. A significant portion of the material is distributed through online platforms, commonly involves virtual discussions, and often incorporates in-person meetings.
80+%	online	A course in which the majority, if not all, of the course materials and instruction are disseminated through online platforms. In general, face-to-face meetings are not commonly held.

Source Allen and Seaman (2013)

Moreover, Chantanarungpak (2005) also proposed a similar online content distribution, categorized into four main types in Table 2.3.

Table 2.3 Types of Course Classifications

Proportion of Content Delivered Online	Type of Course	Typical Description
5-10%	Informational	Courses 5–10% using online technology; online learning is integrated into the process of instruction.
20-30%	Supplement	Courses 20–30% using online technology; instructional content, supplementary resources, websites, and emails will be given online.
50-60%	Blended	Course 50-60% offered in both online and on-site modes. Online resources and materials are used.
90-100%	Distance	Course 90-100% offered only online without face-to-face instruction

Source Chantanarungpak (2005)

Based on discussions about the optimal blended learning ratio, it is suggested that blended learning typically includes at least 50 percent online instruction. Increasing the availability of online content on digital platforms can address the limitations of traditional education and encourage innovative teaching approaches. Blended learning also gives

students more autonomy in managing their learning. Increasing the availability of online content on digital platforms can address the limitations of traditional education and encourage innovative teaching approaches. Additionally, online platforms can effectively distribute course content and instructional materials through technology-mediated delivery.

Therefore, this study anticipated that students would participate in in-class instruction for 2 hours (25%), engage in 2 hours of online self-study (25%), and allocate 4 hours (50%) to independent learning outside of class.

2.2.4 Blended Learning Design

Given the specific challenges of implementing blended learning in certain contexts, various design frameworks guide educators in making this transition. Blended learning exhibits diverse characteristics and implementation styles shaped by focused design choices (Picciano, 2009). As Neumeier (2005) proposed a theoretical framework for developing a blended learning environment. The framework comprises six factors that define the fundamental parameters for designing a blended learning environment. Teachers must carefully consider each of these factors when deciding to incorporate blended learning into their instructional methods. The factors under consideration are as follows:

1. Mode of instruction
2. Model of integration
3. Distribution of learning content and objectives
4. Language teaching methods
5. Involvement of learning subjects
6. Location

Additionally, Garrison and Kanuka (2004) suggested that the design of blended learning to promote the effectiveness and efficiency of teaching and learning will consist of the following:

1. Creating a clear institutional direction and policy
2. Defining the potential and enhancing awareness and dedication
3. Establishing a centralized support, quality assurance, and project management point of contact
4. Creating an innovation fund to provide faculty and departments with financial support and incentives to initiate blended learning course transformations
5. Establishing a reliable and accessible technology infrastructure

6. Selecting prototype projects that prove to be exceptionally successful examples of effective learning through strategic planning
7. Establishing a formal instructional design to complement the available support in a blended format
8. Assessing new course teaching, learning, technology, and administration satisfaction and success systematically
9. Establishing a task force to address issues, challenges, and opportunities, and to communicate and recommend new directions to the university community

Furthermore, Graham (2005) outlined four different levels of blended learning design, as illustrated in Table 2.4. These levels encompass blending at the activity, course, program, and institutional levels. Activity-level blending refers to an instructional method that combines face-to-face learning with technology to enhance teaching and learning in a classroom setting. Hence, course-level blending occurs when a clear distinction is drawn between face-to-face and online/virtual learning. Additionally, program-level blending can be observed when students choose to participate in a combination of in-person and online courses. Institutional-level blending is a pedagogical approach in which educational institutions provide in-person instruction at the beginning and end of courses, while students engage in asynchronous online learning in between sessions to acquire the course content.

Table 2.4 Blended Learning Design

Blended Learning Designs			
Activity-Level Blending	Course-Level Blending	Program-Level Blending	Institutional-Level Blending
Learning takes place in a face-to-face environment with technology-mediated learning.	The distinction between learning in a face-to-face environment and online learning using technology-mediated	Students select a mixture of face-to-face and online courses to attend and complete their learning	Institutions provide the courses, and students learn the material asynchronously online at the beginning, end, and throughout the duration of the courses.

Source Graham (2005)

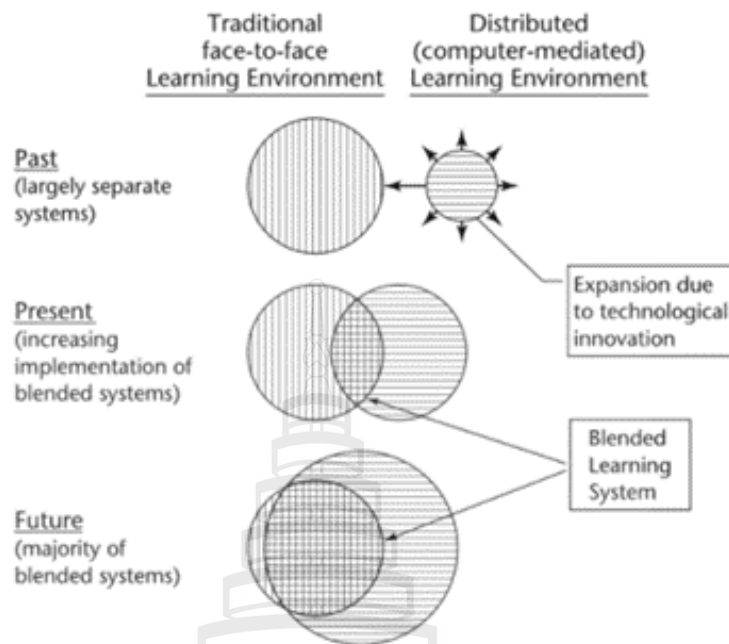
Thus, it is imperative for educators to consider the aforementioned factors when developing the blended learning model. Doing so will enable them to customize their blended learning approach and establish an effective instructional model.

2.2.5 Blended Learning Conceptual Frameworks

The term “blended” has many definitions, stemming from researchers’ efforts to combine modalities, instructional methods, and technologies. All of these are essential components of the blended learning model. The modality is the blended learning environment (online or in-person), whereas the instructional method is the strategy or practice used with technological tools in the classroom (Graham, 2021).

Moreover, Graham (2005) stated that the current and future trends of blended learning models will become increasingly intertwined due to the rise of digital technologies and computer-mediated instruction in conventional classrooms. Educators and researchers continue to use the term “blend” to describe the classroom environment at present. Therefore, with the results of this technological shift, the implementation of blended systems was enhanced by the digital technology used in the setting and could not be separated from it.

In the past, two characteristics of learning environments have been largely separated in blended learning due to the use of different teaching methods and materials. In a traditional classroom, a teacher-led approach is typically utilized. In a synchronous classroom, however, this is not the case. In contrast, an asynchronous distance classroom emphasizes self-study and interaction with materials. As demonstrated in Figure 2.4, the variety of digital technologies and applications has increased computer-mediated instruction in conventional classrooms. Graham (2005) also predicted that the use of digital technology in education will become increasingly intertwined in the future.



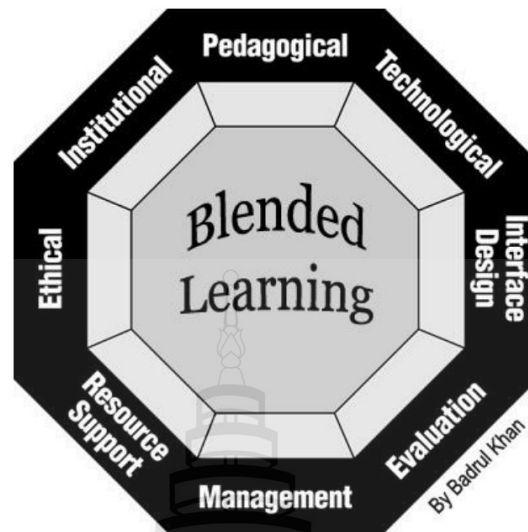
Source Graham (2005)

Figure 2.4 The Trends of Blended Learning

The adoption of a blended learning model has resulted in the development of various aspects; several researchers have proposed different blended instructional modalities, which are outlined below:

2.2.5.1 Khan's Octagonal Framework

The Khan's Octagonal Framework is a guide for planning, developing, delivering, managing, and assessing blended learning programs. There are eight dimensions, including pedagogical, technological, and interface design, as well as evaluation, management, resource support, ethics, and institutional. Khan's framework contributes to the creation of a productive and effective blended learning environment. As shown in Figure 2.5, each of the framework's eight dimensions corresponds to a distinct category of problems that must be resolved. These concerns contribute to the organization of thinking and learning programs, which creates a meaningful learning experience.



Source Khan (2005)

Figure 2.5 Khan's Octagonal Framework

According to Khan (2005), the eight dimensions for creating a blended learning program are as follows:

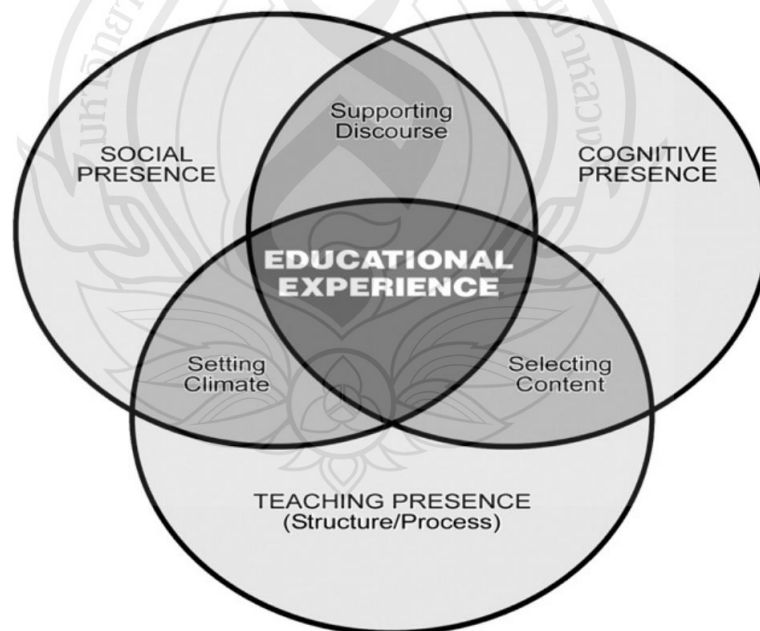
1. The institutional dimension concerns organizational, administrative, academic affairs, and student services.
2. The pedagogical dimension concerns analyzing content, learning objectives, methods, strategies, and students' needs.
3. The technological dimension examines issues of technology infrastructure, learning management systems, and the tools required to deliver blended learning.
4. Interface design refers to the user interface for each blended learning element. The user interface should accommodate the blended learning program, allowing students to use any learning delivery method and switch between them.
5. The evaluation dimension of blended learning concerns the effectiveness of a blended learning program, including assessments of students and evaluations of instruction, the learning environment, and the model. In a blended learning environment, each delivery type should be evaluated using the appropriate method.
6. Management dimension also addresses registration and notification, as well as the scheduling of the various components of the blended learning.

7. Resource support dimension deals with making different types of resources (offline and online) available for learners, as well as organizing them.

8. Ethical dimension outlined the ethical issues that must be considered when designing a blended learning program, including equal opportunity, cultural diversity, and nationality.

2.2.5.2 The Community of Inquiry Framework

The Community of Inquiry (CoI) framework illuminates the process of learning in an online and blended learning environment (Garrison et al., 1999). The framework depicted in Figure 2.6 comprises three types of presence (social, teaching, and cognitive). This framework outlines the elements required for creating profound, meaningful learning. The framework is based on John Dewey's work (Garrison et al., 1999) and is consistent with constructivist approaches to learning in higher education. Blended learning based on the Community of Inquiry framework fosters self-reflection, active cognitive processing, interaction, and peer teaching. The CoI framework facilitates guided inquiry by identifying teaching activities and providing guidance, based on theory and practice, on blended learning's content and procedures.



Source Garrison et al. (1999)

Figure 2.6 The Community of Inquiry Framework

The community of inquiry framework identifies the education experience as occurring at the convergence of three presences as follows:

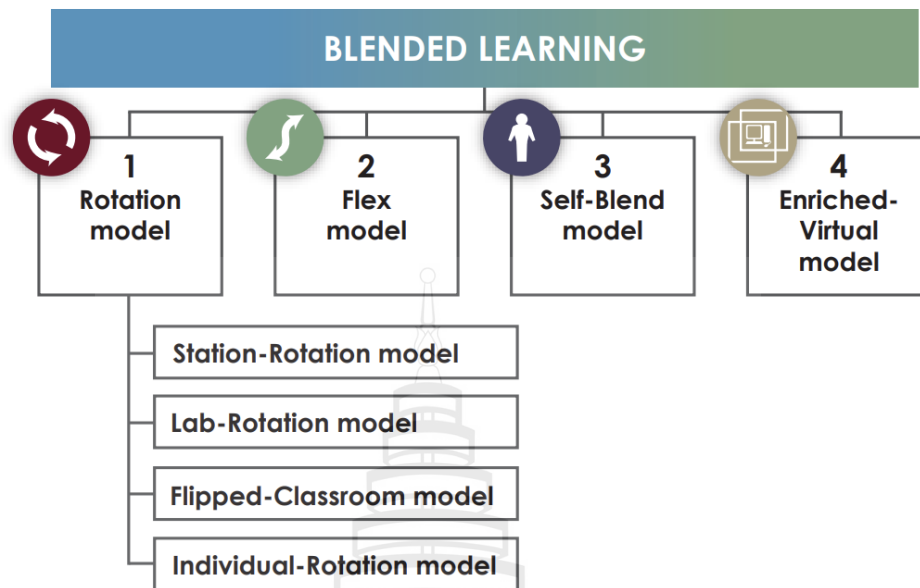
1. Social presence is a theory that explains how individuals can present themselves as real people in mediated communication. Social presence refers to the creation of an online community in which participants feel emotionally and socially connected (Lowenthal & Lowenthal, 2010)

2. Cognitive presence is the extent to which students can construct and validate meaning through sustained reflection and discourse. Cognitive presence in an online course can be achieved through the following four phases: initiation, exploration, integration, and resolution. Consequently, it seems that the critical thinking it seeks is a result of cognitive presence (Garrison et al., 1999).

3. Teaching presence is considered “a significant predictor of student satisfaction, perceived learning, and a sense of community.” Teaching presence is defined as the design, facilitation, and direction of cognitive and social processes to realize personally significant and educationally valuable learning outcomes. Teaching presence includes three elements: instructional design and organization, facilitating discourse, and direct instruction (Garrison & Arbaugh, 2007).

2.2.5.3 The K–12 Blended Learning

The K–12 blended learning model is defined as the formal education programs that combine online learning and brick-and-mortar schools (Staker & Horn, 2012). The model was developed from students’ perspectives on their educational experiences across multiple dimensions, including teacher roles, scheduling, physical space, and delivery methods. K–12 blended learning comprises four major models: the Rotation model, the Flex model, the Self-blended model, and the Enriched-Virtual model (see Figure 2.7). Moreover, the Rotation model classified four sub-models: the Station-Rotation model, the Lab-Rotation model, the Flipped classroom model, and the Individual-Rotation model. Each model offers students varying degrees of control over the time, place, pace, and path of their education. Therefore, teachers can select the optimal instructional strategy to meet each student’s specific needs and ensure that all students make progress toward their learning goals, as shown in Figures 2.7-2.14.



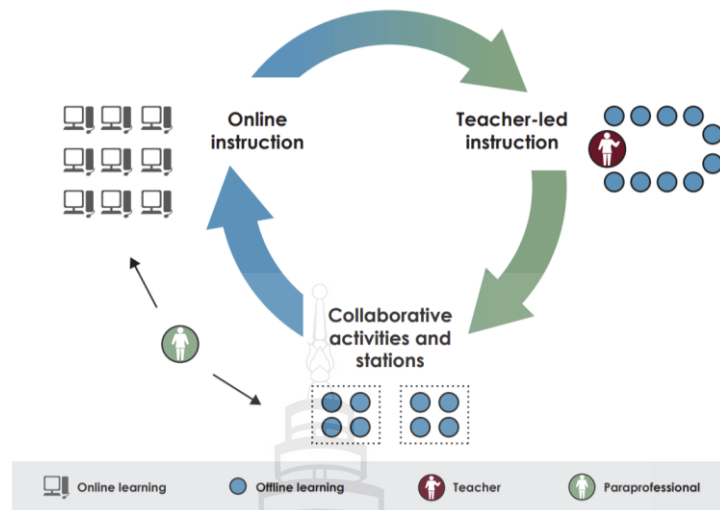
Source Staker and Horn (2012)

Figure 2.7 K-12 Blended Learning Model

According to Staker and Horn (2012), K–12 blended learning consists of four major models and four sub-models as explained below:

7. Rotation model refers to a program in which students rotate between different learning modalities, at least one of which is online learning, either according to a predetermined schedule or at the discretion of the teacher. The teacher will then make an announcement when it is time to take turns, at which point all students will move on to the next educational activity. The students do the majority of their learning on the traditional campus, except for homework assignments. The Rotation model includes four sub-models as follows:

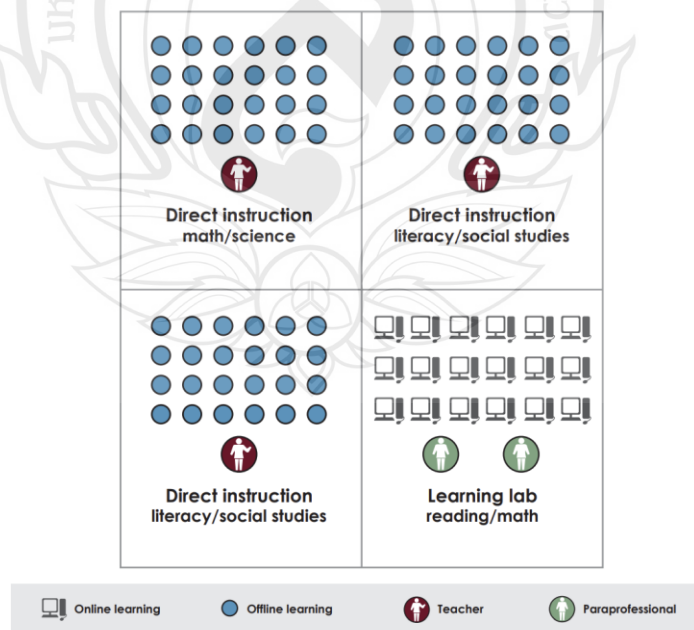
1) Station-Rotation model refers to a program in which students move around from station to station in the classroom, and at least one of these stations features online learning instruction. Other stations include onsite activities such as group discussions, lectures, group work, and projects. These activities are referred to as “stations”. The instructor creates a schedule for the students to follow, and they rotate through each station according to it (Figure 2.8).



Source Staker and Horn (2012)

Figure 2.8 Station-Rotation Model

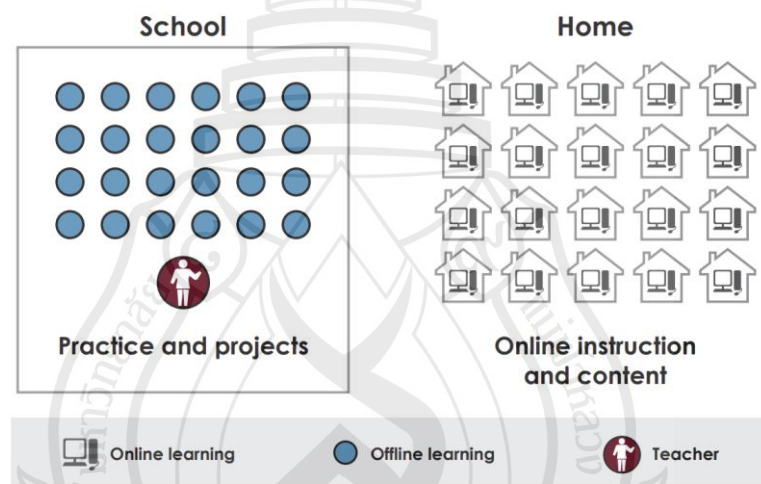
2) Lab-Rotation model refers to a program wherein students systematically alternate between various locations within the conventional classroom setting, either according to a predetermined schedule or at the teacher's discretion. However, the online learning component of this model takes place in a dedicated learning laboratory specifically designed to facilitate e-learning (Figure 2.9).



Source Staker and Horn (2012)

Figure 2.9 Lab-Rotation Model

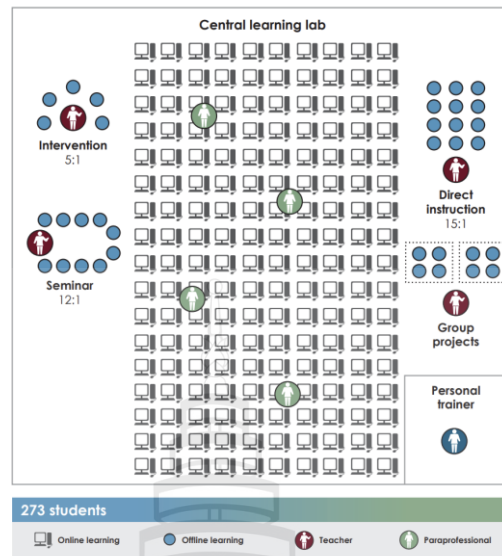
3) The Flipped-Classroom model describes a program in which students transition between in-person, teacher-led learning on campus during regular school hours and remote access to content and instruction on the same subject via online platforms, typically from their homes, outside of school hours. The primary modes of content and instructional delivery in a flipped classroom are through online platforms, distinguishing it from students who solely engage in online homework practice after school. The flipped classroom model aligns with the concept of blended learning, which incorporates student autonomy in terms of time, space, paths, and places. This is achieved by enabling students to select the location from which they access online content and instruction (Figure 2.10).



Source Staker and Horn (2012)

Figure 2.10 Flipped-Classroom Model

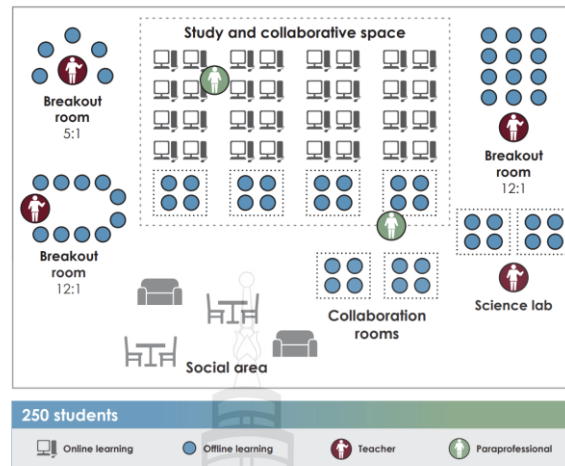
4) The Individual-Rotation model refers to a program wherein students engage in a predetermined, personalized schedule that involves rotating among various learning modalities, with at least one of them being online learning. The creation of each student's schedule is facilitated by either a teacher or an algorithm. The Individual-Rotation model distinguishes itself from other rotation models by not requiring students to rotate to every available station or modality (Figure 2.11).



Source Staker and Horn (2012)

Figure 2.11 Individual-Rotation Model

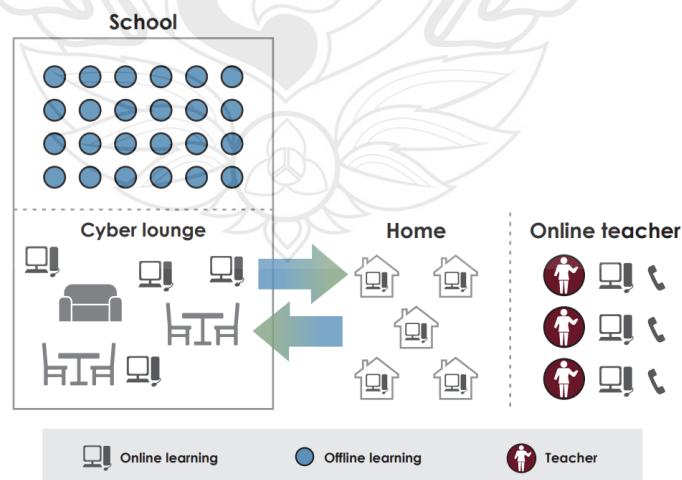
8. Flex model refers to a course or subject in which online learning is the backbone of student learning, even if it occasionally directs students to engage in offline activities. Individually tailored, fluid schedules are used to move students among learning modalities. The teacher of record is on-site, and students learn primarily on the physical campus, except for homework assignments. The teacher of record provides flexible and adaptable face-to-face support as needed through activities such as small-group instruction, group projects, individual tutoring, learning laboratories, and social spaces. In contrast to the individual rotation models, students in this Flex model create their own schedules to rotate between modalities (Figure 2.12).



Source Staker and Horn (2012)

Figure 2.12 Flex Model

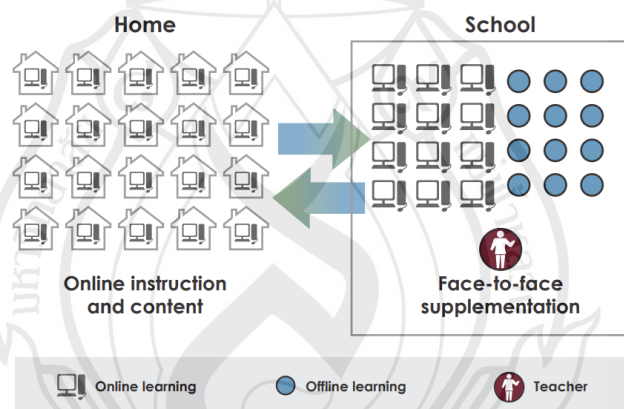
9. The Self-Blend model refers to a program in which students choose to supplement their traditional courses with one or more online courses, and the teacher-of-record is the online instructor. The online courses may be taken either on the physical campus or remotely. This is not a whole-school experience, unlike full-time online learning and the Enriched-Virtual model. Students can self-blend some online courses with others on a traditional campus with face-to-face instructors, making it ideal for students who wish to enroll in additional courses. Moreover, for the Self-blend model to be effective, students must be highly motivated (Figure 2.13).



Source Staker and Horn (2012)

Figure 2.13 Self-Blend Model

10. Enriched-Virtual model refers to a program in which students allocate their time between physically attending a traditional campus and engaging in remote learning through the utilization of online platforms for content delivery and instruction. Several Enriched-Virtual programs originated as fully online schools and subsequently expanded to incorporate blended programs, thereby offering students the opportunity to engage in traditional brick-and-mortar school experiences. The Enriched-Virtual model can be distinguished from the Flipped- Classroom by the fact that in Enriched-Virtual programs, students typically have reduced physical attendance at the traditional campus on a daily basis. The distinguishing feature of the Self-Blend model is its comprehensive nature, encompassing the entire school experience rather than being limited to a course-by-course framework. As a result, Enriched-Virtual programs are available online and incorporate blended learning to enhance the in-person classroom experience for students (Figure 2.14).



Source Staker and Horn (2012)

Figure 2.14 Enriched-Virtual Model

To sum up, the K–12 blended learning model is widely recognized as a transformative innovation capable of enhancing the existing educational delivery model and fundamentally reshaping it. The K–12 blended learning consists of four models and provides students with varying levels of teaching and learning, including timing, location, pace, and direction of their learning experience.

Accordingly, the researcher examines the strengths and weaknesses of the blended learning model and presents them in Table 2.5.

Table 2.5 The Strengths and Weaknesses of Blended Learning Models

Model	Type of learning	Features	Strengths	Weaknesses
Khan's Octagonal Framework (Khan, 2005)	The framework is designed to facilitate meaningful e-learning experiences.	The framework comprises eight dimensions, namely the institutional, pedagogical, technological, interface design, evaluation, management, resource support, and ethics dimensions.	The framework serves as a blueprint for an educational institution seeking to establish a learning environment centered around e-learning.	The interrelation and interdependence of these eight dimensions are evident. Several essential factors must be considered to establish a significant learning environment, posing challenges for educators in adopting the framework.
The Community of Inquiry Framework (Garrison et al., 1999)	A process model of online education in which a collaborative constructivist approach is central.	The framework comprises three distinct components: cognitive presence, social presence, and teaching presence	The framework possesses the capacity to foster a strong social learning experience by enhancing the connectivity, communication, and collaboration among students and instructors.	The COI will not reach its complete potential if students fail to interact with one another or if the instructor lacks sufficient trust to simulate interactions when they encounter difficulties, given that the COI is based on collaborative learning.

Table 2.5 (continued)

Model	Type of learning	Features	Strengths	Weaknesses
The K-12 Blended Learning Model (Staker & Horn, 2012)	The model integrates online learning and traditional schools, considering various aspects from the students' viewpoints, including teacher roles, scheduling, physical space, and delivery methods.	The model comprises four primary models: the Rotation model, Flex model, Self-blended model, and Enriched-Virtual model. Hence, Rotation model categorizes four sub-models: Station-Rotation model, Lab-Rotation model, Flipped Classroom model, the Individual-Rotation model.	The approach will boost flexibility and student responsibility for their education by giving them varied degrees of control over the place, time, pace, and course of their education.	Students must have high levels of responsibility to achieve learning goals. Hence, the instructor is required to have adequate pedagogical abilities.
Rotation Model (Staker & Horn, 2012)	A program that involves students alternating between various learning modalities, with at least one of them being online learning.	The model consists of four sub-models, namely the station-rotation model, the lab-rotation model, the flipped classroom model, and the individual-rotation model.	The model provides a diverse range of instructional activities, opportunities for individualized instruction, and promotes active student participation.	Teachers must be proficient and have a high level of adaptability to tailor their courses.

Table 2.5 (continued)

Model	Type of learning	Features	Strengths	Weaknesses
Station-Rotation Model (Staker & Horn, 2012)	A program in which students rotate between stations within the classroom, with online learning occurring at least one station.	The model combines a variety of stations, including traditional instruction and online learning.	Students rotate through varied learning stations and get the benefit of repetition and increased engagement with the subject matter.	Students are moved through the stations after a set amount of time; however, this time may not be sufficient for them to fully understand the learning at their own pace.
Station-Rotation Model (Staker & Horn, 2012)	A program in which students rotate between stations within the classroom, with online learning occurring at least one station.	The model combines a variety of stations, including traditional instruction and online learning.	Students rotate through varied learning stations and get the benefit of repetition and increased engagement with the subject matter.	Students are moved through the stations after a set amount of time; however, this time may not be sufficient for them to fully understand the learning at their own pace.
Lab-Rotation Model (Staker & Horn, 2012)	A program which students participate in a structured rotation between different areas within the conventional classroom setting and online tasks conducted in a computer lab.	The model combines diverse stations, including face-to-face instruction and computer-based online learning at a laboratory.	The model supports students who cannot access online learning at home or do not have the motivation or environment to self-study at home.	Students are to rotate through stations on a fixed schedule set by the teacher, which will not give them enough time to learn at their own pace.

Table 2.5 (continued)

Model	Type of learning	Features	Strengths	Weaknesses
Flipped-Classroom Model (Staker & Horn, 2012)	A program which students engage in pre-lecture online coursework and study at home, while instructors allocate class time for projects or teacher-led practice.	Online learning and face-to-face instruction.	The model facilitates the conservation of valuable class time while enhancing student engagement. Students have the flexibility to advance at their own pace, as the video lecture can be replayed multiple times and paused at any time.	The flipped classroom model employs present technology that relies on an Internet connection. Flipped learning cannot be successful in the lack of an Internet connection.
Individual-Rotation Model (Staker & Horn, 2012)	Students rotate between learning modes, including online learning, on a tailored, defined schedule.	The model incorporates in-person and online learning methods.	The model enables individual students to progress at their own pace using a personalized playlist.	The design of each student's schedule is facilitated by either a teacher or an algorithm. The fixed schedules may restrict students who could learn at a faster pace with a more adaptable schedule.

Table 2.5 (continued)

Model	Type of learning	Features	Strengths	Weaknesses
Flex Model (Staker & Horn, 2012)	A program that utilizes online learning serves as the foundation of student learning, despite the occasional requirement for students to participate in offline activities.	The model combines a variety of stations, including teacher-led instruction and online learning. However, the contents and materials are delivered online.	Students create their own schedules to alternate between different modes of learning. The model enables individual students to customize their learning according to their own pace, thereby promoting flexibility and active participation in the learning process.	Without an Internet connection, the Flex model will not be successful as all content and materials are exclusively delivered online. Hence, students must have high levels of responsibility to achieve learning goals.
Self-Blend Model (Staker & Horn, 2012)	A program wherein students select one or more online courses to complement their traditional coursework.	A fully online learning program	This program is well-suited for students who are interested in enrolling in supplementary courses.	A model will be effective when students exhibit high levels of motivation, assume responsibilities, and actively participate in the learning process.
Enriched-Virtual Model (Staker & Horn, 2012)	A program that emphasizes in-person learning sessions with teachers at a chosen location, followed by homework completion remotely under teacher supervision.	The model incorporates in-person and online learning methods.	The model offers a high degree of flexibility and personalization in their learning.	Students may experience a lack of face-to-face interaction with their instructors and classmates.

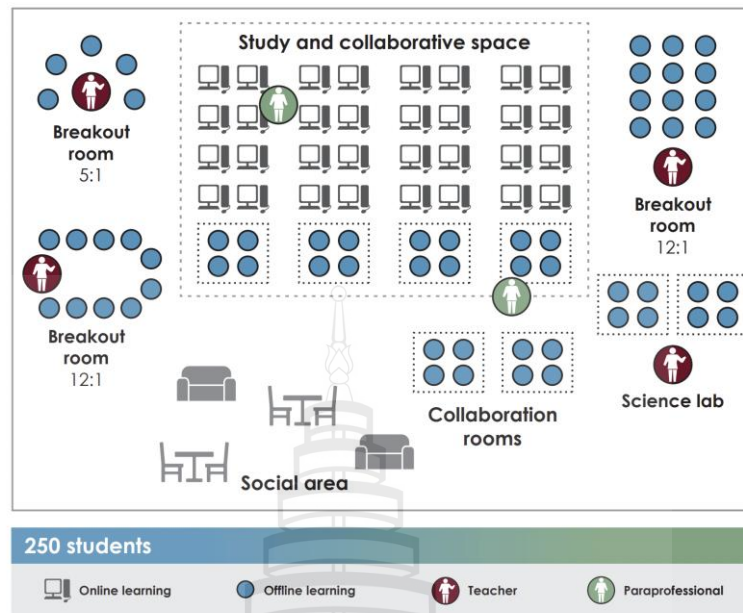
In brief, the various blended learning approaches were developed for different contexts. A single modality cannot accommodate all classroom contexts. Students can customize a diverse array of technology-driven teaching and learning possibilities to suit their individual circumstances. However, various learning modalities share the common goal of effectively supporting students' learning.

2.2.6 The Flex Model

Blended learning involves adopting new methods of learning and teaching that facilitate the distribution and integration of technology across various areas of language instruction. The transformation brought about by technology and students' individual differences has led to a growing appreciation for flexible scheduling and self-paced online materials. This approach enhances student engagement and allows educators to tailor instruction to meet diverse learning needs. As a result, blended learning fosters a more personalized educational experience that can lead to improved outcomes for all learners.

2.2.6.1 Definition of the Flex Model

Blended learning is a teaching method that effectively reduces in-person instruction by integrating diverse, immersive online content. In the digital transformation era, the Flex model (Staker & Horn, 2012) may be applicable and can be transformed to varying levels to accommodate the changes of this era. The term "Flex model" refers to courses or subjects wherein online learning is the foundation of students' learning, even if it occasionally engages students in offline activities. Individually tailored, fluid schedules are used to move students among learning modalities. The teacher of record is on-site, and students learn primarily on the physical campus, except for any homework assignments. The teacher of record provides flexible and adaptable face-to-face support as needed through activities such as small-group instruction, group projects, individual tutoring, learning laboratories, and social spaces (Figure 2.15).



Source Staker and Horn (2012)

Figure 2.15 The Flex Model

Additionally, according to Christensen et al. (2013), the Flex model is characterized by the delivery of all course content through online platforms, with occasional offline activities. Alhumaid (2019) characterized the Flex model of blended learning as the provision of all instructional content to students via computers. Usually, students will enter a classroom equipped with individual computers for each student. Students are free to enter and leave as they please to complete their work, as there are no specified start times for lessons or lectures. With the aid of current computer technology and appropriate instructional software, students of all kinds can independently guide and manage their own learning. Consequently, education will be tailored to each student's unique learning pace, despite their regular presence in the same physical location as their classmates.

Furthermore, the definition of the Flex model as proposed by Moiseienko and Ozarko (2019) can be identified as follows:

1. A course or subject's contents and materials are delivered online and incorporate offline activities as part of its curriculum. This affords students and teachers increased autonomy over time management. Specifically, teachers can allocate more time to engage students individually, as they are no longer obligated to deliver lectures to the

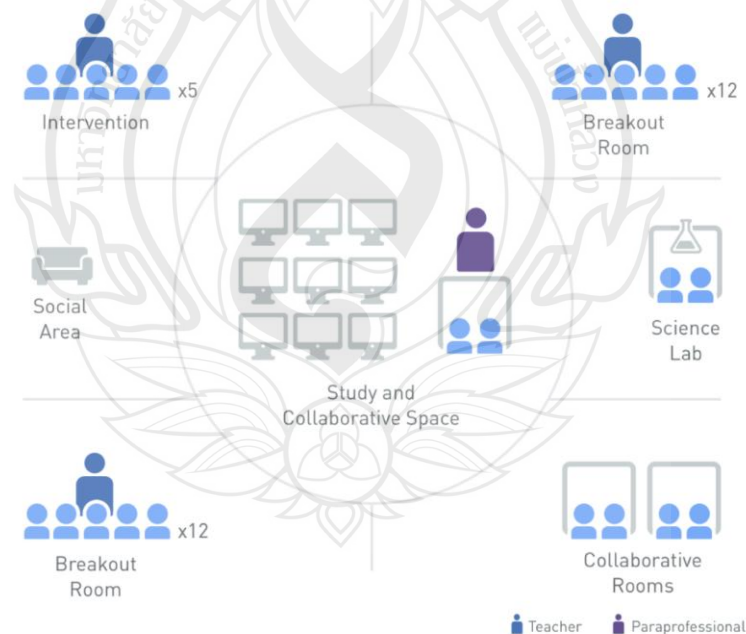
entire class. Simultaneously, students are empowered to assume responsibility for their own learning by accessing classes and educational resources at their own convenience.

2. Student progress through individually tailored and flexible schedules, including various modes of learning. This educational approach facilitates independent student work while providing teachers' guidance and assistance as needed.

3. The teacher provides flexible, adaptive support through activities such as small-group teaching and group projects. This model allows students to have a high level of control over their learning. Teachers provide their students with flexible, appropriate support and instructions while they work on curriculum and content.

4. Most assignments are completed online with this student-oriented option of the Flex model in blended learning. For instance, students work in their place through the curriculum, and teacher assistance is provided as an enrichment (Moiseienko & Ozarko, 2019).

Furthermore, Maxwell (2016) provided the definition of the Flex model and explained its details (Figure 2.16).



Source Maxwell (2016)

Figure 2.16 Flex Model

1. A course or subject that relies on online learning, even if it requires offline activities. Because online learning is the core of instruction, the Flex model increases flexibility for teachers and students. Since teachers are no longer lecturing, they have more time to work with students individually, and students can move through the lessons and materials at their own pace.

2. Students move between various learning modalities on a personalized and flexible schedule. The distinguishing factor between the Flex and Rotation models lies in their respective levels of flexibility. In the Flex model, students do not undergo simultaneous transitions between learning modalities. Rather, they autonomously structure their time schedules and seek assistance from teachers as required.

3. The instructor for the course is physically present at the educational institution, and students primarily engage in learning activities within the traditional campus setting. The Flex model has been specifically developed to facilitate collaborative engagement between students and teachers in a physical educational environment. The difference between the Flex model and the A La Carte model is the inclusion of an online teacher, whereas the Enriched Virtual model enables students to primarily participate in distant coursework.

4. The provision of face-to-face support by the teacher of record for individuals is offered in a flexible and adaptive manner, as required. This support is delivered through various activities, including small-group instruction, group projects, and individual tutoring.

Therefore, the Flex model refers to an educational program in which the teacher-of-record is physically present at the learning site, and students have the flexibility to transition between different learning modes based on their personalized, adaptable schedules. The delivery of activities may include a range of instructional methods, such as small-group instruction, collaborative projects, and one-on-one tutoring.

2.2.6.2 The Advantages of the Flex Model

The Flex model is well-suited to enhancing teaching and learning in the current digital age, thanks to its distinct characteristics, making it the least restrictive among blended learning approaches. The greatest benefit to students of the Flex model is its flexibility, which provides easier access to education and empowers learners to take ownership of their progress. According to Maxwell (2016), the adoption of the flex model

can vary across schools, depending on their specific contexts. This is because the implementation of the Flex model can vary depending on the structures surrounding it. In addition to the model's flexibility, it enables students to personalize their educational experiences. Due to the diverse range of experience and expertise among students in the class, some individuals may necessitate additional guidance, while others may require less. Therefore, students' learning paths are adaptable, and the level of teacher assistance can vary depending on each school's implementation model.

Moreover, the Flex model also facilitates the development of learning autonomy, as certain blended-learning programs that employ it afford students varying degrees of autonomy. For instance, some implementations may require students to meet weekly with teachers to discuss their objectives, while others may require teachers to intervene more frequently (Christensen et al., 2013). Alhumaid (2019) supported the notion that the Flex model empowers students with greater autonomy in their learning, leading to increased engagement in coursework and a proactive approach to learning. Additionally, Kang et al. (2022) revealed that the Flex model has an advantage in both cognitive and affective areas. In the cognitive domain, implementing the Flex model can enhance academic performance, problem-solving, critical thinking, and comprehension. In the affective area, the Flex model has the potential to foster feelings of satisfaction, academic interest, a positive learning disposition, and motivation.

Another significant advantage of the flexible model is its cost-effectiveness in comparison to a conventional educational institution (Graham, 2005). The use of internet resources enhances the strategy's adaptability, thereby facilitating its seamless integration into diverse curricula. Students who encounter challenges in their academic advancement can enhance their comfort level within the classroom environment. This assistant has the potential to expedite the realization of academic potential for exceptionally gifted students. Furthermore, in a blended learning setting, teachers and students can use a wide range of supplementary materials available on online platforms. Both could select resources that are most compatible with their individual learning or teaching preferences and existing knowledge level. To address the challenges of limited learning materials and overcrowded classrooms, one effective educational innovation is to integrate traditional learning with e-learning. This can be achieved through a blended approach, where students receive

instructional material via online learning platforms and engage in face-to-face sessions that emphasize practical application and group discussions.

2.2.6.3 The Comparison between the Flex Model and Others of K–12 Blended Learning

The most effective blended learning model was presented by Staker and Horn (2012). Initially, they classified six models but later simplified this classification to four main models: the rotation model, the flex model, the self-blend model, and the enriched virtual model (Staker & Horn, 2012). To determine the most appropriate and effective model, Table 2.6 presented a comparative analysis of the key components of various K–12 blended learning models.



Table 2.6 The Classification of the Components of Different K–12 Blended Learning Model

Characteristics	Rotation model	Flex model	Self-Blend model	Enriched-Virtual model
Setting	Within a classroom and at least one station is online learning.	The contents and instructions are fully delivered via online learning and incorporate offline activities.	Students can take online learning at school or home.	A full-time online learning.
Rotation	Students rotate in a fixed schedule among the station.	Students rotate on a fluid and customized schedule.	Students choose which courses to take online and which to take in a classroom setting.	Students can start with fully online learning and meet face-to-face teachers during the school day as needed.
Activities	The stations include onsite activities such as group discussions, lectures, group work, and projects.	activities such as small-group instruction, group projects, individual tutoring, learning laboratories, and social spaces.	A program in which students choose to supplement their traditional courses with one or more online courses.	A program available online and subsequently incorporate blended programs to enhance the in-person learning experience onsite.
Teacher's roles	The teacher is an onsite instructor and creates a schedule for the students to follow.	The teacher is the onsite instructor provides flexible and adaptable face-to-face support as needed.	The teacher is an online instructor.	The teacher is an online instructor.
Learner's roles	Students follow the schedule to rotate around each station.	Students tailor their weekly schedules to move among learning modalities.	Students wishing to enroll in additional courses and must be highly motivated and self-directed learners.	Students engage in distance learning through online content and instruction. Typically, students have reduced physical attendance at the traditional campus.

Note Adapted from Ayob et al. (2020), Staker and Horn (2012)

As explain in Table 2.7, to compare the Flex model with others, firstly, the key difference between the Rotation and Flex models is that the Rotation model adds some online learning to what otherwise may look like a traditional school; students work in small groups between different stations on a rotating basis, and at least one of these stations must contain online activities, whereas the Flex model starts with online learning and adds physical supports and connections where valuable. In this model, students have more flexibility in making decisions about their own learning (Maxwell, 2016).

Conversely, the self-blended model distinguishes itself from the Flex model by comprising one or more fully online courses, complemented by traditional courses. The self-blend was specifically developed for students seeking to enhance their knowledge through supplementary courses. Consequently, the foundation of this model is face-to-face, supplemented by online instruction. Unlike the Enriched-Virtual model, which is full-time virtual learning with the teacher online, the Flex model provides face-to-face support from on-site teachers. The Enriched-Virtual paradigm integrates on-campus and remote learning, meaning students participate in both in-person and online courses (Maxwell, 2016). Students requiring classroom instruction begin with this type of activity. Upon completion, individuals proceed remotely with the remaining subjects not covered by the instructor. The Self-blended and Enriched-Virtual models differ from the Flex model regarding content delivery and the role of the teacher. In the Flex model, both content and instruction are provided online, while the teacher remains on-site.

2.2.7 Students Engagement in Blended Learning

The teaching and learning paradigm of education has been severely disrupted by the advancement of technology. The blended learning model continues to evolve to make more effective use of digital technology's real potential and to improve students' educational experiences by utilizing cutting-edge techniques (Snelling, 2022). Blended learning approach combines the use of technology and online instruction with traditional face-to-face classroom activities. According to Garrison and Vaughan (2008), this approach involves both teachers and students, but it also requires students to have some autonomy in determining the time, place, path, or pace of their learning in technological environments.

In the realm of education, student engagement is conceptualized as the extent to which students' manifest qualities such as attentiveness, curiosity, optimism, and enthusiasm during the entirety of the teaching and learning process (Legarde & Sumandal,

2022). Likewise, Graham et al. (2019) described students' engagement as the extent to which students exert both physical and mental effort in order to succeed academically and attain their intended results. Chapman (2003) explained that students' engagement refers to their cognitive investment, behavioral involvement (active participation), and social and emotional engagement with particular learning tasks. The student's engagement is classified into three dimensions namely, cognitive engagement, behavioral engagement, and emotional engagement (Fredricks et al., 2004). In contrast to alternative approaches, engagement can be classified into four distinct dimensions which are cognitive engagement, behavioral engagement, emotional engagement, and social engagement (Wang et al., 2016).

Chapman (2003) and Wang et al. (2016) offer a definition of the four dimensions of learning engagement, which are elucidated as follows:

1. Cognitive engagement pertains to the extent to which students are dedicating mental exertion towards comprehending the concept or resolving problems. The utilization of cognitive and metacognitive strategies for the purpose of assimilating new information with existing knowledge and resolving problems
2. Behavioral engagement refers to the degree to which students actively participate in learning activities, including responding to questions, asking questions, solving problems, and engaging in discussions with teachers or peers
3. Emotional engagement refers to the presence of favorable emotional responses towards their peers and teachers, experiencing interest and enjoyment in activities, and displaying positive attitudes towards learning
4. Social engagement encompasses the degree of social interactions with peers and teachers, as well as the willingness to actively participate in building and sustaining relationships while engaging in learning or work-related tasks.

Furthermore, blended learning employs digital technology to capitalize on learning opportunities in a student-centered setting that seeks to enhance critical thinking and communication across various time periods and locations, with a particular emphasis on fostering greater student engagement. This was supported by Taylor et al. (2018), who claimed that blended learning might improve student engagement by facilitating a personalized learning experience through a systematic design that enhances the integration of offline and online instruction.

Previous scholars have explored the potential of blended learning to augment student engagement. In a study conducted by Vaughan (2014), the focus was on examining how online collaborative learning applications can enhance student engagement and promote success in blended learning courses for first-year undergraduate students. Through a combination of research methods, particularly interviews with teachers, the study concluded that these applications significantly improved student engagement. Moreover, Montgomery et al. (2015) investigated how digital technologies enhance student engagement in three conventional blended learning courses in undergraduate education. The study revealed that students initially engaged in online activities independently, using a range of resources to enhance their engagement. During the following synchronous meetings, students remained engaged by actively participating in learning activities and occasionally employing experiential methods. The use of both individual and group projects, as well as digital resources specifically designed to enhance understanding of the subject matter, effectively increased student engagement in the online learning environment.

Consequently, blended learning enhances learner engagement in a collaborative environment, providing new opportunities to interact with peers, teachers, and content both in and out of the classroom. Consequently, universities and educators are placing greater emphasis on developing and implementing interactive, cooperative teaching and learning approaches. This is done to promote student engagement and enhance their readiness for the project and problem-solving abilities. The key role of the teacher in blended learning should be that of the instructional designer and learning facilitator, with the primary responsibility of developing a teaching presence that supports students' highly engaged, authentically personalized learning experience.

After reviewing previous studies on different types of blended learning, it was clear that the Flex model designed by Staker and Horn (2012) integrated diverse learning modalities and combines online and in-person components, as well as peer and group discussion activities, with the aim of fostering a highly positive attitude and flexibility to enhance student engagement in the teaching and learning process. Therefore, the aim of this study was to develop an innovative instructional approach that employed the Flex model (Staker & Horn, 2012) as a component of the instructional design to enhance critical reading skills among EFL students.

2.3 Instructional Design Models

To meet the needs of diverse students, institutions, educators, and teachers must reinvent the educational system and instructional design to keep pace with technology. Instructional design models give a theoretical and pedagogical framework for effective teaching and learning. They also improve access to education and ensure students learn efficiently.

2.3.1 Definition of Instructional Design Model

Several educational specialists have provided definitions for instructional design models. Berger and Kam (1996) defined instructional design as the systematic development of specific instruction based on instructional theory aimed at ensuring instruction quality. It is the process of analyzing learning requirements and objectives and designing a delivery system to meet them. Instructional materials and activities are created, tested, and evaluated as part of the procedure. In other words, Gustafson and Branch (1997) defined instructional design as the systematic process of transforming general learning and teaching principles into a plan for instructional materials and learning. Similarly, Dick et al. (2001) describe the instructional model as a systematic process in which all elements, including the instructor, students, teaching materials, and the learning environment, are essential to learning success.

Gustafson and Branch (2002) defined instructional design as a system of procedures for creating consistent, reliable educational and training programs. Smith and Ragan (2005) described it as systematically converting learning and teaching ideas into designs for instructional materials, activities, information resources, and evaluation. Additionally, instructional design models are frameworks that outline the steps and activities needed to design effective, efficient, and engaging learning experiences (Branch & Merrill, 2011; Spector et al., 2014).

According to Branch and Kopcha (2014), instructional design is an iterative process of planning outcomes, selecting efficient teaching and learning methods, selecting appropriate technologies, identifying educational media, and measuring performance. Moreover, the definition from Reiser and Dempsey (2018) referred to the methodical procedure that is used to develop consistent and reliable education and training programs.

In conclusion, the instructional design model helps instructors systematically design teaching and learning, plan outcomes, instruction, activities, materials, and assessment, and ensure instructional quality.

2.3.2 The Characteristics of Instructional Design Model

The instructional design model's characteristics were clarified by different experts. According to Gustafson and Branch (1997), instructional design models should give us the conceptual and communication tools we need to manage, visualize, and guided learning processes. They should also help us see both sequential and concurrent aspects of instructional development and help us choose or create the best operational tools.

Branch and Merrill (2011) highlighted the characteristics that should be present in all instructional design models as explain below:

1. Instructional design is learner-centered which focuses on learners and their performances
2. Instructional design is goal-oriented: clearly defined goals are crucial
3. Instructional design focuses on real-world performance: help learners perform the behaviors that are necessary for them in the real world
4. Instructional design focuses on outcomes that can be measured in a reliable and valid way
5. Instructional design is empirical: data are the core of the process
6. Instructional design is usually done by a group of people, and its success depends on how well the instructional designers can work with the other people involved.

Moreover, Mohanty (2016) claimed that a good instructional model required seven characteristics as follow:

1. A model should include assumptions about essential development components. These include creating a good learning environment, interacting with students, and using appropriate pedagogical methods
2. Presentation of relevant experiences to teachers or students
3. A model of teaching seeks to answer fundamental questions regarding teacher and student behavior
4. It is necessary to develop a model based on individual differences
5. A model should be constructed with the learners' interests in mind
6. The philosophy of life influences the design of instructional models

7. The model should be the development of teachers' personalities qualitatively

Similarly, Reiser and Dempsey (2018) specified seven features of Instructional Design as illustrated below:

1. Learners are at the core of instructional design
2. The process of instructional design is goal oriented.
3. The process of instructional design involves creativity.
4. Performance is the main goal of instructional design.
5. Measurable is implied by instructional design trustworthy and legitimate
6. Instructional design is self-correcting, empirical, and iterative.
7. Teamwork is required for instructional design, which depends on the instructional designer's ability to collaborate with the other participants for success

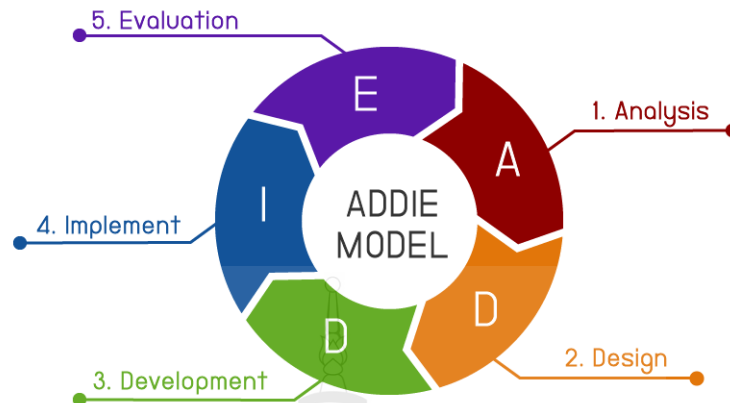
In brief, according to the characteristics of the reviewed model, the most effective instructional design model must take into account learner-centeredness, learning outcomes, teacher and learner behavior, learner interests, engagement, and assessments.

2.3.3 Models of Instructional Design

Due to the variety of instructional design model proposed by educational experts, the study had selected four widely known and recognize model for discussion as illustrated below:

2.3.3.1 ADDIE Model

The ADDIE model provides a methodical process for designing and creating an educational experience. It was initially proposed in the mid-1970s by the Center for Educational Technology at Florida State University (Branson et al., 1975). This framework provides educators with useful, well-defined steps for implementing instruction effectively. Moreover, according to Davis (2013), Hsu et al. (2014), and Peterson (2003), this model is more adaptable to different instructional environments and applicable for integrating technology into instruction. In addition, the ADDIE Model is an iterative instructional design process in which the outcomes of each phase's formative evaluation can lead the instructional designer back to any preceding phase. The outcome of one phase serves as the starting point for the subsequent phase (Aldoobie, 2015).



Source Morrison (2010)

Figure 2.17 ADDIE Model

As illustrated in Figure 2.19, ADDIE model consists of five components as explained follows:

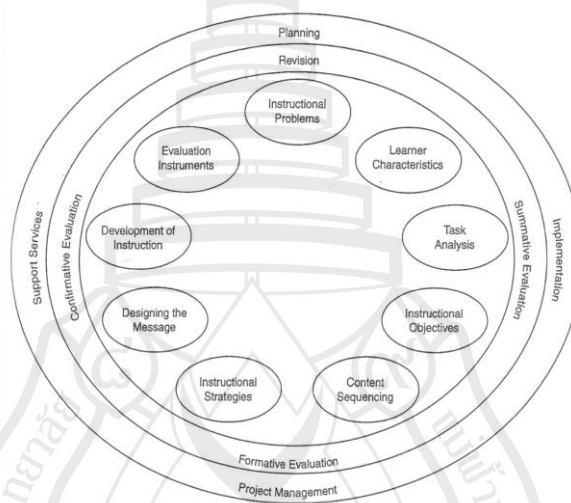
1. Analysis (A): it is the process of defining what is to be learned by conducting needs analysis, task analysis, and instructional analysis
2. Design (D): this process leads to the instructional design goals by asking the questions such as what the instructional design objectives are and what strategies will lead to achieve the goal
3. Development (D): the process of developing the materials to support the result of needs and problems analysis
4. Implement (I): it is the process of implementing or applying materials to the target learners
5. Evaluation (E): the process of assessing the result and effectiveness of the instruction and materials equivalent with the learning outcomes in order to develop the highest quality of the materials

Thus, the ADDIE model is regarded as an effective instructional model that can assist teachers in designing courses and instructional activities. The ADDIE model provides a proven method for creating instructional models that are both clear and effective.

2.3.3.2 Morrison, Ross, and Kemp's Model of Instructional Design

The Kemp Design Model, with its non-linear structure and interconnected components, represents innovation in instructional design (Morrison et al., 2010). The oval shape of his model signifies that the design and development process is an iterative cycle

requiring perpetual planning, design, development, and evaluation for effective education (Hanley, 2009). The Kemp Design Model adopts a circular structure in which instructional design can begin anywhere and progress in any order, essentially a systemic view of development in which all elements are interdependent (Akbulut, 2007; Christopher, 2009). This adaptable arrangement permits the individual to select either of the two processes for course requirements. The complete model of instructional design plan by Morrison, Ross, and Kemp consists of nine elements arranged in a circular manner in the shape of an oval (Figure 2.18).



Source Morrison et al. (2010)

Figure 2.18 Morrison, Kemp, and Ross Instructional Design Model

The nine components of the Morrison, Ross, and Kemp Instructional Design Model (Morrison et al., 2010) are listed below:

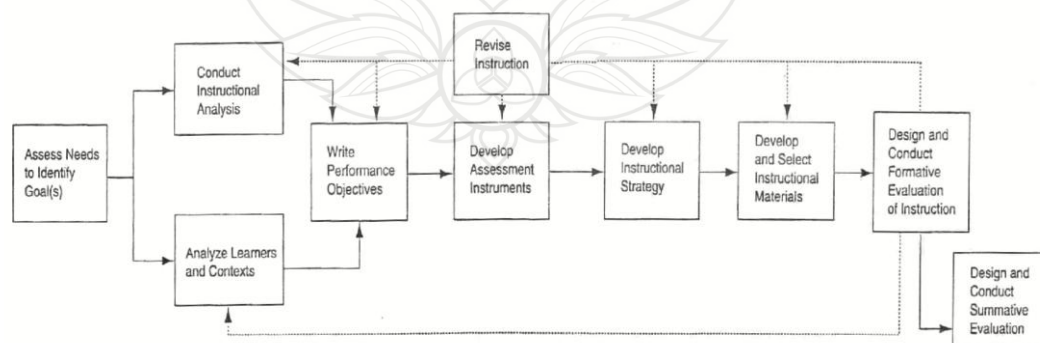
1. Identifying problems with instructional design and defining essential objectives
2. Evaluating characteristics of students
3. Identifying subject matter and analysing task components that are related to instructional goals
4. Defining learning objectives for the students
5. Sequencing content within each unit to promote logical learning
6. Designing instructional strategies for each student to achieve the objectives

7. Planning the delivery of instruction
8. Establishing evaluation tools
9. Selecting supporting materials for educational activities

In summary, the Kemp Instructional Design Model's components are interdependent and adaptable. The designer can start the process from any point and implement it concurrently.

2.3.3.3 Dick and Carey's Instructional Design Model

The systems approach model by Dick and Carey is one of the most influential system-oriented instructional design models. The Dick and Carey's model provide detailed, straightforward step-by-step procedures. Understanding the specifics of the instructional design systemic approach's guiding principles is extremely beneficial for novice instructional designers. As with most models, the Dick and Carey model incorporates the ADDIE model's core elements of analysis, design, development, implementation, and evaluation. The Dick and Carey's model is more complex because the approach based on the five core elements is broken down into additional or a variety of steps with different terminology (Gustafson & Branch, 2002). According to Dick et al. (2022) indicated that the components such as the instructors, students, materials, instructional activities, delivery system, and learning and performance environments collaborate in order to achieve the desired learning outcomes for students. They described a nine-step linear model. Each component is interdependent, as shown by the solid arrow lines. The dotted lines indicate formative evaluations that reexamine the instructional analysis's validity and learners' entry behaviors (Figure 2.19).



Source Dick et al. (2022)

Figure 2.19 The Dick and Carey Instructional Design Model

Consequently, Dick and Carey Instructional Design model comprises of nine components as depicted below:

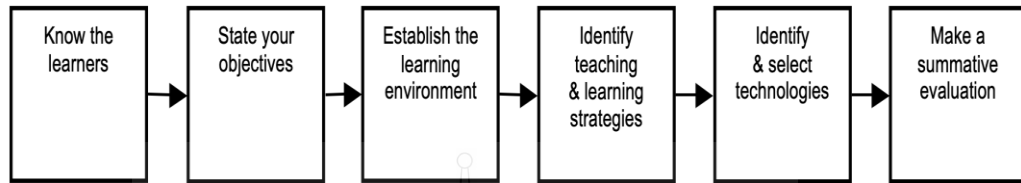
1. Setting the instructional goal by considering what you want students to be able to do after the lesson
2. Analyzing goals: step-by-step analysis of goal performance and entry behaviors
3. Analyzing learners, contexts for learning and use, and performance objectives emphasizes behavior skills to be learned, conditions under which they must be performed, and success criteria
4. Write Performance objectives
5. Planning instruction by emphasizing information, practice, feedback, and testing to reach the goal
6. Creating and choosing instruction using the preferred method to create instructional materials
7. Formative evaluation involves testing instructional materials in one-to-one, small group, or field evaluations so learners can evaluate and revise them before distribution
8. Revising instruction, the formative evaluation data are summarized and interpreted to identify learner difficulties in achieving the objectives and relate them to material deficiencies
9. Summative evaluation, in which it evaluates instruction independently

In brief, Dick and Carey Instructional Design model emphasized a systems view of instruction rather than a sequence of isolated steps. This model addresses instruction holistically, in which context, content, learning, and instruction interact.

2.3.3.4 The Dynamic Instructional Design Model

The Dynamic Instructional Design Model is a systematic approach to designing technology-rich instruction and serves as the foundation for designing such instruction. The Dynamic Instructional Design Model is an adaptable instructional design system, and feedback is the return of information regarding the completion of each step (Lever-Duffy & McDonoald, 2011). Moreover, the Dynamic Instructional Design Model, which is based on Robert Gagne's classic system models, is sequential like its predecessors. The strength of the Dynamic Instructional Design Model,

however, lies in the adaptability it affords the user to respond, modify, and adapt to the learner's ongoing feedback (Figure 2.20).



Source Eberle and Childress (2006)

Figure 2.20 The Dynamic Instructional Design Model

The Dynamic Instructional Design Model comprises of six components as follows:

1. Knowing the learners
2. Stating the objectives
3. Establishing the learning environment
4. Identifying teaching and learning strategies
5. Identifying and select technologies
6. Performing a summative evaluation

Therefore, the Dynamic Instructional Design Model is based on designing technology-infused instruction and focuses on providing students with an effective learning environment. This model is highly learner-center and includes steps such as identifying the learners' learning styles and creating a comfortable learning environment.

Due to the fact that many instructional design models were developed by various specialists, the researcher classified of the design components and were presented them in Table 2.7.

Table 2.7 The Classification of the Components of Different Instructional Models

Details of Designing Components	ADDIE Model (Branson et al., 1975)	The Dick and Carey systems approach model (Dick, et al., 2022)	Morrison, Kemp, and Ross Instructional Design Model (Morrison et al., 2010)	The Dynamic Instructional Design model (Lever-Duffy & McDonoald, 2011)
Identifying and analysing problems	√		√	
Determining instructional goal		√		
Stating and analysing objectives		√	√	√
Writing performance objectives		√		
Analyzing the learners		√	√	√
Analyzing teachers				
Establishing learning environment				√
Identifying subject content and task			√	
Sequencing content			√	
Designing instructional strategy	√	√	√	
Developing assessment instruments		√	√	
Developing instructional strategy	√			√
Developing and selecting instruction	√	√		
Selecting resources			√	
Identifying and selecting technologies				√
Planning instructional delivery			√	

Table 2.7 (continued)

Details of Designing Components	ADDIE Model (Branson et al., 1975)	The Dick and Carey systems approach model (Dick, et al., 2022)	Morrison, Kemp, and Ross Instructional Design Model (Morrison et al., 2010)	The Dynamic Instructional Design model (Lever-Duffy & McDonoald, 2011)
Implementing instruction	√			
Designing and conducting formative evaluation		√		
Revising instruction		√		
Conducting summative evaluation	√	√		√

In brief, all the processes of instructional design interrelate with each other. Firstly, the instructional design might start with analyzing problems, learners, and teachers, setting objectives, and identifying contents and tasks. Next, the data from the analysis and objectives was set as the guide for designing and developing instructional strategies, assessments, and tools. Finally, it should be the stage of evaluation and revision of the model to determine its validity and effectiveness.

Therefore, after the researcher studied and synthesized four models from previous scholars, ten components were selected to be the instructional design model for developing the Flex model of blended learning for enhancing EFL students' critical reading skills. The Flex model of blended learning will be developed with ten components as follows:

1. Analyzing needs and problems
2. Formulating objectives
3. Analyzing learning environment
4. Analyzing teachers' and students' roles
5. Analyzing and designing contents
6. Identifying instructional strategies
7. Selecting instructional technology
8. Developing instructional materials and assessment
9. Implementing the instruction
10. Evaluating and revising

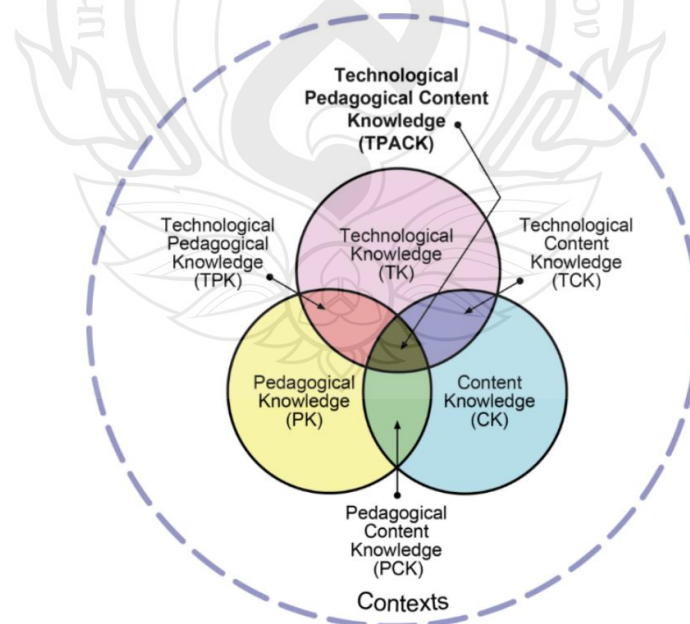
2.4 Technology Integration Models

Despite the digital transformation era, classrooms are in constant change, and teachers struggle to find and select appropriate technology. Presently, numerous technology integration strategies exist to equip teachers for instruction in online or blended environments, including Technological, Pedagogical and Content Knowledge (TPACK), Amplification and Transformation (RAT), Replacement, Technology Integration Matrix (TIM), and Substitution, Augmentation, Modification and Redefinition (SAMR). Therefore, teachers must be aware of their students' abilities and characteristics before

integrating technology and should consider remediation before attempting to implement it (Kopcha et al., 2020). Similarly, Willis et al.'s (2018) study on the best predictors of technology integration found that technologically proficient teachers are more successful at aligning technology with learning objectives, content, and context. Hence, technology must be purposeful, adaptable, and pedagogical, and the educator must implement it with clear expectations and goals (Willis et al., 2018). Therefore, educational experts have proposed a variety of technology integration models, as depicted below:

2.4.1 Technological, Pedagogical, Content Knowledge (TPACK)

As part of the digital transformation, students are exposed to extensive digital technology and are highly adept at using new technologies. Teachers need to change their traditional classroom instruction by integrating technology effectively. Therefore, the TPACK framework proposed by Mishra and Koehler (2006) emerged as the theoretical framework for integrating technology with a more modern learning environment and pedagogical approach. The TPACK framework emphasizes the interactions among technology, pedagogy, and content, as well as among these three aspects and other forms of knowledge (Koehler et al., 2014). In addition, each component is equally important, and educators must consider how they all interact for technology integration to be successful (Mishra & Koehler, 2006).



Source Mishra and Koehler (2006)

Figure 2.2 TPACK Model

TPACK is likely the knowledge essential to teachers in this era to integrate technology into the teaching process (Zhang, 2011). Figure 2.23 identifies a total of seven dimensions, including three fundamental dimensions and four intersections between them as follows:

1. Content Knowledge (CK) refers to the teacher's content knowledge in specific subject areas that must be taught to students, including concepts, theories, facts, and procedures.

2. Pedagogical Knowledge (PK) refers to the teacher's knowledge of the pedagogical activities, procedures, practices, and instructional techniques that comprise the teaching-learning process, as well as their relationship to educational goals. It includes the knowledge of classroom-applicable techniques, methods, and strategies.

3. Technological Knowledge (TK) refers to the teacher's knowledge of various technologies to develop teaching practices and learn and adapt to new technologies.

4. Pedagogical Content Knowledge (PCK) refers to the instructional knowledge of a content area that facilitates student learning, including the teaching approaches and strategies used.

5. Technological Content Knowledge (TCK) refers to teachers' knowledge of how to represent particular concepts through technology, thereby integrating the disciplines of technology and the content. Teachers must comprehend the impact of technology on the curriculum in their respective subject areas.

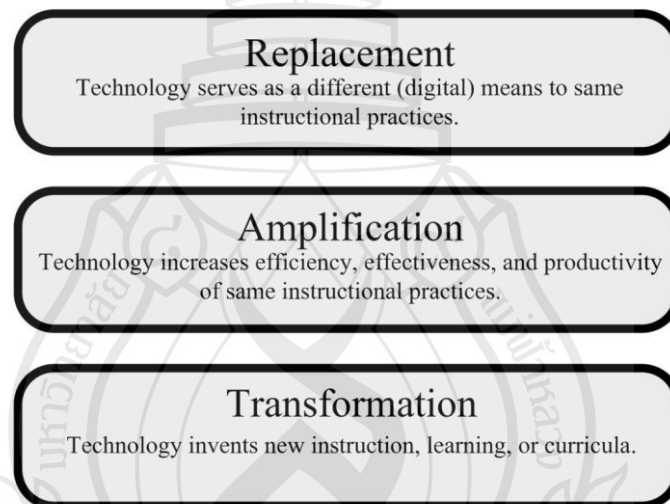
6. Technological Pedagogical Knowledge (TPK) refers to the understanding of pedagogical strategies that can be implemented through technology. This includes the ability to choose a tool based on its efficacy or suitability for the task, as well as the application of pedagogical strategies when using technology.

7. Technological Pedagogical Content Knowledge (TPACK) refers to a teacher's ability to create specialized didactic strategies that use technology to facilitate learning across a variety of subjects.

In conclusion, the TPACK model highlights the knowledge and strategies needed to effectively use technology to teach content and enhance learning.

2.4.2 The RAT Model

The RAT framework was developed to examine the integration of technology in different aspects of teaching and learning (Hughes et al., 2006). They presented a classification system that enables educators to evaluate their proficiency in incorporating technology into their teaching practices. As per their statement, technology can be incorporated into the classroom through three methods: “technology as substitution,” “technology as enhancement,” and “technology as revolution” (Hughes et al., 2006). In addition, the RAT Model (Hughes et al., 2006) provided a list of dimensions that can be substituted, enhanced, or modified for each of these items. This list can be referred to Figure 2.22 and can be presented as follows:



Source Hughes et al. (2006)

Figure 2.22 The RAT Model

1. Replacement: Using technology signifies that technology is substituted by another instrument. The teaching methods, student learning processes, and curriculum objectives remain unchanged with the integration of technology. A learner may use a graphing calculator to plot a system of linear equations rather than a pencil and grid paper.

2. Amplification: This refers to using technology to enhance instructional methods, student learning, and curriculum goals. The goal is not to change these themes, but to boost efficiency or productivity. For example, digital tools let students solve math problems online, submit work electronically, and receive instant feedback.

This streamline grading for teachers and provides students with tailored practice, but does not alter the curriculum direction, learning process, or objectives.

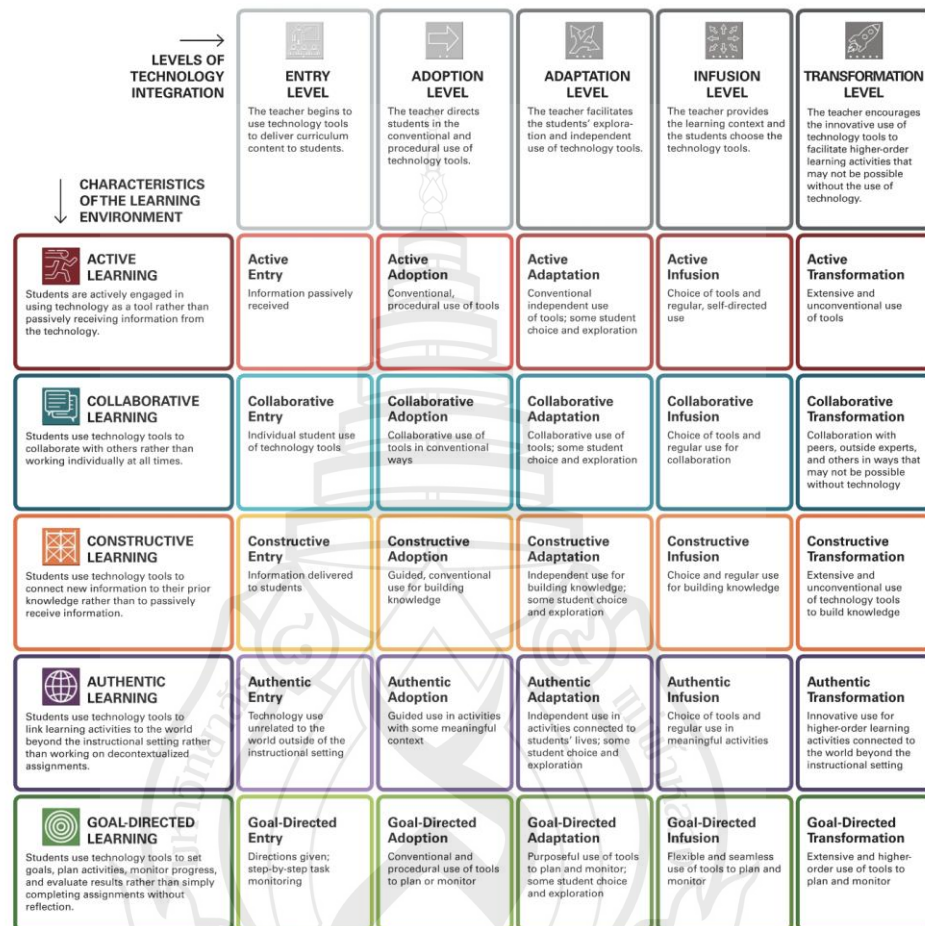
3. Transformation: This occurs when technology is employed as an instrument for significant changes in at least one of the three themes. Technology can revolutionize instructional methods by redefining the teacher's role in the classroom. For instance, when a mathematics instructor employs a flipped instructional approach, students are assigned homework of watching educational videos and then put the learned concepts into practice during classroom sessions. Consequently, the teacher's role shifts from lecturer to facilitator of learning. Student learning processes can be altered by introducing students to novel methods for acquiring the same educational material that would be unimaginable without technology. For instance, students can use the internet to explore various applications of periodic functions and to construct a function to represent a given scenario. The utilization of available technology has the potential to reshape curriculum objectives by generating novel goals. An illustration of this phenomenon occurs when an educator devises novel methods for students to juxtapose graphs of functions using technological graphing tools (Hughes et al., 2006).

2.4.3 The Technology Integration Matrix (TIM)

The Florida Center for Instructional Technology developed the technology integration matrix (TIM) as a model that links pedagogy and technology integration to lesson design (Welsh et al., 2011). TIM functions as a structured system for describing and directing the use of technology to enhance instructional methods. Specifically, TIM is a 25-cell matrix in which each cell represents a combination of a technology integration level entry, adoption, adaptation, infusion, and transformation and a characteristic of meaningful learning. These levels range from teacher-centered at entry to student-centered at transformation, and are connected to five key characteristics: active, collaborative, constructive, authentic, and goal-directed (see Figure 2.23).

The TIM framework helps educators efficiently design and execute student-centered lessons that integrate technology and pedagogy to facilitate significant learning (Welsh et al., 2011). Rather than prioritizing a teacher or a task, the framework offers a range of pedagogical approaches, allowing both students and teachers to select tools that fit their teaching and learning needs. These tools correspond to stages of technology proficiency entry, adoption, adaptation, infusion, and transformation

enabling teachers to build skills and confidence. This also shifts lessons from teacher- to student-focused, granting students authority to make decisions needed to accomplish their tasks (Welsh et al., 2011).



Source Welsh et al. (2011)

Figure 2.23 The Technology Integration Matrix

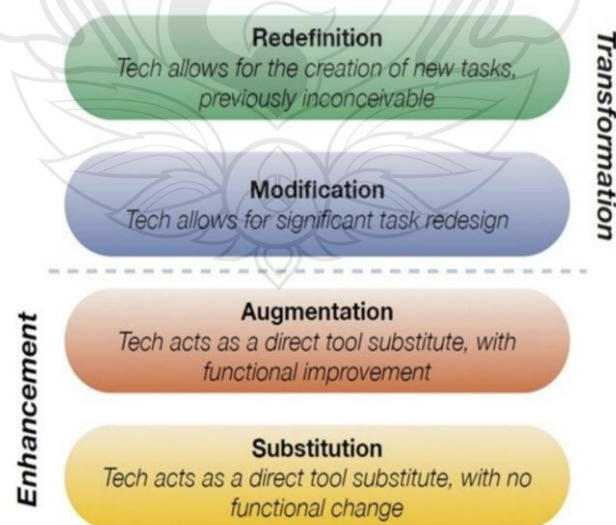
Therefore, TIM provides a framework for explaining and guiding the application of technology to improve the learning process. The Technology Integration Matrix (TIM) was created to facilitate the intricate process of assessing the incorporation of technology, encompassing five interconnected characteristics of significant learning environments: active, collaborative, constructive, authentic, and goal-directed learning.

2.4.4 The SAMR Model

A powerful conceptual tool to think about technology integration is the SAMR model. The SAMR model is a framework developed by Puentedura (2014) that aims at enhancing classroom technology integration. The SAMR model classifies four levels of technology integration in the classroom, namely, Substitution, Augmentation, Modification, and Redefinition. Additionally, Substitution and Augmentation are considered “Enhancement” steps, whereas Modification and Redefinition are “Transformation” steps (Figure 2.24).

The SAMR model is suitable for incorporating technology into the classroom and developing student engagement and learning achievement. Kirkland (2014) posited that the SAMR model is a comprehensive framework for assessing the complexity and profundity of technology integration at different phases. The SAMR model provided teachers with a structured framework for purposefully integrating technology into their classroom instructional practices. When teachers use this model to plan lessons, they can consider the role of technology in education and how it will facilitate students' learning (Puentedura, 2010).

The SAMR model's main contribution is guiding transitions from task substitution to redefinition and enhancement to transformation, exploring technology's teaching and learning possibilities (Puentedura, 2014). Each phase encourages technological interaction and boosts student engagement.



Source Puentedura (2014)

Figure 2.24 The SAMR Model

Additionally, Puentedura (2014) exemplified the details of the four dimensions as follows:

1. Substitution is the use of technology when the learning task could be accomplished without technology. That is to say, there is no functional change in teaching and learning. For instance, substitution is the replacement of traditional practices with technology, such as reading a novel online as an e-book.

2. Augmentation technology is an effective tool for enhancing the instructional process, as it increases student engagement and enriches their learning experiences. Moreover, this level includes integrating interactive digital enhancements, such as comments, hyperlinks, and multimedia. The content remains unchanged, and students can use digital features to enhance the lesson. For example, students will be asked to submit exit tickets using Menti meter or Kahoot before leaving the classroom.

3. Modification is the first step from enhancement to transformation. Technology improves traditional teaching by implementing significant changes, such as facilitating listening activities and rewriting. This includes using textual, visual, and auditory tools to develop shared knowledge. Students may create voice recordings (cell phone), join online discussions (Facebook, Twitter), or use interactive text tools (Thing link, Padlet, Google Forms).

4. Redefinition is the final stage where the creation of new tasks cannot be accomplished without the use of technology. It provides an entirely new approach and strategy through the incorporation of technology, leading to transformation and improvements in students' learning and individual learning preferences. For example, virtual reality of historical sites, interactive simulations of complex scientific concepts, and/or real-time collaboration with peers from other parts of the world.

In addition, according to Puentedura (2014), the SAMR model highlights that when teachers consider incorporating technology into the learning process, they often question the most effective ways to use it. Puentedura (2012) illustrates these types of questions at levels comparable to those of the SAMR framework. By addressing these questions, the educator can determine how technology can optimize instructional design, thereby augmenting student engagement in the teaching and learning process.

The question being investigated at each level is commonly presented as follows:

1. Substitution:

What benefits would my students derive from substituting the outdated technology with the new technology?

2. Substitution to Augmentation:

- 1) Does this new technology add an improvement to the task process?
- 2) How do these components contribute to the learning outcomes?

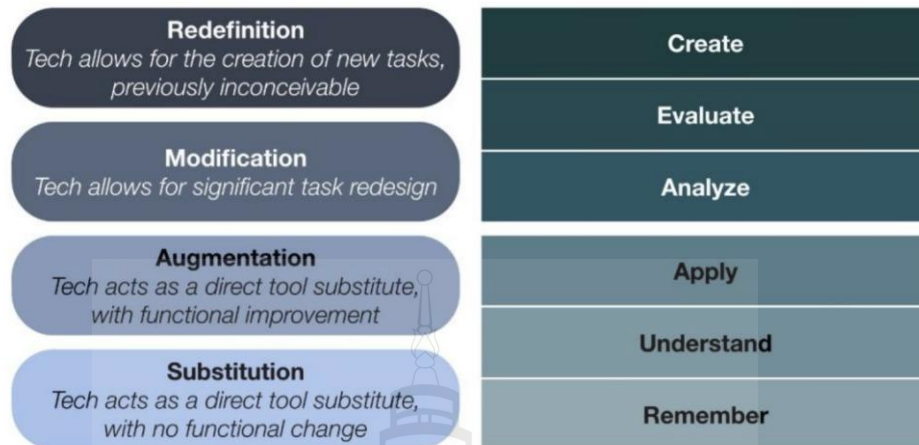
3. Augmentation to Modification:

- 1) How is the original task being modified?
- 2) Is the technology important for a modification of the task?

4. Modification to Redefinition:

- 1) What is the new task?
- 2) Will any section of the initial assignment be preserved?
- 3) How does the new technology enable the new assignment in a unique way?

In addition, the SAMR model parallels Bloom's Taxonomy, a widely used cognitive learning framework, as shown in Figure 2.25. Revised Bloom's Taxonomy (Krathwohl, 2002) consists of: remember, understand, apply, analyze, evaluate, and create. In SAMR, substitution and augmentation align with remember, understand, and apply, while modification and redefinition correspond to analyze, evaluate, and create. Both models emphasize that reaching the highest level is a gradual process requiring systematic progression from the lowest level, which provides the foundational knowledge for advanced learning (Hilton, 2016). Kirkland (2014) states that SAMR implementation is learner-centered, with each level emphasizing the learner. The SAMR model shows that as students participate actively and engagement increases, they develop greater independent learning abilities (Puentedura, 2014).



Source Puentedura (2014)

Figure 2.25 SAMR and Bloom's Taxonomy

Therefore, the SAMR model can be characterized as a theoretical framework for guiding the selection, use, and assessment of technology for teaching and learning. The availability of technology can facilitate learning and instruction, increase classroom efficiency, and encourage student engagement.

The study analyzes the characteristics and limitations among four models: TPACK, RAT, TIM, and SAMR models and summarize in Table 2.8.

Table 2.8 Summary of Pedagogy and Technology, Capabilities, and Limitations of the Technology Integration Models

Model	Pedagogy and technology	Capabilities	Limitations
R.A.T (Hughes et al., 2006)	Three phases of technological advancement Integration assessments were developed to evaluate teachers' comprehension of the role of technology in education. -Replacement -Amplification -Transformation	The RAT framework examines the utilization of digital technologies by teachers in a recently developed learning activity. Additionally, it provides a self-assessment tool for teachers to evaluate their level of technology integration in the classroom.	The RAT model does not explicitly consider the involvement of students in the process, nor does it adequately define the concept of word transformation
TPACK (Mishra & Koehler, 2006)	A 3-component Venn diagram is used to analyze the interconnections and associations among Pedagogical knowledge, Technological knowledge, and Content knowledge, all with the aim of enhancing students' academic performance.	TPACK highlights the importance of the teacher's possession of knowledge in three areas: content knowledge, pedagogical knowledge, and technological knowledge. It also emphasizes the interrelationship between these areas.	The TPACK framework offers teachers a comprehensive structure for integrating various elements but lacks specific instructions on its implementation.
SAMR (Puentedura, 2014)	Four levels that represent the different ways in which technology can be implemented. -Substitution -Augmentation -Modification -Redefinition	The SAMR model facilitates educators in evaluating their present level of curriculum technology integration, determining their integration objectives, and identifying the precise outcomes that technology can offer.	The SAMR model fails to consider important contextual factors, such as infrastructure, technological resources, and teacher knowledge, which can significantly impact technology integration.

Table 2.8 (continued)

Model	Pedagogy and technology	Capabilities	Limitations
TIM (Welsh et al., 2011)	25-parts matrix that aligns 5 meaningful learning environments: Active, Collaborative, Constructive, Authentic, Goal-Oriented and associates each characteristic with five levels of technology integration: -Entry -Adoption -Adaptation -Infusion -Transformation	TIM focuses on the integration of technology by teachers and students in a meaningful educational environment, specifically emphasizing the pedagogical principles incorporated within the framework.	TIM offers an excessive number of levels, with 25 scenarios between two axes and these levels are not mutually exclusive, as a single experience can be both collaborative, constructive, and authentic simultaneously.

According to Table 2.8, The SAMR model delineates the characteristics and limitations of various frameworks by emphasizing technology's role in enhancing and transforming educational practices, illustrating a progressive evolution from substitution to redefinition. In contrast, RAT enables teachers to evaluate their own proficiency in technology by considering whether the technology replaces, amplifies, or transforms instructional methods, with a specific focus on the role technology plays in modifying instruction. Conversely, TPACK focuses on the interplay and integration between teachers' technological, pedagogical, and content knowledge rather than on a hierarchy. TIM, unlike the others, centers on the integration of technology by teachers and students within a meaningful learning environment and outlines stages of technology use for both instructional strategies and student learning.

Moreover, based on the criteria proposed by Kimmons and Hall (2016), it appears that the TPACK, RAT, TIM, and SAMR models each have specific limitations in meeting these requirements. For example, in terms of clarity, teachers often struggle to comprehend abstract concepts such as Substitution and Augmentation in the SAMR model, Technological Pedagogical Knowledge in TPACK, and Transformation in RAT and TIM (Kimmons et. al., 2022). Unlike RAT, which focuses more on the role of technology, or TPACK, which emphasizes the connections between content, pedagogy, and technology, SAMR provides a hierarchical framework, but its terminology may be less immediately intuitive for practitioners.

Moreover, Kimmons et al. (Moreover, Kimmons et al. (2022) criticized the SAMR model for not specifically addressing how students are part of the model and for emphasizing product over process. The TIM model offers greater specificity with 25 distinct levels for teachers to implement in practical situations, but its lack of fruitfulness may impede teachers' ability to engage in meaningful reflection. Hence, the components of the TPACK model are too broad to offer adequate direction for specific practices. Criticisms of this model included that boundaries between sections are unclear, it doesn't specifically guide useful classroom practice, and it may lack context for the classroom teacher. On the other hand, aside from criticism of the SAMR model, other scholars have argued that it may be the most efficient model because it is extremely flexible, can be readily customized, and can be interpreted in various ways, enabling teachers to engage in thoughtful reflection as they employ technology to

achieve specific goals. As a planning tool, it empowers teachers to create, develop, and integrate digital learning experiences that incorporate technology. Moreover, the SAMR framework provides four levels of technology integration that allow teachers to plan for a diverse range of technology tools to enhance student engagement, learning outcomes, and individual needs (Boonmoh & Kulavichian, 2023). Therefore, the SAMR model has the potential to facilitate teaching and learning, increase classroom efficiency, and encourage student engagement.

To empower the Flex model of blended learning, the study employs the SAMR model as a framework for selecting and implementing digital learning tools and experiences in blended learning environments. The potential benefits of integrating the SAMR model might enhance students' learning through transformative learning and foster critical reading skills.

2.5 Related Research

The review of related research provides a comprehensive analysis of previous studies and scholarly works relevant to the present investigation. This section establishes a foundation for understanding the existing knowledge base, theoretical frameworks, and empirical findings related to the research topic.

2.5.1 Research on the Flex Model of Blended Learning

In 2019, Davis studied the implementation of the Flex model in a World History classroom. The study aimed to measure students' mastery, engagement, and understanding of historical concepts at Roxboro Community School in North Carolina. The researcher integrated three blended learning activities from the Flex model into small-group discussions and online activities. The research suggested that the Flex model of blended learning was implemented in a World History class, resulting in improved competency, enhanced comprehension of historical themes, and increased student engagement.

Furthermore, the study of the Flex model through the gamification method of Mosalanejad et al. (2020) aimed to evaluate the implementation of mental gamification in blended learning based on the Flex model and the program's efficacy on students.

The Flex model was used in this study to create lessons on mental illness for executive and undergraduate groups. This study combined two elements of technical and educational design. In the Flex model, lessons are self-guided, learning materials and instructions are provided online, and the teacher is on-site. Following this step, there were online (learning management system) and individual tasks, as well as small-group collaborative learning for discussion and teacher supervision. The study's findings revealed that mental gamification was highly efficient and effective. The majority of students strongly agree that mental gamification is useful and could benefit their learning.

Similarly, Kang et al. (2022) proposed another design of the Flex model, building upon previous approaches, and investigated its validity for evaluating OSCE in a small group of medical students, comparing its outcomes to those of traditional OSCE evaluation methods. In this model, online self-videotaping is combined with small-group offline feedback. Their study found the Flex model to be effective in medical education.

Moreover, Tong et al. (2022) conducted a study on the effectiveness of blended learning in improving students' academic achievement, self-study skills, and learning attitudes. Specifically, the study aimed to determine how well the Flex model supports teaching the mathematics subtopic of plane coordinates by enhancing these aspects, and to compare students taught with the Flex model to those taught using traditional methods. In terms of instructional procedures, students participated in online lessons, completed online homework and offline worksheets, joined class discussions, and used various online resources to solve assigned problems. Teachers monitored students' online behavior and tracked their class participation using checklists. Ultimately, the study found that blended learning positively impacted students' academic performance, student-teacher interaction, self-study skills, and learning attitudes.

As a result of the research review discussed above, it was discovered that all studies used the Flex model as part of the learning environment, including group discussions, online homework, small-group projects, and so on. Furthermore, there are currently a few studies conducted in a Flex model that focus only on subjects such as history, mathematics, and medicine, and do not involve the English language.

Therefore, no studies are currently being conducted to examine the Flex model in English language teaching.

2.5.2 Research on Critical Reading Skills

Roomy (2022) examined the impact of critical reading skills on pupils' reading comprehension. This study examines how these skills enhance undergraduates' reading comprehension during collaborative activities at King Saud Bin Abdulaziz University for Health Sciences. The findings showed that cultivating diverse strategies empowered students to interpret explicit content and implicit messages, helping them better address reading challenges across various levels.

During that year, Manurung and Jabari (2022) examined the implementation of the Question-and-Answer Relationship (QAR) Strategy during the teaching-learning process to promote the critical reading skills of authentic texts. The participants were fourth-semester students at Tridinanti University. The study was conducted over three cycles, comprising four phases: planning, implementation, observation, and reflection. According to the findings, students' critical reading achievement of authentic text increased with each cycle. The QAR strategy's question categories could help students overcome difficulties when engaged in reading activities.

In the Thai context, Churat et al. (2022) employed reading strategies to investigate critical reading skills, specifically examining the effectiveness of the SQ4R technique and students' satisfaction with it. The participants were 31 Thai grade 11 students in a secondary school. Notably, pre- and post-test results highlighted the advantages of SQ4R for improving students' critical reading in this context, while participants also expressed satisfaction with its effectiveness. Consequently, SQ4R was shown to be beneficial for developing more complex critical reading skills.

Hence, Samarng conducted a study on reading strategies in 2023 to investigate the use of the KWL chart in developing university students' critical reading skills and to examine how students used the KWL chart to engage in metacognitive strategies while studying critical reading. The participants were university students majoring in English for Communication. An English critical reading comprehension test and students' reflective writing in the KWL chart were used to collect data. The critical reading comprehension achievement of the EFL students after they were taught using the KWL chart revealed a significant difference between the pre- and post-test results. The findings showed that when

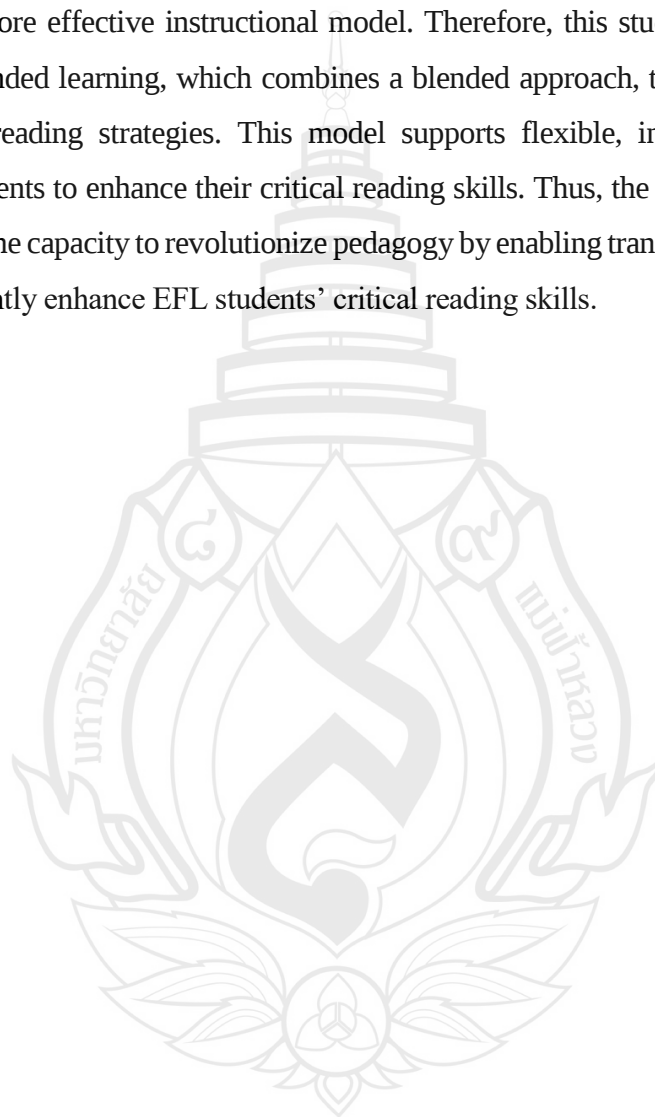
reading and studying critical texts, participants used the chart effectively by drawing on prior knowledge and reading strategies. Furthermore, participants could refer to the chart to describe the steps in their solutions during the critical reading whenever they encountered problems.

On the other hand, some technological studies aim to enhance critical reading skills. In 2021, Alshaye examined the impact of online digital storytelling on the enhancement of critical reading abilities, analytical thinking, and autonomous learning among prospective Arabic teachers. The participants were third-year undergraduate university students at Kuwait University. Participants were divided into two main subgroups: the experimental group (45 students taught via online digital storytelling) and the control group (58 students taught via the traditional lecture approach). The study's instrument consists of a standardized pre-posttest in critical reading and critical thinking, a self-rating scale from the self-regulated learning questionnaire, and a self-regulated learning questionnaire. The results revealed that critical reading, analytical thinking, and autonomous learning skills improved significantly compared to the control group. Therefore, integrating technology into an effective learning environment fosters collaboration in second-language learning, promoting higher-level thinking and self-regulated learning.

Moreover, Yang et al. (2022) conducted a study to examine the impact of mobile blended active language learning on the enhancement of critical reading skills among Thai high school students and to assess their perceptions of this educational approach. The participants were 25 eleventh-grade students enrolled in an intensive English course at a private institution in Chiang Mai, Thailand. The essential reading platform Whooo's Reading and social media platforms, including Facebook, Hello Talk, and Vice News, were used to enhance and develop learners' critical reading skills. The test findings indicated that the critical reading skills in English of Thai high school learners have improved following the use of mobile, blended, active language learning. The students evaluated mobile blended active language learning positively for critical reading abilities, critical reading enhancement, flexibility, engagement, effectiveness, and motivation.

In brief, there is no previous research using the Flex model to improve EFL university students' critical reading skills, particularly in Thailand. While numerous studies have examined the effectiveness of blended learning models, the specific adoption of the Flex model in language teaching remains underrecognized, and recent studies on EFL

students' critical reading skills are lacking. In the digital era, traditional materials alone do not meet diverse student needs; moreover, conventional reading instruction often prioritizes basic comprehension, thereby limiting opportunities to develop analytical thinking and critical inquiry (Thongsan & Anderson, 2025). To address these challenges, it may be necessary to modify lecture formats and classroom layouts by integrating technology and adopting a more effective instructional model. Therefore, this study introduces the Flex model of blended learning, which combines a blended approach, the SAMR framework, and critical reading strategies. This model supports flexible, individualized learning, enabling students to enhance their critical reading skills. Thus, the Flex model of blended learning has the capacity to revolutionize pedagogy by enabling transformative experiences that significantly enhance EFL students' critical reading skills.



CHAPTER 3

METHODOLOGY

This chapter presents research design, participants, research setting, ethical considerations, research instruments, instrument validity and reliability, data collection, and data analysis.

3.1 Research Design

This study employed a mixed-methods design. Both quantitative and qualitative research methods were employed to obtain rich data sets for analysis. In the qualitative method, data were collected through semi-structured interviews to examine the needs and problems faced by teachers and students in the traditional classroom setting before the development of the instructional model. Subsequently, following the implementation of the instructional model, an in-depth interview was conducted to examine the critical reading strategies students employed throughout the study and to triangulate the findings of the critical reading test administered to the students.

For the quantitative part, data were gathered with a pretest and posttest on critical reading. These tests measured the instructional model's effectiveness and assessed students' critical reading skills. After implementation, a questionnaire was administered to assess students' attitudes toward the instructional model.

3.2 Participants

3.2.1 The participants for developing and validating the quality of the Flex model of blended learning

3.2.1.1 The participants involved in identifying the problems and needs for teaching and learning critical reading skills.

1. Five English teachers, all with experience teaching critical reading, participated as interviewees in a semi-structured interview to provide insight into instructional challenges and needs.

2. Ten second-year students, enrolled in the critical reading course, participated as interviewees in a semi-structured interview to share their learning experiences and identify learning challenges.

3.2.1.2 The participants involved in validating the quality of the Flex model of blended learning and instructional documents.

1. Nine experts in English language, educational technology, or curriculum and instruction acted as evaluators, assessing the consistency of the instructional model's components and the appropriateness of their descriptions.

2. An English language instructor, an educational technology specialist, and a curriculum and instruction expert examined the appropriateness and completeness of the critical reading lessons and lesson plans.

3. Three experts in the field of the English language, serving as content validity raters, evaluated the appropriateness of the critical reading test.

4. Twenty second-year students who attend the critical reading course participate in the pilot study.

3.2.2 The participants for implementing and identifying the effectiveness of the Flex model of blended learning

55 second-year students enrolled in the critical reading course in the first semester of the 2025 academic year at a public university in Thailand participated in the study to assess the effectiveness of the Flex model of blended learning. This study employed a purposive sampling approach to select participants, who were divided into two sections, and their level of English proficiency ranged from A2 to B1 according to the CEFR.

3.2.3 The participants for investigating students' attitudes towards the Flex model of blended learning

This study examined the attitudes of 55 second-year students who enrolled in the critical reading course during the first semester of the 2025 academic year at a public university in Thailand. They focused on the effectiveness of the instructional model, students' critical reading skills, and both in-class and outside-class instruction.

3.3 Research Setting

This study was conducted at a public university in Thailand during the first semester of the 2025 academic year. The study focused on a critical reading course designed for second-year students majoring in English education. The study conducted from June to August 2025. The learning environment included both in-class and outside-class instruction. Students participated in in-class instruction for 2 hours and 2 hours for online self-study, while allocating 4 hours for independent learning outside of class. Students were provided with access to online learning platforms that enabled them to access instructional materials, participate in discussions, and complete assignments.

3.4 Ethical Considerations

The researcher followed all ethical procedures of Mae Fah Luang University and obtained ethics approval from its Ethics Committee on Human Research. To collect data, the researcher got participant consent and a signed form. During orientation week, the researcher provided an overview of the study, presented the objectives, offered additional information, and answered participants' questions. All collected data including interviews, transcripts, pretests, posttests, and questionnaires were kept securely.

3.5 Research Instruments

The study used two types of instruments: instructional and research. The instructional instruments included the Flex model of blended learning, critical reading lessons, and lesson plans. The research instruments featured a semi-structured interview, an in-depth interview, a critical reading test, and a student attitudes questionnaire.

3.5.1 Instructional Instruments

The researcher utilizes three instructional instruments in this study, detailed as follows:

3.5.1.1 Flex Model of Blended Learning

This study aims to develop and validate the Flex model of blended learning to enhance EFL students' critical reading skills. The researcher first studied the problems and needs of teachers and students in teaching and learning critical reading skills, relevant theories and concepts, and previous related studies.

The development of the Flex model of blended learning was based on the theoretical concepts of the Flex model (Staker & Horn, 2012), the SAMR model (Puentedura, 2014), critical reading strategies (Axelrod & Cooper, 2002; Nasrollahi et al., 2015), and the synthesis of instructional design models (Dick et al., 2022; Kemp & Dwyer, 2001; Lever-Duffy & McDonald, 2011; Morrison, 2010).

The teaching and learning split was 2 hours of in-class instruction (25%), 2 hours of online self-study (25%), and 4 hours of independent learning outside of class (50%). The critical reading lessons consisted of four lessons, including (1) distinguishing between facts and opinions, (2) identifying the author's purpose, (3) making inferences, and (4) evaluating arguments. Moreover, the study adapted four critical reading strategies (previewing, questioning, analyzing, and reflecting) and tailored them into a teaching and learning procedure.

Figure 3.1 illustrates the ten components of the Flex model of blended learning in the study.

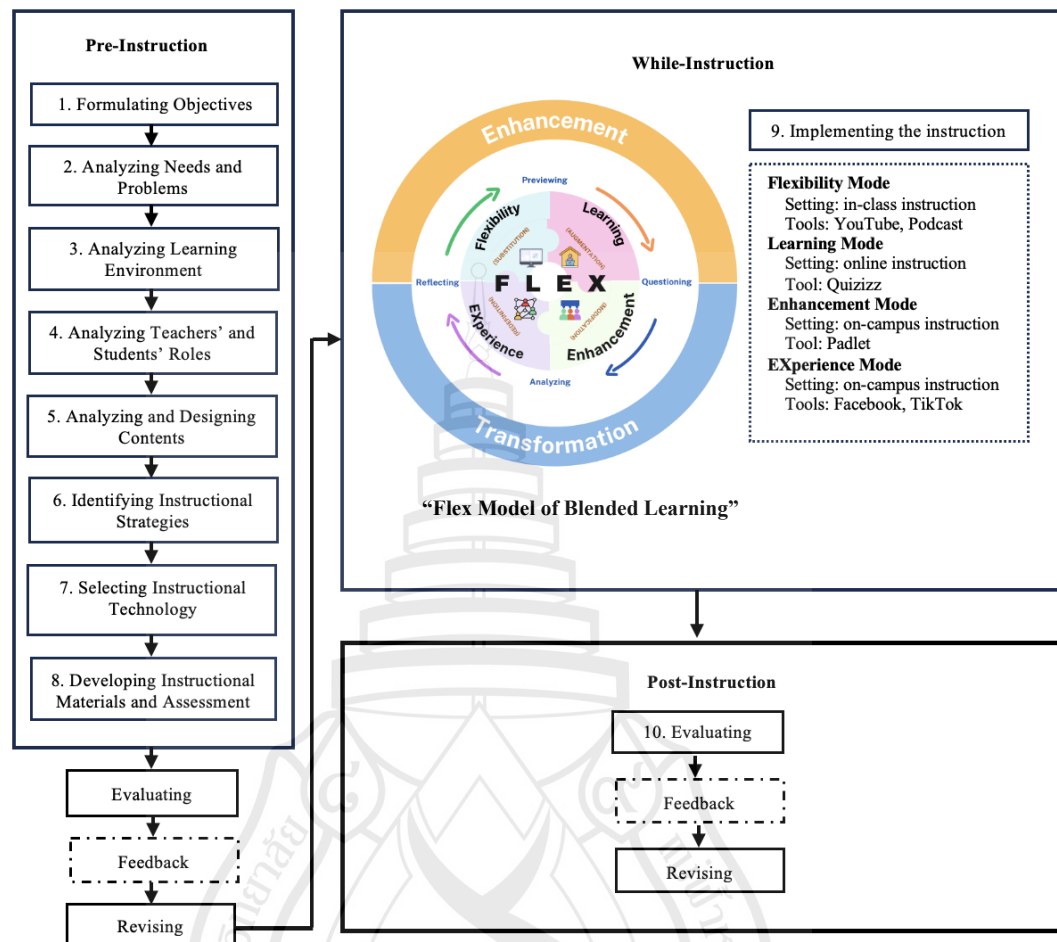


Figure 3.1 Flex Model of Blended Learning

The Flex model of blended learning consisted of the ten components as follows:

1. Analyzing the Needs and Problems

In designing the Flex model of blended learning, the first stage was to identify needs and problems. To identify the needs and problems of interviewing teachers, teachers might reflect on the need to design content and learning activities, significant problems in teaching critical reading, and their experiences and opinions regarding the use of technology in reading class. Students explained their major issues and perspectives on learning critical reading, as well as their experiences and perspectives on using technology in critical reading instruction. The study then

analyzed the interview data and used it as one component in developing the Flex model of blended learning.

2. Formulating Objectives

To formulate the learning objectives, the study analyzed program learning outcomes (PLOs), course learning outcomes (CLOs), and course descriptions to determine students' performance and learning outcomes after implementation. The objectives included both enabling and terminal objectives, guiding the design of content and activities are as follows:

Upon completing the course, students will be able to...

- 1) Distinguish between facts and opinions in the texts correctly
- 2) Identify the author's purpose in the texts correctly
- 3) Make inferences from the texts using schema and textual evidence correctly
- 4) Evaluate an argument using their experiences and evidence from the texts correctly

3. Analyzing the Learning Environment

After synthesizing blended learning approaches from scholars, the study then modifies the Flex model of blended learning to align with a public university context for establishing learning environments. All four learning modes of the study use online learning as their backbone, meaning all content, materials, and tasks are delivered online via various digital tools. As per the university regulations, the study adopts Google Classroom as the learning management system for instruction delivery and leverages several digital tools, including YouTube, Quizizz, Padlet, Facebook, and TikTok, across different learning modes. Moreover, the learning space and facilities used for teaching and learning were mainly on campus but outside the normal classroom, such as the library, an active learning room, and a learning community space.

4. Analyzing Teachers' and Students' Roles

Teachers were no longer required to deliver content from the front of the class. Instead, they adopted Google Classroom as a learning management system to track each student's progress and provide flexible, adaptive support through activities such as group discussions and team projects. Moreover, teachers recommended relevant

learning resources, provided assistance, and answered questions. If students have any questions or problems, they can consult the teachers immediately on campus or online.

Regarding students' roles, they meet biweekly with their teachers to create their learning plans and seek advice on academic solutions. Once students develop their two-week learning plan, they transition through different learning modes as outlined in it. This practice aimed to promote personalized learning and engagement in the learning process. Students can promptly schedule a meeting with the teacher for assistance when needed. The Flex model of blended learning gave students a high level of flexibility in their learning, enabling them to progress through lessons and materials at their own pace.

5. Analyzing and Designing Contents

The contents used in the Flex model of blended learning were consistent with the PLOs, CLOs, the course description, and the objectives of the critical reading course in the first semester of the academic year 2025.

According to PLO5, it focused on “using English language skills in listening, speaking, reading, and writing accurately and fluently.” The CLO1 highlights “analyze reading texts using a variety of reading strategies,” and the CLO2 indicates that “Analyze and interpret underlying meanings across various text types.” Consequently, the course description outlines that “students will study and practice a wide range of reading, text for comprehension, and reading strategies for enhancing reading ability; analyze text types; read text; and conduct reading activities.”

Therefore, the critical reading texts were selected from a variety of sources, including online magazines, news articles, advertisements, and stories. They were selected to correspond to the CEFR B1 level as measured by Flesch-Kincaid. The Flesch-Kincaid Grade Level scores range from 30 to 50. Then, they were delivered via Google Classroom.

The critical reading lessons were divided into four lessons as follows:

Lesson 1: Distinguish between Facts and Opinions

Students practice identifying between facts and opinions in reading passages. Students will be able to indicate the facts that are statements that can be verified and proven, and the opinions that are statements that express the meaning of an author's attitudes or beliefs.

Lesson 2: Identify the Author's Purpose

Students practice identifying the author's reason for or intent in writing by identifying the three main categories of purpose, namely, persuade, inform, and entertain. Understanding the author's purpose helps students grasp the text's main ideas and central themes. This comprehension enables them to make connections and interpret the information presented.

Lesson 3: Make Inferences

Students practice making inferences from the reading passage. This strategy allows students to draw conclusions based on their previous experiences and knowledge of the situation.

Lesson 4: Evaluate the Author's Argument

Students practice analyzing and evaluating the author's assumptions based on the reading passage. This involves practice in identifying the difference between the reason and the evidence in the reading materials so that they can evaluate the writer's intent.

6. Identifying Instructional Strategies

Critical reading strategies are the specific actions readers employ to thoroughly comprehend a text (Wallace, 2003). This study adapted the critical reading strategies from Axelrod and Cooper (2002) and Nasrollahi et al. (2015) as instructional strategies. These instructional strategies are then tailored into a teaching and learning procedure aimed at enhancing students' critical reading skills. The process of teaching and learning consisted of four phases as follows:

Previewing: The preview was done by building students' vocabulary mastery related to the story. Readers can predict the content and structure of a text before engaging in a thorough examination.

Questioning: The questions are intended to help readers comprehend the text and respond to it in greater detail. The study applies higher-order thinking questions, but also includes lower-order thinking, which is still required to assess students' understanding of the text.

Analyzing: identifies the main idea and supporting ideas, then provides a brief summary of the text's main idea by writing or retelling it.

Reflecting: evaluating a text's credibility, logical reasoning, and emotional impact. The work assigned in class occasionally prompts students to reflect on their attitudes, beliefs, and stances regarding contemporary issues.

7. Selecting Instructional Technology

To empower the Flex model of blended learning, the study considered how technology could be used to transform teaching and learning strategies and students' specific learning outcomes. The study employed the SAMR model, which may highlight the potential of technology to revolutionize teaching and learning methods and pinpoint specific objectives to enhance critical reading skills among EFL students. Therefore, the instructional technology tools in the study were selected in accordance with university regulations and aligned with the SAMR framework.

8. Developing Instructional Materials and Assessment

The instructional materials, which include lesson plans and an instructional manual, were developed in alignment with Program Learning Outcomes (PLOs), Course Learning Outcomes (CLOs), course descriptions, and objectives. The instructional strategies written in the lesson plans are previewing, questioning, analyzing, and reflecting.

Formative and summative assessments were created to evaluate students' critical reading skills. The critical reading tasks in each mode serve as formative assessments during the implementation of the critical reading lessons, enabling evaluation of students' progress. After completing all four critical reading lessons, a critical reading test was administered as a summative assessment to measure students' proficiency.

9. Implementing

The Flex model of blended learning combines four learning modes: Flexibility mode (in-class mode), Learning mode (online mode), Enhancement mode (on-campus mode), and Experience mode (on-campus mode), each of which requires at least 2 periods to complete. The Flexibility and Learning modes are enhancement tools, whereas the Enhancement and Experience modes are transformation tools designed to transform teaching and learning and foster students' learning outcomes. The Flex model of blended learning's characteristics of each mode are as follows:

1) Flexibility Mode

The teaching and learning aim to create learning flexibility. Students engage in flexible learning spaces and use technology to actively collaborate and communicate with peers from their learning paths.

Table 3.1 Characteristics of the Flexibility Mode

Characteristic	Explanation
Setting	Teaching and learning take place at a traditional classroom.
Technology Integration	Technology is used to substitute and augment the traditional classroom with the intention of creating learning flexibilities. Students engage in using technology as a tool for teaching and learning.
Learning Activities	Peer discussion, teacher reflection, and critical reading tasks.
Technology Tools	Multimedia resources: YouTube and Podcasts Learning management system: Google Classroom
Critical Reading Strategies	Previewing, Questioning, Analyzing, Reflecting

2) Learning Mode

The teaching and learning aim to foster students' self-practice. Students can learn the lessons whenever and wherever they want. Students have the opportunity to use different learning strategies to acquire knowledge.

Table 3.2 Characteristics of the Learning Mode

Characteristic	Explanation
Setting	Teaching and learning take place at students' residences.
Technology integration	Technology is used to augments and facilitates an individual learning experience. Technology fosters self-directed progress by enabling student engagement and autonomy, while also facilitating interactive and prompt feedback.
Learning Activities	Interactive online exercises, teacher reflection, and critical reading tasks.
Technology Tools	Interactive collaboration tools: Quizizz Learning management system: Google Classroom
Critical Reading Strategies	Previewing, Questioning, Analyzing, Reflecting

3) Enhancement Mode

Teaching and learning aim to transform the educational process by integrating technology, improving students' problem-solving skills, and promoting collaborative communication.

Table 3.3 Characteristics of the Enhancement Mode

Characteristic	Explanation
Setting	Teaching and learning take place in a faculty's library.
Technology integration	Technology integration is used to transform the instructional approach and fundamentally changes the learning process. Students use technological resources to link information with their existing knowledge. Students can foster dynamic interaction via a collaborative whiteboard by responding to the insights of their peers, contributing their own viewpoints.
Activities	Group discussion, critical reflection, collaborative learning, and critical reading tasks.
Technology Tools	Interactive board: Padlet website Learning management system: Google Classroom
Critical Reading Strategies	Previewing, Questioning, Analyzing, Reflecting

4) Experience Mode

Teaching and learning aim to foster the development of innovative educational experiences. Students utilize social media and modern technology to enhance their learning path and cultivate a community of learning and social engagement.

Table 3.4 Characteristics of the Experience Mode

Characteristic	Explanation
Setting	Teaching and learning take place in an active learning space on campus.
Technology integration	The integration of technology transforms both the pedagogical approach and creates innovative learning experiences. The teaching and learning strategies emphasized on the social engagement fostering a sense of community through the use of an online learning platform or social networking tools.
Activities	Team project, group discussion, critical reflection, and critical reading tasks.
Technology Tools	Social media platform: Facebook and TikTok Learning management system: Google Classroom

Additionally, each critical reading lesson takes two weeks (8 periods) to finish. Students are responsible for engaging in in-class instruction for 2 periods and for 6 periods of independent learning outside the classroom, as outlined in their learning plan. The implementation is divided into 3 steps, namely, before the lesson, during the lesson, and after the lesson, as illustrated in Figure 3.2 below:

A. Before the lesson, a teacher conducts an orientation session to introduce the critical reading lessons and tasks. Students must work with their teacher to set a goal and a two-week learning plan that enables them to study independently at their own pace.

B. During the lesson, students must complete all four learning modes within two weeks to meet the criteria.

C. After the lesson, a teacher provides feedback on the students and monitors their progress towards completing the criteria, which is classified as a formative assessment. After completing the four critical reading lessons, students must take a critical reading test as a summative assessment.

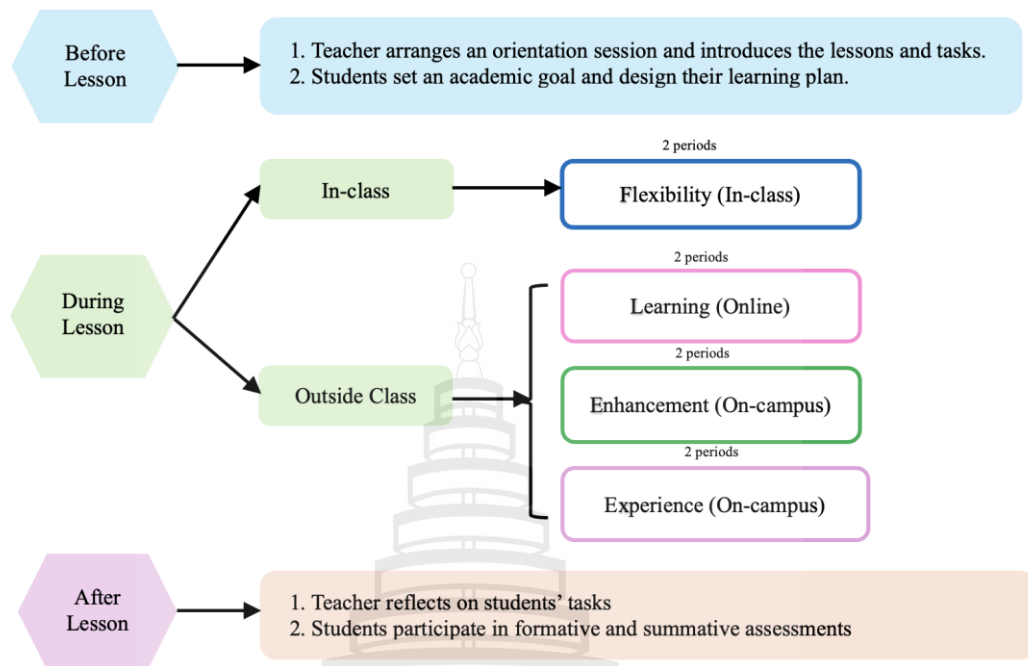


Figure 3.2 The Process of the Implementation

Table 3.5 presents the explanations of the instructional procedures for each learning mode, with brief descriptions as follows:

Table 3.5 The Instructional Procedures with Brief Descriptions, Learning Environment, Teacher’s Role, and Students’ Role

Instructional Procedures	Learning Environment	Teacher’s Role	Student’s Role
Before Lesson			
- Teacher introduces the lessons and series of critical reading tasks with a brief explanation. - Students set an academic goal and design their learning plan.	Google Meet (Online)	-Teacher creates a system to ensure students can move at their own pace during the lesson. - The teacher advises students by suggesting activities that will help them achieve their goal.	- Students set their learning plan and continue with their learning plan through all four modes.
During the Lesson			
I: Flexibility			
<u>Teaching Procedure:</u> Previewing: using various activities to enhance students’ vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: students complete the exercise and discuss with peers to find the answers to questions. 3. Analyzing: students watch or listen to YouTube or podcasts to study critical reading skills and discuss with peers to find the answers to questions.	Classroom (Face-to-Face)	Teacher-led instruction and facilitator onsite.	Students do critical reading tasks and discuss on the given topic with peers.

Table 3.5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
4. Reflecting: students engage in higher-level thinking processes such as evaluating the credibility, logical reasoning, and emotional aspects of a text. <u>Critical Reading Task:</u> - Critical reading exercises - Peer discussion <u>Technology Integration:</u> - YouTube - Podcast - Google Classroom II: Learning <u>Teaching procedure:</u> 1. Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: Students read the text to find the answers to questions to complete the critical reading task using Quizizz. 3. Analyzing: students study critical reading skills and discuss with peers to find the answers to questions.	Student's residents (Online)	The teacher is an interventionist and facilitator online.	Students take part in individual study.

Table 3.5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
4. Reflecting: students engage in higher-level thinking processes such as evaluating the credibility, logical reasoning, and emotional aspects of a text. <u>Critical Reading Task:</u> - Critical reading exercises <u>Technology Integration:</u> - Google Classroom - Quizizz III: Enhancement <u>Teaching procedure:</u> 1. Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: students engage in reading the text and collaborate with their peers in finding the answers to the provided questions. 3. Analyzing: students study critical reading skills and discuss with peers to find the answers to questions. - Google classroom	Library (On campus)	The teacher is an interventionist and facilitator onsite.	Students participate in group discussions.

Table 3.5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
4. Reflecting: students are required to engage in a group activity where they analyze and discuss their thoughts, questions, and interpretations of the reading text using Padlet. <u>Critical Reading Task:</u> - Critical reading exercises - Group discussion <u>Technology Integration:</u> - Padlet IV: Experience <u>Teaching procedure:</u> 1. Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: students engage in reading the text and collaborate with their peers in finding the answers to the provided questions. 3. Analyzing: students study critical reading skills and discuss with peers to find the answers to questions.	an active learning space (On campus)	The teacher is an interventionist and facilitator onsite.	Students participate in team projects.

Table 3.5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
4. Reflecting: students collaborate with their team to discuss the assigned project, then share their ideas on social media such as TikTok and Facebook for further discussion and sharing. <u>Critical Reading Task:</u> - Critical reading exercises - Team project <u>Technology Integration:</u> - TikTok - Facebook After the Lesson	Google Meet (Online)	Teacher schedules time to meet with each individual student to get feedback on progress.	Students consult with teacher and get feedback on their progression.
- Students get feedback on assignment progress and complete a formative and summative assessment.			

10. Evaluating and Revising

To evaluate the model's effectiveness, the Flex model of blended learning was evaluated by nine experts in English language, curriculum and instruction, and technology before implementation. During instruction, the formative assessment was used to monitor students' progress in the critical reading lesson. Finally, post-instruction, the posttest and in-depth interview were administered to the students to assess their critical reading skills. For revising, the instructional model was constantly modified. For revision, the instructional model was continually modified in response to evaluation outcomes conducted pre-, during, and post-instruction, following implementation, to enhance the model.

3.5.1.2 Critical Reading Lessons

Critical reading lessons were designed according to the PLOs, CLOs, course description, and objectives. The critical reading texts were chosen from a variety of sources, including online magazines, news articles, advertisements, and stories. They were selected to correspond to the CEFR B1 level as measured by Flesch-Kincaid. The Flesch-Kincaid Grade Level scores range from 30 to 50. The critical reading lessons consisted of four chapters as follows:

1. Distinguishing between facts and opinions
2. Identifying the author's purpose
3. Making inferences
4. Evaluating arguments

3.5.1.3 Lesson Plans

The lesson plans were created to serve as guidelines for teachers to follow when conducting instruction. There are four lesson plans with detailed information on classroom activities, tasks, and procedures. Each lesson plan included the lesson title, objectives, contents, materials, duration, activities, and evaluation.

3.5.2 Research Instruments

Four research instruments were used in the study as explained below:

3.5.2.1 Semi-Structure Interviews

To develop and validate the effectiveness of the Flex model of blended learning, semi-structured interviews were conducted with English teachers and students to share their needs and problems in their current critical reading classroom. The semi-

structured interview consisted of a set of open-ended questions formulated by the researcher. Before collecting the data, the researcher asked for their permission and had a consent form signed. Then, the individual interview was conducted face-to-face and lasted approximately 15 minutes. To ensure that no interview responses were missed, respondents' voices were recorded and securely stored.

The sample interview questions for teachers' needs and problems in teaching critical reading were as follows:

1. What problems do you encounter in teaching critical reading (reading texts, reading tasks, activities, time, resources, and so on)?
2. In your opinion, what instructional strategies can promote critical reading skills?
3. What problems do you encounter when using digital tools in the critical reading classroom?
4. What do you think about digital tools that are applicable in the critical reading classroom?

The sample interview questions for students' needs and problems in learning critical reading were as follows:

1. What do you think about learning critical reading?
2. What difficulties or problems do you face in learning critical reading?
3. What types of reading texts can motivate you to read more?
4. What do you think about digital tools that can motivate you to learn critical reading?
5. To what extent do you practice your critical reading skills after class?

3.5.2.2 Critical Reading Test

To assess students' critical reading skills, a test was administered based on the course objectives and served as both a pretest and a posttest. The test consisted of 20 items that evaluate various critical reading skills through multiple-choice questions.

3.5.2.3 In-Depth Interview

To triangulate the critical reading test, an in-depth interview was used to ask students about the critical reading skills they employed during the learning process through the Flex model of blended learning. The in-depth interview consisted of four questions developed by the researcher. Before collecting the data, the researcher asked

for their permission and had a consent form signed. Each individual interview was conducted face-to-face and lasted approximately 15 minutes. To ensure that no interview responses were missed, respondents' voices were recorded and securely stored. Critical reading skills after implementing the Flex model of blended learning were as follows:

1. How do you distinguish between fact and opinion in various texts?
2. How do you identify the author's purposes?
3. How do you make an inference and draw a conclusion from the text?
4. How do you evaluate an argument about the text?

3.5.2.4 Students' Attitudes Questionnaire

The students' attitudes questionnaire was used to assess their attitudes toward the Flex model of blended learning. The questionnaire used a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The focus of the investigation was on the instructional model, in-class and out-of-class instruction, and critical reading skills related to teaching and learning in the Flex model of blended learning.

3.6 Validity and Reliability of the Instruments

To ensure the accuracy and consistency of the findings, the research instruments were examined for validity and reliability as follows:

3.6.1 Validity and Reliability of Instructional Instruments

3.6.1.1 Flex Model of Blended Learning

The Flex model of blended learning was evaluated for the consistency of its components and the appropriateness of their descriptions by nine experts who specialize in English language, curriculum and instruction, and educational technology. The evaluation forms included the open-ended form and the Index of Item-Objective Congruence (IOC) form. Then, the Flex model of blended learning was evaluated for its effectiveness in the pilot study.

3.6.1.2 Critical Reading Lessons

The critical reading lessons were assessed for completeness and appropriateness of content and language use by three experts specializing in curriculum

and instruction, English language, and educational technology. The first section of the form employed a 4-point Likert scale (4 = very appropriate, 3 = appropriate, 2 = inappropriate, and 1 = very inappropriate). The second section of the form was open-ended, requesting further recommendations from the experts. The lessons were tested in the pilot study.

3.6.1.3 Lesson Plans

The lesson plans were evaluated for the appropriateness and completeness of their components and language use by three experts specializing in curriculum and instruction, English language, and educational technology. The evaluation form consisted of two sections: the first used a 4-point Likert scale (4 = very appropriate, 3 = appropriate, 2 = inappropriate, and 1 = very inappropriate), while the second section was an open-ended format that asked for further recommendations from the experts. The lesson plans were implemented in the pilot study.

3.6.2 Validity and Reliability of Research Instruments

3.6.2.1 Semi-Structured Interview

The open-ended questions used in the interview were evaluated for completeness and appropriateness of language use by three English-language specialists using an open-ended evaluation form.

3.6.2.2 Critical Reading Test

The Critical Reading Test was evaluated for content validity and appropriateness of language use by three English language teaching specialists using the Index of Item-Objective Congruence (IOC). The test was then administered in a pilot study. After pilot testing, the difficulty levels and discrimination powers of the test items were analyzed, and the test's reliability was calculated using Cronbach's alpha.

3.6.2.3 In-Depth Interview

The open-ended questions employed in the interview were evaluated for completeness and appropriateness of language by three English specialists using an open-ended evaluation form.

3.6.2.4 Students' Attitudes Questionnaire

The questionnaire items were reviewed and evaluated for content validity by three English-language specialists using IOC.

3.7 Research Procedure

In this study, the research procedure was divided into three phases as follows:

3.7.1 Phase 1: Developing and validating the quality of the Flex model of blended learning to enhance critical reading skills of EFL students.

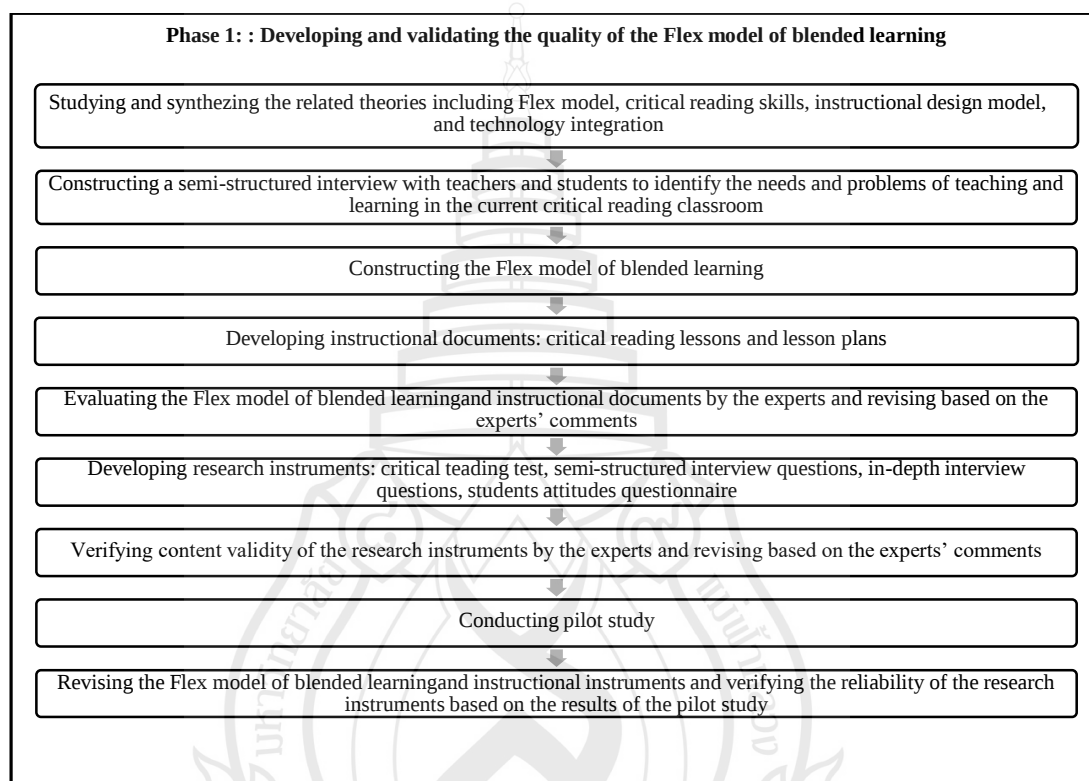


Figure 3.3 Data Collection Procedure of Phase 1

In this phase, the data was gathered using both qualitative and quantitative methods, as shown in Figure 3.3

3.7.1.1 Studying and synthesizing the related theories, including the Flex model, critical reading skills, instructional design model, and technology integration

The development of the Flex model of blended learning as the instructional model of critical reading skills was based on the theoretical concepts of the Flex model (Staker & Horn, 2012), the SAMR model (Puentedura, 2014), critical reading strategies (Axelrod & Cooper, 2002; Nasrollahi et al., 2015), and the synthesis of instructional design models (Dick et al., 2022; Kemp & Dwyer, 2001; Lever-Duffy & McDonoald, 2011; Morrison, 2010).

3.7.1.2 Constructing a semi-structured interview with teachers and students

The semi-structured interview was conducted to collect data from five teachers with experience in teaching critical reading skills and ten English education program students enrolled in the critical reading course at a public university in Thailand, categorized by experience level as high, intermediate, and low. The interview was conducted face-to-face, with participants' responses recorded on audio. Additionally, the interviewer supplemented the recordings with written notes. The information obtained from the interviews served as foundational data for developing models.

3.7.1.3 Constructing the Flex model of blended learning

The specific information from related theories, as well as from students' and teachers' interviews that represented needs and problems in teaching and learning critical reading skills, served as the basis for the model's development.

3.7.1.4 Developing instructional documents

To prepare the content and materials for the Flex model of blended learning, the instructional documents were designed to underpin the analysis of the program learning outcomes (PLOs), course learning outcomes (CLOs), course description, and objectives. Consequently, the instructional documents comprised critical reading lessons, an instructional manual, and lesson plans. The critical reading lessons consisted of four chapters; each chapter promotes the different critical reading skills, namely, 1) distinguishing between facts and opinions, 2) identifying the author's purpose, 3) making inferences, and 4) evaluating arguments. Moreover, the lesson plans were conducted in accordance with the critical reading lessons and functioned as instructional guidelines. Consequently, every lesson plan covered a topic, learning objectives, time, resources, content, methods of instruction, and assessment.

3.7.1.5 Evaluating the Flex model of blended learning and instructional documents by the experts and revising based on the experts' suggestions

The Flex model of blended learning was evaluated by nine experts specializing in English language, curriculum and instruction, and educational technology. The model was revised in accordance with the experts' feedback. The Flex model of blended learning was assessed for the consistency of its components and the appropriateness of the descriptions of each component utilizing the Index of

Congruence (IOC). The instructional documents were evaluated by three specialists in English language, curriculum and instruction, and educational technology. Subsequently, they were revised based on the experts' feedback.

3.7.1.6 Developing research instruments

The research instruments developed for this study included critical reading tests, semi-structured and in-depth interview questions, and a questionnaire on students' attitudes.

3.7.1.7 Verifying content validity of the research instruments

The research instruments were validated by three specialists in the field of English utilizing the Item Objective Congruence (IOC) method. Then, they were revised based on the experts' feedback.

3.7.1.8 Conducting a pilot study

After revising the Flex model of blended learning and the instructional instruments based on the experts' suggestions and comments, the researcher conducted a pilot study to test the instruments before actual implementation. The pilot study aimed to evaluate the effectiveness of the Flex model of blended learning and its instructional materials, as well as the reliability of the research instruments. The study was conducted over a two-week period with 20 second-year students in the English Education Program enrolled in the Critical Reading Skills course during the second semester of the 2024 academic year.

3.7.1.9 Revising the Flex model of blended learning and instructional instruments and verifying the reliability of the research instruments

After completing the pilot study, the Flex model of blended learning and the instructional instruments were revised, and the instruments' reliability and validity were subsequently verified.

3.7.2 Phase 2: Implementing and identifying the effectiveness of the Flex model of blended learning to enhance the critical reading skills of EFL students

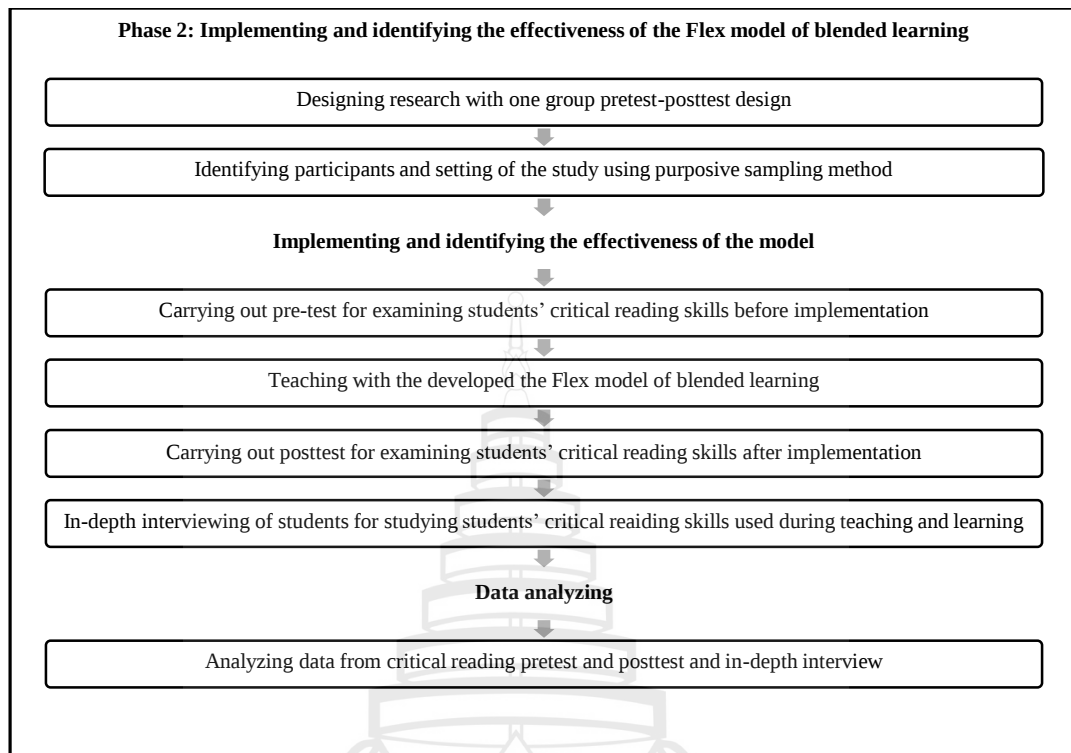


Figure 3.4 Data Collection Procedure of Phase 2

According to Figure 3.4, the data was gathered using both qualitative and quantitative methods below:

3.7.2.1 Designing research with a one-group pretest and posttest design

The study employed a one-group pretest and posttest design, which was considered appropriate for indicating variations in learning outcomes before and after the implementation of the instructional model. The study enrolled participants in the critical reading course at a public university in Thailand during the first semester of the 2025 academic year. The research design was explained as follows:

Table 3.6 Research Design

	Group	Pretest	Treatment	Posttest
	Experimental Group	T ₁	X	T ₂
Note	T ₁ represents	pretest for the experimental group		
	T ₂ represents	posttest for the experimental group		
	X represents	the instruction based on Flex model of blended learning		

3.7.2.2 Identifying participants and the setting of the study using a purposive sampling method

In this study, the researcher selected 55 second-year students enrolled in the critical reading course during the first semester of the 2025 academic year. This study employed a purposive sampling method to select participants, who were divided into two sections.

“Implementing and identifying the effectiveness of the Flex model of blended learning”

To implement and evaluate the effectiveness of the Flex model of blended learning, four procedures are outlined below:

3.7.2.3 Carrying out a pretest for examining students’ critical reading skills before implementation

Orientation sessions were held prior to implementation to provide an overview of the experiment, introduce the Flex model of blended learning, and equip students with comprehensive knowledge of teaching and learning activities and of using online learning platforms. The students then completed a two-hour pretest on critical reading skills.

3.7.2.4 Teaching with the developed instructional model

The instructional implementation lasted for eight weeks. During this period, the teacher served as a facilitator for four periods per week, while the students engaged in four periods per week to complete their learning plans.

3.7.2.5 Carrying out a posttest for examining students’ critical reading skills after implementation

When the instructional implementation was completed, the students then took a two-hour pretest on critical reading skills.

3.7.2.6 In-depth interviewing of students for the purpose of studying critical reading skills employed during teaching and learning

At the end of the implementation, 10 participants participated in an in-depth interview to examine the critical reading skills they employed during teaching and learning. The individual interview was conducted face-to-face and lasted approximately 15 minutes.

“Data analyzing”

3.7.2.7 Analyzing data from critical reading pretest, posttest, and in-depth interview

To evaluate the effectiveness of the Flex model of blended learning, students’ pretest and posttest scores were compared, and qualitative data from in-depth interviews were analyzed to support and triangulate the quantitative data.

3.7.3 Phase 3: Investigating the students’ attitudes toward the Flex model of blended learning

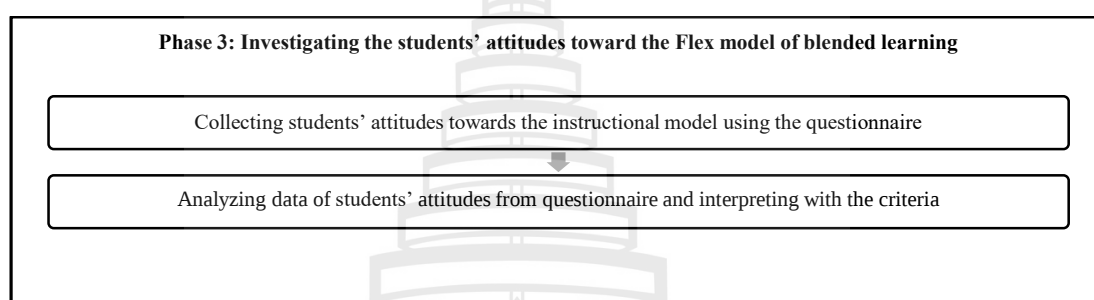


Figure 3.5 Data Collection Procedure of Phase 3

As illustrated in Figure 3.5, there were two procedures for investigating the students’ attitudes toward the Flex model of blended learning as follows:

3.7.3.1 Collecting students’ attitudes towards the instructional model

After implementation, the students completed a questionnaire to assess their attitudes toward teaching and learning using the Flex model of blended learning. The focus of the investigation was on students’ attitudes toward the Flex model of blended learning, including in-class and out-of-class instruction and critical reading skills, as measured by the questionnaire and interpreted using the criteria.

3.7.3.2 Analyzing data of students’ attitudes from questionnaire and interpreting with the criteria

After the students completed the questionnaire, the collected data were analyzed statistically using mean and standard deviation. The mean scores were then interpreted according to the following criteria.

4.50-5.00 = very positive attitudes

3.50-4.49 = positive attitudes

2.50-3.49 = neutral attitude

1.50-2.49 = negative attitude

1.00-1.49 = very negative attitude

3.8 Data Analysis

3.8.1 Semi-Structured Interview

The data from the semi-structured interviews on teachers' and students' needs and problems in teaching and learning critical reading were analyzed using content analysis to provide basic information on the needs and problems of the Flex model of blended learning.

3.8.2 Flex Model of Blended Learning

The data resulting from the experts' evaluation form was analyzed using IOC values. The following criteria were used to interpret the results:

0.50–1.00 means appropriate

0.49 means inappropriate

The components with a score of 0.5 or higher were reserved, and those with a score below 0.50 were revised.

3.8.3 The Instructional Documents

The mean and standard deviation were used to analyze data from the evaluation forms for the critical reading lessons and lesson plans. The following criteria were used for interpreting the mean values:

4.50-5.00 = appropriate at the highest level

3.50–4.49 = appropriate at the high level

2.50–3.49 = appropriate at the average level

1.50-2.49 = appropriate at the low level

1.00–1.49 = appropriate at the lowest level

The supplementary comments and recommendations from the experts in the open-ended section were analyzed by content analysis.

3.8.4 Critical Reading Test

The data from the pretest and posttest were analyzed statistically using means and standard deviations, and a t-test with a significance level of 0.05 to compare critical reading scores before and after implementing the Flex model of blended learning.

3.8.5 In-Depth Interview

The data from the in-depth interviews on students' critical reading skills were analyzed using thematic analysis. The interview data were organized into thematic categories and summarized to support the triangulation of the critical reading test results.

3.8.6 Students' Attitudes Questionnaire

The data on students' attitudes toward the Flex model of blended learning were analyzed using descriptive statistics (mean and standard deviation).

4.50-5.00 = very positive attitudes

3.50-4.49 = positive attitudes

2.50-3.49 = neutral attitude

1.50-2.49 = negative attitude

1.00-1.49 = very negative attitude

CHAPTER 4

RESULTS

This chapter presents research findings derived from data analysis. Data collection utilized multiple instruments during and after the implementation phase. The research design follows a mixed-methods approach, incorporating both quantitative and qualitative data. Collecting and interpreting data from diverse sources facilitated data triangulation and enhanced the validity of the findings. The results are organized into three main sections as follows:

Finding one: the development and validation of the of quality he Flex model of blended learning in enhancing EFL students' critical reading skills

Finding two: the effectiveness of the Flex model of blended learning in enhancing EFL students' critical reading skills.

Finding three: the students' attitudes toward the Flex model of blended learning

4.1 Finding One: The Development and Validation of the Quality of the Flex Model of Blended Learning in Enhancing EFL Students' Critical Reading Skills

4.1.1 The Development of the Flex Model of Blended Learning

The Flex model of blended learning was developed based on the background information: (1) the students' need and problems in learning critical reading, (2) the needs and problems of teaching and learning in a critical reading, and (3) theoretical concepts underpinning the instructional model development.

This section presented information regarding:

4.1.1.1 The findings of the semi-structured interview studying the needs and problems in teaching and learning critical reading

4.1.1.2 Theoretical concepts underpinning the instructional model development

4.1.1.3 The result of the Flex model of blended learning

4.1.1.1 The Findings of the Semi-Structured Interview Studying the Needs and Problems in Teaching and Learning Critical Reading.

A semi-structured interview was conducted with five English teachers and ten students at a public university in Thailand to identify the specific needs and problems associated with teaching and learning critical reading.

The following is a summary of the interview results:

1. The Semi-Structured Interview Exploring the Students' Needs and Problems in Learning Critical Reading

The data was analyzed and grouped into three parts: (1) needs in learning critical reading, (2) challenges in learning critical reading and (3) integration of technological tools in learning critical reading.

1) Needs in learning critical reading

To identify the students' needs in learning critical reading lesson, the students expressed that:

"I need more time to read and re-read to make understanding the passage."

Student 2 (personal communication, 2025)

"In my opinion, I like working in groups because discussing with my friends helps me understand the deeper meaning of the passage more clearly."

Student 3 (personal communication, 2025)

"I believe it is important for the teacher to remain in the classroom with us so that I can ask questions immediately when I don't understand the reading passage."

Student 5 (personal communication, 2025)

"The long and boring reading makes it hard for me to stay engaged with the material. At those times, I tend to skip some paragraphs and answer the questions without fully understanding them."

Student 8 (personal communication, 2025)

"I enjoy reading the stories that are closest to my experience and daily life, such as the reading about games and social media."

Student 10 (personal communication, 2025)

Interview responses indicated that student 2 required extended reading time and would benefit from improved time management, reflecting individual differences in learning pace. Student 3 expressed a preference for group activities, suggesting that discussion and collaborative learning foster a deeper understanding of reading passages. Student 5 emphasized the need for teacher facilitation in the classroom, including on-site support and individualized assistance. Student 8 and 10 preferred reading content related to daily life, which can increase reading motivation. Collectively, these insights highlight students' needs in critical reading, specifically regarding time allocation, activity type, teacher support, and reading material relevance.

2) Challenges in learning critical reading

For the challenges in learning critical reading, the students reported that:

"I think my vocabulary knowledge is quite limited, so every time I read, I have to look up the meaning of unfamiliar words. This is a major problem for me when I need to analyze a text critically."

Student 1 (personal communication, 2025)

"I believe that not having effective reading strategies is what makes reading challenging. I was unsure of any strategies that could enhance my critical reading."

Student 4 (personal communication, 2025)

"I found it challenging to analyze texts that required critical thinking, particularly when evaluating the argument or identifying the author's purpose."

Student 5 (personal communication, 2025)

"My critical reading skills were quite weak because I hadn't learned any reading strategies and didn't have strong critical thinking skills."

Student 7 (personal communication, 2025)

"I didn't know many strategies for analyzing a reading, which made it difficult for me to understand the author's purpose."

Student 9 (personal communication, 2025)

Interview responses indicated that Student 1 experienced difficulty due to limited vocabulary, which impeded comprehension and text analysis. Students 4, 7, and 9 emphasized the significance of critical reading strategies, reporting that insufficient strategies negatively affected their critical reading abilities. Overall, the primary challenges in developing critical reading skills were inadequate vocabulary and restricted application of critical reading strategies.

3) Integration of technological tools in learning critical reading

For the integration of technological tools in learning critical reading, the students expressed that:

“I think using technological tools like online games makes reading classes more enjoyable.”

Student 2 (personal communication, 2025)

“I prefer technological tools that give immediate feedback because they help me see how well I understand the reading.”

Student 4 (personal communication, 2025)

“I think using technological tools in lessons is better because they can motivate me to be more active in my learning.” (S7)

Student 7 (personal communication, 2025)

“In my opinion, I prefer the technological tools that allow everyone to share their ideas or content. This tool helps us understand each other’s thinking.”

Student 8 (personal communication, 2025)

“I liked lessons where the teacher used online exercises like Quizizz and Kahoot because they gave the answers right away, and I could play them as many times as I wanted.”

Student 10 (personal communication, 2025)

Interview responses indicated that students 2, 7, and 10 preferred interactive online tools such as Quizizz or Kahoot, which provide immediate feedback or display the correct answer. These tools assist students in assessing their reading

comprehension. Student 7 also expressed a need for technology, including discussion boards or online quizzes, to promote participation and provide additional practice. Therefore, students reported that the use of technology in class increases engagement and enhances understanding of the reading material by offering prompt feedback.

To conclude, analysis of students' interview responses indicates a need for increased classroom activities, interactive digital tools, contemporary reading materials, and additional time for self-directed practice. However, students frequently encounter challenges in critical reading. Limited vocabulary and insufficient reading strategies impede text comprehension and reduce motivation to learn. These deficiencies may further discourage engagement with reading materials. Implementing classroom and technology-based activities, providing age-appropriate and modern texts, and encouraging independent reading practice outside the classroom may improve students' engagement and foster the development of critical reading skills.

2. The Semi-Structured Interview Examining the Teachers' Needs and Problems in Teaching and Learning Critical Reading

The data were analyzed and classified into four parts: (1) challenges in teaching and learning critical reading, (2) technological barriers in critical reading instructions, (3) instructional strategies, and (4) integration of technological tools in critical reading instructions.

1) Challenges in teaching and learning critical reading

For challenges in teaching and learning critical reading, the teachers expressed that:

"I often find three main problems; first, the teaching materials aren't compatible with students' reading levels. Second, there is a mismatch between the students' reading abilities and the level of the reading materials or output requirements. Most of them don't understand the deeper meaning of the text. Third, the students' reading habits and motivation. They are passive readers who do not question their reading materials."

Teacher 1 (personal communication, 2025)

“The main challenges with teaching reading are how well students are doing and how interested they are. Students may not want to read texts that are too difficult, and they lack the linguistic skills that will reflect their learning engagement.”

Teacher 2 (personal communication, 2025)

“After years of teaching reading, I have observed that the students lack interest in reading. They may easily give up if the reading is longer than one A4 page. They prefer the shorter formats. Moreover, some students struggle to grasp the main idea of texts. They just memorize the answers without really understanding the passage. Some students have difficulty comprehending vocabulary, indicating a lack of vocabulary knowledge.”

Teacher 4 (personal communication, 2025)

Analysis of the interview data revealed that teachers identified two primary factors contributing to challenges in teaching and learning critical reading: students' reading comprehension difficulties and low levels of student engagement. Reading comprehension difficulties were attributed to limited vocabulary, weak reading proficiency, and underdeveloped critical thinking skills. As a result, students are unable to interpret texts in depth or engage in analytical reading. Low student engagement was associated with a limited variety of reading materials, restricted text types, and excessive text length, all of which fail to stimulate students' interest and active participation in reading activities.

2) Technological barriers in critical reading instructions

For technological barriers in critical reading instructions, the teachers reported that:

“In my class, my students and I use digital tools under close supervision; this ensures that digital tools are used in an appropriate and timely manner. But there were major technological difficulties which is dependence and the fact that I found that my students rely more on digital assistance; they ask AI or Google for answers even for simple tasks.”

Teacher 1 (personal communication, 2025)

“One common problem is that technology is not always easy to use. Some students don't have the same access to reliable equipment, consistent internet connections, or up-to-date software, which might make learning chances unfair. Another concern is that people may not be accustomed with digital platforms, or they may have technical issues like system faults or delayed loading times. These problems could take up important teaching time and make classes less effective.” (T3)

Teacher 3 (personal communication, 2025)

“In my teaching, I always use Google Classroom and applications to give them an online task, but the internet sometimes cuts off while they are participating in the task or reading activities, and the application doesn't load at all. In addition, the use of Google Translate presents a significant challenge in the reading classroom, as students tend to translate entire texts rather than trying to comprehend and analyze the material independently.”

Teacher 5 (personal communication, 2025)

Interview data indicate that teachers identified two primary challenges in teaching critical reading: limited internet access and students' excessive reliance on AI tools. Limited internet connectivity presents a significant barrier to online reading, as many students are unable to access class materials or participate in real-time activities. This limitation reduces student engagement and leads to missed learning opportunities. Additionally, students' excessive reliance on AI tools fosters passive reading habits, thereby diminishing opportunities to develop critical reading skills.

3) Instructional strategies

For instructional strategies, the teachers indicated that:

“I frequently use the WH-prompt question in the classroom and encourage students to question the reading text. Moreover, use active reading techniques like taking notes and summarizing to assess their comprehension, holding group discussions and meetings, and helping them develop their vocabulary.”

Teacher 1 (personal communication, 2025)

“I think that explicit reading skills, such predicting, inferring, summarizing, and putting together information from many sources, are quite helpful. Also, group discussions and jigsaw reading are examples of collaborative learning activities that provide students a chance to share their points of view, question how others see things, and improve their own understanding.”

Teacher 3 (personal communication, 2025)

“In my class, I often use group discussion activity for encouraging students to share their ideas with reliable sources. I also employ questioning and reflection to promoting critical reading.”

Teacher 4 (personal communication, 2025)

Analysis of the interview data revealed that teachers identified two primary instructional strategies for promoting critical reading: the questioning technique and collaborative learning. The questioning technique is used to encourage students to engage in critical thinking. Collaborative learning encompasses activities such as group discussions, where students collectively interpret, critique, and construct meaning from texts.

4) Integration of technological tools in critical reading instruction.

For integration of technological tools in critical reading instruction, the teachers stated that:

“I think the reading gamified apps may assist them in engaging with more personalized and motivated reading materials that suit their reading levels.”

Teacher 2 (personal communication, 2025)

“Digital tools can be very helpful in the reading classroom since they can help with engagement, accessibility, and understanding. Also, variety of tools like movies, infographics, and interactive quizzes can help students connect what they read with what they see or hear. Also, collaborative tools like discussion boards and shared documents make it easier for people to talk to each other and have crucial discussions on texts.”

Teacher 4 (personal communication, 2025)

“I think the video on YouTube can help them to deeper understand the lesson or build the context. I also encourage them to use an online dictionary, which can help them to master vocabulary, and I use interactive applications such as online mind mapping and Kahoot, which will foster students’ engagement.”

Teacher 5 (personal communication, 2025)

Analysis of the interview data revealed that teachers identified two primary technological tools supporting the development of critical reading skills: multimedia resources and interactive applications. Multimedia resources, such as YouTube, online reading platforms, and online dictionaries, are employed to enhance students’ comprehension and deepen their understanding of texts. Interactive applications, including Kahoot and online mind-mapping tools, promote collaborative learning and increase student engagement.

In brief, teachers reported that students enrolled in critical reading courses encounter multiple challenges, such as difficulty comprehending texts, low motivation, restricted internet access, and excessive dependence on artificial intelligence tools. These challenges are frequently attributed to insufficient practice with reading materials and technological advancements that influence contemporary learning processes. In response, teachers recommended enhancing instructional strategies and integrating digital resources to increase lesson engagement and foster the development of critical reading skills.

4.1.1.2 Theoretical Concepts Underpinning the Instructional Model Development

The development of the Flex model of blended learning to enhance EFL students' critical reading skills was grounded in the study and analysis of four key theories and concepts: the instructional design model, the Flex model, the SAMR model, and critical reading skills. The interplay among these frameworks informed the approach to instructional model development in this research. The following sections outline each concept and explain its relevance to the development process.

1. The Instructional Design Models

The instructional design model is important for all instructors, as it can support them in systematically designing the teaching and learning process, including planning for learning outcomes, instruction, activities, materials, and assessment, and

ensuring the quality of instruction. Smith and Ragan (2005) defined instructional design as the systematic process of transforming learning and teaching principles into plans for instructional materials, activities, information resources, and evaluation. According to Branch and Kopcha (2014), instructional design is an iterative process of planning outcomes, selecting efficient teaching and learning methods, selecting appropriate technologies, identifying educational media, and measuring performance. Moreover, Gustafson and Branch (1997) defined that the models of instructional design should provide us with conceptual and communication tools that we can use to visualize, direct, and manage processes of guided learning, facilitate us to view both sequential and concurrent aspects of instructional development, and to select or develop the most appropriate operational tools.

In this study, the researcher selected four instructional design models to synthesize: Dick and Carey's Design Model (Dick et al., 2022), the Kemp Model (Kemp & Dwyer, 2001), and the ADDIE Model (Morrison, 2010). After reviewing all four instructional design models, the researcher found that the processes of instructional design interrelate. Firstly, the instructional design might start with analyzing learners' and teachers' problems, setting objectives, and identifying content and tasks. Next, the analysis data and objectives served as a guide for designing and developing instructional strategies, assessments, and tools. Finally, it should be the stage of model evaluation and revision to determine its validity and effectiveness. Finally, ten components were selected as the instructional design model for developing the Flex model of blended learning to enhance EFL students' critical reading skills. Therefore, the Flex model of blended learning will be developed with ten components, which are analyzing needs and problems, formulating Objectives, analyzing the learning environment, analyzing teachers' and students' roles, analyzing and designing content, identifying instructional strategies, selecting instructional technology, developing instructional materials and assessment, implementing the instruction, and evaluating and revising.

2. The Flex Model

Blended learning adopts new teaching methods that integrate technology across language instruction, reducing in-person time through diverse, immersive online experiences. Students benefit from flexible scheduling, self-paced online materials, and face-to-face interaction with instructors.

The flex model proposed by Staker and Horn (2012) is described as instructional programs in which online learning serves as the basis for students' learning, occasionally leading them to offline activities. Students primarily learn on campus and transition between learning modalities using customized, flexible schedules. The teacher is on-site and provides individual support through activities such as small-group discussion, individual instruction, learning laboratories, and social spaces (Staker & Horn, 2012).

In addition, Alhumaid (2019) characterized the Flex model as the provision of all instructional content to students via computers. Students will usually enter a classroom equipped with individual computers for each student. Students are free to enter and leave as they please to complete their work, as there are no specified start times for lessons or lectures. Moreover, the Flex model offers benefits in terms of learning flexibility, student autonomy, and engagement, and its applicability can be adapted to different educational settings to varying extents. Hence, the cost-effectiveness of online platforms enables teachers and students to access a diverse array of supplementary materials. Numerous studies highlighted the benefits of blended learning. According to Christensen et al. (2013), the Flex model offers advantages in learning flexibility, student autonomy, and engagement, and its implementation can be tailored to varying degrees across different educational contexts. Moreover, Kang et al. (2022) demonstrated that the Flex model offers advantages in both cognitive and affective domains. The Flex model applied in the cognitive domain may improve academic achievement, problem-solving, critical thinking, and comprehension. In the affective domain, the Flex model of blended learning has the potential to foster feelings of satisfaction, academic interest, a positive learning disposition, and motivation. Additionally, Lu's (2021) study revealed that students believed blended learning significantly enhanced their critical thinking skills, enabling them to analyze and synthesize information during classroom discussions.

Therefore, the Flex model provides a comprehensive, flexible framework that effectively addresses the unique opportunities and challenges in teaching and learning. The aim of this study is to develop innovative instruction that employs the Flex model (Staker & Horn, 2012) as a framework for fostering critical reading skills in EFL students.

3. The SAMR Model

Despite the digital transformation era, classrooms are constantly changing, and teachers struggle to find and select appropriate technology. Currently, various

technology integration models are available to prepare teachers for teaching in online or blended contexts. Teachers must be aware of their students' abilities and characteristics before integrating technology and should consider remediation before attempting to implement it (Kopcha et al., 2020). Similarly, Willis et al.'s (2018) study on the best predictors of technology integration found that technologically proficient teachers are more successful at aligning technology with learning objectives, content, and context. Hence, technology must be purposeful, adaptable, and pedagogical, and the educator must implement it with clear expectations and goals. Additionally, the good model should provide educators with valuable, productive knowledge, prioritize student achievement, and view technology as a tool for achieving specific goals (Kimmons & Hall, 2016).

The SAMR model is suitable for incorporating technology into the classroom and enhancing student engagement and learning outcomes. The SAMR model is a framework developed by Puentedura (2012) that aims at enhancing classroom technology integration. The SAMR model classifies four levels of technology integration in the classroom, namely, Substitution, Augmentation, Modification, and Redefinition. Additionally, Substitution and Augmentation are considered "Enhancement" steps, whereas Modification and Redefinition are "Transformation" steps.

The SAMR model provided teachers with a structured framework for purposefully integrating technology into their classroom instructional practices. When teachers use this model to plan lessons, they can consider the role of technology in education and how it will facilitate students' learning (Puentedura, 2012). Moreover, the most significant contributions of the SAMR model to the education system are its provision of a guide for transitioning from task substitution to task redefinition and from task enhancement to task transformation while examining the vast possibilities that technology presents for both teaching and learning (Puentedura, 2014).

Puentedura (2014) exemplified the details of the four dimensions as follows:

- 1) Substitution is the use of technology when the learning task could be accomplished without technology. There is no functional change in teaching and learning. The substitution level is the degree to which traditional practices are replaced by technology, such as reading a novel online as an e-book.

2) Augmentation is the use of technology as an effective tool to enhance the instructional process, increasing student engagement and enriching their learning experiences. Moreover, this level includes integrating interactive digital enhancements, such as comments, hyperlinks, and multimedia. The content remains unchanged; however, students now have the opportunity to utilize digital functionalities to augment the lesson. For example, students will be asked to submit exit tickets using the Mentimeter and Kahoot websites before leaving the classroom.

3) Modification is the initial step in the progression from enhancement to transformation. The new techniques and tools are used to facilitate, for example, listening activities and rewriting. It focuses on textual, visual, and auditory tools for developing shared knowledge. Examples include students creating voice recordings (cell phone), participating in online group discussions (Facebook, Twitter), and using interactive text tools (Thinglink, Padlet, Google Forms).

4) Redefinition is the final stage where the creation of new tasks cannot be accomplished without the use of technology. It provides an entirely new approach and strategy through the incorporation of technology, leading to transformation and improvements in students' learning and individual learning preferences. For example, virtual reality of historical sites, interactive simulations of complex scientific concepts, and/or real-time collaboration with peers from other parts of the world.

Additionally, according to Puentedura (2012), the SAMR model highlights that when teachers consider incorporating technology into the learning process, they often question the most effective ways to use it. Puentedura (2012) illustrates these types of questions at levels comparable to those of the SAMR framework. By addressing these questions, the educator can determine how technology can optimize instructional design, thereby augmenting student engagement in the teaching and learning process. According to Chen's (2014) study, tablets offer various benefits for English learners, such as grammar checking, pronunciation practice, and word lookup, which could improve informal language acquisition by providing functional enhancements and augmenting the learning experience beyond the classroom.

Therefore, this study employs the SAMR model as the framework for selecting and implementing digital learning tools in blended learning environments. The integration of the SAMR model into the Flex model of blended learning in the study has

the potential to transform students' learning from enhancement to transformative, thereby advancing critical reading skills.

4. The Critical Reading Skills

One of the essential generic skills that tertiary students should acquire during their university studies is critical reading. Critical reading is described as “a high-level reading process that entails the ability to read with analysis and judgment” (Huijie, 2010). According to Wallace (2003), critical reading provides students the opportunity to think about and analyze information, consider the context with a wider perspective linked to their critical understanding, and evaluate the context they face. Likewise, Wallace and Wray (2011) asserted that critical reading involves using skepticism to evaluate how the author supports their argument or whether the reader has greater knowledge of the subject matter. The objective of critical reading is to create judgments regarding the functioning of a text. When individuals engage in critical reading, they go beyond simply absorbing or comprehending the text. They also interpret, analyze, and evaluate the content. It centers on the analysis of the pattern, underlying assumptions, and deeper meaning behind the text. Those areas of focus will be subject to questioning rather than being unquestioningly accepted (Kurland, 2010).

In a nutshell, critical reading can't be achieved without critical thinking. This means that critical thinking is considered a crucial component of critical reading skills. Critical reading comprises advanced cognitive processes such as analysis, evaluation, and synthesis, which are vital for academic achievement (Lee, 2015). To engage in critical reading, an individual must also be able to think critically (Suratha, 2019). According to Fraser (2024), to cultivate critical reading abilities, a reader must engage with the text, relevant ideas, the validity of arguments, and the reliability of sources to comprehend it. In the context of English as a Foreign Language (EFL), critical reading encompasses the capacity to deduce implicit meanings, evaluate the author's intent, identify bias, and distinguish between fact and opinion (Cai et al., 2024). Students must acquire the skills of both reading comprehension and critical and reflective thinking to succeed academically.

Furthermore, the sub-skills of critical reading are critical reading strategies, the methods employed to systematically analyze and evaluate texts, and that form the basis for the development of critical reading skills. Critical reading strategies empower students to engage systematically and analytically with their textbooks and other reading materials.

Students are encouraged to employ cognitive processes at the three highest levels of Bloom's Taxonomy through critical reading strategies, which are typically associated with critical thinking. Critical reading strategies encompass the specific actions readers employ to thoroughly comprehend a text (Wallace, 2003). Several scholars have proposed instructional strategies aimed at fostering students' critical reading abilities (Axelrod & Cooper, 2002; Nasrollahi et al., 2015), which include the following:

- 1) Annotating: writing notes, circling important words, and adding remarks.
- 2) Previewing: acquiring information about a text prior to reading it.
- 3) Contextualizing: placing a text in its cultural contexts, biographical contexts, and historical contexts
- 4) Outlining: identifying the main ideas
- 5) Analyzing: an analysis of the main idea and its supporting elements
- 6) Summarizing: rephrasing the main idea in their language
- 7) Paraphrasing: the act of rephrasing the main idea without altering its meaning
- 8) Synthesizing: the process of generating a new entity by combining different parts
- 9) Inquiring: asking questions regarding the topic
- 10) Reflecting: evaluating the credibility, emotional impact, and logic of a text

Therefore, after synthesizing the critical reading strategies from scholars, the study adapted them (Axelrod & Cooper, 2002; Nasrollahi et al., 2015) and tailored them into a teaching and learning procedure that encompasses four steps, namely, previewing, questioning, analyzing, and reflecting, which aim to enhance students' critical reading skills.

4.1.1.3 The Result of the Flex model of blended learning

This study aims to develop and validate the Flex model of blended learning to enhance EFL students' critical reading skills. The Flex model of blended learning was developed based on three interrelated theories and concepts: the Flex model (Staker & Horn, 2012), the SAMR model (Puentedura, 2014), and critical reading strategies (Axelrod & Cooper, 2002; Nasrollahi et al., 2015). Its components were synthesized from four

instructional design models: Dick et al. (2022), Kemp and Dwyer (2001), Lever-Duffy and McDonald (2011), and Morrison (2010). The development process also incorporated an analysis of teachers' and students' needs and challenges in teaching and learning the critical reading course.

The teaching and learning split was 2 hours of in-class instruction (25%), 2 hours of online self-study (25%), and 4 hours of independent learning outside of class (50%). The critical reading lessons consisted of four lessons, including 1) distinguishing between facts and opinions, 2) identifying the author's purpose, 3) making inferences, and 4) evaluating arguments. Moreover, the study adapted four critical reading strategies (previewing, questioning, analyzing, and reflecting) and tailored them into a teaching and learning procedure.

Figure 4.1 illustrates the ten components of the Flex model of blended learning in the study.

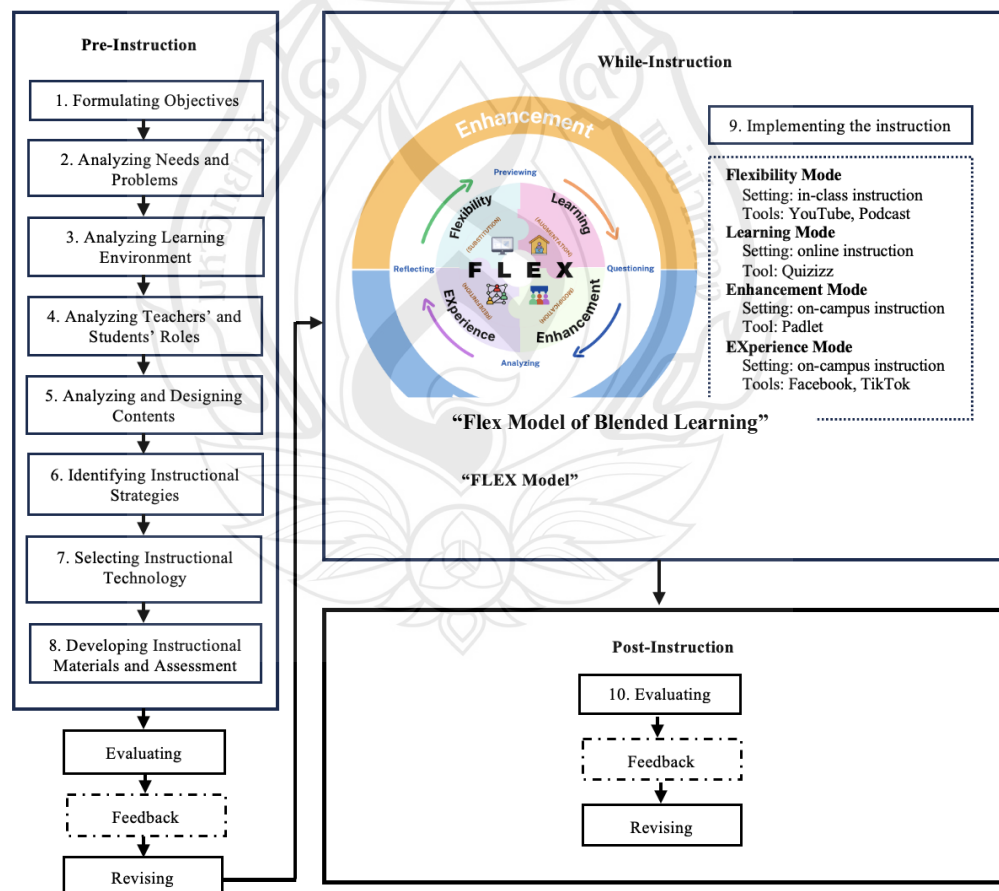


Figure 4.1 The Flex Model of Blended Learning

The Flex model of blended learning consisted of the ten components as follows:

1. Analyzing the Needs and Problems

In designing the Flex model of blended learning, the first stage was to identify needs and problems. To identify the needs and problems of interviewing teachers, teachers might reflect on the need to design content and learning activities, significant problems in teaching critical reading, and their experiences and opinions regarding the use of technology in reading class. Students explained their major issues and perspectives on learning critical reading, as well as their experiences and perspectives on using technology in critical reading instruction. The study then analyzed the interview data and used it as one component in developing the Flex model of blended learning.

2. Formulating Objectives

To formulate the learning objectives, the study analyzed program learning outcomes (PLOs), course learning outcomes (CLOs), and course descriptions to determine students' performance and learning outcomes after implementation. The objectives included both enabling and terminal objectives, guiding the design of content and activities are as follows:

Upon completing the course, students will be able to...

- 1) Distinguish between facts and opinions in the texts correctly
- 2) Identify the author's purpose in the texts correctly
- 3) Make inferences from the texts using schema and textual evidence correctly
- 4) Evaluate an argument using their experiences and evidence from the texts correctly

3. Analyzing the Learning Environment

After synthesizing blended learning approaches from scholars, the study then modifies the Flex model of blended learning to align with a public university context for establishing learning environments. All four learning modes of the study use online learning as their backbone, meaning all content, materials, and tasks are delivered online via various digital tools. As per the university regulations, the study adopts Google Classroom as the learning management system for instruction delivery and leverages several digital tools, including YouTube, Quizizz, Padlet, Facebook, and TikTok, across different learning modes. Moreover, the learning space and facilities used for teaching and

learning were mainly on campus but outside the normal classroom, such as the library, an active learning room, and a learning community space.

4. Analyzing Teachers' and Students' Roles

Teachers were no longer required to deliver content from the front of the class. Instead, they adopted Google Classroom as a learning management system to track each student's progress and provide flexible, adaptive support through activities such as group discussions and team projects. Moreover, teachers recommended relevant learning resources, provided assistance, and answered questions. If students have any questions or problems, they can consult the teachers immediately on campus or online.

Regarding students' roles, they meet biweekly with their teachers to create their learning plans and seek advice on academic solutions. Once students develop their two-week learning plan, they transition through different learning modes as outlined in it. This practice aimed to promote personalized learning and engagement in the learning process. Students can promptly schedule a meeting with the teacher for assistance when needed. The Flex model of blended learning gave students a high level of flexibility in their learning, enabling them to progress through lessons and materials at their own pace.

5. Analyzing and Designing Contents

The contents used in the Flex model of blended learning were consistent with the PLOs, CLOs, the course description, and the objectives of the critical reading course in the first semester of the academic year 2025.

According to PLO5, it focused on "using English language skills in listening, speaking, reading, and writing accurately and fluently." The CLO1 highlights "analyze reading texts using a variety of reading strategies," and the CLO2 indicates that "Analyze and interpret underlying meanings across various text types." Consequently, the course description outlines that "students will study and practice a wide range of reading, text for comprehension, and reading strategies for enhancing reading ability; analyze text types; read text; and conduct reading activities."

Therefore, the critical reading texts were selected from a variety of sources, including online magazines, news articles, advertisements, and stories. They were selected to correspond to the CEFR B1 level as measured by Flesch-Kincaid. The Flesch-Kincaid Grade Level scores range from 30 to 50. Then, they were delivered via Google Classroom.

The critical reading lessons were divided into four lessons as follows:

Lesson 1: Distinguish between Facts and Opinions

Students practice identifying between facts and opinions in reading passages. Students will be able to indicate the facts that are statements that can be verified and proven, and the opinions that are statements that express the meaning of an author's attitudes or beliefs.

Lesson 2: Identify the Author's Purpose

Students practice identifying the author's reason for or intent in writing by identifying the three main categories of purpose, namely, persuade, inform, and entertain. Understanding the author's purpose helps students grasp the text's main ideas and central themes. This comprehension enables them to make connections and interpret the information presented.

Lesson 3: Make Inferences

Students practice making inferences from the reading passage. This strategy allows students to draw conclusions based on their previous experiences and knowledge of the situation.

Lesson 4: Evaluate the author's argument

Students practice analyzing and evaluating the author's assumptions based on the reading passage. This involves practice in identifying the difference between the reason and the evidence in the reading materials so that they can evaluate the writer's intent.

6. Identifying Instructional Strategies

Critical reading strategies are the specific actions readers employ to thoroughly comprehend a text (Wallace, 2003). This study adapted the critical reading strategies from Axelrod and Cooper (2002) and Nasrollahi et al. (2015) as instructional strategies. These instructional strategies are then tailored into a teaching and learning procedure aimed at enhancing students' critical reading skills. The process of teaching and learning consisted of four phases as follows:

Previewing: The preview was done by building students' vocabulary mastery related to the story. Readers can predict the content and structure of a text before engaging in a thorough examination.

Questioning: The questions are intended to help readers comprehend the text and respond to it in greater detail. The study applies higher-order thinking questions, but also

includes lower-order thinking, which is still required to assess students' understanding of the text.

Analyzing: identifies the main idea and supporting ideas, then provides a brief summary of the text's main idea by writing or retelling it.

Reflecting: evaluating a text's credibility, logical reasoning, and emotional impact. The work assigned in class occasionally prompts students to reflect on their attitudes, beliefs, and stances regarding contemporary issues.

7. Selecting Instructional Technology

To empower the Flex model of blended learning, the study considered how technology could be used to transform teaching and learning strategies and students' specific learning outcomes. The study employed the SAMR model, which may highlight the potential of technology to revolutionize teaching and learning methods and pinpoint specific objectives to enhance critical reading skills among EFL students. Therefore, the instructional technology tools in the study were selected in accordance with university regulations and aligned with the SAMR framework.

8. Developing Instructional Materials and Assessment

The instructional materials, which include lesson plans and an instructional manual, were developed in alignment with Program Learning Outcomes (PLOs), Course Learning Outcomes (CLOs), course descriptions, and objectives. The instructional strategies written in the lesson plans are previewing, questioning, analyzing, and reflecting.

Formative and summative assessments were created to evaluate students' critical reading skills. The critical reading tasks in each mode serve as formative assessments during the implementation of the critical reading lessons, enabling evaluation of students' progress. After completing all four critical reading lessons, a critical reading test was administered as a summative assessment to measure students' proficiency.

9. Implementing

The Flex model of blended learning combines four learning modes: Flexibility mode (in-class mode), Learning mode (online mode), Enhancement mode (on-campus mode), and Experience mode (on-campus mode), each of which requires at least 2 periods to complete. The Flexibility and Learning modes are enhancement tools, whereas the Enhancement and Experience modes are transformation tools designed to transform teaching

and learning and foster students' learning outcomes. The Flex model of blended learning's characteristics of each mode are as follows:

1) Flexibility Mode

The teaching and learning aim to create learning flexibility. Students engage in flexible learning spaces and use technology to actively collaborate and communicate with peers from their learning paths.

Table 4.1 Characteristics of the Flexibility Mode

Characteristic	Explanation
Setting	Teaching and learning take place at a traditional classroom.
Technology Integration:	Technology is used to substitute and augment the traditional classroom with the intention of creating learning flexibilities. Students engage in using technology as a tool for teaching and learning.
Learning Activities	Peer discussion, teacher reflection, and critical reading tasks.
Technology Tools	Multimedia resources: YouTube and Podcasts Learning management system: Google Classroom
Critical Reading Strategies	Previewing, Questioning, Analyzing, Reflecting

2) Learning Mode

The teaching and learning aim to foster students' self-practice. Students can learn the lessons whenever and wherever they want. Students have the opportunity to use different learning strategies to acquire knowledge.

Table 4.2 Characteristics of the Learning Mode

Characteristic	Explanation
Setting	Teaching and learning take place at students' residences.
Technology integration	Technology is used to augments and facilitates an individual learning experience. Technology fosters self-directed progress by enabling student engagement and autonomy, while also facilitating interactive and prompt feedback.
Learning Activities	Interactive online exercises, teacher reflection, and critical reading tasks.
Technology Tools	Interactive collaboration tools: Quizizz Learning management system: Google Classroom
Critical Reading Strategies	Previewing, Questioning, Analyzing, Reflecting

3) Enhancement Mode

Teaching and learning aim to transform the educational process by integrating technology, improving students' problem-solving skills, and promoting collaborative communication.

Table 4.3 Characteristics of the Enhancement Mode

Characteristic	Explanation
Setting	Teaching and learning take place in a faculty's library.
Technology integration	Technology integration is used to transform the instructional approach and fundamentally changes the learning process. Students use technological resources to link information with their existing knowledge. Students can foster dynamic interaction via a collaborative whiteboard by responding to the insights of their peers, contributing their own viewpoints.
Activities	Group discussion, critical reflection, collaborative learning, and critical reading tasks.
Technology Tools	Interactive board: Padlet website Learning management system: Google Classroom
Critical Reading Strategies	Previewing, Questioning, Analyzing, Reflecting

4) Experience Mode

Teaching and learning aim to foster the development of innovative educational experiences. Students utilize social media and modern technology to enhance their learning path and cultivate a community of learning and social engagement.

Table 4.4 Characteristics of the Experience Mode

Characteristic	Explanation
Setting	Teaching and learning take place in an active learning space on campus.
Technology integration:	The integration of technology transforms both the pedagogical approach and creates innovative learning experiences. The teaching and learning strategies emphasized on the social engagement fostering a sense of community through the use of an online learning platform or social networking tools.
Activities	Team project, group discussion, critical reflection, and critical reading tasks.
Technology Tools	Social media platform: Facebook and TikTok Learning management system: Google Classroom

Additionally, each critical reading lesson takes two weeks (8 periods) to finish. Students are responsible for engaging in in-class instruction for 2 periods and for 6 periods of independent learning outside the classroom, as outlined in their learning plan. The implementation is divided into 3 steps, namely, before the lesson, during the lesson, and after the lesson, as illustrated in Figure 3.2 below:

1) Before the lesson, a teacher conducts an orientation session to introduce the critical reading lessons and tasks. Students must work with their teacher to set a goal and a two-week learning plan that enables them to study independently at their own pace.

2) During the lesson, students must complete all four learning modes within two weeks to meet the criteria.

3) After the lesson, a teacher provides feedback on the students and monitors their progress towards completing the criteria, which is classified as a formative assessment. After completing the four critical reading lessons, students must take a critical reading test as a summative assessment.

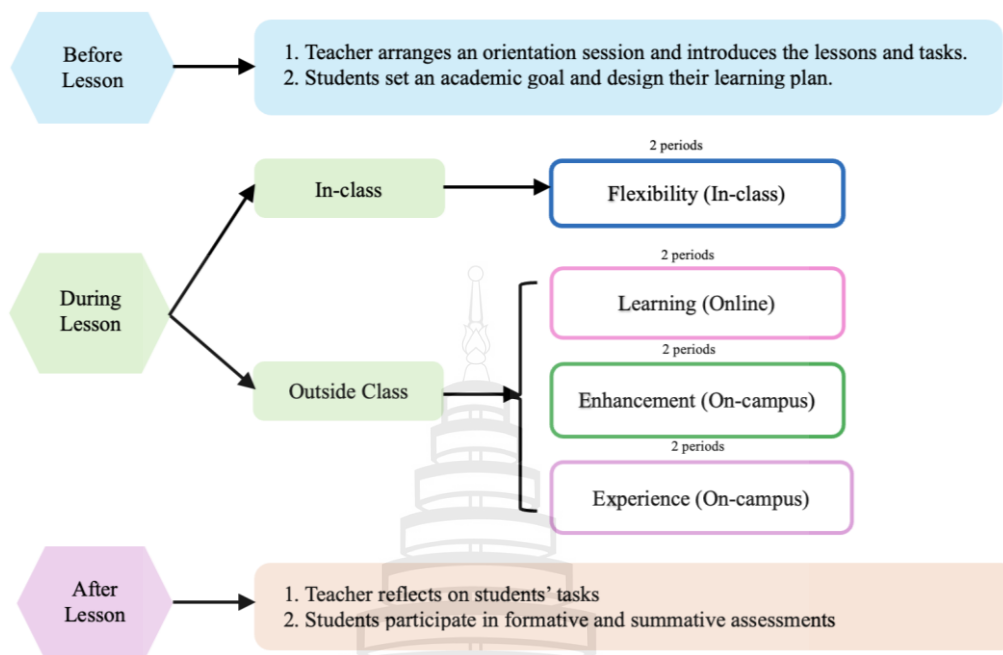


Figure 4.2 The Process of the Implementation

Table 4.5 Presents the Explanations of the Instructional Procedures for Each Learning Mode, with Brief Descriptions as Follows

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
Before Lesson			
- Teacher introduces the lessons and series of critical reading tasks with a brief explanation. - Students set an academic goal and design their learning plan.	Google Meet (Online)	-Teacher creates a system to ensure students can move at their own pace during the lesson. - The teacher advises students by suggesting activities that will help them achieve their goal.	- Students set their learning plan and continue with their learning plan through all four modes.
During the Lesson			
I: Flexibility			
<u>Teaching Procedure:</u>			
Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: students complete the exercise and discuss with peers to find the answers to questions. 3. Analyzing: students watch or listen to YouTube or podcasts to study critical reading skills and discuss with peers to find the answers to questions.	Classroom (Face-to-Face)	Teacher-led instruction and facilitator onsite.	Students do critical reading tasks and discuss on the given topic with peers.

Table 4.5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
4. Reflecting: students engage in higher-level thinking processes such as evaluating the credibility, logical reasoning, and emotional aspects of a text. <u>Critical Reading Task:</u> - Critical reading exercises - Peer discussion <u>Technology Integration:</u> - YouTube - Podcast - Google Classroom II: Learning <u>Teaching procedure:</u> 1. Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: Students read the text to find the answers to questions to complete the critical reading task using Quizizz. 3. Analyzing: students study critical reading skills and discuss with peers to find the answers to questions.	Student's residents (Online)	The teacher is an interventionist and facilitator online.	Students take part in individual study.

Table 4.5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
4. Reflecting: students engage in higher-level thinking processes such as evaluating the credibility, logical reasoning, and emotional aspects of a text. <u>Critical Reading Task:</u> - Critical reading exercises <u>Technology Integration:</u> - Google Classroom - Quizizz			
III: Enhancement <u>Teaching procedure:</u> 1. Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: students engage in reading the text and collaborate with their peers in finding the answers to the provided questions. 3. Analyzing: students study critical reading skills and discuss with peers to find the answers to questions.	Library (On campus)	The teacher is an interventionist and facilitator onsite.	Students participate in group discussions.

Table 4.5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
4. Reflecting: students are required to engage in a group activity where they analyze and discuss their thoughts, questions, and interpretations of the reading text using Padlet. <u>Critical Reading Task:</u> - Critical reading exercises - Group discussion <u>Technology Integration:</u> - Padlet - Google classroom			
IV: Experience <u>Teaching procedure:</u> 1. Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: students engage in reading the text and collaborate with their peers in finding the answers to the provided questions. 3. Analyzing: students study critical reading skills and discuss with peers to find the answers to questions.	an active learning space (On campus)	The teacher is an interventionist and facilitator onsite.	Students participate in team projects.

Table 4.5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
4. Reflecting: students collaborate with their team to discuss the assigned project, then share their ideas on social media such as TikTok and Facebook for further discussion and sharing. <u>Critical Reading Task:</u> - Critical reading exercises - Team project <u>Technology Integration:</u> - TikTok - Facebook After the Lesson - Students get feedback on assignment progress and complete a formative and summative assessment.	Google Meet (Online)	Teacher schedules time to meet with each individual student to get feedback on progress.	Students consult with teacher and get feedback on their progression.

10. Evaluating and Revising

To evaluate the model's effectiveness, the Flex model of blended learning was evaluated by nine experts in English language, curriculum and instruction, and technology before implementation. During instruction, the formative assessment was used to monitor students' progress in the critical reading lesson. Finally, post-instruction, the posttest and in-depth interview were administered to the students to assess their critical reading skills. For revising, the instructional model was constantly modified. For revision, the instructional model was continually modified in response to evaluation outcomes conducted pre-, during, and post-instruction, following implementation, to enhance the model.

4.1.2 The Validation of the Quality of Flex Model of Blended Learning in Enhancing EFL Students' Critical Reading Skills.

Four primary findings must be drawn to verify the quality of the Flex model of blended learning, and those are as follows:

4.1.2.1 The Consistency of the Components of the Flex Model of Blended Learning and the Appropriateness of the Components' Description

The Flex model of blended learning was validated for quality by nine experts in English language, curriculum and instruction, and educational technology. The Flex model of blended learning was assessed in two dimensions: the consistency of the model components and the appropriateness of the descriptions of each component utilizing the Index of Congruence (IOC).

Table 4.6 The Consistency of the Components of the Flex Model of Blended Learning and the Appropriateness of the Component Descriptions

Components of the Instructional Model	Consistency of the components of the Instructional model		Appropriateness of the descriptions of each component	
	$\bar{X}$	Meaning	$\bar{X}$	Meaning
1. Analyzing needs and problems	0.89	consistent	0.78	appropriate
2. Formulating objectives	0.89	consistent	0.89	appropriate
3. Analyzing learning environment	0.89	consistent	0.89	appropriate
4. Analyzing teachers' and students' roles	1.00	consistent	1.00	appropriate
5. Analyzing and designing contents	1.00	consistent	0.89	appropriate
6. Identifying instructional strategies	1.00	consistent	0.89	appropriate
7. Selecting instructional technology	0.89	consistent	0.89	appropriate

Table 4.6 (continued)

Components of the Instructional Model	Consistency of the components of the Instructional model		Appropriateness of the descriptions of each component	
	$\bar{X}$	Meaning	$\bar{X}$	Meaning
8. Developing instructional materials and assessment	1.00	consistent	0.89	appropriate
9. Implementing the instruction	0.89	consistent	0.89	appropriate
10. Evaluating and revision	0.89	consistent	0.73	appropriate
Total	0.93	consistent	0.88	appropriate

Note n=9

Table 4.6 shows that the consistency index for model components was 0.93, with no component displaying low consistency. Four components: analyzing teachers' and students' roles, analyzing and designing contents, identifying instructional strategies, and developing instructional materials and assessment had consistency index scores of 1.00. The other six components: analyzing needs and problems, formulating objectives, analyzing learning environment, selecting instructional technology, implementing the instruction, and evaluating and revising had scores of 0.89. Thus, based on evaluations by nine experts, the IOC was consistent across all components. The findings revealed that the descriptions of each component correlated at 0.88. The mean rating for each component description ranged from 0.78 to 1.00. This suggested that the description of the model's components was appropriate.

4.1.2.2 The Evaluation of the Instructional Manual

The appropriateness of the instructional manual for the Flex model of blended learning was evaluated by three specialists in English language, curriculum and instruction, and educational technology. The results are presented in the table 4.7:

Table 4.7 The Appropriateness of the Instructional Manual

Item	Components of the Instructional Model	$\bar{X}$	S.D.	Level of the Appropriateness
1	Details in the manual are clear and useful for teacher to use the instructional model effectively.	4.00	0.00	Very Appropriate
2	Explanation of teaching materials preparation helps teachers to know what materials they need to prepare for their teaching and learning process.	3.67	0.58	Appropriate
3	Description of instructional materials indicates the essential components required for effective teaching.	3.67	0.58	Appropriate
4	Explanation of the evaluation provides teachers clear understanding of the preparation required for evaluation tools, methods, and processes.	4.00	0.00	Very Appropriate
5	Suggestion to the role of the teacher, students and the environment of the classroom is clear understanding	4.00	0.00	Very Appropriate
Total		3.87	0.23	Very Appropriate

Note n=3

Table 4.7 demonstrates the results of the evaluation of the appropriateness of the instructional manual. The overall mean scores for appropriateness were 3.87 (S.D. = 0.23). This indicated that the instructional manual was very appropriate. Three items were evaluated 4.00 (S.D. = 0.00), indicating a very appropriate level. They were the items on “Details in the manual are clear and useful for teacher to use the instructional model effectively”, “Explanation of the evaluation provides teachers clear understanding of the preparation required for evaluation tools, methods, and processes”, and “Suggestion to the role of the teacher, students and the environment of the classroom is clear understanding.”

The mean rating for the remaining two items was 3.67 (S.D. = 0.58), indicating that they were appropriate, with the item “Explanation of teaching materials preparation helps teachers to know what materials they need to prepare for their teaching and learning process” and “Description of instructional materials indicates the essential components required for effective teaching.”

4.1.2.3 The Evaluation of the Lesson Plans

Three experts in English language, curriculum and instruction, and educational technology evaluated the lesson plans for their appropriateness. The results are presented in the Table 4.8.

Table 4.8 The Appropriateness of the Lesson Plans

No.	Items	$\bar{X}$	S.D.	Level of the Appropriateness
1	Lesson plan consists of all essential components for instruction.	3.67	0.58	Appropriate
2	An arrangement of the lesson plan components is appropriate.	4.00	0.00	Very Appropriate
3	Topics of the lesson plans are appropriate.	4.00	0.00	Very Appropriate
4	Objectives are appropriate, observable, and measurable.	3.67	0.58	Appropriate
5	The lesson plans' objectives specify the desired outcome for the students.	4.00	0.00	Very Appropriate
6	The time allocation for each learning mode is appropriate for the different contents and activities.	3.67	0.58	Appropriate
7	Contents for each learning mode is appropriate for learners.	3.00	0.00	Appropriate
8	Contents for each learning mode is related to the objectives of the lesson plans.	3.67	0.58	Appropriate
9	Teaching method enables students to involve in learning process and are supported the objectives of the lesson plans.	3.67	0.58	Appropriate
10	Teaching materials are appropriate for teaching and learning activities.	4.00	0.00	Very Appropriate
11	Teaching and learning processes in each learning mode is appropriate and let the students participate in the process.	4.00	0.00	Very Appropriate
12	The instructional strategies which are supported to the objectives.	3.67	0.58	Appropriate
13	The assessment that is related to the instructional model's objectives.	4.00	0.00	Very Appropriate
14	The assessment that is related to the lesson plans' objectives.	3.67	0.58	Appropriate
15	The use of language in the lesson plans is appropriate.	3.67	0.58	Appropriate
Total		3.76	0.31	Appropriate

Note n=3

As presented in table 4.8, the overall mean score was at 3.76 (S.D. = 0.31), demonstrating the appropriate level, with no items evaluated at an inappropriate level.

There were 6 items reaching a very appropriate level ($\bar{X} = 4.00$, S.D. = 0.00); “An arrangement of the lesson plan components,” “Topics of the lesson plans,” “The lesson plans’ objectives specify the desired outcome for the students,” “Teaching materials are appropriate for teaching and learning activities,” “Teaching and learning processes in each learning mode are appropriate and let the students participate in the process,” and “The assessment that is related to the instructional model’s objectives.” Moreover, there were 8 items rated at 3.67 (S.D. = 0.58) at the appropriate level; “The lesson plan consists of all essential components for instruction,” “Objectives are appropriate, observable, and measurable,” “The time allocation for each learning mode is appropriate for the different contents and activities.” “The contents for each learning mode are related to the objectives of the lesson plans,” “The teaching methods enable students to be involved in the learning process and are supported by the objectives of the lesson plans.” “The instructional strategies are supported by the objectives,” “The assessment is related to the lesson plans’ objectives,” and “The use of language in the lesson plans is appropriate.” Lastly, the statement “Contents for each learning mode is appropriate for learners” received a rating of 3.00 (S.D. = 0.00), indicating an appropriate level.

4.1.2.4 The Evaluation of the Critical Reading Lessons

The critical reading lessons used in the Flex model of blended learning were comprised of 4 lessons: (1) distinguishing between facts and opinions, (2) identifying the author’s purpose, (3) making inferences, and (4) evaluating an author’s arguments. They were evaluated the appropriateness by three experts in English language, curriculum and instruction, and educational technology. The findings were presented as follows:

Table 4.9 The Appropriateness of the Distinguishing between Facts and Opinions Lesson

No.	Items	$\bar{X}$	S.D.	Level of the Appropriateness
The contents of the lessons				
1	The contents are related to the lesson’s objectives.	3.67	0.58	Appropriate
2	The contents are suitable for the learners’ level of knowledge.	3.33	0.58	Appropriate
3	The contents are concise.	3.67	0.58	Appropriate
4	The contents are accurate.	4.00	0.00	Very Appropriate
5	The language use in the lessons is appropriate.	3.67	0.58	Appropriate

Table 4.9 (continued)

No.	Items	$\bar{X}$	S.D.	Level of the Appropriateness
The contents presentation				
6	The contents are organized in appropriate sequences.	4.00	0.00	Very Appropriate
7	The content in each part is consistent with other parts.	4.00	0.00	Very Appropriate
8	The total amount of content in every lesson is suitable for the time given frame.	3.33	0.58	Appropriate
9	The contents provide a simple and understandable explanation.	3.67	0.58	Appropriate
10	The font sizes and styles used for the lessons are suitable.	4.00	0.00	Very Appropriate
Total		3.73	0.35	Appropriate

Note n=3

In Table 4.9, the distinguishing between facts and opinions lesson, the overall mean of the lesson's appropriateness was at 3.73 (S.D. = 0.35), which meant the lesson was appropriate. There were 4 items rated as very appropriate ($\bar{X} = 4.00$, S.D. = 0.00): "The contents are arranged in appropriate sequences," "The content in each part is consistent with other parts," and "The font styles and sizes used in the lessons are appropriate." Furthermore, there were 4 items rated as appropriate ($\bar{X} = 3.67$, S.D. = 0.58): "The contents are relevant to the objectives of the lessons," "The contents are concise," "The language use in the lessons is appropriate. The explanation in the contents is clear and easy to understand." There are 2 items rated at 3.33 (S.D. = 0.58), meaning appropriate: "The contents are appropriate for the learners' knowledge," and "The amount of the contents in each lesson is appropriate for the time period." However, no item was rated inappropriately.

Table 4.10 The Appropriateness of the Identifying the Author's Purpose Lesson

No.	Items	$\bar{X}$	S.D.	Level of the Appropriateness
The contents of the lessons				
1	The contents are related to the lesson's objectives.	4.00	0.00	Very Appropriate
2	The contents are suitable for the learners' level of knowledge.	3.67	0.58	Appropriate
3	The contents are concise.	3.67	0.58	Appropriate
4	The contents are accurate.	4.00	0.00	Very Appropriate
5	The language use in the lessons is appropriate.	3.67	0.58	Appropriate

Table 4.10 (continued)

No.	Items	$\bar{X}$	S.D.	Level of the Appropriateness
The contents presentation				
6	The contents are organized in appropriate sequences.	4.00	0.00	Very Appropriate
7	The content in each part is consistent with other parts.	3.67	0.58	Appropriate
8	The total amount of content in every lesson is suitable for the time given frame.	3.67	0.58	Appropriate
9	The contents provide a simple and understandable explanation.	4.00	0.00	Very Appropriate
10	The font sizes and styles used for the lessons are suitable.	4.00	0.00	Very Appropriate
Total		3.83	0.35	Appropriate

Note n=3

In Table 4.10, the identifying the author's purpose lesson, the overall mean of the lesson's appropriateness was at 3.83 (S.D. = 0.35), which meant the lesson was appropriate. There were 5 items rated at very appropriate ($\bar{X} = 4.00$, S.D. = 0.00): "The contents are relevant to the objectives of the lessons," "The contents are accurate," "The contents are arranged in appropriate sequences," and "The explanation in the contents is clear and easy to understand" and "The font styles and sizes used in the lessons are appropriate."

However, there were 5 items rated at appropriate ($\bar{X} = 3.67$, S.D. 0.58) "The contents are appropriate for the learners' knowledge," "The contents are concise," "The language use in the lessons is appropriate," "The content in each part is consistent with other parts," and "The amount of the contents in each lesson is appropriate for time period." Nonetheless, no item was rated inappropriately.

Table 4.11 The Appropriateness of the Making Inferences Lesson

No.	Items	$\bar{X}$	S.D.	Level of the Appropriateness
The contents of the lessons				
1	The contents are related to the lesson's objectives.	3.67	0.58	Appropriate
2	The contents are suitable for the learners' level of knowledge.	3.33	0.58	Appropriate
3	The contents are concise.	3.67	0.58	Appropriate
4	The contents are accurate.	4.00	0.00	Very Appropriate
5	The language use in the lessons is appropriate.	3.67	0.58	Appropriate

Table 4.11 (continued)

No.	Items	$\bar{X}$	S.D.	Level of the Appropriateness
The contents presentation				
6	The contents are organized in appropriate sequences.	4.00	0.00	Very Appropriate
7	The content in each part is consistent with other parts.	3.33	0.58	Appropriate
8	The total amount of content in every lesson is suitable for the time given frame.	3.33	0.58	Appropriate
9	The contents provide a simple and understandable explanation.	4.00	0.00	Very Appropriate
10	The font sizes and styles used for the lessons are suitable.	4.00	0.00	Very Appropriate
Total		3.70	0.35	Appropriate

Note n=3

In Table 4.11, the making inferences lesson, the overall mean of the lesson's appropriateness was at 3.70 (S.D. = 0.35), which meant the lesson was appropriate. Four items received a rating of "very appropriate" ($\bar{X} = 4.00$, S.D. = 0.00): "The contents are accurate," "The contents are arranged in appropriate sequences," "The explanation in the contents is clear and easy to understand," and "The font styles and sizes used in the lessons are appropriate."

In addition, there were 6 items rated as appropriate ($\bar{X} = 3.67$, S.D. = 0.58): "The contents are relevant to the objectives of the lessons," "The contents are concise," "The language use in the lessons is appropriate," and "The contents are appropriate for the learners' knowledge." Moreover, there are also two items that were rated as appropriate ($\bar{X} = 3.33$, S.D. = 0.58): "The content in each part is consistent with other parts," and "The amount of the contents in each lesson is appropriate for the time period." Nevertheless, no item was rated inappropriately.

Table 4.12 The Appropriateness of the Evaluating the Arguments Lesson

No.	Items	$\bar{X}$	S.D.	Level of the Appropriateness
The contents of the lessons				
1	The contents are related to the lesson's objectives.	4.00	0.00	Very Appropriate
2	The contents are suitable for the learners' level of knowledge.	3.67	0.58	Appropriate
3	The contents are concise.	3.67	0.58	Appropriate
4	The contents are accurate.	4.00	0.00	Very Appropriate
5	The language use in the lessons is appropriate.	3.67	0.58	Appropriate
The contents presentation				
6	The contents are organized in appropriate sequences.	4.00	0.00	Very Appropriate
7	The content in each part is consistent with other parts.	4.00	0.00	Very Appropriate
8	The total amount of content in every lesson is suitable for the time given frame.	4.00	0.00	Very Appropriate
9	The contents provide a simple and understandable explanation.	4.00	0.00	Very Appropriate
10	The font sizes and styles used for the lessons are suitable.	4.00	0.00	Very Appropriate
Total		3.90	0.17	Appropriate

Note n=3

In Table 4.12, the evaluating the author's arguments lesson, the overall mean of the lesson's appropriateness was at 3.90 (S.D. = 0.17), which meant the lesson was appropriate. There were 7 items rated at very appropriate ($\bar{X} = 4.00$, S.D. = 0): "The contents are relevant to the objectives of the lessons" "The contents are accurate," "The contents are arranged in appropriate sequences," "The content in each part is consistent with other parts," "The amount of the contents in each lesson is appropriate for time period," "The explanation in the contents is clear and easy to understand," and "The font styles and sizes used in the lessons are appropriate."

Moreover, there were 3 items rated at appropriate ($\bar{X} = 3.67$, S.D. = 0.58), "The contents are appropriate for the learners' knowledge," "The contents are concise," and "The language use in the lessons is appropriate". Nevertheless, no item was rated inappropriately.

4.1.2.5 The Result of the Pilot Study

A pilot study was conducted over two weeks with 20 second-year students enrolled in the critical reading course during the second semester of the 2024 academic

year to identify weaknesses, evaluate the quality of the model, the critical reading lesson, and the lesson plans, and test the research instruments. Prior to engaging with the Flex model of blended learning, students completed a critical reading pre-test. Subsequently, students were responsible for in-class instruction for 2 periods, with 6 periods allocated to independent study outside the classroom. Upon completing the lesson, the students completed the posttest. The results were as follows:

Table 4.13 The Critical Reading Pre-Test and Post-Test Mean Scores of the Pilot Group

Critical reading test	n	$\bar{X}$	S.D.	t	p
Pre-test	20	9.30	3.27	-15.85	.000*
Post-test	20	14.75	4.41		

Note * $p < .05$

A paired sample t-test was used to compare critical reading skills before and after implementing the Flex model in the pilot group (Table 4.9). The post-test mean score ($\bar{X} = 14.75$, $SD = 4.41$) was higher than the pre-test mean ($\bar{X} = 9.30$, $SD = 3.27$), showing a statistically significant difference at the 0.05 level.

In the pilot study, the researcher found that students were confused about switching between learning modes. Some were also unfamiliar with the technological tools. Students need clear, comprehensible instructions to help allocate time between learning modes. The teacher should also provide step-by-step instructions for accessing the tools.

4.2 Finding Two: The Effectiveness of the Flex Model of Blended Learning in Enhancing EFL Students' Critical Reading Skills

To examine the effectiveness of the Flex model of blended learning in enhancing EFL students' critical reading skills, the finding was divided into two sections as follow:

4.2.1 The findings of the comparison of critical reading pre-test and critical reading post-test scores.

4.2.2 The finding of an in-depth interview to examine the critical reading skills during the teaching and learning with the Flex model of blended learning.

4.2.1 The Findings of the Comparison of Critical Reading Pre-test and Critical Reading Post-test Scores

Participants completed a pre-test, engaged in instruction using the Flex model of blended learning, and then completed a post-test assessing critical reading skills. This procedure was designed to evaluate the effectiveness of the Flex model in enhancing EFL students' critical reading abilities. A dependent-samples t-test was conducted to compare students' critical reading skills before and after implementation of the Flex model. Table 4.14 presents the results.

Table 4.14 The Average Score for the Comparison of Critical Reading Skills of EFL Students by Using the Flex model of blended learning by Pre-Test and Post-Test Scores

Critical reading test	n	$\bar{X}$	S.D.	t	p	Cohen's d Effect Size
Pre-test	55	9.89	4.91	-19.43	.000*	1.65
Post-test	55	14.55	3.04			

Note * $p < .05$

Table 4.14 shows that the post-test mean score ($\bar{X} = 14.55$, $SD = 3.04$) exceeded the pre-test mean score ($\bar{X} = 9.89$, $SD = 4.91$). This difference was statistically significant at the .05 level ($t = -19.43$, $P = .000$). Cohen's d was calculated to evaluate the effectiveness of the Flex model of blended learning in improving EFL students' critical reading skills. The analysis indicated a very large effect size ($d = 1.65$).

4.2.2 The Finding of an In-Depth Interview to Examine the Critical Reading Skills During the Teaching and Learning with the Flex Model of Blended Learning.

An in-depth interview was conducted with ten students to investigate the critical reading strategies employed during the teaching and learning process within the Flex model of blended learning. Participants were selected based on their English proficiency and categorized into high, intermediate, or low proficiency. The data were analyzed using thematic analysis (Braun & Clarke, 2006), which includes familiarization with data, generating initial codes, developing themes, reviewing themes, defining and naming themes, and writing the report. The data were organized into four themes related to critical

reading skills. Representative students' responses are presented below to illustrate these findings:

4.2.2.1 Distinguishing between Facts and Opinions

The participant quotations presented below exemplify the themes identified in the analysis of critical reading strategies used to distinguish between facts and opinions.

"I can identify the opinion statements by looking for the signal words in the text. I read quickly, searching for the important words, such as modal verbs, feeling words, and the words "belief" and "think."

Student 3 (personal communication, 2025)

"As I read, I search for evidence to help me identify the fact claims, such as numbers, statistics, and research."

Student 5 (personal communication, 2025)

"I'm always looking at the writing style, and I think factual statements are usually found in studies, news, and science books."

Student 7 (personal communication, 2025)

"I read all sentences quickly and search for the clues to help me identify the fact and opinion, such as numbers, statistics, judgment, belief, and research."

Student 8 (personal communication, 2025)

The interview data indicated that students used previewing and analyzing strategies to differentiate between factual and opinion statements. For example, Student 7 previewed the writing style of different text types by skimming introductory sentences and headings before identifying facts and opinions within the text. Student 3 identified opinion statements by scanning for signal words, such as modal verbs and terms like "belief" and "think," then marking them for later discussion. Additionally, Student 8 reported separating sentences by highlighting clauses or marking sections with textual evidence to distinguish facts from opinions. These approaches correspond to the "Analyze" level of Bloom's taxonomy, in which students engage in cognitive processes to examine the structure, language, relationships, and assumptions within the text.

4.2.2.2 Identifying the Author's Purpose

To investigate the critical reading strategies utilized for identifying the author's purpose, the excerpts below are presented with participants' reported strategies.

"Before identifying the author's purpose, I must look into each type of reading because, in the context of an advertising, I assume the purpose of the writer will be to entertain the reader."

Student 1 (personal communication, 2025)

"I begin by identifying the main idea and asking myself, 'How can I understand the reading? How did I feel while reading it?' I believe that my emotional response to the text can help me identify the author's purpose."

Student 8 (personal communication, 2025)

"I can identify the author's purpose by reading the text to find the main idea and thinking about what the author wants me to know. Then I look for evidence that helps me figure out what the author meant."

Student 3 (personal communication, 2025)

"I look at the topic and picture and point out the type of reading, such as advertisement, story, or magazine, and identify what the writer's purpose is. Then I read the text and look for the sentence that backs up what I think."

Student 4 (personal communication, 2025)

Interview data indicated that students integrated questioning and analyzing strategies to determine the author's purpose. For instance, Student 3 focused on identifying the main idea and intended message and supported these points with evidence. Similarly, Student 4 examined contextual factors such as topic, visuals, and genre before determining the author's intent. These approaches demonstrated cognitive processing at the "Analyze" level of Bloom's taxonomy. Consequently, students investigated the connections among ideas to identify meaning and purpose, thereby enhancing their critical reading skills.

4.2.2.3 Making Inferences

To indicate the critical reading strategies used to make inferences, the following excerpts are provided to demonstrate the participants' reported strategies.

“I can make inferences by reading the text, underlining the topic sentence, and asking myself what it implies. I also look for evidence and connect it to my experience and then draw a conclusion.”

Student 2 (personal communication, 2025)

“I can make inferences by summarizing the main idea and applying my background knowledge to predict the implied meaning in the text.”

Student 7 (personal communication, 2025)

“I analyzed the text by connecting the evidence with my personal experience which allowed me to identify information that was not stated explicitly.”

Student 8 (personal communication, 2025)

“I look for textual clues and apply my background knowledge to predict the inferred information that is not stated explicitly.”

Student 10 (personal communication, 2025)

The interview findings indicated that students employed questioning and summarizing strategies to make inferences during reading. For example, Student 2 used questioning strategies to make judgments about the text and applied summarizing strategies to draw conclusions informed by personal experience. Student 7 summarized the main idea and activated prior knowledge to infer the underlying meaning of the text. Additionally, Student 8 evaluated the credibility of statements and attempted to interpret them. Collectively, these results demonstrate that students engaged cognitive processes to interpret implicit ideas and summarize evidence based on their experiences, aligning with the “Evaluate” level of Bloom’s taxonomy.

4.3.1.4 Evaluating Arguments

To analyze the critical reading strategies employed in evaluating arguments, the following excerpts are presented to demonstrate the participants' reported strategies.

“I first look for reasons to support the argument statement while asking myself if it is reasonable. How strong are the arguments? I sometimes find the evidence and think of hidden assumptions.”

Student 1 (personal communication, 2025)

“I think an argument represents the writer’s opinion; therefore, argument statements are similar to the opinion statements I have learned about before. I identify the argument first, then look for the reasons and evidence that support it.”

Student 6 (personal communication, 2025)

“I evaluate the arguments in the text by looking for the claims, evidence, and reasons to assess the quality and sufficiency of evidence used to support the reasons.”

Student 9 (personal communication, 2025)

“I think the reason represents the writer’s opinion used to support the argument, while the evidence is similar to factual statements, such as statistics data or research studies.”

Student 10 (personal communication, 2025)

The interview data indicated that students employed both questioning and reflecting as strategies for evaluating arguments. For example, Student 1 engaged in self-questioning while justifying the text and utilized reflective strategies to assess the supporting reasons and evidence. Similarly, Student 9 systematically identified the claims presented, examined the evidence, and evaluated the strength and sufficiency of that evidence in relation to the logical reasons provided. These reading strategies correspond to the “Evaluate” level of Bloom’s taxonomy, suggesting that the students enhanced their critical reading skills.

Table 4.15 presented a summary of the critical reading strategies employed in teaching and learning across the four critical reading lessons as follows:

Table 4.15 Students' Critical Reading Strategies Employed During the Implementation

Theme	Critical reading strategies					Bloom's taxonomy
	Previewing	Analyzing	Questioning	Summarizing	Reflecting	
Distinguishing between facts and opinion	√	√				Analyze
Identifying the author's purpose		√	√			Analyze
Making inferences			√	√	√	Evaluate
Evaluating arguments			√		√	Evaluate

Table 4.11 demonstrated that students employed five critical reading strategies: previewing, analyzing, questioning, summarizing, and reflecting throughout the learning process. These strategies correspond to the higher-order cognitive processes of Bloom's taxonomy, specifically "Analyze" and "Evaluation".

In summary, critical reading strategies function as sub-skills within the broader critical reading skill set and serve as methods for systematically analyzing and evaluating texts. These strategies encourage students to utilize cognitive processes at the three highest levels of Bloom's taxonomy, which are closely linked to critical thinking. This approach forms the foundation for the development of critical reading skills.

4.3 Finding Three: The Students' Attitudes Toward the Flex Model of Blended Learning

The students' attitudes towards the Flex model of blended learning were explored using the questionnaire. In the questionnaire, the students were asked about their attitudes toward the Flex model of blended learning, in-class instructions, and outside-class instructions. The results of the findings were shown below:

Table 4.16 Students' Attitudes Towards the Flex Model of Blended Learning

No.	Evaluated Items	$\bar{X}$	S.D.	Meaning
The Flex model of blended learning				
1	The Flex model of blended learning helps you enhance critical reading skills.	4.56	0.46	Highest
2	You can learn and practice critical reading skills both in and outside the classroom.	4.27	0.49	High
3	The proportion of the combination between in-class and outside classroom learning modes is appropriate.	4.27	0.56	High
4	The contents designed are useful and interesting.	4.09	0.63	High
5	The tasks and activities designed are useful and interesting.	4.49	0.43	High
6	The Flex model of blended learning allows interaction with the teacher and with peers.	4.55	0.43	Highest
7	The teacher provides sufficient help and support for your learning both in and outside the classroom.	4.55	0.43	Highest
8	The digital tools used for the Flex model of blended learning are applicable.	4.56	0.39	Highest
9	Materials used in the Flex model of blended learning are convenient and allow you to get access anytime and anywhere.	4.53	0.43	Highest
Total		4.43	0.47	High
In-class Instruction				
10	In-class teaching helps you enhance critical reading skills.	4.18	0.62	High
11	In-class teaching enables you to become more involved in the learning process.	4.05	0.60	High
12	You can have a chance to get immediate support or feedback from your teacher and peers.	4.13	0.47	High
Total		4.12	0.56	High
Outside-class Instruction				
13	Outside-class teaching help you enhance critical reading skills.	4.22	0.53	High
14	You can use digital tools (e.g. E-mail, Padlet, Google Classroom) to communicate with your classmates and teacher.	4.58	0.24	Highest
15	Outside-class teaching encourages you to take more responsibility for your own learning.	4.64	0.38	Highest
16	Outside-class teaching offers opportunities to repeat and do activities as needed and access material whenever convenient.	4.71	0.32	Highest
Total		4.54	0.37	Highest
Total		4.40	0.46	High

Note n=55

According to Table 4.16, the questionnaire was divided into three parts: the Flex model of blended learning, in-class instruction, and outside-class instruction. The Flex model of blended learning yielded a total mean score of 4.40 (S.D. = 0.46), signifying that students' attitudes were at a positive level.

For the Flex model of blended learning, the total mean score was 4.34 (S.D. = 0.47), showing students had positive attitudes. Two of nine items reached the very positive level: "The Flex model of blended learning helps you enhance critical reading skills" ($\bar{X} = 4.56$, S.D. = 0.46) and "The digital tools used for the Flex model of blended learning are applicable" ($\bar{X} = 4.56$, S.D. = 0.39).

For in-class instruction, all items reached high mean levels. The total mean score was 4.12 (S.D. = 0.56), showing that students' attitudes were positive. Scores for all three items were high: "In-class teaching helps you enhance critical reading skills." ($\bar{X} = 3.18$, S.D. = 0.62), "You can get immediate support or feedback from your teacher and peers." ($\bar{X} = 3.13$, S.D. = 0.47), and "In-class teaching enables you to become more involved in the learning process." ($\bar{X} = 4.05$, S.D. = 0.60).

For outside-class instruction, the mean score was 4.54 (S.D. = 0.37), showing very positive student attitudes. Three items had the highest means: "Outside-class teaching offers opportunities to repeat and do activities as needed and access material whenever convenient." ($\bar{X} = 4.71$, S.D. = 0.32), "Outside-class teaching helps you enhance critical reading skills" ($\bar{X} = 4.64$, S.D. = 0.38), and "You can use digital tools (e.g., Email, Padlet, Google Classroom) to communicate with your classmates and teacher" ($\bar{X} = 4.58$, S.D. = 0.24).

In brief, students reported a positive attitude toward teaching and learning in the Flex model of blended learning, noting improvements in their critical reading skills. Both in-class and outside-class instruction offered opportunities to engage with diverse reading materials, supporting ongoing skill development. The instructional model's flexibility promoted student autonomy, confidence, and active participation in their education. Many found that the supportive environment fostered stronger collaboration with peers and encouraged them to take greater responsibility for their academic growth.

CHAPTER 5

CONCLUSION AND DISCUSSION

The Flex model of blended learning has been developed in the current study to enhance the critical reading skills of EFL students. This chapter presented a summary of the findings, discussion, implications and recommendations for further study.

5.1 Summary of Findings

According to the research objectives, the results were summarized and discussed after being divided into three parts as presented below:

5.1.1 A Development and Validation of the Quality of the Flex Model of Blended Learning in Enhancing EFL Students' Critical Reading Skills

The first objective of this study was to develop and validate the Flex model of blended learning for enhancing EFL students' critical reading skills. This section provides a summary of the instructional model development process. The model development comprised four main components: analysis of students' needs and challenges in learning critical reading, analysis of teachers' needs and challenges in teaching critical reading, examination of relevant theoretical concepts, and evaluation by experts.

The development of the Flex model of blended learning was informed by four key theories and concepts, as well as detailed analyses of needs and challenges in teaching and learning critical reading. The theoretical foundations included the Flex model, the SAMR model, critical reading strategies, and instructional design models. Data on needs and challenges in teaching and learning critical reading were systematically analyzed and synthesized. Consequently, the Flex model of blended learning was constructed with ten components: analyzing needs and problems, formulating objectives, analyzing the learning environment, analyzing teachers' and students' roles, analyzing and designing content, identifying instructional strategies,

selecting instructional technology, developing instructional materials and assessment, implementing the instruction, and evaluating and revising.

The quality of the model was evaluated by nine experts, who reported a mean consistency score of 0.93, with no component receiving a low score. Four components—analyzing teachers’ and students’ roles, analyzing and designing contents, identifying instructional strategies, and developing instructional materials and assessment—each received a mean score of 1.00. The remaining six components—analyzing needs and problems, formulating objectives, analyzing the learning environment, selecting instructional technology, implementing the instruction, and evaluating and revising—each received a mean score of 0.89. These results indicate that all elements of the Flex model of blended learning demonstrated consistency. The evaluation of the component descriptions yielded a total mean score of 0.88, which reflects an appropriate level. The mean ratings for individual component descriptions ranged from 0.78 to 1.00, indicating that the descriptions for all model components were appropriate. The pilot study also demonstrated that participants’ post-test scores surpassed their pre-test scores, indicating that the Flex model of blended learning was effective for critical reading instruction. In summary, the development of the Flex model was appropriate for teaching critical reading.

5.1.2 The Effectiveness of the Flex Model of Blended Learning in Enhancing EFL Students’ Critical Reading Skills

The second objective of this study was to implement and identify the effectiveness of the Flex model of blended learning in enhancing EFL students’ critical reading skills. This section reports the outcomes of the instructional model implementation, incorporating both qualitative and quantitative findings to demonstrate its effectiveness.

After developing the instructional model and related materials, it was implemented with a group of 55 second-year students enrolled in a critical reading course at a public university in Thailand during the first semester of the 2025 academic year. The course lasted eight weeks. Participants completed pre-tests and post-tests to assess the effectiveness of the Flex model in enhancing critical reading skills.

A paired-samples t-test revealed that students’ post-test mean score ($\bar{X} = 14.75$, $SD = 4.41$) exceeded the pre-test mean score ($\bar{X} = 9.30$, $SD = 3.27$). This difference was statistically significant at the .05 level. The effect size, as measured by Cohen’s d ,

was 1.46, indicating a very large effect and substantial development in students' critical reading skills. Following, in-depth interviews were conducted with 10 students to explore their procedural reading skills and the strategies utilized during the learning process. The findings indicate that students employed five critical reading strategies: previewing, questioning, analyzing, summarizing, and reflecting. These critical reading strategies were used to uncover the reading materials. Consequently, the Flex model of blended learning proved effective in developing students' critical reading skills.

5.1.3 The Students' Attitudes Toward the Flex Model of Blended Learning

The third objective was to examine students' attitudes toward the Flex model of blended learning using a questionnaire. This section reports students' attitudes in three distinct parts: the Flex model of blended learning, in-class instruction, and outside-class instruction.

Analysis of students' attitudes toward teaching and learning within the instructional model revealed that the Flex model of blended learning received a high mean score ($\bar{X} = 4.34$, S.D. = 0.47), reflecting positive student perceptions of the model. In-class instruction also achieved a high mean score ($\bar{X} = 4.12$, S.D. = 0.56), suggesting favorable attitudes toward classroom-based learning. Moreover, outside-class instruction obtained the highest mean score ($\bar{X} = 4.54$, S.D. = 0.37), indicating a preference for learning activities conducted outside the classroom. Therefore, the overall mean score was high ($\bar{X} = 4.40$, S.D. = 0.46), demonstrating that students generally held positive attitudes toward teaching and learning with the Flex model of blended learning.

5.2 Discussion

This section addresses the discussion in three areas aligned with the research objectives as follows:

5.2.1 The Development and Validation of the Quality of Flex Model of Blended Learning in Enhancing EFL Students' Critical Reading Skills

The Flex model of blended learning was developed based on three interrelated theories and concepts: the Flex model (Staker & Horn, 2012), the SAMR model

(Puentedura, 2014), and critical reading strategies (Axelrod & Cooper, 2002; Nasrollahi et al., 2015). Its components were synthesized from four instructional design models: Dick et al. (2022), Kemp and Dwyer (2001), Lever-Duffy and McDonald (2011), and Morrison (2010). The development process also incorporated an analysis of teachers' and students' needs and challenges in teaching and learning the critical reading course. The phases of the model were systematically organized, with each phase building upon the previous one. Therefore, this instructional model provides a structured guideline for instructional development, particularly for teachers seeking to enhance students' critical reading skills.

The analysis of students' needs and challenges revealed that students face learning challenges and insufficient reading materials, leading to lower learning engagement. Consequently, students need to develop additional reading strategies, use interactive materials, and integrate digital technologies throughout their learning. Conversely, the analysis of teachers' needs and challenges in teaching a critical reading course found that teachers face challenges engaging students in learning and a tendency toward passive learning behaviors. Teachers need instructional strategies and digital tools to enhance students' engagement in learning and their critical reading skills. The analysis of students' and teachers' needs and challenges was integrated as a fundamental component in the development of the instructional model. Conducting a needs analysis is crucial for identifying instructional gaps, challenges, and requirements, which in turn informs the design of an effective instructional process. According to Adegbola et al. (2019), investigating the needs of a specific population enables the identification and justification of appropriate strategies to address those needs. Moreover, Morrison et al. (2011), the instructional design process should begin with identifying the problem and associated needs, which allows designers to define these elements within their specific contexts. In accordance with Dick et al. (2001), the instructional designer should evaluate students' prior knowledge, learning objectives, preferences, and attitudes to develop effective instructional model.

The Flex model of blended learning presented in this study integrates the principles of the Flex model (Staker & Horn, 2012) and the SAMR model (Puentedura, 2014) to create a technologically enriched learning environment intended to enhance the effectiveness of traditional teaching and learning. Unlike previous approaches that

utilized either the Flex model or the SAMR model independently, this instructional model synthesizes elements from both frameworks to address the identified needs and challenges in developing students' critical reading skills. The resulting Flex model of blended learning comprises four interconnected learning modes: Flexibility, Learning, Enhancement, and Experience. Each mode is designed to support the others, thereby improving students' critical reading skills and overall learning outcomes through the use of diverse technological tools and learning environments.

In addition, instructional documents, including the instructional manual, lesson plans, and critical reading lessons, were developed. The instructional manual and lesson plans serve as a sequential guide for implementing the instructional model. The study adapted critical reading strategies from Axelrod and Cooper (2002) and Nasrollahi et al. (2015), which were systematically applied across the lesson plans' teaching stages: previewing, questioning, analyzing, and reflecting. These strategies directly foster the development of critical thinking and problem-solving skills, both of which are essential for critical reading (Le et al., 2024; Le & Chong, 2024). Furthermore, critical reading strategies structure the learning process by beginning with previewing to stimulate student interest, incorporating language preparation to promote higher-order thinking, and activating prior knowledge. Questioning strategies support readers in comprehending and analyzing texts while cultivating higher-order thinking. Analyzing strategies enables students to gain a deeper understanding of reading materials through summarization and retelling. Finally, reflecting strategies connect the text to students' experiences and facilitate the application of new knowledge to personal decision-making and real-world contexts (Axelrod & Cooper, 2002; Nasrollahi et al., 2015).

In this study, the Flex model of blended learning was evaluated for component consistency and the appropriateness of component descriptions by nine experts specializing in English language, curriculum and instruction, and educational technology. The mean consistency score for the instructional model components was 0.93, indicating a high level of agreement. The mean score for the appropriateness of component descriptions was 0.88, also reflecting a suitable standard. These results suggest that the Flex model of blended learning is appropriate for critical reading instruction. Additionally, the appropriateness of related documents, including the instructional manual, lesson plans, and critical reading lessons, was assessed by three

experts in the relevant fields. The instructional manual received a mean score of 3.87, and the lesson plans scored 3.76, with no items rated as inappropriate. Critical reading lessons 1 through 4 achieved mean scores of 3.73, 3.83, 3.90, and 3.90, respectively, all within the appropriate range. These findings demonstrate that all supporting documents for the learning model are suitable for implementation. The evaluation results indicate that the Flex model of blended learning was systematically developed with careful consideration of instructional features. The pilot study further revealed that participants' post-test scores exceeded their pre-test results. Based on these findings, the Flex model of blended learning and its associated lessons have the potential to effectively enhance students' critical reading skills.

Therefore, the Flex model of blended learning was developed through a systematic approach grounded in theoretical foundations, a coherent instructional framework, and alignment with cognitive processes essential for critical reading. This model is designed to facilitate meaningful learning experiences that foster higher-order thinking skills. Previous research by Surdyanto and Kurniawan (2020) demonstrated the effectiveness and practicality of a critical reading module that incorporates diverse reading materials and questions intended to promote deeper and more critical thinking among students. Similarly, the Critical Reading Module developed by Ilyas (2015), which integrates a content-and-language-learning approach, seeks to improve both English language proficiency and students' critical thinking abilities. This module includes authentic reading materials that introduce challenging inquiries and debates to further develop students' critical thinking skills.

5.2.2 The Effectiveness of the Flex Model of Blended Learning in Enhancing EFL Students' Critical Reading Skills

The second phase of the study addressed the second research objective: "To implement and identify the effectiveness of the Flex model of blended learning in enhancing EFL students' critical reading skills." Findings were categorized as quantitative and qualitative. Quantitative results demonstrated a statistically significant difference between pre-test and post-test scores, $t = -19.43$, $p < .05$. An effect size of 1.46 indicates a very large effect (Cohen, 1988) and demonstrates that students employed higher-order critical reading skills during the intervention. These results

suggest that the Flex model of blended learning had a substantial impact on students' critical reading skills.

The qualitative analysis corroborated the quantitative findings obtained through statistical methods. Qualitative data demonstrated that students developed and applied critical reading strategies throughout their learning process to uncover the underlying meaning of the text. Students exhibited key features of critical reading skills, such as distinguishing between facts and opinions, identifying the author's purpose, making inferences, and evaluating arguments. These skills reflect higher-order cognitive abilities, specifically the analyze and evaluate levels, suggesting that students are developing advanced cognitive processes as outlined in Bloom's taxonomy.

Therefore, the quantitative and qualitative data provide strong evidence that three factors are central to improving the effectiveness of the Flex model of blended learning in developing EFL students' critical reading skills: critical reading strategies, a blended learning environment, and technological integration.

5.2.2.1 Factor One: Critical Reading Strategies

The implementation of the Flex model of blended learning greatly improves students' critical reading skills by incorporating critical reading strategies as teaching methodologies that prompt students to question assumptions, identify textual biases, and evaluate evidence. These strategies represent higher-level cognition and directly enhance the cultivation of critical thinking and problem-solving abilities, which are vital for critical reading skills (Krathwohl, 2002; Le et al., 2022; Le & Chong, 2024).

Moreover, when readers engaged in critical reading, they employed critical thinking to investigate both the text and their interpretation of it (Lanchwathanakorn & Na-Songkhla, 2018). Critical reading can't be achieved without critical thinking, which is why it is considered a crucial component of critical reading skills. Critical thinking is the process of evaluating and assessing information and ideas to determine what to accept and believe. Likewise, critical reading involves the application of cognitive processes such as analysis, synthesis, and evaluation, and possesses the ability to think critically (Lee, 2015; Suratha, 2019). This is supported by the study of Nasrollahi et al. (2015), which indicated that critical reading strategies were exhibited as a collection of individual skills and were infrequently employed systematically in real contexts. The results of the study indicated that the critical reading strategies of skimming and

scanning for text processing, posing questions to enhance comprehension, and note-taking are most important for students.

The relationship between critical reading skills and strategies is mutual. “Critical reading strategies” refers to the techniques employed by readers to find the underlying meaning of the texts, while “critical reading skills” indicates the reader’s ability to utilize these strategies effectively. According to the qualitative data from this study, students used five critical reading strategies to analyze and comprehend texts, including previewing, questioning, summarizing, analyzing, and reflecting. The qualitative data clearly support the quantitative data, demonstrating a higher level of involvement according to Bloom’s taxonomy. The hierarchical structure of Bloom’s taxonomy provides a framework for creating reading questions and activities that promote both language proficiency and analytical thinking. Improving individual critical reading skills can facilitate the cultivation of critical thinking abilities (Hidayati et al., 2020). This aligns with the findings of Huyen and Ngoc (2024), who indicated that EFL learners frequently employ critical thinking skills, including interpretation and inference, which play an important role in enhancing reading comprehension.

When consistent with Bloom’s taxonomy, the findings demonstrated that at the initial stage of application, students’ cognitive processes were at the “analyze” level and transitioned to the “evaluate” level at the final stage. This indicated that students transitioned their learning from a surface-level understanding to higher-level cognitive engagement. This is supported by the study by Pinchai and Sojisirikul (2024), which found that incorporating critical reading skills into language education may improve cognitive development. Likewise, Butterfuss et al. (2020) and Fraser (2024) found that critical reading involves evaluating the reliability of information and the credibility of sources, which requires the ability to connect a reader’s prior experiences to new information and apply it in everyday situations.

5.2.2.2 Factor Two: Blended Learning Environment

The Flex model, an expansion of blended learning proposed by Staker and Horn (2012), refers to instructional programs in which online learning forms the foundation of students’ educational experiences, occasionally supplemented by offline activities. Students primarily learn on campus and transition between learning modalities through customized, flexible schedules. Teachers remain on-site to provide

individual support through activities such as small-group discussions, individual instruction, and engagement in social community spaces. In the present study, the Flex model serves as a framework for designing learning environments that integrate online instruction through distributed teaching and extend beyond traditional classroom boundaries. Learning activities and environments are widely recognized as critical factors in fostering the development of critical reading skills. Within the Flex model, learning settings and activities are intentionally structured to scaffold students' knowledge through peer and group discussions, collaborative projects, participation in social communities, and independent practice outside the classroom. Lu (2021) noted that cooperative learning is particularly prominent in blended environments, where online forums, group projects, and peer discussions facilitate engagement and enhance social learning. Therefore, the Flex model (Staker & Horn, 2012) is considered a significant factor in supporting students' development of critical reading skills. This assertion is supported by Khathayut and Walker-Gleaves (2025), who argued that an effective learning environment requires both efficient pedagogical approaches and a diverse range of academic and recreational activities, thereby emphasizing the importance of cultivating students' critical reading skills.

Numerous studies have highlighted the benefits of blended learning. Lu (2021) found that students perceived blended learning as a substantial enhancement to their critical thinking abilities, facilitating analysis and synthesis of knowledge during classroom discussions. Kang et al. (2022) reported that blended learning in the cognitive domain may improve academic achievement, problem-solving, critical thinking, and comprehension. Similarly, Müller et al. (2023) emphasized that the online component of blended learning offers students flexibility, enabling them to interact with course materials at their convenience and reducing barriers associated with traditional, scheduled classes. Furthermore, Yang et al. (2022) demonstrated that mobile blended active language learning significantly improved Thai high school students' English critical reading skills and was positively perceived for its flexibility, engagement, and motivational impact.

Additionally, the activities and tasks assigned in this learning environment encourage students to move beyond passive reading toward critical analysis, interpretation, and evaluation of the text. This learning transformation can be supported

by transformative learning theories (Mezirow, 2003), which emphasize the importance of supportive learning environments where educators facilitate the development of communities that enable students to become transformative learners and acquire experiences and knowledge that foster self-development. In the study of Gunnlaugson et al. (2023), it was found that technology tools can enhance the transformative learning process by facilitating metacognitive reflection, promoting collaborative learning, and providing personalized feedback that challenges students' thinking. Similarly, Shamida et al. (2023) assert that students' motivation to read and learn may be significantly influenced by their specific attention to the learning environment. These findings support the view that critical reading skills are not solely individual cognitive abilities but are also socially constructed processes enriched through interaction.

As a result, it was proved that the Flex model of blended learning, which incorporated theoretical concepts and instructional procedures, was both practical and effective in enhancing students' critical reading skills. This effectiveness may be attributed to the systematic construction of the model, which considered factors such as instructional needs, challenges in teaching and learning critical reading, relevant theoretical concepts, and instructional strategies that supported model development. Furthermore, the model underwent expert evaluation and revision prior to implementation. Another reason that could result in the effectiveness of the model was the learning activities. The design of learning activities also contributed to the model's effectiveness, as these activities played a significant role in developing students' critical reading abilities.

5.2.2.3 Factor Three: Technology Integration

The integration of technological tools can significantly enhance the development of the Flex model of blended learning and revolutionize the learning process, rather than merely replacing traditional instruction, to foster EFL students' critical reading skills. This study employed the SAMR model to direct the integration of technological tools in teaching and learning critical reading course and carefully designed to facilitate students' advancement. The SAMR model has four levels, which are shown as steps on a ladder from lower to higher levels of technology integration. The model encouraged teachers to progress from lower to higher levels of technology integration. As Al-Khalidi (2021) explained, the SAMR model emphasizes

incorporating technology across all phases of activity or task design, facilitating technological interaction and enhancing student engagement. As Kirkland (2014) pointed out, effective technology use involves developing enriching tasks that transform conventional learning methods and create opportunities unavailable without technological integration.

Moreover, this designed model positions technological tools not simply as delivery media but as cognitive scaffolds that empower students to engage more deeply with texts. Rather than simply substituting traditional activities, technology at the modification and redefinition levels facilitated the development of learning tasks that required advanced cognitive skills, such as analyze, evaluate, and interpretation of information, which are vital for critical reading. This meant that technological tools were used to transform traditional learning and to empower the four learning modes of the Flex model of blended learning, fostering students' critical reading skills. This supported by Puentedura (2010) indicated that the SAMR model enables teachers to evaluate their use of technology, redesign lesson plans, and create activities that foster more meaningful understanding and engagement.

The previous study of Liu and Tsai (2012) provided an example of the Redefinition level of the SAMR model using m-learning by developing an augmented-reality mobile application to help Chinese students learn English. The finding revealed that augmented-reality mobile learning may increase the effectiveness of language learning. Similarly, Drugova et al. (2021) assert that advancing to higher SAMR levels, in which technology modifies and redefines tasks, notably enhances student engagement and learning outcomes. For example, using a discussion board like Padlet to publish their work online increases the application of valuable feedback for students, thus augmenting their engagement and motivation. The collaborative platforms also enhance teamwork, critical thinking, and analytical skills, rendering the learning environment more engaging and inclusive. Consistent with the study by De Castro & Guia (2025), it indicated that technology positively impacts student learning by promoting engagement, often leading to better information retention. These results suggest that the SAMR framework can serve as an effective design guide for teachers seeking to apply technology tools in ways that truly reform teaching and learning in their classrooms. Likewise, Nair and Chuan (2021) demonstrated, through an

examination of a revised SAMR model, the importance of integrating technology into teaching and learning, which led to improved student performance, particularly at the Augmentation, Modification, and Redefinition levels.

Thus, integrating the SAMR model in this study can effectively guide the selection of digital resources to fundamentally transform teaching and learning. The integration of technological tools has the potential to significantly enhance the instructional model development and fundamentally transform educational practices, rather than merely substituting for traditional instruction. Therefore, when the SAMR model was incorporated into the blended learning model, it fostered the model's effectiveness in developing students' critical reading skills.

5.2.3 The Students' Attitudes Toward the Flex Model of Blended Learning

The high mean score ($\bar{X} = 4.40$, S.D. = 0.46) on the student attitudes questionnaire indicates that students generally held positive attitudes toward teaching and learning within the Flex model of blended learning. The questionnaire comprised three sections, assessing attitudes toward the Flex model, in-class instruction, and out-of-class instruction. The first section yielded a mean score of 4.34 (S.D. = 0.47), reflecting a high level of positive attitude. The second section produced a mean score of 4.12 (S.D. = 0.56), also indicating a high level of positive attitude. The third section achieved a mean score of 4.54 (S.D. = 0.37), representing the highest level of positive attitude among the three sections.

The first section indicated that students were satisfied with the course content, learning activities and tasks, materials, and the technology tools implemented in the Flex model of blended learning. This satisfaction may be attributed to the model's ability to transform traditional reading classes into flexible, interactive, and student-centered learning experiences. Students actively participate in meaningful learning activities, experience greater autonomy, and engage in social interactions with peers and instructors. The findings suggest that students demonstrated active engagement in completing lessons and activities, increased autonomy, and encountered fewer barriers compared to traditional classroom instruction. These results align with Liu (2012), who argued that blended learning provides students with a flexible learning environment, as learning is not confined to the classroom. Similarly, Kurt (2017) reported that students perceived the blended learning environment as more student-centered. Furthermore, students described the class as more positive and less stressful than traditional face-to-face learning. Monteiro and Morrison (2014) also

reported a strong positive impact of blended learning on both academic and behavioral engagement.

Additionally, students reported that in-class instruction offers immediate support and feedback from both peers and instructors. Structured classroom activities increased teacher-student interaction and created opportunities for learning and practice. These results align with Gao and Shi (2023), who found that face-to-face components facilitate direct engagement with teachers and peers, promote in-depth discussions, provide prompt feedback, and foster a sense of community.

Nevertheless, the results indicated that the mean score for outside-class instruction was higher than that for in-class instruction, suggesting a possible preference for outside-class learning. Students noted that outside-class instruction allows for greater repetition, increased engagement in tasks, and convenient access to materials. The learning environment plays a crucial role in motivating students to read and learn (Shamida et al., 2023). Jensen and Scharff (2019) also found that the online component enables students to reflect on information and formulate their thoughts by providing access to a wider range of materials and supporting self-paced learning. Therefore, students' attitudes toward the Flex model of blended learning, as well as their perceptions of in-class and outside-class instruction, may contribute to the development of critical reading skills.

In summary, the questionnaire results indicated that the instructional model was innovative and facilitated the development of students' critical reading skills. The integration of in-class and outside-class instruction, course materials, learning activities, and technology tools within this model mutually reinforced one another, thereby enhancing the effectiveness of the instructional approach in improving critical reading skills.

5.3 Implications for Practice

The research findings indicate that the Flex model of blended learning effectively enhances students' critical reading skills. The instructional model is systematically structured, encompassing both teaching strategies and learning activities. Teachers are encouraged to develop well-organized lesson plans, tasks, and activities that leverage

technological tools. Such systematic design ensures that the model addresses students' needs and improves learning outcomes.

Furthermore, critical reading strategies should be systematically integrated into the curriculum through technology-enhanced assignments aligned with Bloom's taxonomy. The structured sequence of learning activities in the Flex model of blended learning demonstrates how digital technologies can support students' progression from basic comprehension to advanced critical thinking and evaluation. Curriculum designers may utilize this model as a guide for integrating digital tools with cognitive learning objectives.

The study underscores the necessity of professional development that prioritizes both technical competencies and pedagogical design for effective technology integration. Teachers should receive support in enhancing their skills in instructional design, task redesign, and the use of digital resources to increase student engagement and improve critical reading skills.

At the institutional level, support should include robust infrastructure, access to digital materials, and effective methods for assisting teachers. Educational policy should promote flexible and adaptable learning models that facilitate meaningful technological integration and the development of advanced cognitive skills.

The results of this study are significant for instructors, universities, and instructional designers. The findings reinforce that blended learning and technology-integration models are effective in fostering more engaging learning environments, which may lead to improved learning achievement. These outcomes contribute to the academic discourse on critical reading and establish a foundation for future research in this area. However, the study's limitations, including the context-specific nature of the findings, suggest that educators should further investigate critical reading skills with students from diverse academic backgrounds and that additional research is needed to determine broader applicability.

5.4 Suggestions for Future Research

This study offers new insights into reading instruction by integrating the Flex and SAMR models with critical reading strategies. However, further research is required to advance understanding in this area.

Future studies should include larger and more diverse samples from various educational institutions and proficiency levels to enhance the generalizability of the findings. Additionally, researchers are encouraged to conduct longitudinal studies to assess the long-term effects of blended learning on students' critical reading development.

Critical reading strategies were implemented throughout the eight-week instructional period. Future research should investigate which specific critical reading strategies are most effective at enhancing students' analytical, interpretive, and evaluative reading abilities in blended learning environments.

The researchers are encouraged to utilize quasi-experimental or mixed-methods research designs to obtain more comprehensive data on students' learning experiences, engagement, and academic performance.

Finally, future studies should examine the effectiveness of the Flex model in developing additional English language skills, including writing, speaking, and listening, as well as in fostering students' motivation, autonomy, and digital literacy.

REFERENCES

- Adams, W., & Patterson, B. (2008). *Developing reading versatility*. Thomson
- Akbulut, Y. (2007). *Implications of two well-known models for instructional designers in distance education: Dick-Carey versus Morrison-ross-kemp*.
<https://eric.ed.gov/?id=ED496543>
- Alam, S., Albozeidi, H. F., Al-Hawamdeh, B. O. S., & Ahmad, F. (2022b). Practice and principle of blended learning in ESL/EFL pedagogy: Strategies, techniques and challenges. *International Journal of Emerging Technologies in Learning (iJET)*, 17(11), 225–241. <https://doi.org/10.3991/ijet.v17i11.29901>
- Aldoobie, N. (2015). ADDIE model. *American International Journal of Contemporary Research*, 5(6), 68–72.
https://aijcr.thebrpi.org/journals/Vol_5_No_6_December_2015/10.pdf
- Alharbi, A. (2023). Implementation of education 5.0 in developed and developing countries: A comparative study. *Creative Education*, 14(05), 914–942.
<https://doi.org/10.4236/ce.2023.145059>
- Alhumaid, K. (2019). Four ways technology has negatively changed education. *Journal of Educational and Social Research*, 9(4), 10.
<https://doi.org/10.36941/jesr-2019-0002>
- Allan, B. (2007). *Blended learning: Tools for teaching and training*. Facet Publishing.
- Allen, E., & J. Seaman. (2013). *Changing course: Ten years of tracking online education in the United States*. <https://files.eric.ed.gov/fulltext/ED541571.pdf>
- Alshaye, S. (2021). Digital storytelling for improving critical reading skills, critical thinking skills, and self-regulated learning skills. *Cypriot Journal of Educational Sciences*, 16(4), 2049–2069.
<https://doi.org/10.18844/cjes.v16i4.6074>
- Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching and assessing: A revision of bloom's taxonomy of educational objectives. Longman.

- Anuar, N., Muhammad, A. M., & Awang, Z. (2023). Development and validation of critical reading intention scale (CRIS) for university students using exploratory and confirmatory factor analysis. *Asian Journal of University Education*, 19(1), 39-52. <https://doi.org/10.24191/ajue.v19i1.21231>
- Axelrod, R. B., & Cooper, C. R. (2002). *Reading critically, writing well: a reader and guide*. Bedford/St. Martin's.
- Ayob, N. S., Halim, N. D. A., Zulkifli, N. N., Zaid, N. M., & Mokhtar, M. (2020). Overview of blended learning: The effect of station rotation model on students' achievement. *Journal of Critical Reviews*, 7(06). <https://doi.org/10.31838/jcr.07.06.56>
- Banyen, W., Viriyavejakul, C., & Ratanaolarn, T. (2016). A Blended learning model for learning achievement enhancement of Thai undergraduate students. *International Journal of Emerging Technologies in Learning (Ijet)*, 11(04), 48. <https://doi.org/10.3991/ijet.v11i04.5325>
- Barnet, S., Bedau, H., & O' Hara, J. (2020). *Critical thinking, reading, and writing: A brief guide to argument* (10th ed.). Macmillan Learning.
- Bartu, H. (2002). *A critical reading course*. Boğaziçi University Press.
- Beard, L. A., & Harper, C. (2002). Student perceptions of online versus on campus instruction. *Education*, 122(4), 658–663.
- Berger, C., & Kam, R. (1996). *Definitions of instructional design*. <http://www.umich.edu/~ed626/define.html>
- Bernard, R. M., Abrami, P. C., Borokhovski, E., Wade, C., Tamim, R., . . . Bethel, E. C. (2009). A meta-analysis of three types of interaction treatments in distance education. *Review of Educational Research*, 79(3), 1243–1289. <https://doi.org/10.3102/0034654309333844>
- Bharuthram, S. (2012). Making a case for the teaching of reading across the curriculum in higher education. *South African Journal of Education*, 32(2), 205–214.
- Bonk, C. J., & Graham, C. R. (2012). *The handbook of blended learning: Global perspectives, local designs*. John Wiley & Sons.

- Boonmoh, A., & Kulavichian, I. (2023). Exploring Thai EFL pre-service teachers' technology integration based on SAMR model. *Contemporary Educational Technology, 15*(4), ep457. <https://doi.org/10.30935/cedtech/13567>
- Branch, R. M., & Kopcha, T. J. (2014). Instructional design models. In J. M. Spector, M. D. Merrill, J. Elen & M. J. Bishop (Eds.), *Handbook of research on educational communications and technology* (pp. 77-87). Springer. https://doi.org/10.1007/978-1-4614-3185-5_7
- Branch, R., & Merrill, M. D. (2011). Characteristics of instructional design models. In R. A. Reiser & J. V. Dempsey (Eds.), *Trends and issues in instructional design and technology* (pp. 8–16). Merrill-Prentice Hall.
- Branson, R. K., Rayner, G. T., Cox, J. L., Furman, J. P., King, F. J., & Hannum, W. H. (1975). *Interservice procedures for instructional systems development: Executive summary and model* (vols. 1-5). U.S. Army Training and Doctrine Command.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Butterfuss, R., Kim, J., & Kendeou, P. (2020). *Reading comprehension*. Oxford Research Encyclopedia of Education. <https://doi.org/10.1093/acrefore/9780190264093.013.865>
- Cai, L., Huang, C. W., & Tan, H. Y. (2024). Critical literacy approach to English as a foreign language: From theory to practice. *Applied Linguistics, 45*(6), 1120-1122. <https://doi.org/10.1093/applin/amad018>
- Cai, M. (2024). Digital intelligence quotient: A new way to promote the digitization of higher education. *Proceedings of the 3rd International Conference on Internet Technology and Educational Informatization, ITEI 2023*. <https://doi.org/10.4108/eai.24-11-2023.2343615>
- Carman, J. M. (2002). *Blended learning design: Five key ingredients*. <https://blended2010.pbworks.com/f/Carman.pdf>
- Carrigus, R. (2002). *Design in reading: An introduction to critical reading*. Longman.

- Chantanarungpak, K. (2005). Development of web-based instruction model blended with cooperative learning in mathematics for upper primary school students [Master thesis]. Chulalongkorn University.
- Chapman, E. (2002). Alternative strategies for measuring student engagement related to academic outcomes. *Educational Research and Evaluation*, 8(3), 289–301
- Chawwang, N. (2008). *An investigation of English reading problems of Thai 12th – Grade students in Nakhonratchasima Educational Regions 1,2,3 and 7*. [Unpublished master's thesis]. Srinakharinwirot University.
- Chen, C.-M., Wang, J.-Y., & Chen, Y.-C. (2014). Facilitating English language reading performance by a digital reading annotation system with self-regulated learning mechanisms. *Journal of Educational Technology & Society*, 17(1), 102-114.
- Christensen, C. M., Horn, M. B., & Staker, H. (2013). *Is k-12 blended learning disruptive? An introduction to the theory of hybrids*. Clayton Christensen Institute. <http://www.christenseninstitute.org/wpcontent/uploads/2014/06/Is-K-12-blended-learning-disruptive.pdf>
- Christopher, A. (2009). *Instructional designer's job aids. instructional design process*. https://issuu.com/avchristopher/docs/christopher_mrk_jobaids_final3
- Churat, J., Prommatha, R., Pengsawat, W., Upanit, W., Chaemchun, S., Intasena, A., . . . Yotha, N. (2022). The use of the SQ4R technique in enhancing Grade 11 student critical reading. *Higher Education Studies*, 12(4), 113. <https://doi.org/10.5539/hes.v12n4p113>
- Cohen, J. (1998). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.
- Davies, L. J., Chiocca, E. S., Hiller, K. E., Campbell, M., & Naghib, S. L. (2020). Transformative learning in times of global crisis: Reflections on collaborative working practices. *the CEA Critic/CEA Critic*, 82(3), 218–226. <https://doi.org/10.1353/cea.2020.0036>
- Davis, A. L. (2013). Using instructional design principles to develop effective information literacy instruction: The ADDIE model. *College & Research Libraries News*, 74(4), 205-207. <https://doi.org/10.5860/crln.74.4.8934>

- Davis, K. N. (2019). *Implementing the flex model of blended learning in a world history classroom: How blended learning affects student engagement and mastery* [Doctoral dissertation]. University of South Carolina.
- De Castro, C. C., & Guia, A. (2025). Effectiveness of the SAMR model for enhancing literature instruction in junior high school. *Journal of Interdisciplinary Perspectives*, 3(6), 518-531. <https://doi.org/10.69569/jip.2025.211>
- Dick, W., Carey, L., & Carey, J. O. (2022). *The systematic design of instruction* (9th ed.). Pearson
- DiYanni, R. (2017). Reading responsively, reading responsibly: An approach to critical reading. *Critical Reading across the Curriculum: Humanities, 1*, 1-23. <https://doi.org/10.1002/9781119154907.ch1>
- Driscoll, M. (2002). *Blended learning: Let's get beyond the hype*. IBM Global Services. http://www-07.ibm.com/services/pdf/blended_learning.pdf
- Drugova, E., Zhuravleva, I., Aiusheeva, M., & Grits, D. (2021). Toward a model of learning innovation integration: TPACK-SAMR based analysis of the introduction of a digital learning environment in three Russian universities. *Education and Information Technologies*, 26(4), 4925–4942. <https://doi.org/10.1007/s10639-021-10514-2>
- Eberle, J., & Childress, M. (2006). Universal design for culturally diverse online learning. In A. Edmundson (Ed.), *Globalized e-learning cultural challenges* (pp. 239-254). Idea Group, Inc.
- Fraser, C. (2024). *Academic writing for success -- Canadian edition 2.0*. <https://ecampusontario.pressbooks.pub/academicwritingsuccessc2/chapter/post-secondary-reading-and-writing>
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59–109. <https://doi.org/10.3102/00346543074001059>
- Gao, X., & Shi, L. (2023). Interactions in online versus face-to-face classes: Students' and teachers' perceptions. *International Journal of Chinese Language Teaching*, 4(3), 76-93. <https://doi.org/10.46451/ijclt.20230305>

- Garrison, D. R., & Arbaugh, J. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education*, 10(3), 157–172. <https://doi.org/10.1016/j.iheduc.2007.04.001>
- Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *Internet and Higher Education*, 7(2), 95–105. <https://doi.org/10.1016/j.iheduc.2004.02.001>
- Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. John Wiley & Sons.
- Garrison, D., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2–3), 87–105. [https://doi.org/10.1016/s1096-7516\(00\)00016-6](https://doi.org/10.1016/s1096-7516(00)00016-6)
- Kurt, G. (2017). Implementing the flipped classroom in teacher education: Evidence from Turkey. *Journal of Educational Technology & Society*, 20(1), 211–221. <http://www.jstor.org/stable/jeductechsoci.20.1.211>
- Graham, C. R. (2005). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.), *Handbook of blended learning: Global perspectives, local designs* (pp. 3-21). Pfeiffer Publishing.
- Graham, C. R. (2021). Exploring definitions, models, frameworks, and theory for blended learning research. In A. G. Picciano, C. D. Dziuban, C. R. Graham & P. D. Moskal (Eds.), *Blended learning: Research perspectives* (vol. 3, pp. 10-29). Routledge.
- Gunnlaugson, O., Cueto de Souza, R., Zhao, S., Yee, A., Scott, C., & Bai, H. (2023). Revisiting the nature of transformative learning experiences in contemplative higher education. *Journal of Transformative Education*, 21(1), 84–101. <https://doi.org/10.1177/15413446211067285>
- Gustafson, K. L., & Branch, R. M. (1997). Revisioning models of instructional development. *Educational Technology Research and Development*, 45(3), 73–89. <https://doi.org/10.1007/bf02299731>

- Gustafson, K. L., & Branch, R. M. (2002). What is instructional design?. In R. A. Reiser & J. A. Dempsey (Eds.), *Trends and issues in instructional design and technology*. Merrill/Prentice Hall. <http://doi.org/10.1016/B978-0-12-386531-1.00002-8>
- Hanley, M. (2009). *Re: Discovering instructional design 11: The Kemp Model* [Web log comment]. <http://elearningcurve.edublogs.org/2009/06/10/discovering-instructional-design-11-the-kemp-model/>
- Heilporn, G., Lakhal, S., & Bélisle, M. (2022). Examining effects of instructional strategies on student engagement in blended online courses. *Journal of Computer Assisted Learning*, 38(6), 1657–1673. <https://doi.org/10.1111/jcal.12701>
- Hidayati, M., Inderawati, R., & Loeneto, B. (2020). The correlations among critical thinking skills, critical reading skills and reading comprehension. *English Review Journal of English Education*, 9(1), 69–80. <https://doi.org/10.25134/erjee.v9i1.3780>
- Hsu, T., Lee-Hsieh, J., Turton, M. A., & Cheng, S. (2014). Using the ADDIE model to develop online continuing education courses on caring for nurses in Taiwan. *Journal of Continuing Education in Nursing*, 45(3), 124. <https://doi.org/10.3928/00220124-20140219-04>
- Hu, X., Xu, Y., Liao, H., & Ma, J. (2024). A systematic literature review study of digital transformation in higher education: Technologies, challenges and trends. In *ICETM '24: Proceedings of the 2024 7th International Conference on Educational Technology Management* (pp. 146–153). <https://doi.org/10.1145/3711403.3711424>
- Hudson, T. (2007). *Teaching second language reading*. Oxford University Press.
- Hughes, J. E., Thomas, R., & Scharber, C. (2006). *Assessing technology integration: The RAT – replacement, amplification, and transformation - framework*. Association for the Advancement of Computing in Education (AACE).
- Huijie, L. (2010). Developing a hierarchical framework of critical reading proficiency. *Chinese Journal of Applied Linguistics (Bimonthly)*, 33(6), 40-54.
- Ilyas, H. P. (2015). *Critical thinking: Its representation in Indonesian*. ELT Textbooks.
- Jenkins, J. (2015). *Global Englishes*. Routledge.

- Jensen, M., & Scharff, L. (2019). Improving critical reading with E-texts: A controlled study in a collegiate philosophy course. *Journal of the Scholarship of Teaching and Learning*, 19(3). <https://doi.org/10.14434/JOSOTL.V19I2.23978>
- Kang, S. M., Kim, T. Y., Son, H., Park, Y., & Lee, S. H. (2022). Validity of OSCE evaluation using the FLEX model of blended learning. *Journal of Korean Medical Science*, 37(20), e163. <https://doi.org/10.3346/jkms.2022.37.e163>
- Kemp, S., & Dwyer, L. (2001). An examination of organisational culture — the Regent Hotel, Sydney. *International Journal of Hospitality Management*, 20(1), 77–93. [https://doi.org/10.1016/s0278-4319\(00\)00045-1](https://doi.org/10.1016/s0278-4319(00)00045-1)
- Khamkhong, S. (2018). Developing English L2 critical reading and thinking skills through the PISA reading literacy assessment framework: A case study of Thai EFL learners. *3L: The Southeast Asian Journal of English Language Studies*. 24(3). 83-94. <http://doi.org/10.17576/3L-2018-2403-07>
- Khan, B. H. (2005). *Managing e-learning: Design, delivery, implementation and evaluation*. Information Science Publishing.
- Khathayut, P., & Walker-Gleaves, C. (2025). An exploration of EFL students' perceptions of English critical reading: A case of Thai undergraduate students in Songkhla Province. *LEARN Journal: Language*, 18(2), 183-211. <https://doi.org/10.70730/MRTQ9889>
- Kimmons, R., & Hall, C. (2016). Emerging technology integration models. In G. Veletsianos (Ed.), *Emergence and innovation in digital learning foundations and applications* (pp. 51-54). AU Press.
- Kimmons, R., Draper, D., & Backman, J. (2022). PICRAT: The PICRAT technology integration model. In *EdTechnica: The open encyclopedia of educational technology* (pp. 225-233). EdTech Books. <https://doi.org/10.59668/371.5895>
- Kirkland, A. B. (2014). Models for technology integration in the learning commons. *Canadian School Libraries Journal*, 32(1), 14-18.
- Koehler, M. J., Mishra, P., Kereluik, K., Shin, T. S., & Graham, C. R. (2014). The technological pedagogical content knowledge framework. In J. M. Spector, M. D. Merrill, J. Elen & M. J. Bishop (Eds.), *Handbook of research on educational communications and technology* (pp. 101-111). Springer.

- Kopcha, T. J., Neumann, K. L., & Ottenbreit-Leftwich, A. (2020). Process over product: The next evolution of our quest for technology integration. *Education Tech Research Dev.*, 68, 729–749. <https://doi.org/10.1007/s11423-020-09735-y>
- Krathwohl, D. R. (2002). A revision of bloom's taxonomy: An overview. *Theory Into Practice*, 41(4), 212–218. https://doi.org/10.1207/s15430421tip4104_2
- Kurniawan, I. W. A. (2024). English language and its importance as global communication. *International Journal of Social Studies*, 2(1), 51-57
<https://doi.org/10.25078/ijoss.v2i1.3920>
- Kuta, K. W. (2008). *Reading and writing to learn: Strategies across the curriculum*. Libraries Unlimited.
<http://syiafullaheducationinformationcenter.blogspot.com/2010/09/classroom-action-research-in-language.html>
- Lanchwathanakorn, C., & Na-Songkhla, J. (2018). Enhancement of critical reading and critical thinking skills of sixth grade students with reading difficulties by using a mindtool-based scaffolded reading instruction system with evidence-based intervention. *Journal of Education Studies*, 46(4), 1–17.
<https://doi.org/10.58837/chula.educu.46.4.1>
- Lantada, A. D. (2020). Engineering education 5.0: Continuously evolving engineering education. *International Journal of Engineering Education*, 36(6), 1814–1832.
- Larking, M. (2017). Critical reading strategies in the advanced English classroom. *APU Journal of Language Research*, 2, 50.
- Le, H. V., & Chong, S. L. (2024). The dynamics of critical thinking skills: A phenomenographic exploration from Malaysian and Vietnamese undergraduates. *Thinking Skills and Creativity*, 51, 101445.
<https://doi.org/10.1016/j.tsc.2023.101445>
- Le, H. V., Nguyen, T. A. D., Le, D. H. N., Nguyen, P. U., & Nguyen, T. T. A. (2024). Unveiling critical reading strategies and challenges: A mixed-methods study among English major students in a Vietnamese higher education institution. *Cogent Education*, 11(1), 2326732.
<https://doi.org/10.1080/07294360.2024.2326732>

- Lee, Y. H. (2015). Facilitating critical thinking using the C-QRAC collaboration script: Enhancing science reading literacy in a computer-supported collaborative learning environment. *Computers & Education*, 88, 182-191.
- Legarde, M. A. A., & Sumandal, A. H. (2022). Teaching amidst the pandemic: Exploring the perceptions and experiences of teachers in remote rural municipalities in the Philippines. *International Journal of Multidisciplinary Applied Business and Education Research*, 3(10), 2106–2111.
<https://doi.org/10.11594/ijmaber.03.10.22>
- Lever-Duffy, J., & McDonoald, J.B. (2011). *Teaching and learning with technology* (4th ed.). Pearson Education, Inc.
- Lowenthal, P. R. (2010). The evolution and influence of social presence theory on online learning. In T. T. Kidd (Ed.), *Online education and adult learning: New frontiers for teaching practices* (pp. 124–139). IGI Global.
- Lu, D. (2021). Students' perceptions of a blended learning environment to promote critical thinking. *Frontiers in Psychology*, 12, 696845.
<https://doi.org/10.3389/fpsyg.2021.696845>
- Manurung, J. E., & Jabari, N. A. M. (2022). Applying Question and Answer Relationship (QAR) strategy to enhance critical reading skill of authentic text. *Jurnal Pendidikan*, 7(11), 485–492.
- Maxwell, C. (2016). *A deeper look at the flex model*. Blended Learning Universe.
<https://www.blendedlearning.org/a-deeper-look-at-the-flex-model/>
- Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education*, 74, 5-12. <http://doi.org/10.1002/ace.7401>
- Mezirow, J. (2003). Transformative learning as discourse. *Journal of Transformative Education*, 1(1), 58-63. <https://doi.org/10.1177/1541344603252172>
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A new framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054.
- Mohanty, S. (2016). *Models-based teaching: As excellent innovations in teaching*. Partridge Publishing.
- Moiseienko, N. V., & Ozarko, I. I. (2019). Types of blended learning. *Science and Education a New Dimension*, 67(187), 47–50.

- Montgomery, A. P., Hayward, D. V., Dunn, W., Carbonaro, M., & Amrhein, C. G. (2015). Blending for student engagement: Lessons learned for MOOCs and beyond. *Australasian Journal of Educational Technology*, 31(6).
<https://doi.org/10.14742/ajet.1869>
- Monteiro, E., & Morrison, K. (2014). Challenges for collaborative blended learning in undergraduate students. *Educational Research and Evaluation*, 20(7–8), 564–591. <https://doi.org/10.1080/13803611.2014.997126>
- Morrison, G. R., Ross, S. M., & Kemp, J. E. (2004). *Designing effective instruction*. John Wiley & Sons.
- Morrison, G. R., Ross, S. M., & Kemp, J. E. (2012). *Designing effective instruction* (6th ed.). John Wiley & Sons.
- Morrison, G. R. (2010). *Designing effective instruction* (6th ed.). John Wiley & Sons.
- Mosalanejad, L., Abdollahifard, S., & Abdian, T. (2020). Psychiatry gamification from blended learning models and efficacy of this program on students. *PubMed*, 9, 68. https://doi.org/10.4103/jehp.jehp_352_19
- Müller, C., Mildenerger, T., & Steingruber, D. (2023). Learning effectiveness of a flexible learning study programme in a blended learning design: Why are some courses more effective than others?. *International Journal of Educational Technology in Higher Education*, 20(1), 1–25.
<https://doi.org/10.1186/s41239-022-00379-x>
- Nasrollahi, M. A., Kris N. Krishnasamy, P., Mohd Noor, N., & Faculty of Social Sciences and Humanities, National university of Malaysia. (2015). Identifying the critical reading strategies employed by Iranian EFL learners. *International J. Soc. Sci. & Education*, 5(2), 360.
<https://files.eric.ed.gov/fulltext/ED609812.pdf>
- Neumeier, P. (2005). A closer look at blended learning: Parameters for designing a blended learning environment for language teaching and learning. *ReCALL*, 17, 163–178. <https://doi.org/10.1017/S0958344005000224>
- Osguthorpe, R. T., & Graham, C. R. (2003). Blended learning environments: Definitions and directions. *Quarterly Review of Distance Education*, 4(3), 227.
- Paul, R., & Elder, L. (2006). Critical thinking: The nature of critical and creative thought. *Journal of Developmental Education*, 30(2), 34–35.

- Paul, R., & Elder, L. (2008). *The miniature guide to critical thinking: Concepts and tools* (5th ed.). Pearson.
- Peterson, C. (2003). Bringing ADDIE to life: Instructional design at its best. *Journal of Educational Multimedia and Hypermedia*, 12(3), 227-241.
- Pinchai, P., & Sojisirikul, P. (2024). Using Micro-content modules to enhance students' critical reading ability. *rEFLECTIONS*, 31(3), 1386–1407.
<https://doi.org/10.61508/refl.v31i3.277703>
- Pirozzi, R. (2003). *Critical reading, critical thinking* (2nd ed.). Longman.
- Puentedura, R. (2010). *SAMR and TPACK: Intro to advanced practice*.
http://hippasus.com/resources/sweden2010/SAMR_TPACK_IntroToAdvancedPractice.pdf
- Puentedura, R. (2014). *Learning, technology, and the SAMR model: Goals, processes, and practice*. <http://www.hippasus.com/rrpweblog/archives/2014/06/29/LearningTechnologySAMRModel.pdf>
- Ratanaruamkarn, S., Piyanukool, S., & Nuemaihom, A. (2023). Trends in teaching critical reading in the Thai context. *Theory and Practice in Language Studies*, 13(2), 424–431. <https://doi.org/10.17507/tpls.1302.17>
- Reiser, R., & Dempsey, J. (2018). *Trends and issues in instructional design and technology* (4th ed.). Pearson Education
- Richards, J. C., & Schmidt, R. W. (2013). *Longman dictionary of language teaching and applied linguistics*. Routledge.
- Roomy, M. A. (2022). Investigating the effects of critical reading skills on students' reading comprehension. *Arab World English Journal*, 13(1), 366–381.
<https://doi.org/10.24093/awej/vol13no1.24>
- Royal Thai Embassy. (2015). *Agenda 1: Prepare Thais 4.0 for Thailand becoming a first world nation*. <http://thaiembdc.org/agenda-1-prepare-thais-4-0-for-thailand-becoming-a-first-world-nation/>
- Samarng, C. (2023). Effects of using the KWL chart on fostering EFL university students' critical reading. *Warasan Parichat*, 36(1), 182–197.
<https://doi.org/10.55164/pactj.v36i1.259611>

- Shamida, A., Sidhu, G. K., Kamil, S., & Du, R. (2023). EFL students' perspectives and challenges in critical reading skills for postgraduate study. *Environment-Behaviour Proceedings Journal*, 8(25), 21–26. <https://doi.org/10.21834/e-bpj.v8i25.4867>
- Sharma, P., & Barrett, B. (2007). *Blended learning: Using technology in and beyond the language classroom*. Macmillan.
- Smith, P. L., & Ragan, T. J. (2005). *Instructional design* (3rd ed.). John Wiley & Sons.
- Snelling, C. (2022). *Lessons from the pandemic: Making the most of technologies in teaching*. Universites UK. <https://www.universitiesuk.ac.uk/what-we-do/policy-and-research/publications/lessons-pandemic-making-most>
- Sousa, D. A. (2014). *How the brain learns to read*. Corwin Press.
- Spector, J. M., Merrill, M., Elen, J., & Bishop, M. (2014). *Handbook of research on educational communications and technology*. Springer eBooks. <https://doi.org/10.1007/978-1-4614-3185-5>
- Staker, H., & Horn, M. B. (2012). *Classifying K-12 blended learning*. Innosight Institute. <http://www.christenseninstitute.org/wp-content/uploads/2013/04/Classifying-K-12-blended-learning.pdf>
- Suratha, M. (2019). *Exploring critical reading in the English textbooks for Thai students* [Independent Study]. Chulalongkorn University. <https://doi.org/10.58837/chula.is.2019.31>
- Surdyanto, A., & Kurniawan, W. (2020). Developing critical reading module using integrated learning content and language approach. *Studies in English Language and Education*, 7(1), 154-169. <https://doi.org/10.24815/siele.v7i1.15098>
- Taylor, M., Vaughan, N., Ghani, S. K., Atas, S., & Fairbrother, M. (2018). Looking back and looking forward: A glimpse of blended learning in higher education from 2007-2017. *International Journal of Adult Vocational Education and Technology (IJAVET)*, 9(1), 1-14.
- Thongsan, N. C., & Anderson, N. J. (2025). From passive answers to active inquiry: How AI supports critical reading in EFL classrooms. *LEARN Journal: Language Education and Acquisition Research Network*, 18(2), 795–820. <https://doi.org/10.70730/KMKL8505>

- Tomasek, T. (2009). Critical reading: Using reading prompts to promote active engagement with text. *International Journal of Teaching and Learning in Higher Education*, 21(1), 127–132.
- Tong, D. H., Uyen, B. P., & Ngan, L. K. (2022). The effectiveness of blended learning on students' academic achievement, self-study skills and learning attitudes: A quasi-experiment study in teaching the conventions for coordinates in the plane. *Heliyon*, 8(12), e12657. <https://doi.org/10.1016/j.heliyon.2022.e12657>
- Tovani, C. (2000). *I read it, but i don't get it, comprehension strategies for adolescent readers*. Stenhouse Pub.
- Trevisan, L. V., Eustachio, J. H. P. P., Dias, B. G., Filho, W. L., & Pedrozo, E. Á. (2023). Digital transformation towards sustainability in higher education: state-of-the-art and future research insights. *Environment Development and Sustainability*, 26(2), 2789–2810. <https://doi.org/10.1007/s10668-022-02874-7>
- Vaughan, N. (2014). Student engagement and blended learning: Making the assessment connection. *Education Sciences*, 4(4), 247–264. <https://doi.org/10.3390/educsci4040247>
- Wallace, C. (2003). *Critical reading in language education*. Palgrave Macmillan.
- Wallace, M., & Wray, A. (2021). *Critical reading and writing for postgraduates* (4th ed.). SAGE Publications.
- Wang, M., Fredricks, J. A., Ye, F., Hofkens, T. L., & Linn, J. S. (2016). The math and science engagement scales: Scale development, validation, and psychometric properties. *Learning and Instruction*, 43, 16–26. <https://doi.org/10.1016/j.learninstruc.2016.01.008>
- Welsh, J. L., Harmes, J. C., & Winkelman, R. J. (2011). Tech tips: Florida's technology integration matrix. *Principal Leadership*, 12(2), 69–71.
- Wilson, K. (2016). Critical reading, critical thinking: Delicate scaffolding in English for Academic Purposes (EAP). *Thinking Skills and Creativity*, 22, 256–265.
- Yang, Y., Dibyamandala, J., & Mangkhang, C. (2022). The effects of mobile blended active language learning on the English critical reading skills of high school students in Thailand. *Journal of Curriculum and Teaching*, 11(5), 1. <https://doi.org/10.5430/jct.v11n5p1>

Zhang, B. H. (2011). CK, PCK, TPCK, and non-intellectual factors in sustaining an iMVT innovation for Science learning. *Procedia - Social and Behavioral Sciences*, 15, 2142– 2147. <https://doi.org/10.1016/j.sbspro.2011.04.068>



APPENDIX A

CERTIFICATE OF EXAMPTION



The Mae Fah Luang University Ethics Committee on Human Research
333 Moo 1, Thasud, Muang, Chiang Rai 57100
Tel: (053) 917-170 to 71 Fax: (053) 917-170 E-mail: rec.human@mfu.ac.th

CERTIFICATE OF EXEMPTION

COE: 41/2025

Protocol No: EC 25051-10

Title: Flex Model of Blended Learning Development in Enhancing EFL Students' Critical Reading Skills

Principal investigator: Miss Atchara Limpapattarakul

School: liberal arts

The Mae Fah Luang University Ethics Committee on Human Research (MFU EC) reviewed the protocol in compliance with international guidelines such as Declaration of Helsinki, the Belmont Report, CIOMS Guidelines and the International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use - Good Clinical Practice (ICH GCP) and decided to exempt the above research protocol.

Date of Exemption: March 14, 2025

(Jullapong Achalapong, M.D.)

Chairperson of the MFU Ethics Committee on Human Research

For research protocol exempted by the Mae Fah Luang University Ethics Committee on Human Research (MFU EC), the investigators must comply with the followings:

- No need to submit a progress report.
- When there are changes of the protocol, the investigator must send an amendment report (AP 06/2022) to the MFU EC.
- When the research finishes, the investigator must send a final report (AP 09/2022).

Please go to <https://ec.mfu.ac.th> to download MFU EC forms for reporting.

I, as an investigator, agree to comply with the above obligation.

Miss Atchara Limpapattarakul

Date

APPENDIX B

LIST OF EXPERTS

- 
- | | | |
|-----|---|---|
| 1. | Assist. Prof. Dr. Panyanut Saksittanupab | Sisaket Rajabhat University |
| 2. | Dr. Phiyaphorn Chaya | Srinakharinwirot University |
| 3. | Dr. Kittika Limpariwatthana | Lamphang Rajabhat University |
| 4. | Dr. Thaweesak Linkam | Rajamangala University of
Technology Krungthep |
| 2. | Assist. Prof. Dr Chuanpit Sriwichai | Phayao University |
| 3. | Dr. Phatcharin Satchayad | Phayao University |
| 4. | Assist. Prof. Dr. Phinyapat Kawinkham | Chiangrai Rajabhat University |
| 5. | Assist. Prof. Dr. Bhudtree Wetpichetkosol | Chiangrai Rajabhat University |
| 6. | Assist. Prof. Dr. Supaporn Tewiya | Chiangrai Rajabhat University |
| 7. | Dr. Navarat Boonsamritphol | Chiangrai Rajabhat University |
| 8. | Dr. Suthasinee Sriwichai | Chiangrai Rajabhat University |
| 9. | Assist. Prof. Dr. Wilawan Champakaew | Mae Fah Luang University |
| 10. | Dr. Chayaphol Khamyod | Mae Fah Luang University |
| 11. | Dr. Maneerat Chuaychowong | Mae Fah Luang University |

APPENDIX C

THE FLEX MODEL OF BLENDED LEARNING

1. Background of the Instructional Model

In today's world, English has emerged as the global language, serving as a lingua franca in facilitating communication among people from diverse linguistic and cultural backgrounds. English has significantly influenced various fields, including education, technology, science, business, and tourism (Jenkins, 2015; Kurniawan, 2024). In this fast-changing technological landscape, the combination of technology and language transforms how people communicate and learn. English language is fundamental for achieving academic and professional success. In higher education, a lack of critical reading skills can lead to various academic challenges. Critical reading is a key instrument for acquiring knowledge and is widely recognized as an essential academic skill because it enables students to engage with texts analytically. Critical reading skills include comprehension, evaluation of arguments, identification of bias, synthesis of knowledge, and questioning of assumptions (Barnett, 1997; Hudson, 2007; Paul & Elder, 2008). To cultivate critical reading skills, students must be able to identify the reading purpose, the author's stance, and the source's credibility, and they should also reflect critically after reading (Anuar et al., 2023; Ratanarumkarn et al., 2023).

At the policy level, the concept of Education 5.0 represents a new paradigm in education and aims to improve learning outcomes and promote individualized education by integrating advanced digital technologies into the educational system (Alharbi, 2023; Lantada, 2020). Similarly, the Thailand 4.0 policy aims to reform the education system to make students more competent in 21st-century skills and to become global citizens. The key to making Thailand 4.0 a success is to deliver knowledge to society through the cooperation of educational institutions (Puncreobutr, 2017). This policy-driven transformation has significantly impacted teaching and learning, dynamically changing the roles of both teachers and students while underscoring the need for innovative instructional approaches aligned with the digital era.

In higher education, university students are expected to learn more than basic reading comprehension skills; they need to understand the text fully and critically. Wallace and Wray (2021) emphasized that critical reading is an essential academic skill for university students because it enables them to construct knowledge and participate effectively in scholarly discourse. With this, Wallace (2003) supported critical reading as the learners' abilities to comprehend not only the literal meaning but also the word choice and style of language.

Many EFL students, especially in Asian countries, still have trouble learning how to read critically (Barnet et al., 2020; Khamkhong, 2018; Le et al., 2024). Many Thai researchers have found the English reading ability of Thai students urgently need to be improved. In Thailand, university students face significant challenges in reading instruction, which has traditionally focused on memorization and repetition rather than the development of higher-order thinking skills. Although many Thai universities require compulsory critical reading courses, students frequently struggle to critically analyze, evaluate, and synthesize information from texts. At the public university examined in this study, the critical reading course is a core component of the curriculum. However, students demonstrated unsatisfactory English reading achievement, with final exam scores indicating that their critical reading skills range from low to middle levels. These students experienced difficulties in comprehending texts, identifying main ideas, and interpreting the underlying meaning of reading materials.

Many studies have documented the significant problems of Thai students. Accordingly, Thongsan and Anderson (2025) indicated that conventional reading instructions frequently prioritize basic comprehension, which restricts students' opportunities to cultivate analytical skills and critical inquiry. Bharuthram (2012) found that many university students had insufficient abilities, students can read and comprehend the text, but they cannot read it critically. Moreover, the study by Chawwang (2008) indicated that Thai learners encounter difficulties related to vocabulary, sentences structure, reading strategies, and inadequate reading resources. Khamkong's (2018) study also revealed the performance of Thai university students in Northeastern Thailand on English critical reading and thinking assessments. The majority performed inadequately on English reading comprehension, especially with

interpretative and critical inquiries. These challenges indicate that insufficient critical reading skills may negatively affect students' academic achievement and their abilities to engage with reading materials critically.

At the same time, the Thai educational system is undergoing rapid digital transformation, which has significantly influenced teaching and learning practices in higher education. Educational institutions are increasingly integrating digital technologies into classrooms to support flexible learning and develop students' 21st-century skills. However, challenges such as limited technological infrastructure, insufficient curriculum development, and inadequate teacher preparation continue to hinder effective technology integration in education. Consequently, there is a growing need for innovative instructional approaches that can simultaneously enhance students' critical reading skills and support meaningful technology integration in language learning classrooms.

To enhance the critical reading skills of EFL students within the context of the digital transformation era, using traditional instructions and materials are no longer sufficient to meet the diverse characteristics of today's students. To address these challenges, it may be necessary to modify the traditional lecture format and physical arrangement of the classroom by integrating technology tools into the teaching and learning process. A possible solution might be an instructional model that is significantly more effective. This study introduces the "Flex model of blended learning" as a critical reading instructional model incorporating the Flex model (Staker & Horn, 2012), the SAMR model (Puentedura, 2014), and critical reading strategies (Axelrod & Cooper, 2002; Nasrollahi et al., 2015; Tovani, 2000). This instructional model promotes the development of critical reading skills by providing students with flexible and personalized learning experiences. The Flex model, an expansion of the blended learning proposed by Staker and Horn (2012), is described as instructional programs in which online learning serves as the basis for students' learning, occasionally leading them to offline activities. Students primarily learn on campus and transition between learning modalities through customized, flexible schedules. The teacher is on-site and provides individual support through activities.

Numerous studies highlighted the benefits of blended learning. Lu's (2021) research indicated that students perceived blended learning as a substantial

enhancement to their critical thinking abilities, facilitating their analysis and synthesis of knowledge during classroom discussions. Furthermore, the study by Yang et al. (2022) found that mobile blended active language learning significantly improved Thai high school students' English critical reading skills and was positively perceived for its flexibility, engagement, and motivation.

The incorporation of technological tools can substantially advance the evolution of blended learning and transform the educational process, rather than simply replacing traditional instruction. Puentedura (2014) developed the SAMR model as a framework to describe the levels of selecting, using, and evaluating technology integration in the classroom. The SAMR model has four levels, (Substitution, Augmentation, Modification, and Redefinition), which are shown as steps on a ladder from lower to higher levels of technology integration.

The previous study of Liu and Tsai (2012) provided an example of the Redefinition level of the SAMR model using m-learning by developing an augmented-reality mobile application to help Chinese students learn English. The finding revealed that augmented-reality mobile learning may increase the effectiveness of language learning. Therefore, this incorporation of the Flex model of blended learning and the SAMR model may facilitate a paradigm shift in learning that fosters the development of critical reading skills. As the education system continues to reform, it is evident that teachers may require diverse educational strategies and take the opportunity to implement digital technologies.

When the Flex model of blended learning of the study is combined with the SAMR model, it has the potential to foster transformative learning by offering the sense of community and additional learning possibilities beyond the traditional classroom. Transformative learning is a learning process that actively engages students through critical reflection and discussion. Students are encouraged to question their assumptions and expectations to deepen their understanding of the knowledge gained (Mezirow, 1997). Moreover, transformative learning occurs in an environment that fosters a strong sense of community through activities such as small group work, class discussions, and group assignments (Davies et al., 2020). Thereby, teachers need to encourage students to maintain frequent communication with their peers and coordinate activities that promote cooperation and a sense of community.

As blended learning becomes increasingly prevalent in higher education, there is a growing need for theoretically grounded research to inform instructional practice. Existing research has not sufficiently articulated the theoretical relationships among blended learning, the SAMR model, and the development of critical reading skills. Although blended learning and technology integration have been widely examined, empirical studies focusing on SAMR-based blended learning within the English as a Foreign Language (EFL) context remain limited. Graham (2021) observed that blended learning research continues to lack unified conceptual frameworks that explain how technology-supported environments facilitate higher-order cognitive processes. Similarly, Garrison and Kanuka (2004) highlighted the transformative and reflective potential of blended learning but provided limited explanation of how instructional technology integration supports specific cognitive skills, such as critical reading.

This study aims to develop the Flex model of blended learning as an instructional model to enhance students' critical reading skills. Four main theories and concepts inform the development of this instructional model: the Flex model, the SAMR model, critical reading strategies, and the instructional design model. Therefore, the objectives of the study are:

- 1) To develop and validate the quality of Flex model of blended learning in enhancing EFL students' critical reading skills
- 2) To implement and identify the effectiveness of the Flex model of blended learning in enhancing EFL students' critical reading skills
- 3) To explore the students' attitudes toward the Flex model of blended learning

2. Theoretical Concepts Underpinning the Development of the Flex Model of Blended Learning

2.1 The Instructional Design Models

The instructional design model is important for all instructors, as it can support them in systematically designing the teaching and learning process, including planning for learning outcomes, instruction, activities, materials, and assessment, and ensuring the quality of instruction. Smith and Ragan (2005) defined instructional design as the systematic process of transforming learning and teaching principles into plans for

instructional materials, activities, information resources, and evaluation. According to Branch and Kopcha (2014), instructional design is an iterative process of planning outcomes, selecting efficient teaching and learning methods, selecting appropriate technologies, identifying educational media, and measuring performance. Moreover, Gustafson and Branch (1997) defined that the models of instructional design should provide us with conceptual and communication tools that we can use to visualize, direct, and manage processes of guided learning, facilitate us to view both sequential and concurrent aspects of instructional development, and to select or develop the most appropriate operational tools.

In this study, the researcher selected four instructional design models to synthesize: Dick and Carey's Design Model (Dick et al., 2022), the Kemp Model (Kemp & Dwyer, 2001), and the ADDIE Model (Morrison, 2010). After reviewing all four instructional design models, the researcher found that the processes of instructional design interrelate with one another. Firstly, the instructional design might start with analyzing problems, learners, and teachers, setting objectives, and identifying content and tasks. Next, the analysis and objectives served as the guide for designing and developing instructional strategies, assessments, and tools. Finally, it should be the stage of model evaluation and revision to determine its validity and effectiveness. Finally, ten components were selected as the instructional design model for developing the Flex model of blended learning to enhance EFL students' critical reading skills.

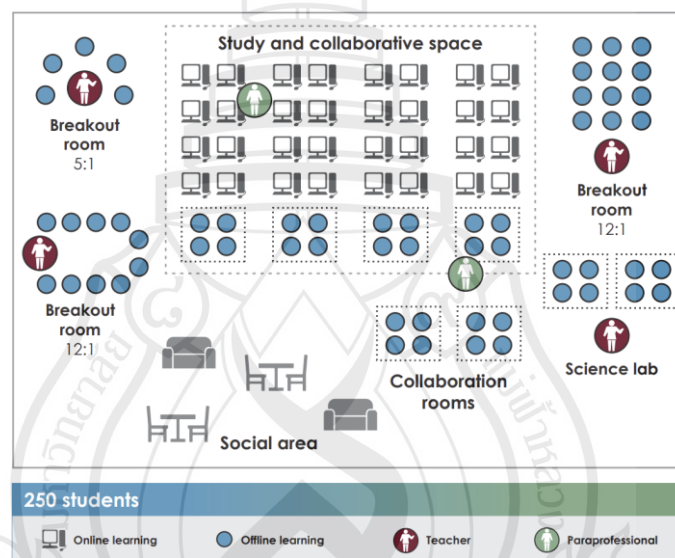
Therefore, the Flex model of blended learning will be developed with ten components, which are analyzing needs and problems, formulating Objectives, analyzing the learning environment, analyzing teachers' and students' roles, analyzing and designing content, identifying instructional strategies, selecting instructional technology, developing instructional materials and assessment, implementing the instruction, and evaluating and revising.

2.2 The Flex Model

Blended learning is the adoption of new ways of learning and teaching that promote the integration of technology across different areas of language teaching. Blended learning is a pedagogical approach that effectively reduces in-person instruction by integrating diverse, immersive online learning experiences. Students in

blended learning courses appreciate flexible scheduling, self-paced online materials, and face-to-face interaction with instructors.

The Flex model proposed as illustrated in Figure C1, is described as instructional programs in which online learning serves as the basis for students' learning, occasionally leading them to offline activities. Students primarily learn on campus and transition between learning modalities using customized, flexible schedules. The teacher is on-site and provides individual support through activities such as small-group discussion, individual instruction, learning laboratories, and social spaces. (Staker & Horn, 2012),



Source Staker and Horn (2012)

Figure C1 The Flex Model

In addition, Alhumaid (2019) characterized the Flex model as the provision of all instructional content to students via computers. Students will usually enter a classroom equipped with individual computers for each student. Students are free to enter and leave as they please to complete their work, as there are no specified start times for lessons or lectures. Moreover, the Flex model offers benefits in terms of learning flexibility, student autonomy, and engagement, and its applicability can be adapted to different educational settings to varying extents. Hence, the cost-effectiveness of online platforms enables teachers and students to access a diverse array of supplementary materials.

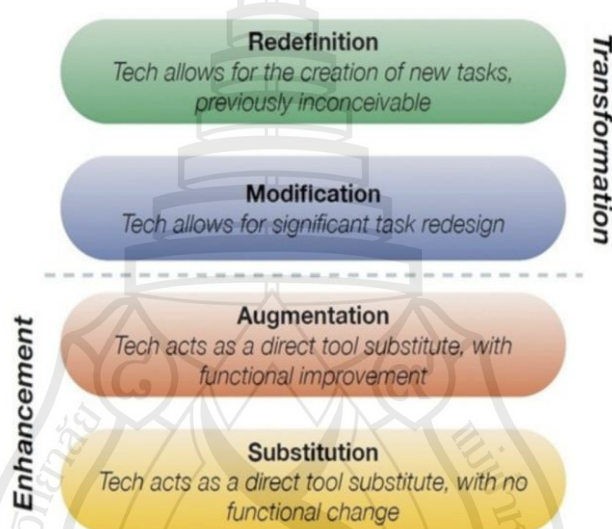
Numerous studies highlighted the benefits of the blended learning model. According to Christensen et al. (2013), the blended learning model offers advantages in learning flexibility, student autonomy, and engagement, and its implementation can be tailored to varying degrees across different educational contexts. Moreover, Kang et al. (2022) demonstrated that the blended learning offers advantages in both cognitive and affective domains. The blended learning model, when applied in the cognitive domain, may improve academic achievement, problem-solving, critical thinking, and comprehension. In the affective domain, the blended learning model has the potential to foster feelings of satisfaction, academic interest, a positive learning disposition, and motivation. Additionally, Lu's (2021) study revealed that students believed blended learning significantly enhanced their critical thinking skills, enabling them to analyze and synthesize information during classroom discussions.

Therefore, the Flex model provides a comprehensive, flexible framework that effectively addresses the unique opportunities and challenges in teaching and learning. The aim of this study is to develop innovative instructional model that employs the Flex model (Staker & Horn, 2012) as a framework for fostering critical reading skills in EFL students.

2.3 The SAMR Model

Despite the digital transformation era, classrooms are constantly changing, and teachers struggle to find and select appropriate technology. Currently, various technology integration models are available to prepare teachers for teaching in online or blended contexts. Teachers must be aware of their students' abilities and characteristics before integrating technology and should consider remediation before attempting to implement it (Kopcha et al., 2020). Similarly, Willis et al.'s (2019) study on the best predictors of technology integration found that technologically proficient teachers are more successful at aligning technology with learning objectives, content, and context. Hence, technology must be purposeful, adaptable, and pedagogical, and the educator must implement it with clear expectations and goals. Additionally, the good model should provide educators with valuable, productive knowledge, prioritize student achievement, and view technology as a tool for achieving specific goals (Kimmons & Hall, 2016).

The SAMR model is suitable for incorporating technology into the classroom and enhancing student engagement and learning outcomes. The SAMR model is a framework developed by Puentedura (2012) that aims at enhancing classroom technology integration. The SAMR model classifies four levels of technology integration in the classroom, namely, Substitution, Augmentation, Modification, and Redefinition. Additionally, Substitution and Augmentation are considered “Enhancement” steps, whereas Modification and Redefinition are “Transformation” steps (Figure C2).



Source Puentedura (2012)

Figure C2 The SAMR model

The SAMR model provided teachers with a structured framework for purposefully integrating technology into their classroom instructional practices. When teachers use this model to plan lessons, they can consider the role of technology in education and how it will facilitate students’ learning (Puentedura, 2012). Moreover, the most significant contributions of the SAMR model to the education system are its provision of a guide for transitioning from task substitution to task redefinition and from task enhancement to task transformation while examining the vast possibilities that technology presents for both teaching and learning (Puentedura, 2010).

According to Figure 2, Puentedura (2012) exemplified the details of the four dimensions as follows:

1) Substitution is the use of technology when the learning task could be accomplished without technology. There is no functional change in teaching and learning. The substitution level is the degree to which traditional practices are replaced by technology, such as reading a novel online as an e-book.

2) Augmentation is the use of technology as an effective tool for enhancing the instructional process, as it increases student engagement and enriches their learning experiences. Moreover, this level includes integrating interactive digital enhancements, such as comments, hyperlinks, and multimedia. The content remains unchanged; however, students now have the opportunity to utilize digital functionalities to augment the lesson. For example, students will be asked to submit exit tickets using Menti-meter and the Kahoot website before leaving the classroom.

3) Modification is the initial step in the progression from enhancement to transformation. The new techniques and tools are used to facilitate, for example, listening activities and rewriting. It focuses on textual, visual, and auditory tools for developing shared knowledge. Examples of this include students creating voice recordings (cellphone), participating in online group discussions (Facebook, Twitter), and using interactive text tools (Thinglink, Padlet, Google Forms).

4) Redefinition is the final stage where the creation of new tasks cannot be accomplished without the use of technology. It provides an entirely new approach and strategy through the incorporation of technology, leading to transformation and improvements in students' learning and individual learning preferences. For example, virtual reality of historical sites, interactive simulations of complex scientific concepts, and/or real-time collaboration with peers from other parts of the world.

According to Puentedura (2012), the SAMR model highlights that when teachers consider incorporating technology into the learning process, they often question the most effective ways to use it. Puentedura (2012) illustrates these types of questions at levels comparable to those of the SAMR framework. By addressing these questions, the educator can determine how technology can optimize instructional design, thereby augmenting student engagement in the teaching and learning process. According to Chen's (2013) study, tablets offer various benefits for English learners, such as grammar checking, pronunciation practice, and word lookup, which could

improve informal language acquisition by providing functional enhancements and augmenting the learning experience beyond the classroom.

Therefore, this study employs the SAMR model as the framework for selecting and implementing digital learning tools in blended learning environments. Integrating the SAMR model into the Flex model could potentially shift students' learning from enhancement to transformative learning, ultimately leading to the development of critical reading skills.

2.4 The Critical Reading Skills

One of the essential generic skills that tertiary students should acquire during their university studies is critical reading. Critical reading is described as “a high-level reading process that entails the ability to read with analysis and judgment” (Huijie, 2010). According to Wallace (2003), critical reading provides students the opportunity to think about and analyze information, to view the context with a wider perspective linked to their critical understanding, and to evaluate the context they face. Likewise, Wallace and Wray (2021) define critical reading as questioning how the author proves the argument or whether the reader has more information about the subject matter. The objective of critical reading is to create judgments regarding the functioning of a text. When individuals engage in critical reading, they go beyond simply absorbing or comprehending the text. They also interpret, analyze, and evaluate the content. It centers on the analysis of the pattern, underlying assumptions, and deeper meaning behind the text. Those areas of focus will be subject to questioning rather than being unquestioningly accepted (Kurland, 2010).

In a nutshell, critical reading can't be achieved without critical thinking. This means that critical thinking is considered a crucial component of critical reading skills. Critical reading comprises advanced cognitive processes such as analysis, evaluation, and synthesis, which are vital for academic achievement (Lee, 2015). To engage in critical reading, an individual must also be able to think critically (Suratha, 2019). According to Fraser (2024), to cultivate critical reading abilities, a reader must engage with the text, relevant ideas, the validity of arguments, and the reliability of sources to comprehend it. In the context of English as a Foreign Language (EFL), critical reading encompasses the capacity to deduce implicit meanings, evaluate the author's intent, identify bias, and distinguish between fact and opinion (Cai et al., 2023). Students must

acquire the skills of both reading comprehension and critical and reflective thinking to succeed academically.

Furthermore, the sub-skills of critical reading are critical reading strategies, which are the methods employed to systematically analyze and evaluate texts and form the basis for the development of critical reading skills. Critical reading strategies empower students to engage systematically and analytically with their textbooks and other reading materials. Students are encouraged to employ cognitive processes at the three highest levels of Bloom's Taxonomy through critical reading strategies, which are typically associated with critical thinking. Critical reading strategies encompass the specific actions readers employ to thoroughly comprehend a text (Wallace, 2003). The scholars have proposed instructional strategies aimed at fostering students' critical reading abilities (Axelrod & Cooper, 2002; Nasrollahi et al., 2015), which include the following:

- 1) Annotating: writing notes, circling important words, and adding remarks.
- 2) Previewing: acquiring information about a text prior to reading it.
- 3) Contextualizing: placing a text in its cultural contexts, biographical contexts, and historical contexts
- 4) Outlining: identifying the main ideas
- 5) Analyzing: an analysis of the main idea and its supporting elements
- 6) Summarizing: rephrasing the main idea in their language
- 7) Paraphrasing: the act of rephrasing the main idea without altering its meaning
- 8) Synthesizing: the process of generating a new entity by combining different parts
- 9) Inquiring: asking questions regarding the topic
- 10) Reflecting: evaluating the credibility, emotional impact, and logic of a text

In conclusion, after synthesizing critical reading strategies proposed by scholars, this study adapted these approaches (Axelrod & Cooper, 2002; Nasrollahi et al., 2015) and developed a teaching and learning procedure comprising four steps: previewing, questioning, analyzing, and reflecting. These steps are designed to enhance students' critical reading skills.

2.5 The Result of the Flex Model of Blended Learning

The development of the Flex model of blended learning as the instructional model of critical reading skills was based on the theoretical concepts of the Flex model (Staker & Horn, 2012), the SAMR model (Puentedura, 2012), critical reading strategies (Axelrod & Cooper, 2002; Nasrollahi et al., 2015), and the synthesis of previous models for instructional design, including Dick and Carey's Design Model (Dick et al., 2022), the Kemp Model (Kemp & Dwyer, 2001), the ADDIE Model (Morrison, 2010), and the Dynamic Instructional Design Model (Lever-Duffy & McDonald, 2011). The teaching and learning will be split into 2 hours of in-class instruction (25%) and 2 hours of online self-study (25%), with independent learning outside-class instruction (50%).

The critical reading lessons consist of four chapters; each chapter promotes the different critical reading skills, namely, 1) distinguishing between facts and opinions, 2) identifying the author's purpose, 3) making inferences, and 4) evaluating arguments. Moreover, the study adapted four critical reading strategies: previewing, questioning, analyzing, and reflecting, and then tailored them into a teaching and learning procedure. Consequently, the learning contents, activities, and series of tasks are delivered through four learning modes, both in-class and outside-class instruction, which are:

- 1) Flexibility (in-class mode)
- 2) Learning (online mode)
- 3) Enhancement (on-campus mode)
- 4) Experience (on-campus mode)

Finally, the students' attitudes towards the Flex model of blended learning will also be explored. The Flex model of blended learning is presented as illustrated in Figure C3.

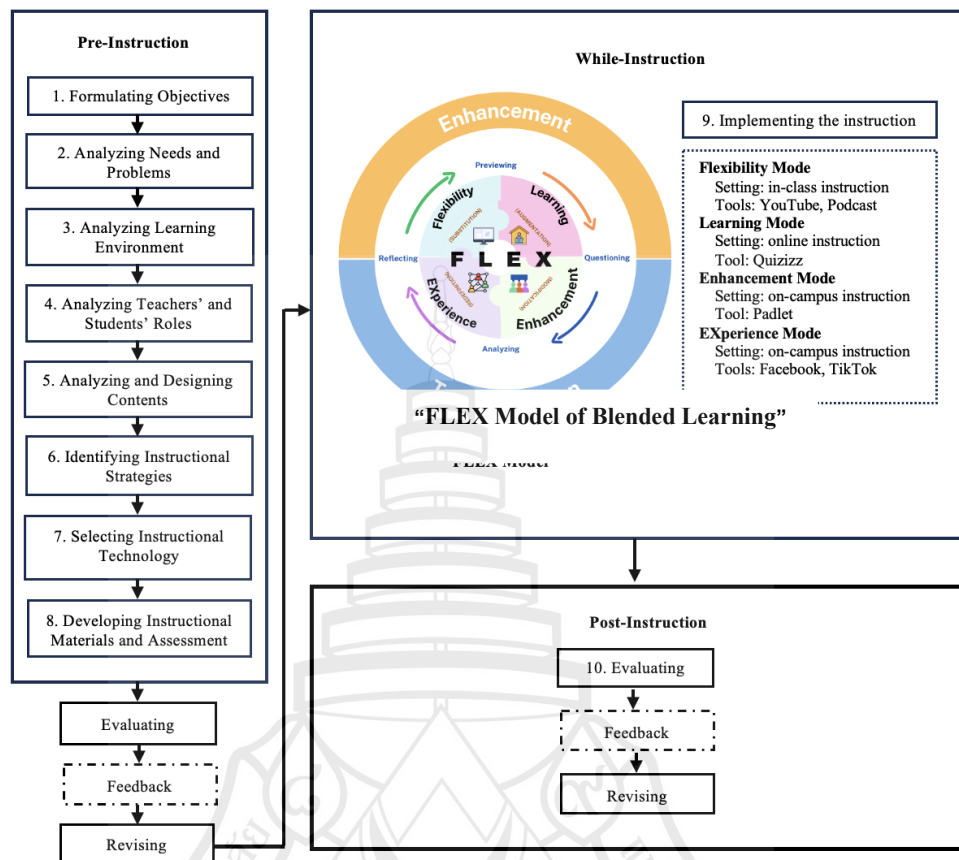


Figure C3 The Flex Model of Blended Learning

The Flex model of blended learning consisted of the ten components as follows:

1) Analyzing the Needs and Problems

In designing the Flex model of blended learning, the first stage was to identify needs and problems. To identify the needs and problems of interviewing teachers, teachers might reflect on the need to design content and learning activities, significant problems in teaching critical reading, and their experiences and opinions regarding the use of technology in reading class. Students explained their major issues and perspectives on learning critical reading, as well as their experiences and perspectives on using technology in critical reading instruction. The study then analyzed the interview data and used it as one component in developing the Flex model of blended learning.

2) Formulating Objectives

To formulate the learning objectives, the study analyzed program learning outcomes (PLOs), course learning outcomes (CLOs), and course descriptions to determine students' performance and learning outcomes after implementation. The objectives included both enabling and terminal objectives, guiding the design of content and activities are as follows:

Upon completing the course, students will be able to...

- (1) Distinguish between facts and opinions in the texts correctly
- (2) Identify the author's purpose in the texts correctly
- (3) Make inferences from the texts using schema and textual evidence correctly
- (4) Evaluate an argument using their experiences and evidence from the texts correctly

3) Analyzing the Learning Environment

After synthesizing blended learning approaches from scholars, the study then modifies the Flex model of blended learning to align with a public university context for establishing learning environments. All four learning modes of the study use online learning as their backbone, meaning all content, materials, and tasks are delivered online via various digital tools. As per the university regulations, the study adopts Google Classroom as the learning management system for instruction delivery and leverages several digital tools, including YouTube, Quizizz, Padlet, Facebook, and TikTok, across different learning modes. Moreover, the learning space and facilities used for teaching and learning were mainly on campus but outside the normal classroom, such as the library, an active learning room, and a learning community space.

4) Analyzing Teachers' and Students' Roles

Teachers were no longer required to deliver content from the front of the class. Instead, they adopted Google Classroom as a learning management system to track each student's progress and provide flexible, adaptive support through activities such as group discussions and team projects. Moreover, teachers recommended relevant learning resources, provided assistance, and answered questions. If students have any questions or problems, they can consult the teachers immediately on campus or online.

Regarding students' roles, they meet biweekly with their teachers to create their learning plans and seek advice on academic solutions. Once students develop their two-week learning plan, they transition through different learning modes as outlined in it. This practice aimed to promote personalized learning and engagement in the learning process. Students can promptly schedule a meeting with the teacher for assistance when needed. The Flex model of blended learning gave students a high level of flexibility in their learning, enabling them to progress through lessons and materials at their own pace.

5) Analyzing and Designing Contents

The contents used in the Flex model of blended learning were consistent with the PLOs, CLOs, the course description, and the objectives of the critical reading course in the first semester of the academic year 2025. According to PLO5, it focused on “using English language skills in listening, speaking, reading, and writing accurately and fluently.” The CLO1 highlights “analyze reading texts using a variety of reading strategies,” and the CLO2 indicates that “Analyze and interpret underlying meanings across various text types.” Consequently, the course description outlines that “students will study and practice a wide range of reading, text for comprehension, and reading strategies for enhancing reading ability; analyze text types; read text; and conduct reading activities.”

Therefore, the critical reading texts were selected from a variety of sources, including online magazines, news articles, advertisements, and stories. They were selected to correspond to the CEFR B1 level as measured by Flesch-Kincaid. The Flesch-Kincaid Grade Level scores range from 30 to 50. Then, they were delivered via Google Classroom.

The critical reading lessons were divided into four lessons as follows:

Lesson 1: Distinguish between Facts and Opinions

Students practice identifying between facts and opinions in reading passages. Students will be able to indicate the facts that are statements that can be verified and proven, and the opinions that are statements that express the meaning of an author's attitudes or beliefs.

Lesson 2: Identify the Author's Purpose

Students practice identifying the author's reason for or intent in writing by identifying the three main categories of purpose, namely, persuade, inform, and entertain. Understanding the author's purpose helps students grasp the text's main ideas and central themes. This comprehension enables them to make connections and interpret the information presented.

Lesson 3: Make Inferences

Students practice making inferences from the reading passage. This strategy allows students to draw conclusions based on their previous experiences and knowledge of the situation.

Lesson 4: Evaluate the Author's Argument

Students practice analyzing and evaluating the author's assumptions based on the reading passage. This involves practice in identifying the difference between the reason and the evidence in the reading materials so that they can evaluate the writer's intent.

6) Identifying Instructional Strategies

Critical reading strategies are the specific actions readers employ to thoroughly comprehend a text (Wallace, 2003). This study adapted the critical reading strategies from Axelrod and Cooper (2002) and Nasrollahi et al. (2015) as instructional strategies. These instructional strategies are then tailored into a teaching and learning procedure aimed at enhancing students' critical reading skills. The process of teaching and learning consisted of four phases as follows:

Previewing: The preview was done by building students' vocabulary mastery related to the story. Readers can predict the content and structure of a text before engaging in a thorough examination.

Questioning: The questions are intended to help readers comprehend the text and respond to it in greater detail. The study applies higher-order thinking questions, but also includes lower-order thinking, which is still required to assess students' understanding of the text.

Analyzing: identifies the main idea and supporting ideas, then provides a brief summary of the text's main idea by writing or retelling it.

Reflecting: evaluating a text's credibility, logical reasoning, and emotional impact. The work assigned in class occasionally prompts students to reflect on their attitudes, beliefs, and stances regarding contemporary issues.

7) Selecting Instructional Technology

To empower the Flex model of blended learning, the study considered how technology could be used to transform teaching and learning strategies and students' specific learning outcomes. The study employed the SAMR model, which may highlight the potential of technology to revolutionize teaching and learning methods and pinpoint specific objectives to enhance critical reading skills among EFL students. Therefore, the instructional technology tools in the study were selected in accordance with university regulations and aligned with the SAMR framework.

8) Developing Instructional Materials and Assessment

The instructional materials, which include lesson plans and an instructional manual, were developed in alignment with Program Learning Outcomes (PLOs), Course Learning Outcomes (CLOs), course descriptions, and objectives. The instructional strategies written in the lesson plans are previewing, questioning, analyzing, and reflecting.

Formative and summative assessments were created to evaluate students' critical reading skills. The critical reading tasks in each mode serve as formative assessments during the implementation of the critical reading lessons, enabling evaluation of students' progress. After completing all four critical reading lessons, a critical reading test was administered as a summative assessment to measure students' proficiency.

9) Implementing

The Flex model of blended learning combines four learning modes: Flexibility mode (in-class mode), Learning mode (online mode), Enhancement mode (on-campus mode), and Experience mode (on-campus mode), each of which requires at least 2 periods to complete. The Flexibility and Learning modes are enhancement tools, whereas the Enhancement and Experience modes are transformation tools designed to transform teaching and learning and foster students' learning outcomes. The Flex model of blended learning's characteristics of each mode are as follows:

(1) Flexibility Mode

The teaching and learning aim to create learning flexibility. Students engage in flexible learning spaces and use technology to actively collaborate and communicate with peers from their learning paths.

Table C1 Characteristics of the Flexibility Mode

Characteristic	Explanation
Setting	Teaching and learning take place at a traditional classroom.
Technology Integration	Technology is used to substitute and augment the traditional classroom with the intention of creating learning flexibilities. Students engage in using technology as a tool for teaching and learning.
Learning Activities	Peer discussion, teacher reflection, and critical reading tasks.
Technology Tools	Multimedia resources: YouTube and Podcasts Learning management system: Google Classroom
Critical Reading Strategies	Previewing, Questioning, Analyzing, Reflecting

(2) Learning Mode

The teaching and learning aim to foster students' self-practice. Students can learn the lessons whenever and wherever they want. Students have the opportunity to use different learning strategies to acquire knowledge.

Table C2 Characteristics of the Learning Mode

Characteristic	Explanation
Setting	Teaching and learning take place at students' residences.
Technology integration	Technology is used to augments and facilitates an individual learning experience. Technology fosters self-directed progress by enabling student engagement and autonomy, while also facilitating interactive and prompt feedback.
Learning Activities	Interactive online exercises, teacher reflection, and critical reading tasks.
Technology Tools	Interactive collaboration tools: Quizizz Learning management system: Google Classroom
Critical Reading Strategies	Previewing, Questioning, Analyzing, Reflecting

(3) Enhancement Mode

Teaching and learning aim to transform the educational process by integrating technology, improving students' problem-solving skills, and promoting collaborative communication.

Table C3 Characteristics of the Enhancement Mode

Characteristic	Explanation
Setting	Teaching and learning take place in a faculty's library.
Technology integration	Technology integration is used to transform the instructional approach and fundamentally changes the learning process. Students use technological resources to link information with their existing knowledge. Students can foster dynamic interaction via a collaborative whiteboard by responding to the insights of their peers, contributing their own viewpoints.
Activities	Group discussion, critical reflection, collaborative learning, and critical reading tasks.
Technology Tools	Interactive board: Padlet website Learning management system: Google Classroom
Critical Reading Strategies	Previewing, Questioning, Analyzing, Reflecting

(4) Experience Mode

Teaching and learning aim to foster the development of innovative educational experiences. Students utilize social media and modern technology to enhance their learning path and cultivate a community of learning and social engagement.

Table C4 Characteristics of the Experience Mode

Characteristic	Explanation
Setting	Teaching and learning take place in an active learning space on campus.
Technology integration:	The integration of technology transforms both the pedagogical approach and creates innovative learning experiences. The teaching and learning strategies emphasized on the social engagement fostering a sense of community through the use of an online learning platform or social networking tools.
Activities	Team project, group discussion, critical reflection, and critical reading tasks.
Technology Tools	Social media platform: Facebook and TikTok Learning management system: Google Classroom

Additionally, each critical reading lesson takes two weeks (8 periods) to finish. Students are responsible for engaging in in-class instruction for 2 periods and for 6 periods of independent learning outside the classroom, as outlined in their learning plan. The implementation is divided into 3 steps, namely, before the lesson, during the lesson, and after the lesson, as illustrated in Figure 4:

1) Before the lesson, a teacher conducts an orientation session to introduce the critical reading lessons and tasks. Students must work with their teacher to set a goal and a two-week learning plan that enables them to study independently at their own pace.

2) During the lesson, students must complete all four learning modes within two weeks to meet the criteria.

3) After the lesson, a teacher provides feedback on the students and monitors their progress towards completing the criteria, which is classified as a formative assessment. After completing the four critical reading lessons, students must take a critical reading test as a summative assessment.

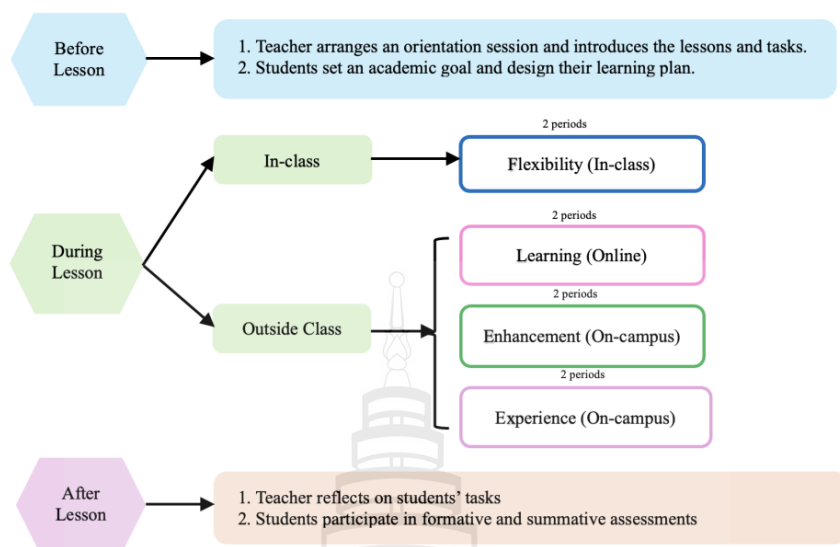


Figure C4 The Process of the Implementation

Table C5 presents the explanations of the instructional procedures for each learning mode, with brief descriptions as follows:

Table C5 The Instructional Procedures with Brief Descriptions, Learning Environment, Teacher’s Role, and Students’ Role

Instructional Procedures	Learning Environment	Teacher’s Role	Student’s Role
Before Lesson			
- Teacher introduces the lessons and series of critical reading tasks with a brief explanation. - Students set an academic goal and design their learning plan.	Google Meet (Online)	-Teacher creates a system to ensure students can move at their own pace during the lesson. - The teacher advises students by suggesting activities that will help them achieve their goal.	- Students set their learning plan and continue with their learning plan through all four modes.
During the Lesson			
I: Flexibility			
<u>Teaching Procedure:</u>			
Previewing: using various activities to enhance students’ vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: students complete the exercise and discuss with peers to find the answers to questions. 3. Analyzing: students watch or listen to YouTube or podcasts to study critical reading skills and discuss with peers to find the answers to questions.	Classroom (Face-to-Face)	Teacher-led instruction and facilitator onsite.	Students do critical reading tasks and discuss on the given topic with peers.

Table C5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
4. Reflecting: students engage in higher-level thinking processes such as evaluating the credibility, logical reasoning, and emotional aspects of a text. <u>Critical Reading Task:</u> - Critical reading exercises - Peer discussion <u>Technology Integration:</u> - YouTube - Podcast - Google Classroom			
II: Learning <u>Teaching procedure:</u> 1. Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: Students read the text to find the answers to questions to complete the critical reading task using Quizizz. 3. Analyzing: students study critical reading skills and discuss with peers to find the answers to questions.	Student's residents (Online)	The teacher is an interventionist and facilitator online.	Students take part in individual study.

Table C5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
4. Reflecting: students engage in higher-level thinking processes such as evaluating the credibility, logical reasoning, and emotional aspects of a text. <u>Critical Reading Task:</u> - Critical reading exercises <u>Technology Integration:</u> - Google Classroom - Quizizz			
III: Enhancement <u>Teaching procedure:</u> 1. Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: students engage in reading the text and collaborate with their peers in finding the answers to the provided questions. 3. Analyzing: students study critical reading skills and discuss with peers to find the answers to questions.	Library (On campus)	The teacher is an interventionist and facilitator onsite.	Students participate in group discussions.

Table C5 (continued)

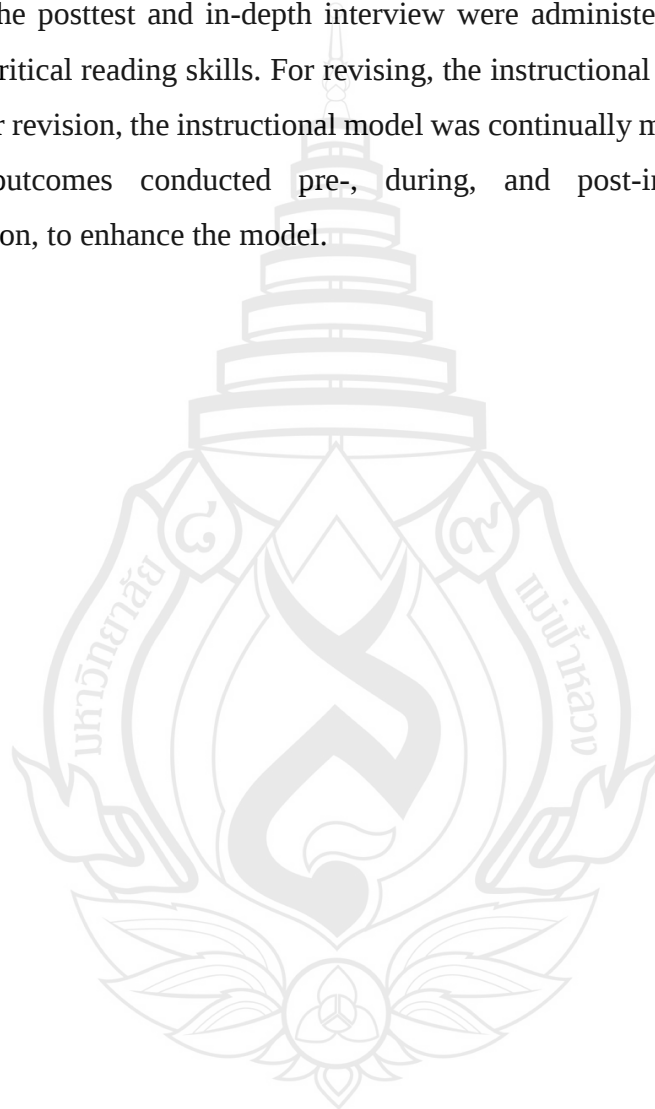
Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
4. Reflecting: students are required to engage in a group activity where they analyze and discuss their thoughts, questions, and interpretations of the reading text using Padlet. <u>Critical Reading Task:</u> - Critical reading exercises - Group discussion <u>Technology Integration:</u> - Padlet - Google classroom			
IV: Experience <u>Teaching procedure:</u> 1. Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: students engage in reading the text and collaborate with their peers in finding the answers to the provided questions. 3. Analyzing: students study critical reading skills and discuss with peers to find the answers to questions.	an active learning space (On campus)	The teacher is an interventionist and facilitator onsite.	Students participate in team projects.

Table C5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
4. Reflecting: students collaborate with their team to discuss the assigned project, then share their ideas on social media such as TikTok and Facebook for further discussion and sharing. <u>Critical Reading Task:</u> - Critical reading exercises - Team project <u>Technology Integration:</u> - TikTok - Facebook After the Lesson	Google Meet (Online)	Teacher schedules time to meet with each individual student to get feedback on progress.	Students consult with teacher and get feedback on their progression.
- Students get feedback on assignment progress and complete a formative and summative assessment.			

10) Evaluating and Revising

To evaluate the model's effectiveness, the Flex model of blended learning was evaluated by nine experts in English language, curriculum and instruction, and technology before implementation. During instruction, the formative assessment was used to monitor students' progress in the critical reading lesson. Finally, post-instruction, the posttest and in-depth interview were administered to the students to assess their critical reading skills. For revising, the instructional model was constantly modified. For revision, the instructional model was continually modified in response to evaluation outcomes conducted pre-, during, and post-instruction, following implementation, to enhance the model.



APPENDIX D

INSTRUCTIONAL MANUAL

Instructional Manual

The Instructional Manual for Using the Flex model of blended learning Development
in Enhancing EFL Students' Critical Reading Skills

.....

Rationale

This instructional manual is specifically designed for the Flex model of blended learning development in enhancing EFL students' critical reading skills. This instructional model is specifically designed for teachers who are interested in implementing it in their critical reading courses. This manual presents a comprehensive set of guidelines preceding the instruction to aid teachers in comprehending the instructional model and facilitating its implementation in critical reading courses. To employ the instructional model effectively in a critical reading class, instructors must study, comprehend all details, and adhere to the prescribed steps—all with the aim of improving students' critical reading abilities.

Relevant Documents

Relevant documents for the implementation of the Flex model of blended learning include the following:

1. The Flex model of blended learning (the critical reading instructional model)
2. The instructional manual
3. The lesson plans
4. The critical reading lessons for the four learning modes

Guidelines before Implementing the Instruction

Before implementing the instructional model for critical reading, the instructor must:

1. Start with a comprehensive study of the model to comprehend its history, the theoretical concepts that underpin its development, its components, and the relationships between them,
2. Examine the instructional manual and lesson plans to obtain guidance on how to implement the instruction.

The lesson plans focus on the following critical reading strategies:

Lesson Plan	Critical Reading Strategies
Lesson 1	Distinguish between facts and opinions
Lesson 2	Identify the author's purpose
Lesson 3	Make inferences
Lesson 4	Evaluate author's argument

Documents and Materials Preparation for the Instruction

The documents and materials for instruction are prepared in accordance with each lesson plan. Prior to providing the instruction, it is necessary to outline the sequential actions that need to be followed:

1. Study the lesson plans thoroughly before the instruction
2. Prepare complete materials used during the instruction for the students.

The materials mentioned in the lesson plans are:

2.1 The critical reading texts are those that comprise the learning outcomes for the students. To accommodate the students' individual interests, the texts are comprised of a variety of resources and writing styles, including magazines, websites, and books. Additionally, in order to determine the text readability score, the critical reading texts will be selected to correspond to the CEFR B1 level as measured by Flesch-Kincaid. The range of the Flesch-Kincaid Grade level scores is 30 to 50.

Furthermore, the reading texts will be consistent with the PLOs, CLOs, course description, and objectives of the Critical Reading for English Teachers course and they consist of four critical reading sub-skills namely, distinguish between facts and opinions, identify the author's purposes, make inferences, and evaluate author's arguments. The reading texts are delivered online via Google Classroom.

2.2 Instructional technology used in teaching and learning for the four learning modes which are presented below:

- Online video/audio platform (YouTube, Podcast)
- Online learning platform (Google Classroom)
- Free web-based applications (Quizizz, Padlet)
- Social Networking (TikTok, Facebook)

2.3 Evaluation Tools and Method

Evaluation tools include a critical reading pre-test and post-test which are delivered through Google Classroom. The test includes 20 items testing different critical reading skills with multiple-choice items. To demonstrate comprehension of the evaluation outlined in the instructional model and lesson plan, Figure 1 below illustrates the summary of the evaluation:

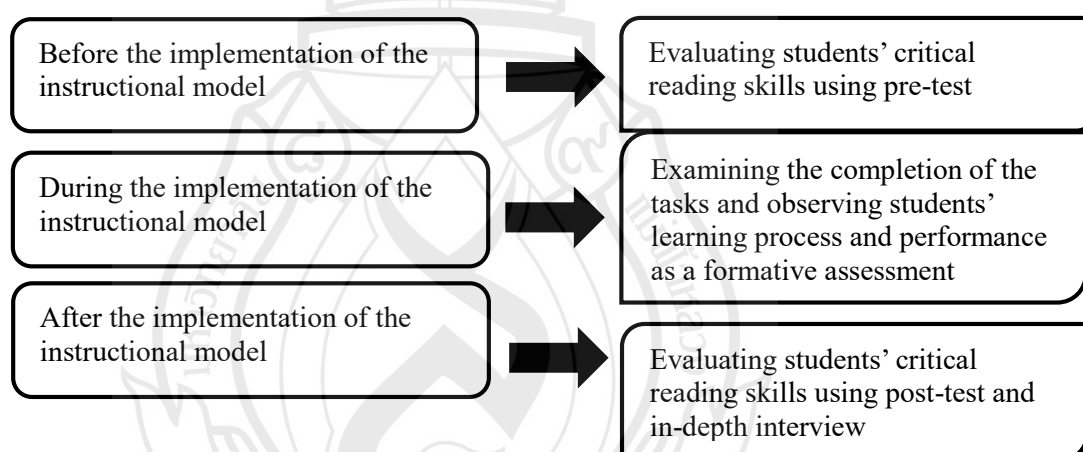


Figure D1 The Summary of the Evaluation

As shown in Figure 1, there are three main steps of evaluation for the instructional model, which can be conducted as follows:

2. Before implementing the instructional model: the students are given a pre-test. Subsequently, the teacher corrects the students' responses and records their scores.

3. During the implementation of the instructional model: the teacher assesses students' task completion in each lesson, observes their reading processes, and evaluates their performance during interactive activities.

4. After implementing the instructional model: the post-test and in-depth interview are administered to assess students' critical reading skills following implementation of the instructional model.

Instructional Procedure:

The Flex model of blended learning was implemented in the critical reading course for a duration of 8 weeks. Students have a responsibility to engage in in-class instruction for 2 hours (25%) and 2 hours for online self-study (25%) while distributing 4 hours (50%) for independent learning outside-class instruction. The model's learning environment divided into four learning modes that each requires at least two periods to complete namely, Flexibility (In-class mode), Learning (Online mode), Enhancement (On-campus mode), and Experience (On-campus mode) as explained in the table below. Hence, each critical reading lesson takes 2 weeks (8 hours) to finish which means students have a responsibility to engage in in-class instruction for a duration of 2 hours, while distributing 6 hours for independent learning during their flexible time outside the classroom.

1. Flexibility Mode

The teaching and learning aim to create learning flexibility. Students engage in flexible learning spaces and use technology to actively collaborate and communicate with peers from their learning paths.

Table D1 Characteristics of the Flexibility Mode

Characteristic	Explanation
Setting	Teaching and learning take place at a traditional classroom.
Technology Integration:	Technology is used to substitute and augment the traditional classroom with the intention of creating learning flexibilities. Students engage in using technology as a tool for teaching and learning.
Learning Activities	Peer discussion, teacher reflection, and critical reading tasks.
Technology Tools	Multimedia resources: YouTube and Podcasts Learning management system: Google Classroom
Critical Reading Strategies	Previewing, Questioning, Analyzing, Reflecting

2. Learning Mode

The teaching and learning aim to foster students' self-practice. Students can learn the lessons whenever and wherever they want. Students have the opportunity to use different learning strategies to acquire knowledge.

Table D2 Characteristics of the Learning Mode

Characteristic	Explanation
Setting	Teaching and learning take place at students' residences.
Technology integration	Technology is used to augment and facilitates an individual learning experience. Technology fosters self-directed progress by enabling student engagement and autonomy, while also facilitating interactive and prompt feedback.
Learning Activities	Interactive online exercises, teacher reflection, and critical reading tasks.
Technology Tools	Interactive collaboration tools: Quizizz Learning management system: Google Classroom
Critical Reading Strategies	Previewing, Questioning, Analyzing, Reflecting

3. Enhancement Mode

Teaching and learning aim to transform the educational process by integrating technology, improving students' problem-solving skills, and promoting collaborative communication.

Table D3 Characteristics of the Enhancement Mode

Characteristic	Explanation
Setting	Teaching and learning take place in a faculty's library.
Technology integration	Technology integration is used to transform the instructional approach and fundamentally changes the learning process. Students use technological resources to link information with their existing knowledge. Students can foster dynamic interaction via a collaborative whiteboard by responding to the insights of their peers, contributing their own viewpoints.
Activities	Group discussion, critical reflection, collaborative learning, and critical reading tasks.
Technology Tools	Interactive board: Padlet website Learning management system: Google Classroom
Critical Reading Strategies	Previewing, Questioning, Analyzing, Reflecting

4. Experience Mode

Teaching and learning aim to foster the development of innovative educational experiences. Students utilize social media and modern technology to enhance their learning path and cultivate a community of learning and social engagement.

Table D4 Characteristics of the Experience Mode

Characteristic	Explanation
Setting	Teaching and learning take place in an active learning space on campus.
Technology integration:	The integration of technology transforms both the pedagogical approach and creates innovative learning experiences. The teaching and learning strategies emphasized on the social engagement fostering a sense of community through the use of an online learning platform or social networking tools.
Activities	Team project, group discussion, critical reflection, and critical reading tasks.
Technology Tools	Social media platform: Facebook and TikTok Learning management system: Google Classroom

Additionally, each critical reading lesson takes two weeks (8 periods) to finish. Students are responsible for engaging in in-class instruction for 2 periods and for 6 periods of independent learning outside the classroom, as outlined in their learning plan. The implementation is divided into 3 steps, namely, before the lesson, during the lesson, and after the lesson, as illustrated in Figure 2:

1) Before the lesson, a teacher conducts an orientation session to introduce the critical reading lessons and tasks. Students must work with their teacher to set a goal and a two-week learning plan that enables them to study independently at their own pace.

2) During the lesson, students must complete all four learning modes within two weeks to meet the criteria.

3) After the lesson, a teacher provides feedback on the students and monitors their progress towards completing the criteria, which is classified as a formative assessment. After completing the four critical reading lessons, students must take a critical reading test as a summative assessment.

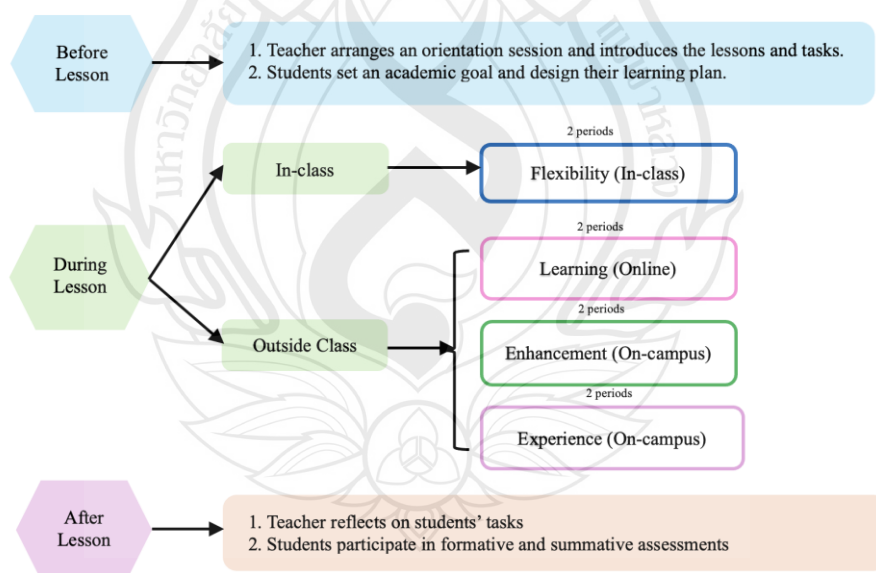


Figure D2 The Process of the Implementation

Table D5 presents the explanations of the instructional procedures for each learning mode, with brief descriptions as follows:

Table D5 The Instructional Procedures with Brief Descriptions, Learning Environment, Teacher's Role, and Students' Role

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
Before Lesson			
- Teacher introduces the lessons and series of critical reading tasks with a brief explanation. - Students set an academic goal and design their learning plan.	Google Meet (Online)	-Teacher creates a system to ensure students can move at their own pace during the lesson. - The teacher advises students by suggesting activities that will help them achieve their goal.	- Students set their learning plan and continue with their learning plan through all four modes.
During the Lesson			
I: Flexibility			
<u>Teaching Procedure:</u>			
Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: students complete the exercise and discuss with peers to find the answers to questions. 3. Analyzing: students watch or listen to YouTube or podcasts to study critical reading skills and discuss with peers to find the answers to questions.	Classroom (Face-to-Face)	Teacher-led instruction and facilitator onsite.	Students do critical reading tasks and discuss on the given topic with peers.

Table D5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
4. Reflecting: students engage in higher-level thinking processes such as evaluating the credibility, logical reasoning, and emotional aspects of a text. <u>Critical Reading Task:</u> - Critical reading exercises - Peer discussion <u>Technology Integration:</u> - YouTube - Podcast - Google Classroom			
II: Learning <u>Teaching procedure:</u> 1. Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: Students read the text to find the answers to questions to complete the critical reading task using Quizizz.	Student's residents (Online)	The teacher is an interventionist and facilitator online.	Students take part in individual study.

Table D5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
3. Analyzing: students study critical reading skills and discuss with peers to find the answers to questions. 4. Reflecting: students engage in higher-level thinking processes such as evaluating the credibility, logical reasoning, and emotional aspects of a text. <u>Critical Reading Task:</u> - Critical reading exercises <u>Technology Integration:</u> - Google Classroom - Quizizz			
III: Enhancement <u>Teaching procedure:</u> 1. Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading. 2. Questioning: students engage in reading the text and collaborate with their peers in finding the answers to the provided questions.	Library (On campus)	The teacher is an interventionist and facilitator onsite.	Students participate in group discussions.

Table D5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
3. Analyzing: students study critical reading skills and discuss with peers to find the answers to questions. 4. Reflecting: students are required to engage in a group activity where they analyze and discuss their thoughts, questions, and interpretations of the reading text using Padlet. <u>Critical Reading Task:</u> - Critical reading exercises - Group discussion <u>Technology Integration:</u> - Padlet - Google classroom			
IV: Experience <u>Teaching procedure:</u> 1. Previewing: using various activities to enhance students' vocabulary skills. Allow students to use their background knowledge to predict the content of the reading before reading.	an active learning space (On campus)	The teacher is an interventionist and facilitator onsite.	Students participate in team projects.

Table D5 (continued)

Instructional Procedures	Learning Environment	Teacher's Role	Student's Role
2. Questioning: students engage in reading the text and collaborate with their peers in finding the answers to the provided questions. 3. Analyzing: students study critical reading skills and discuss with peers to find the answers to questions. 4. Reflecting: students collaborate with their team to discuss the assigned project, then share their ideas on social media such as TikTok and Facebook for further discussion and sharing. <u>Critical Reading Task:</u> - Critical reading exercises - Team project <u>Technology Integration:</u> - TikTok - Facebook After the Lesson - Students get feedback on assignment progress and complete a formative and summative assessment.	 Google Meet (Online)	Teacher schedules time to meet with each individual student to get feedback on progress.	Students consult with teacher and get feedback on their progression.

Furthermore, prior to beginning the lesson as previously described, each student is required to develop a two-week learning plan, as illustrated in Figure D3, which enables independent pacing.

Learning Plan

Students Name (ชื่อ-สกุล):

My goals for this lesson (เป้าหมายของการเรียนรู้ในบทเรียน): *what I need to know.....*

Teaching and learning methods required (กระบวนการเรียนการสอนที่ต้องการ) :

My Learning Plan

Flexibility Mode: ☐ Week 1 ☐ Week 2

Objective (วัตถุประสงค์): Today, I will.....

Learning Mode: ☐ Week 1 ☐ Week 2

Objective (วัตถุประสงค์): Today, I will.....

Enhancement Mode: ☐ Week 1 ☐ Week 2

Objective (วัตถุประสงค์): Today, I will.....

eXperience Mode: ☐ Week 1 ☐ Week 2

Objective (วัตถุประสงค์): Today, I will.....

Self-reflections (การสะท้อนคิดของตนเอง):

Teacher reflections (การสะท้อนคิดของครู):

Figure D3 Learning Plan

APPENDIX E

SAMPLE OF LESSON PLAN

Lesson Plan 1

Lesson 1: Distinguishing between facts and opinions

Time Period: 8 periods (2 hours in-class and 6 hours outside class instructions)

Enabling Objectives:

1. Students will be able to identify key signal words and phrases that indicate facts and opinions
2. Students will be able to differentiate between factual statements and opinion statements.

Terminal Objective:

1. After the completion of this lesson, students will be able to distinguish between facts and opinions statements in various types of texts.

Contents:

1. Flexibility Mode

The teaching and learning in this mode aim to create learning flexibility. Students engage in flexible learning spaces and use technology to actively collaborate and communicate with peers from their learning paths.

Title: Dating app billboard causes a stir in Korat

Reading Ease Score: 50 Fairly difficult)

Setting: Classroom (Face-to-Face)

Teaching Materials: YouTube and Google Classroom

2. Learning Mode

The teaching and learning aim to foster students' self-practice. Students are able to learn the lessons wherever and whenever they want to. Students have the opportunity to use different learning strategies to acquire knowledge.

Title: Plov: Uzbekistan's rice dish with "sexual power"

Reading Ease Score: 50 (Fairly difficult)

Setting: Student's residents (Online)

Teaching Materials: Quizizz and Google Classroom

3. Enhancement Mode

Teaching and learning aim to transform the learning process through the integration of technology and pedagogical approaches. Students customize their learning path with the modified pedagogical approach, which enhance students' problem-solving abilities and fosters collaborative communication.

Title: Air pollution in Chiang Mai highlighted in Chinese life-style social media

Reading Ease Score: 48.9 (Difficult)

Setting: Library (On-campus)

Teaching Materials: Padlet and Google Classroom

4. Experience Mode

Teaching and learning aim to foster the development of innovative educational experiences. Students utilize social media and modern technology to enhance their learning path and cultivate a community of learning and social engagement.

Title: Florida Approves Law Banning Social Media for Children under 14

Reading Ease Score: 48.7 (Difficult)

Setting: Active learning space (On-campus)

Teaching Materials: TikTok and Google Classroom

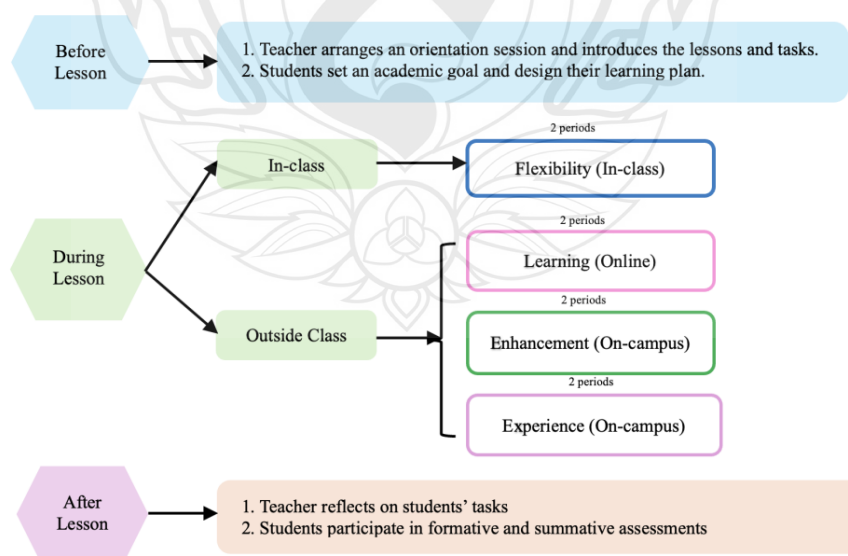


Figure E1 The Process of the Instructional Procedure

Evaluation:

1. Formative Assessments: Class Discussions and reading tasks.
2. Summative Assessment: Post-test (Critical Reading Test)

References:

<https://pressbooks.pub/irwlevel1/chapter/distinguishing-between-facts-and-opinions/>

<https://www.mometrix.com/academy/fact-or-opinion/>

<https://www.thaipsworld.com/dating-app-billboard-causes-a-stir-in-korat/>

<https://www.bbc.com/travel/article/20240222-plov-uzbekistans-rice-dish-with-sexual-power>

www.thaipbsworld.com/air-pollution-in-chiang-mai-highlighted-in-chinese-life-style-social-media/

<https://learningenglish.voanews.com/a/florida-bans-social-media-for-children-under-14/7545764.html>

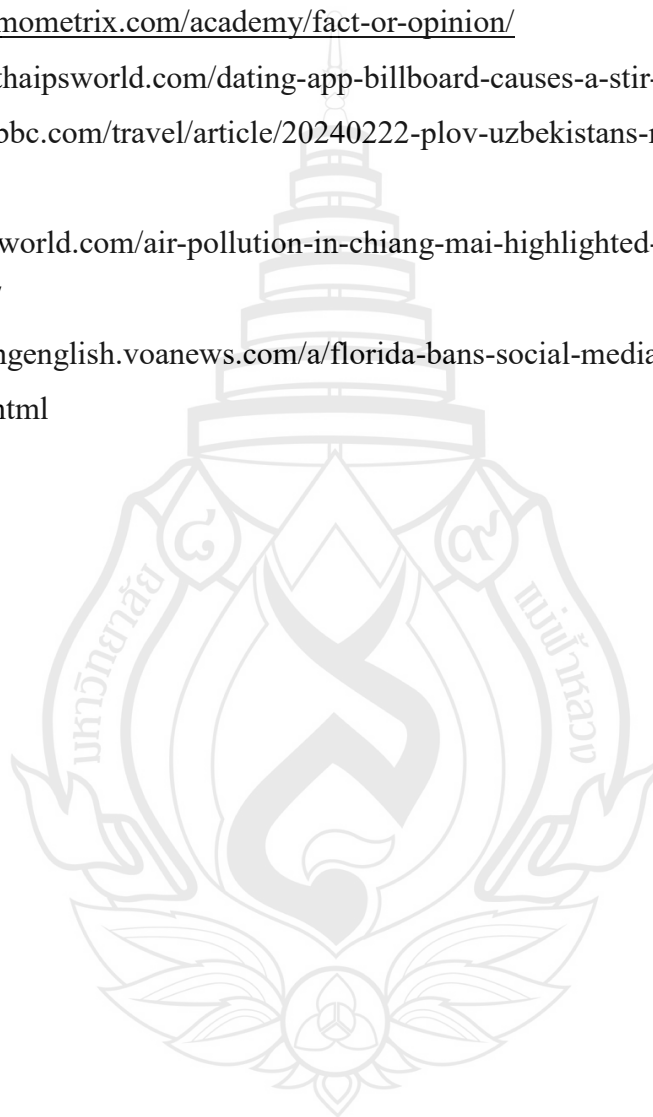
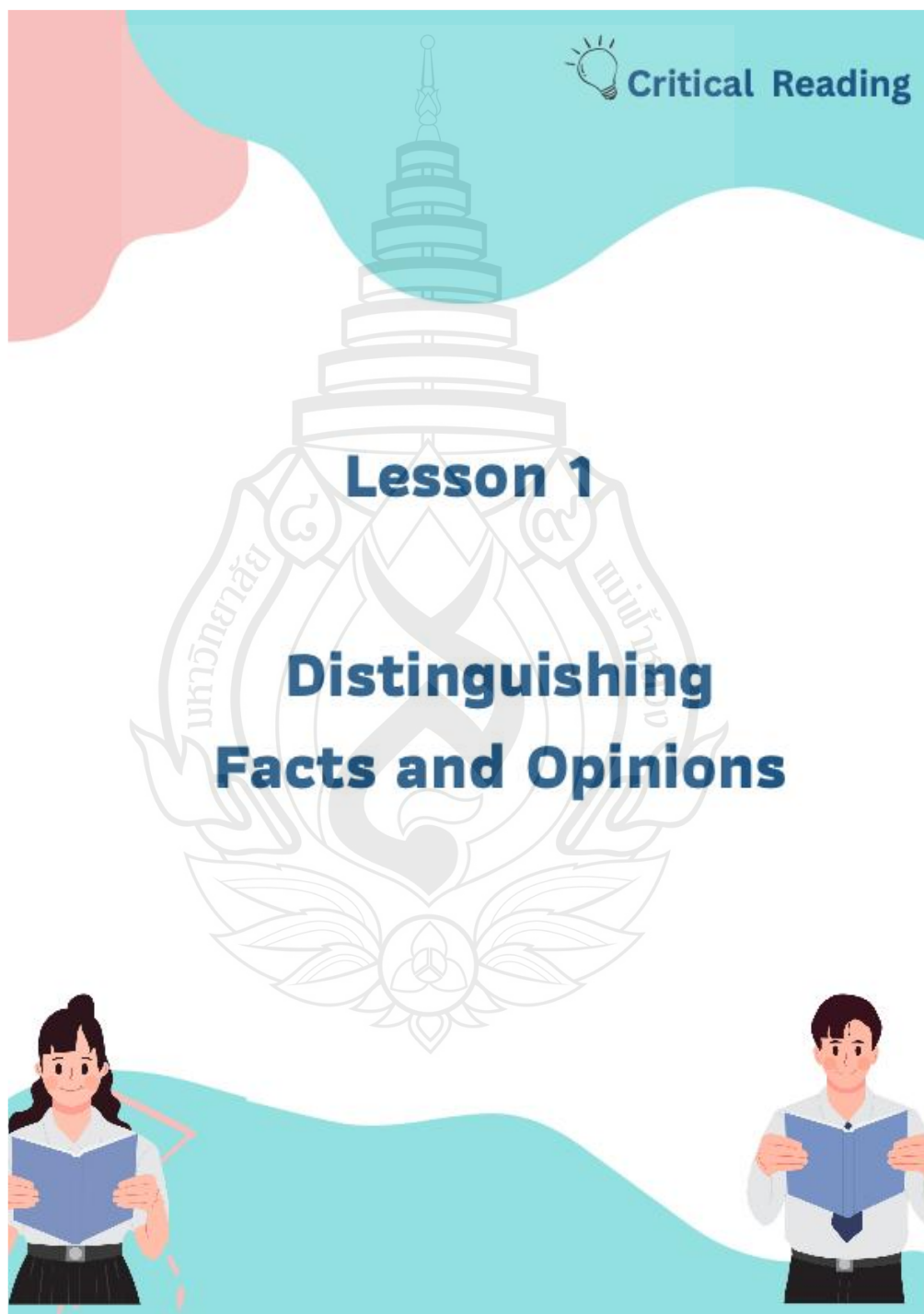


Table E1 Instructional Procedure

Mode	Instructional Procedures				Formative Assessment	Teacher's Roles	Student's Roles
	Critical Reading Strategies						
	Previewing	Questioning	Analyzing	Reflecting			
Flexibility	1. Students complete the vocabulary activity. 2. Students predict the reading contents using their background knowledge before reading the texts.	1. Students read the text and discuss with peers to find the answers to questions.	1. Students watch a YouTube video and then discuss in pairs, finding the answers to questions. 2. Students read the text again and identify the facts and opinions.	1. Students write three factual statements and three opinion statements about “a dating app.”	1. Class Discussions 2. Reading tasks	Facilitator	Students complete activities and discuss the given topic with peers.
Learning	1. Students complete the vocabulary activity. 2. Students predict the reading contents using their background knowledge before reading the texts.	1. Students read the text and answer the questions.	1. Students study critical reading skills: distinguishing facts from opinions. 2. Students read the text again and then identify the facts and opinions.	1. Students write three factual statements and three opinion statements to support their agreement or disagreement with this statement “If you know you have only one day left on Earth, spend it eating plov.”	1. Class Discussions 2. Reading tasks	Interventionist and facilitator	Students take part in independent study to complete activity

Table E1 (continued)

Mode	Instructional Procedures				Formative Assessment	Teacher's Roles	Student's Roles
	Critical Reading Strategies						
	Previewing	Questioning	Analyzing	Reflecting			
Enhancement	1. Students predict the reading contents before reading the texts. 2. Students read the text, identify the unknown words, and search in a dictionary for their meanings.	1. Students read the text and answer the questions.	1. Students study critical reading skills. 2. Students read the text and then identify the facts and opinions. 3. Students convert the sentence form the text that expresses a fact into an opinion statement.	1. Students write three factual statements and three opinion statements about <i>“how to stop the airborne pollution in Thailand, then share your statements via Padlet.”</i>	1. Class Discussions 2. Reading tasks	facilitator	Students participate in group discussion to complete activities
Experience	1. Students predict the reading contents before reading the texts. 2. Students read the text, identify the unknown words, and search in a dictionary for their meanings.	1. Students read the text and answer the questions.	1. Students study critical reading skills. 2. Students read the text again and then identify the facts and opinions. 3. Students convert the sentence form the text that expresses a fact into an opinion statement.	1. Students discuss in group and write three factual statements and three opinion statements about “banning social media for children in Thailand,” then share their statements via video on TikTok.	1. Class Discussions 2. Reading tasks	Facilitator	Students participate in group discussion to complete activities

APPENDIX F**SAMPLE OF LESSON**



Lesson Plan

Lesson 1: Distinguishing between facts and opinions

Time Period:

8 periods (2 hours in-class and 6 hours outside class instructions)

Enabling Objectives:

1. Students will be able to identify key signal words and phrases that indicate facts and opinions
2. Students will be able to differentiate between factual statements and opinion statements.

Terminal Objective:

1. Students will be able to distinguish between facts and opinion statements in various types of texts.

Critical Reading Strategies



Learning Plan

Students Name (ชื่อ-สกุล):

My goals for this lesson (เป้าหมายของการเรียนรู้ในบทเรียน): *what I need to know.....*

Teaching and learning methods required (กระบวนการเรียนการสอนที่ต้องการ) :

My Learning Plan

Flexibility Mode: ☐ Week 1 ☐ Week 2

Objective (วัตถุประสงค์): Today, I will.....

Learning Mode: ☐ Week 1 ☐ Week 2

Objective (วัตถุประสงค์): Today, I will.....

Enhancement Mode: ☐ Week 1 ☐ Week 2

Objective (วัตถุประสงค์): Today, I will.....

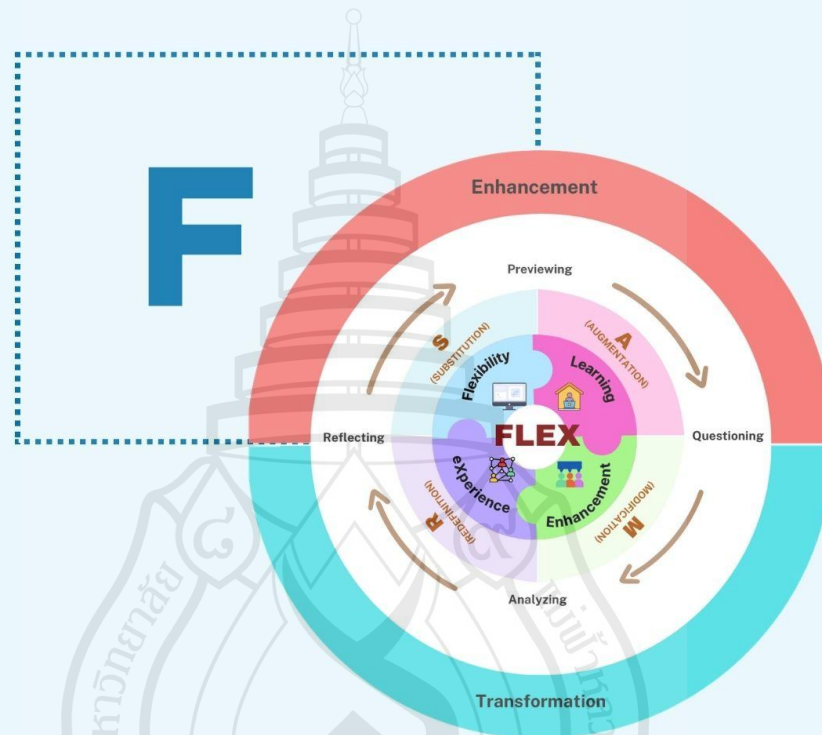
eXperience Mode: ☐ Week 1 ☐ Week 2

Objective (วัตถุประสงค์): Today, I will.....

Self-reflections
(การสะท้อนคิดของตนเอง):

Teacher reflections
(การสะท้อนคิดของครู):

Flexibility Mode



The teaching and learning in this mode aims to create learning flexibility. Students engage in flexible learning spaces and use technology to actively collaborate and communicate with peers from their learning paths.

Flexibility Mode

Objective: After the completion of this lesson, the students will be able to identify between facts and opinions from the text.

1. Previewing: (Google Classroom)

Activity 1: Write the letter of the correct definition next to the target word.

- | | |
|---------------------|--|
| _____ 1. erect | a. a person who uses the internet a lot |
| _____ 2. reaction | b. the act of allowing somebody to do something, |
| _____ 3. netizen | c. the power to give orders to people |
| _____ 4. authority | d. to build something |
| _____ 5. granted | e. what you do, say or think as a result of something that has happened |
| _____ 6. permission | f. used to show that you accept that something is true, often before you make another statement about it |

Activity 2: From the topic "Dating app billboard causes a stir in Korat", what do you think the term "Dating App" means?

- _____ 1. It is an online dating service presented through a mobile phone application.
- _____ 2. Mobile application that enables people to make appointment for work.

Dating app billboard causes a stir in Korat



A billboard promoting a dating app, recently erected in Muang district of Nakhon Ratchasima, known locally as Korat, has drawn mixed reactions from Thai netizens. On the billboard, this question was asked: "What is delicious in Korat?" There were two choices: "Fried Korat Noodles" or "Korat ladies." There was a checkmark next to "Korat Ladies" and a cross next to "Fried Korat Noodles".

The presence of the billboard came to light after Korat Daily Facebook posted its photo. It is reported that some people who saw the billboard are not happy, claiming that the advertisement looks down on Korat women. Nonetheless, many of those who comment on the Korat Daily Facebook page expressed their interest in trying the dating app to find love. In responding to negative comments, some wrote advising people to "please relax and enjoy your life; it is an ad from Tinder, which is a dating app." Some persons suggested that the billboard should be taken down, asking which authorities granted permission for its erection.

Reference: <https://www.thaipbsworld.com/dating-app-billboard-causes-a-stir-in-korat/>

2. Questioning: (Google Classroom)

Activity 3: Read the text and answer the questions.

1. What is the purpose of the billboard?

2. Why had the billboard drawn the reaction from Thai netizens?

3. Who made light of this matter?

4. Why are people not happy when they see the billboard?

5. Why do people suggest taking down this advertisement?

3. Analyzing: (Google Classroom / YouTube)

Activity 4 : Students watch YouTube videos (<https://youtu.be/V1TQzFhn2Hs>) about distinguishing between facts and opinions, and then discuss, in pairs, finding the answers to the following questions:

1. When reading, how can you tell whether a statement is a fact or an opinion?

2. Why is it important to be able to distinguish between facts and opinions?

Facts and opinions

Now that you know about the ways texts persuade us, it is also important to know the difference between facts and opinions and how to recognize them.

Facts are statements that can be verified and are always objective. A fact contains no opinion of the author and a fact can be proven.

For example: *I pay 500 euros per month for my room.*

Opinions express the meaning of an author or his attitudes or beliefs. They cannot be proven true or false. You often see opinions in controversial topics, when the future is predicted or when opinions are expressed about people, things or places.

For example: *500 euros for a room is too expensive.*

<https://libguides.uvt.nl/academic-reading/critical-reading-4>

Activity 5: Read the text again, identify the statements that show facts (F) and opinions (O) in the passage.

1. _____ A billboard promoting a dating app, recently erected in Muang district of Nakhon Ratchasima, known locally as Korat.
2. _____ There was a checkmark next to "Korat Ladies" and a cross next to "Fried Korat Noodles".
3. _____ The presence of the billboard came to light after Korat Daily Facebook posted its photo.
4. _____ It is reported that some people who saw the billboard are not happy, claiming that the advertisement looks down on Korat women.
5. _____ Some persons suggested that the billboard should be taken down, asking which authorities granted permission for its erection.

Reflecting: (Google Classroom)

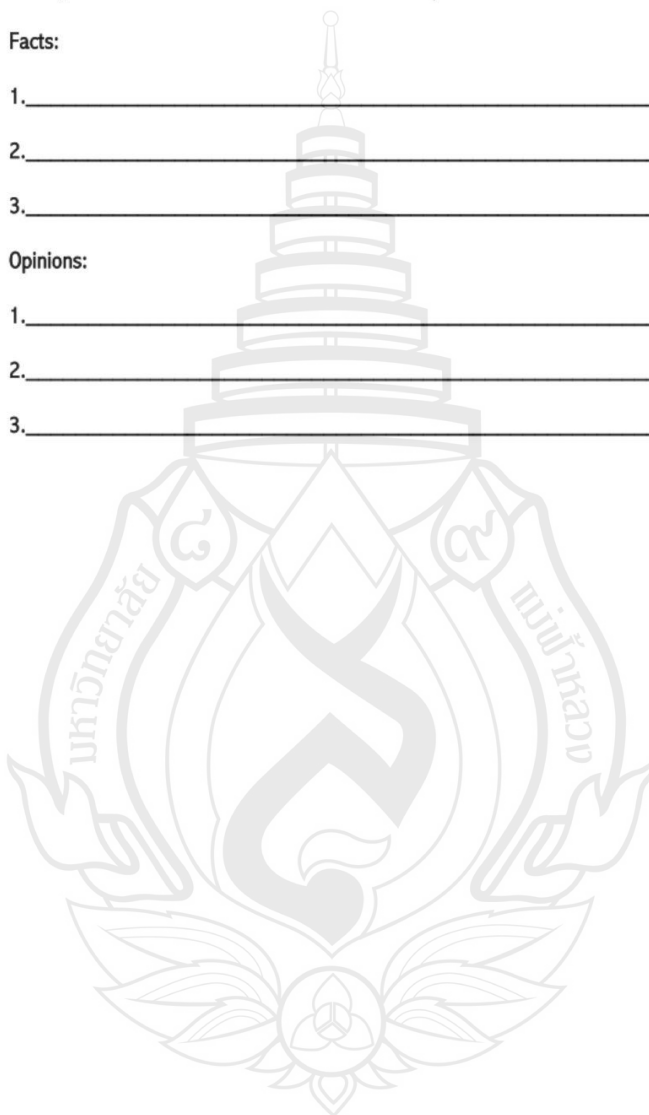
Activity 6: Write three factual statements and three opinion statements about "a dating app."

Facts:

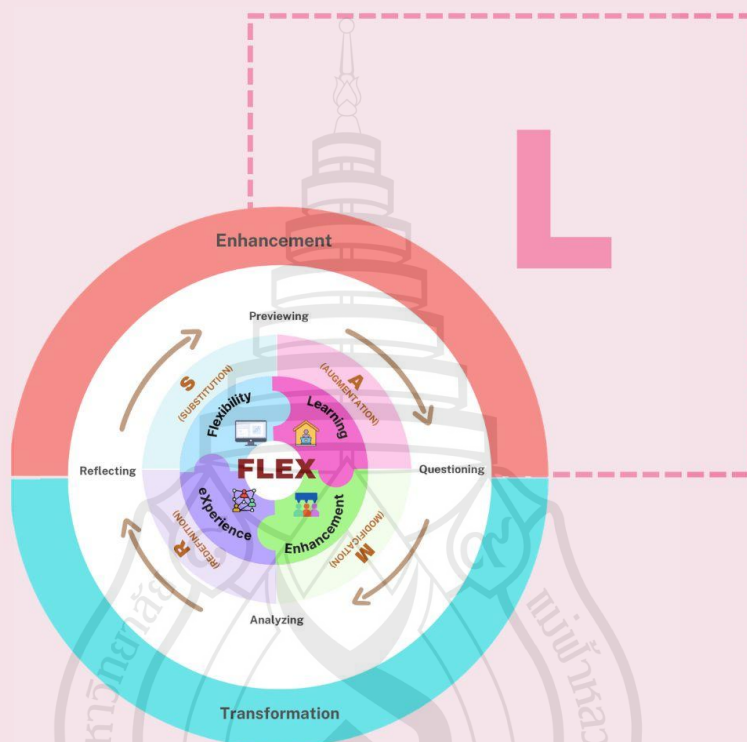
1. _____
2. _____
3. _____

Opinions:

1. _____
2. _____
3. _____



Learning Mode



The teaching and learning aims to foster students self-practice. Students are able to learn the lessons wherever and whenever they want to. Students have the opportunity to use different learning strategies to acquire knowledge.

Learning Mode

1. Previewing: (Google Classroom /Quizizz)

Activity 1: Write the letter of the correct definition next to the target word.

- | | |
|------------------------|---|
| _____ 1. aphrodisiac | a. a ceremony, often a religious one, for burying burning a dead person. |
| _____ 3. indispensable | b. a story from ancient times about people and events, that may or may not be true. |
| _____ 4. funeral | c. connected with cooking or food |
| _____ 5. legend | d. too important to be without |
| _____ 6. sustain | e. a food or drug that is said to give people a strong desire to have sex. |
| _____ 7. passionate | f. having or showing strong feelings of sexual love or of anger. |
| _____ 8. culinary | g. a large deep pot for boiling liquids or cooking food over a fire. |
| _____ 10. cauldron | h. to provide enough of what somebody/something needs in order to live or exist. |

Activity 2: Look at the picture below and read the title of the text, then try to figure out what we're going to read.

- ☐ How to cook Uzbekistan's national dish.
- ☐ Why Uzbekistan's dish is considered the country's tradition.

Plov: Uzbekistan's rice dish with "sexual power"



Uzbekistan's beloved national dish, plov, is widely believed to have aphrodisiac qualities and so it's traditionally eaten on Thursdays — a popular day for conceiving children.

Plov — a medley of rice, vegetables, meat and spices — is popular throughout the countries of the Silk Road, but it's most closely associated with Uzbekistan. Widely consumed at least once a week, it's the country's national dish and is considered an indispensable part of family celebrations, served at births, weddings and funerals and to honor Muslims returning from Hajj.

According to legend, plov was first invented for Alexander the Great, who ordered the creation of a satisfying meal to sustain his army during their campaigns in Central Asia. "We don't have historical records to prove that, but what we do know is that by the 9th and 10th Centuries, plov had become very popular here," said Nilufar Nuriddinova, an Uzbek tour guide who is passionate about food history. "Rice has been a staple crop in this region for more than 1,000 years. It requires hard physical work to grow, as does harvesting crops and raising livestock. So, plov would've been an ideal high-calorie, nutrient-rich dish for the largely agricultural society."

Plov is now considered such a vital part of the country's culinary traditions that it was recently inscribed on UNESCO's Intangible Cultural Heritage of Humanity List. "It is more than just a meal," Nuriddinova explained. "It creates social bonds and encourages friendship; it brings our nation together." She told me even the word is an important part of the Uzbek language. "It appears in many everyday expressions such as, 'If you know you have only one day left on Earth, spend it eating plov,'" she said. "It means that afterwards you can die happy. In Uzbekistan, life without plov is unthinkable."

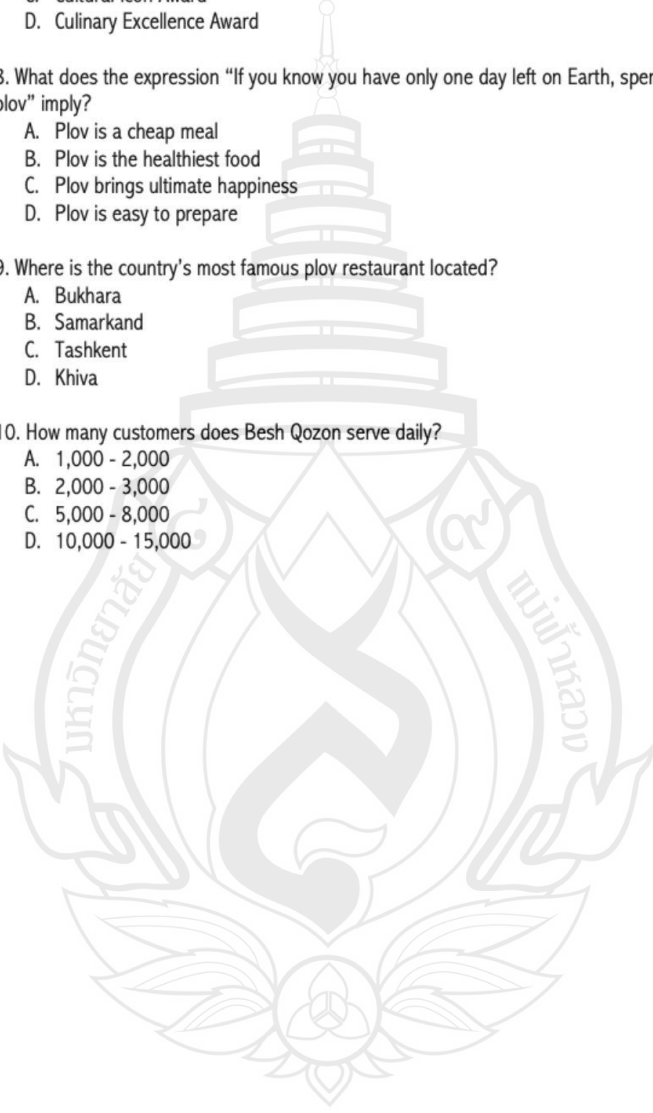
The country's most famous plov restaurant is Besh Qozon (also known as the Central Asian Plov Centre), located in the Yunusabad neighborhood of the capital, Tashkent. Thought to be one of the largest plov restaurants in Central Asia, Besh Qozon serves between 5,000 and 8,000 customers daily, with plov made in nine vast wood-fired cauldrons known as kazan.

Reference: <https://www.bbc.com/travel/article/20240222-plov-uzbekistans-rice-dish-with-sexual-power>

2. Questioning: (Quizizz)

Activity 3: Read the text and then answer the questions.

1. What is the national dish of Uzbekistan?
 - A. Biryani
 - B. Sushi
 - C. Plov
 - D. Paella
2. On which day is plov traditionally eaten in Uzbekistan for its believed aphrodisiac qualities?
 - A. Monday
 - B. Thursday
 - C. Friday
 - D. Sunday
3. What are the main ingredients of plov?
 - A. Pasta, vegetables, meat, and spices
 - B. Rice, vegetables, meat, and spices
 - C. Bread, vegetables, meat, and spices
 - D. Potatoes, vegetables, meat, and spices
4. Which historical figure is associated with the legend of the invention of plov?
 - A. Genghis Khan
 - B. Julius Caesar
 - C. Alexander the Great
 - D. Napoleon Bonaparte
5. In which centuries did plov become very popular in Uzbekistan, according to Nilufar Nuriddinova?
 - A. 5th and 6th Centuries
 - B. 7th and 8th Centuries
 - C. 9th and 10th Centuries
 - D. 11th and 12th Centuries
6. Why was plov considered an ideal dish for the largely agricultural society in Uzbekistan?
 - A. It was easy to cook
 - B. It was high-calorie and nutrient-rich
 - C. It was inexpensive to make
 - D. It was a traditional festive dish

7. What recognition has plov recently received from UNESCO?
- A. World Heritage Site
 - B. Intangible Cultural Heritage of Humanity List
 - C. Cultural Icon Award
 - D. Culinary Excellence Award
8. What does the expression "If you know you have only one day left on Earth, spend it eating plov" imply?
- A. Plov is a cheap meal
 - B. Plov is the healthiest food
 - C. Plov brings ultimate happiness
 - D. Plov is easy to prepare
9. Where is the country's most famous plov restaurant located?
- A. Bukhara
 - B. Samarkand
 - C. Tashkent
 - D. Khiva
10. How many customers does Besh Qozon serve daily?
- A. 1,000 - 2,000
 - B. 2,000 - 3,000
 - C. 5,000 - 8,000
 - D. 10,000 - 15,000
- 
-

3. Analyzing: (Google Classroom / Quizizz)

Facts and Opinions

Facts: Statements that can be verified. They can be proven true or false. Statements of fact are objective -- they contain information but do not tell what the writer thinks or believes about the topic.

Example: My car payment is \$250 per month.

Questions to Identify Facts:

1. Can the statement be proved or demonstrated to be true?
2. Can the statement be observed in practice or operation? Can you see it happen?
3. Can the statement be verified by witnesses, manuscripts, or documents?

Opinions: Statements that express a writer's feelings, attitudes, or beliefs. They are neither true nor false. They are one person's view about a topic or issue.

Example: My car payments are too expensive.

Types of Opinions:

1. Positions on controversial issues
2. Predictions about things in the future
3. Evaluations of people, places, and things

Words to Identify Opinions:

1. Biased Words (bad, worse, worst, good, better, best, worthwhile, worthless, etc.)
2. Qualifiers (all, always, likely, never, might, seem, possibly, probably, should, etc.)

Goodall, J. (n.d.). READING Fact vs. Opinion.

Activity 3: Activity Questions to Identify Informed Speakers:

1. Does the speaker have a current and relevant background to the topic under discussion?

2. Is the speaker generally respected within the field?

3. Does the speaker carefully signal, via judgment words, to identify when they are presenting opinions vs. facts?

Activity 4: Read the text again, identify the statements that show facts (F) and opinions (O) in the passage.

1. _____ Uzbekistan's beloved national dish, Plov, is widely believed to have aphrodisiac qualities.
2. _____ Plov dish traditionally eaten on Thursdays.
3. _____ Plov is cooked from a medley of rice, vegetables, meat, and spices.
4. _____ Plov was first invented for Alexander the Great, who ordered the creation of a satisfying meal to sustain his army during their campaigns in Central Asia.
5. _____ Plov would've been an ideal high-calorie, nutrient-rich dish for the largely agricultural society.
6. _____ Plov is considered such a vital part of the country's culinary traditions that it was recently inscribed on UNESCO's Intangible Cultural Heritage of Humanity List.
7. _____ Nuriddinova explained. "It creates social bonds and encourages friendship; it brings our nation together."

8. _____ "If you know you have only one day left on Earth, spend it eating plov," Nuriddinova said.
9. _____ The country's most famous Plov restaurant is Besh Qozon located in the Yunusabad neighborhood of the capital, Tashkent.
10. _____ Besh Qozon serves between 5,000 and 8,000 customers daily.

Reflecting: (Google Classroom)

Activity 5: From the statement, "*If you know you have only one day left on Earth, spend it eating plov,*" do you agree or disagree? Write three factual statements and three opinions to support your answers.

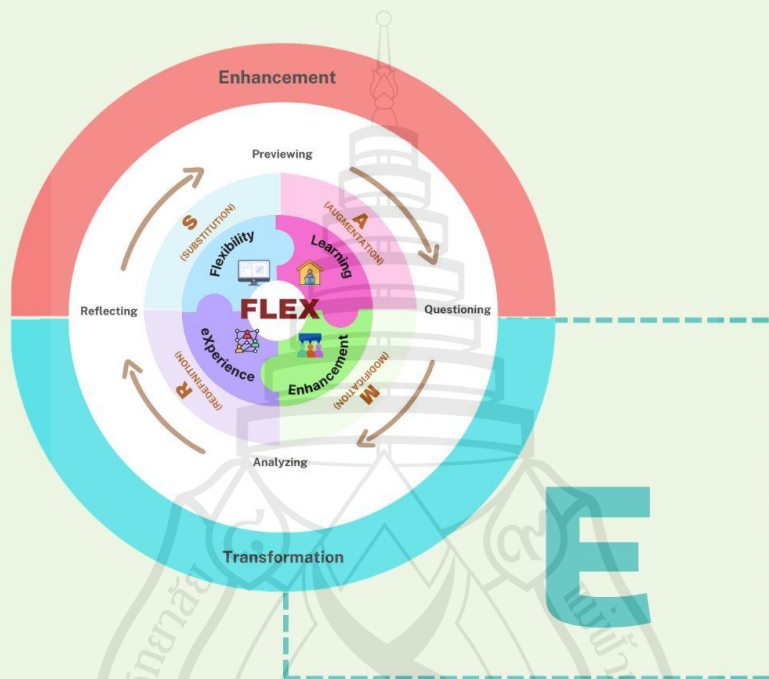
Facts:

1. _____
2. _____
3. _____

Opinions:

1. _____
2. _____
3. _____

Enhancement Mode

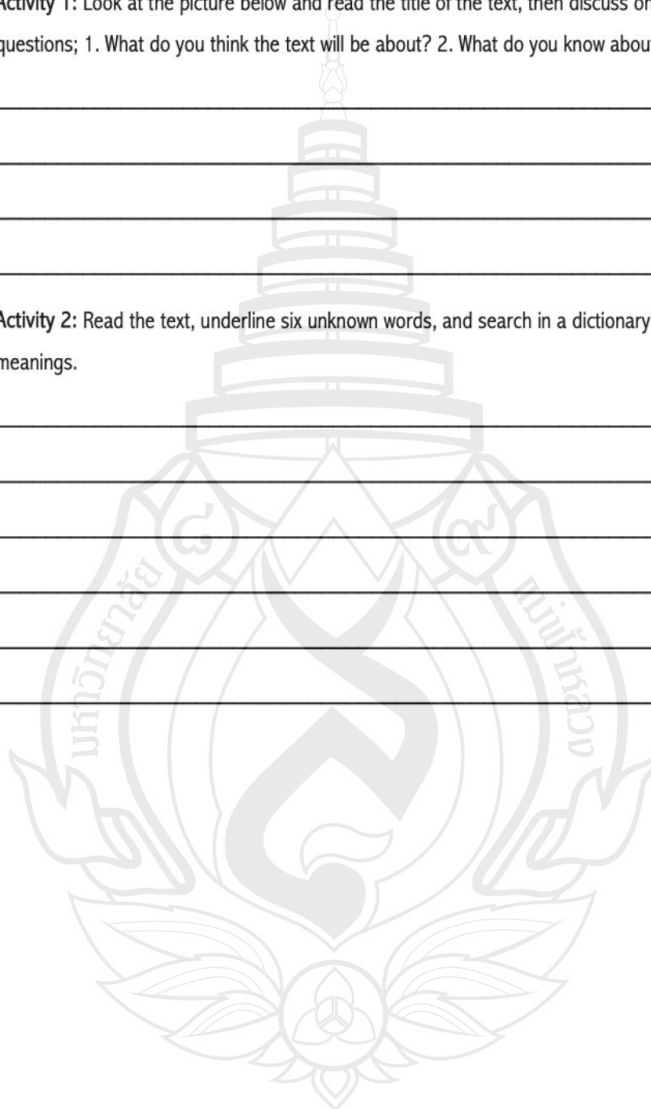


Teaching and learning fosters the development of innovative educational experiences. Students utilize modern technology to enhance their learning journey and cultivate a community of learning and social engagement.

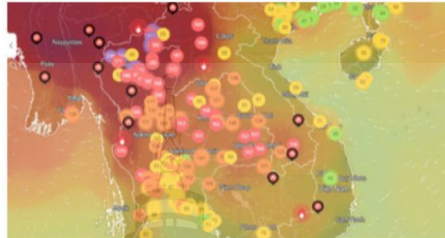
Enhancement Mode**1. Previewing: (Padlet)**

Activity 1: Look at the picture below and read the title of the text, then discuss on these questions; 1. What do you think the text will be about? 2. What do you know about this topic?

Activity 2: Read the text, underline six unknown words, and search in a dictionary for their meanings.



Air pollution in Chiang Mai highlighted in Chinese life-style social media



Airborne pollution in Chiang Mai, which was ranked the most polluted city in the world by the real time Air Quality Index (AQI) last week, has become a topic of widespread criticism in Xiaohongshu, a popular Chinese life-style social media.

According to Ai Chong's Facebook post on events and lifestyles in China, the hashtag "smog season in Chiang Mai" has attracted about 50,000 views, while another hashtag "air pollution" has attracted over 17 million views. One post about the pollution in Chiang Mai reads "Bye-bye Chiang Mai. Will return the next time because the smog problem is unbearable."

Ai Chong said that, although the "smog season in Chiang Mai" hashtag has not yet gone viral, the pollution will hurt the image of the city in the long run. He also said that he re-posted the criticism in Xiaohongshu, with an intention to address the problem to Thai authorities so they would tackle the issue earnestly and sustainably.

Meanwhile, CNN reported on the pollution in Chiang Mai, noting that the air-borne pollutants are 20 times higher than the standard of the World Health Organization. It reported that the problem is being caused by the burning of farm waste to prepare land for the next crop cycle. Today, Chiang Mai is the world's fifth most polluted city, according to the real time AQI.

Reference: <https://www.thaipbsworld.com/air-pollution-in-chiang-mai-highlighted-in-chinese-life-style-social-media/>

2. Questioning: (Padlet and Google Classroom)

Activity 3: Read the text and then answer the following questions.

1. Who posted the pollution criticism in Chiang Mai?

2. What is "Xiaohongshu"?

3. Why has the airborne pollution in Chiang Mai become a criticism?

4. "He also said that he re-posted the criticism in Xiaohongshu" What does the word "criticism" in this sentence refer to?

5. What is the cause of airborne pollution in Chiang Mai?

6. What will happen in Chiang Mai if it still has airborne pollution?

7. What do these number refer to in the article?

50,000 _____

17 million _____

20 _____

fifth _____

3. Analyzing: (Padlet)

Fact and an Opinion

Facts can be proven beyond any doubt through verifiable evidence such as measurements, statistics, or observations. Opinions cannot be proven and are instead a reflection of one's own experiences, ideas, beliefs, or feelings about the topic of the statement in question.

What does "fact" mean?

"Fact" means any statement that can be proven to be either true or false and does not rely on the author's own beliefs, ideas, or feelings. Facts are objective and can be verified by evidence

For example: *Paris is the capital of France and is home to over two million people.*

What does "opinion" mean?

"Opinion" means any statement that cannot be proven to be either true or false and relies on the author's own beliefs, ideas, or feelings. Opinions are subjective, and while the author can provide evidence to support their statement, the evidence cannot prove the statement to be true or false.

For example: *May 22th is the best day of the year.*

<https://study.com/academy/lesson/video/facts-vs-opinions-examples-games-activities.html>

Activities 4: Read the text again, identify whether each statement is a **FACT** or an **OPINION**.
(using a different color to highlight the text)

Activity 5: From Activity 5, convert three sentence that expresses a fact into an opinion statement.

1.

2.

3.

4. Reflecting: (Padlet)

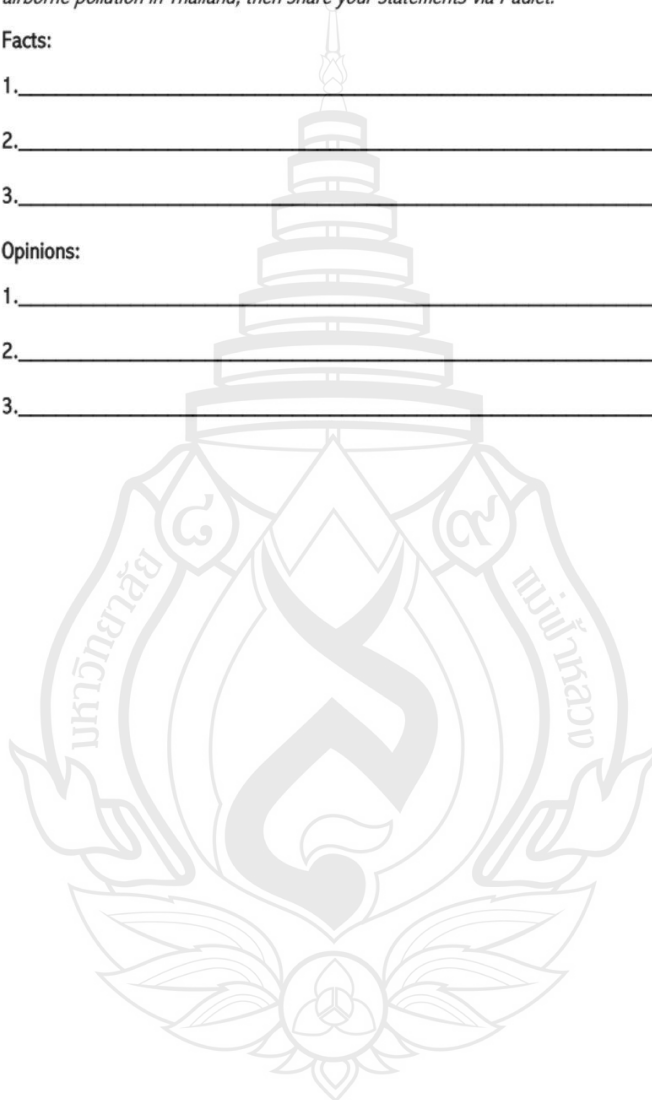
Activity 6: Write three factual statements and three opinion statements about *"how to stop the airborne pollution in Thailand, then share your statements via Padlet."*

Facts:

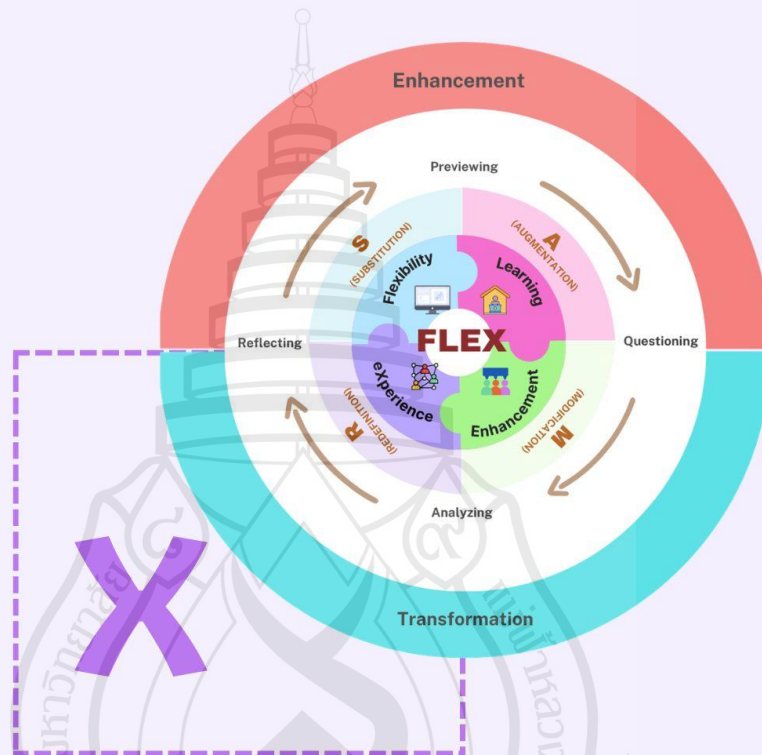
1. _____
2. _____
3. _____

Opinions:

1. _____
2. _____
3. _____



EXperience Mode



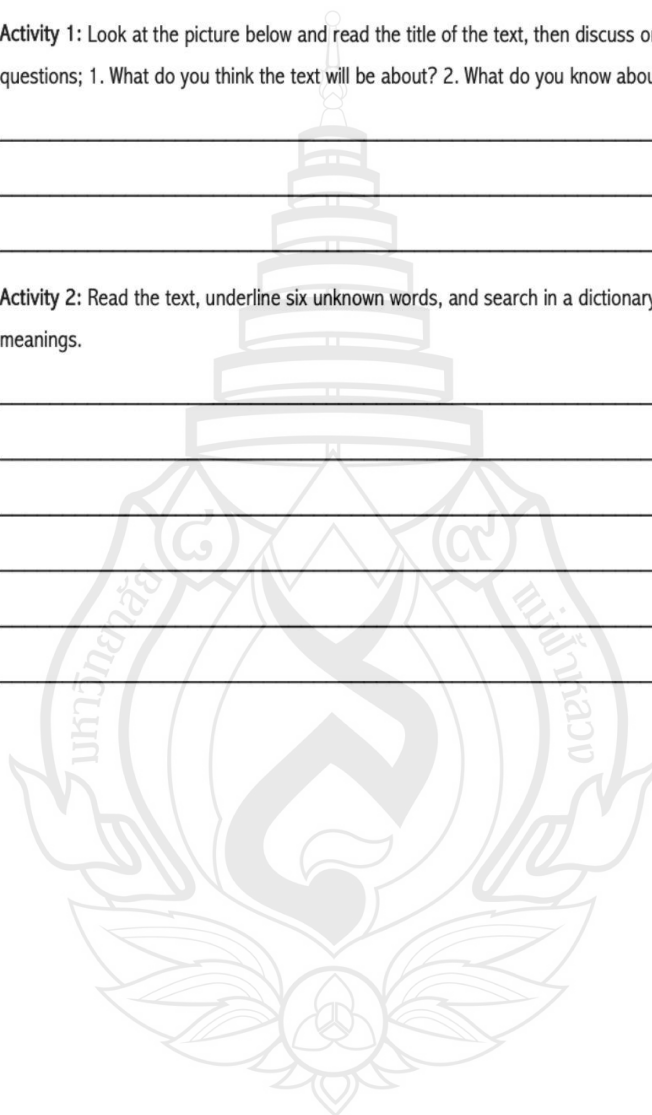
Teaching and learning aims to transform the learning process through the integration of technology and pedagogical approaches. Students customize their learning path with the modified pedagogical approach which enhances students' problem-solving abilities and fosters collaborative communication.

EXperience Mode

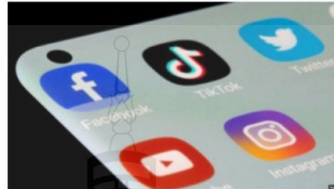
1. Previewing: (Google Classroom)

Activity 1: Look at the picture below and read the title of the text, then discuss on these questions; 1. What do you think the text will be about? 2. What do you know about this topic?

Activity 2: Read the text, underline six unknown words, and search in a dictionary for their meanings.



Florida Approves Law Banning Social Media for Children under 14



Florida Governor Ron DeSantis on Monday signed a law that bans children in the state under the age of 14 from having a social media account. The measure requires parental permission before 14- and 15-year-olds can sign up for personal social media accounts in Florida.

Supporters say the bill protects children from possible online harm, including threats to mental health and privacy. Critics have said the law might violate the U.S. Constitution's First Amendment protection of free speech. Some opponents have said they think parents — not the government — should be the ones to decide which restrictions are best for their child. Meta, the parent company of Facebook, opposed the legislation for example.

Florida's legislature passed the law earlier this month. It was the second version of the measure. The first version, which passed Florida's legislature in February, would have completely banned children under age 16 from social media. DeSantis vetoed that version of the bill, saying he thought it was too restrictive of parental rights. But the governor's office worked with legislators to come up with a new measure he could support. The new law leaves it up to parents to decide whether their 16- and 17-year-olds can sign up for social media accounts.

In a statement, DeSantis said research had repeatedly shown that social media services can harm children in several major ways. The legislation, he added, is designed to give parents "a greater ability to protect their children."

The law is set to take effect on January 1, 2025. The new law was guided through Florida's House of Representatives by Republican Speaker Paul Renner. At a bill-signing ceremony at a school, Renner said a child, whose brain is still developing, "doesn't have the ability to know that they're being sucked into these addictive technologies." He added, "Because of that, we have to step in for them."

The bill does not name any specific social media service. But it states that it targets social media sites using tools to get users to stay online for long periods. The measure does not cover services that mainly provide email, messaging or texting services. The law requires social media companies to permanently remove personal information collected from closed accounts. And it lets parents bring civil lawsuits against services failing to do so.

Reference: <https://learningenglish.voanews.com/a/florida-bans-social-media-for-children-under-14/7545764.html>

2. Questioning: (Google Classroom)

1. According to the first paragraph, who cannot have a social media account?

2. When was the Florida's law started?

3. From the first version of the law, what age can students have a social media account?

4. What is the purpose of Florida's legislature for parents?

5. "doesn't have the ability to know that they're being sucked into these addictive technologies." What does the word "these" refer to?

6. Why has Florida's legislature banned social media for students under 14?

7. Why did Florida's government change the measurement to the second version?

8. What services does the measure not cover?

9. What are the requirements of the government for the social media company?

10. What do these numbers refer to in the text?

14 _____

16-17 _____

January 1, 2025 _____

3. Analyzing: (Google Classroom)

Facts and Opinions

A **fact** is a statement that is true of which can be verified by presenting supporting evidence. This means that all facts are true for all situations and individuals. Statistics and other numerical data occasionally serve as evidence for facts.

Example: Humans are mammals.
Asia is the largest continent in the world.
World War II began in 1939

Each of these statements is **verifiably true**. In other words, evidence exists that could prove each claim. When something is factual, it is known as being objective.

An **opinion** is a statement that isn't always true or false is called an opinion. It might convey what you think, feel, believe, value, or judge.

Example: Humans are the best mammals in existence.
Asia is the most interesting continent in the world.
World War II was a terrible war.

Each of these statements is debatable. One can agree or disagree with each statement. When something can be argued about, it's called being subjective.

When trying to distinguish opinion from fact, be on the lookout for certain signal word that often accompany an opinion.

Signal Word:

Always	Bad	Beautiful	Best
Disgusting	Favorite	Good	Great
Horrible	Lovely	Most	Must
Never	Pretty	Should	Strangest

As you read, ask yourself these questions to help you tell the difference between facts and opinions:

- Is there a specific source I can check, like a newspaper or textbook, that backs up this claim? It's probably true if that's the case.
- Are there ideas like this that haven't been proven true by evidence but that some people think are true? If so, it's probably just an opinion.
- Does this statement make a judgment or is it very general? It's probably an opinion if that's the case.

<https://www.mometrix.com/academy/fact-or-opinion>

Activities 4: Read the text again, identify whether each statement is a FACT or an OPINION.

(using a different color to highlight the text)

Activity 5: From Activity 5, convert the sentence that expresses a fact into an opinion statement.

4. Reflecting: (TikTok)

Team Project: Write three factual statements and three opinion statements about *"banning social media for children in Thailand"*, then share your factual and opinion statements via video on TikTok.

"Banning social media for children in Thailand"

Fact:

1.

2.

3.

Opinion:

1.

2.

3.

APPENDIX G

CRITICAL READING TEST

Critical Reading Test

Time: 2 hours

Text 1:

Should you avoid eating chocolate?

Dark chocolate and similar cocoa products are contaminated with lead and cadmium, two neurotoxic metals that are linked to cancer, chronic disease, or reproductive and developmental issues, especially in children, a new study found.

As natural elements in the Earth's crust, lead, cadmium and other heavy metals are in the soil in which crops are grown and thus can't be avoided. Some crop fields and regions, however, contain more toxic levels than others, partly due to the overuse of metal-containing fertilizers and ongoing industrial pollution.

However, despite growing on land with fewer pesticides and other contaminants, organic versions of dark chocolate had some of the highest levels, according to the study published Wednesday in the journal *Frontiers in Nutrition*.

Dark chocolate is known for being rich in plant nutrients called flavonoids, antioxidants and beneficial minerals and has been linked to improved cardiovascular health, cognitive performance and less chronic inflammation.

The research team examined only pure dark chocolate products as they contain the highest amount of cacao, the raw, unprocessed part of the cacao bean. Candies or baking chocolates with other ingredients were eliminated. The study did not disclose the names or manufacturers of the tested products.

“The average levels of lead and cadmium in cocoa-containing products in the new study are at or above the average amounts the US Food and Drug Administration find for lead

and cadmium in the most highly contaminated foods they test,” said Jane Houlihan, the national director of science and health for Healthy Babies Bright Futures.

That risk of heavy metal exposure rises, however, if a person is medically comprised, pregnant, or a small child, said Tewodros Godebo, an assistant professor of environmental geochemistry at Tulane University School of Public Health and Tropical Medicine in New Orleans. He authored a July study which analyzed 155 samples of chocolate and found higher levels of cadmium but little lead in dark chocolates.

Over time, consuming low levels of cadmium can damage the kidneys. The Environmental Protection Agency calls the metal a probable human carcinogen.

Children can absorb about 50% of ingested lead after a meal and up to 100% on an empty stomach, experts say. There is no safe level of lead, especially for children, according to the World Health Organization.

“In particular, lead can affect children’s brain development, resulting in reduced intelligence quotient (IQ), behavioral changes such as reduced attention span and increased antisocial behavior, and reduced educational attainment,” WHO states on its website.

<https://edition.cnn.com/2024/07/31/health/cacao-dark-chocolate-lead-heavy-metals-wellness/index.html>

Instruction: Read the texts carefully and then answer the following questions.

1. Based on the information presented in the text, what is the author’s overall conclusion about consuming dark chocolate?

- A. Dark chocolate is a healthy food that should be consumed regularly.
- B. Dark chocolate should be avoided due to its high levels of heavy metals.
- C. Dark chocolate can be consumed in moderation, but pregnant women and children should
- A. exercise caution.
- D. More research is needed to determine the safety of dark chocolate consumption.

2. Why did the research team examine only pure dark chocolate products?
 - A. They are the most popular type of chocolate
 - B. They contain the highest amount of cacao
 - C. They are easier to analyze
 - D. They are the least expensive type of chocolate
3. What are the potential health effects of lead exposure in children?
 - A. Reduced intelligence, behavioral problems, and developmental issues
 - B. Increased risk of diabetes and heart disease
 - C. Weight gain and obesity
 - D. Skin allergies and rashes
4. Which of the following is a fact about chocolate?
 - A. Chocolate is the most delicious food.
 - B. Everyone should eat chocolate every day.
 - C. Dark chocolate is the healthiest type of chocolate.
 - D. Chocolate contains lead and cadmium.
5. Which of the following is an opinion about the health risks of lead and cadmium exposure?
 - A. The government should regulate the levels of lead and cadmium in chocolate.
 - B. There is no safe level of lead exposure, especially for children.
 - C. Lead and cadmium can damage the kidneys.
 - D. People should avoid eating chocolate altogether.
6. Choose the most likely primary purpose of the author in writing this text:
 - A. To promote the health benefits of dark chocolate.
 - B. To encourage consumers to avoid eating chocolate altogether.
 - C. To inform readers about the potential health risks of consuming chocolate.
 - D. To persuade the government to regulate the chocolate industry.
7. Which of the following is an argument presented in the text?
 - A. Dark chocolate is a healthy food because it is rich in antioxidants.
 - B. All chocolate products are safe for consumption.
 - C. Organic chocolate is always healthier than conventional chocolate.
 - D. The health risks of lead and cadmium outweigh the potential benefits of eating chocolate.

8. Which argument does the text support?
- A. Consumers should completely avoid eating chocolate.
 - B. The government should ban the sale of chocolate products.
 - C. It is important to be aware of the potential health risks associated with chocolate consumption.
 - D. The chocolate industry is not responsible for the presence of heavy metals in chocolate.
9. The study found that organic dark chocolate had some of the highest levels of heavy metals. What can be inferred about the safety of organic dark chocolate compared to non-organic dark chocolate?
- A. Organic dark chocolate is generally safer than non-organic dark chocolate.
 - B. Non-organic dark chocolate is likely to have higher levels of heavy metals than organic dark chocolate.
 - C. Organic dark chocolate might pose a higher risk of heavy metal exposure compared to non-organic dark chocolate.
 - D. The safety of organic versus non-organic dark chocolate cannot be determined from the study.
10. The text states that children can absorb up to 100% of ingested lead on an empty stomach. What can be inferred about the relative risk of lead exposure for children compared to adults?
- A. Children are at a lower risk of lead exposure compared to adults.
 - B. Children absorb lead more efficiently, making them more at risk from lead exposure than adults.
 - C. Adults absorb lead more efficiently than children.
 - D. The risk of lead exposure is the same for both children and adults.

Text 2

How social media affects sleep quality

Beyond unpleasant and distressing dreams, the Flinders study and other related research shows that poorer sleep quality and sleep disruptions are also generally more common among people who overuse social media applications.

“A large body of research supports the association between screen-based media consumption time as a whole and poorer sleep health in minors and possibly in adults as well,” says Anthony Levasseur, a sleep researcher at the Center for Advanced Research in Sleep Medicine in Montreal, Canada.

Indeed, Khan's 2024 study of more than 200,000 social media users shows that social media habits and behaviors that interfere with work and school responsibilities and negatively impact interpersonal relationships can cause enough stress to boost one's odds of getting a lousy night's sleep. Another study shows that when teens learn of missed opportunities or events on social platforms, they experienced a fear of missing out (FOMO) intense enough they can lose sleep.

“Any socially- or emotionally triggering experience can lead to rumination, which could affect both your ability to fall asleep or stay asleep,” says Lauren Hale, co-author of a recent related study and the graduate program director of the Population Health and Clinical Outcomes Research program at Stony Brook University in New York. She says sleep is affected by social media use in more practical ways as well such as through push notifications, noises and vibrations, or other alerts that interrupt or prevent sleep.

Even more plain, Chen says “if your eyes are open doing something else, you're not sleeping.” She also says that highly engaging content with fast-paced imagery results in a more alert brain "that is not primed for sleep."

Another related issue is "disrupted circadian rhythm due to the blue light emitted from your electronic device," explains Ben Carter, a professor of medical statistics at King's College London in the United Kingdom. This light stimulates the blue-light-sensitive ganglion cells of the retina, which are photoreceptors in the eye that communicate with the gland responsible for the production of melatonin, explains Levasseur. "This ends

up suppressing the production of melatonin, which is the hormone that stimulates drowsiness," he explains.

While research shows that some people are more sensitive to blue light stimulation than others, affected melatonin levels have nevertheless been shown to increase alertness at bedtime, making it more difficult to fall or stay asleep.

[https://www.nationalgeographic.com/science/
article/social-media-related-nightmares](https://www.nationalgeographic.com/science/article/social-media-related-nightmares)

Instruction: Read the texts carefully and then answer the following questions.

11. What is the main idea of the text?
 - A. The benefits of social media use.
 - B. The impact of social media on sleep quality.
 - C. The importance of a good night's sleep.
 - D. The different types of social media platforms.
12. What are some of the factors that contribute to poor sleep quality due to social media use?
 - A. The fear of missing out (FOMO) and push notifications.
 - B. Engaging content and the blue light emitted from screens.
 - C. Stressful interactions and negative social experiences.
 - D. All of the above.
13. Which of the following is a fact about social media use and sleep quality?
 - A. Social media is the only factor that affects sleep quality.
 - B. People who use social media excessively are more likely to experience sleep problems.
 - C. All social media platforms have the same negative impact on sleep.
 - D. There is no scientific evidence to support the link between social media and sleep issues.
14. Which of the following is an opinion about social media use?
 - A. Social media can be addictive.
 - B. Screen-based media consumption time is associated with poorer sleep health.
 - C. Push notifications can disrupt sleep.
 - D. Blue light emitted from electronic devices can affect melatonin production.

15. What is the main argument presented in the text?
- A. Social media has a negative impact on sleep quality.
 - B. Social media is not harmful to sleep.
 - C. People should spend more time on social media.
 - D. Sleep is not important for overall health.
16. What evidence does the author provide to support the claim that social media use can negatively impact sleep?
- A. Personal stories of individuals who have experienced sleep problems due to social media
 - A. use.
 - B. Citing studies that show a correlation between social media use and poorer sleep quality.
 - C. Expert opinions from sleep researchers and psychologists.
 - D. All of the above.
17. What is the primary purpose of the author in writing this text?
- A. To persuade readers to completely avoid social media.
 - B. To inform readers about the relationship between social media and sleep quality.
 - C. To entertain readers with stories about sleep problems.
 - D. To promote new technological solutions for improving sleep.
18. What is the author's purpose in stating that some people are more sensitive to blue light stimulation than others?
- A. To argue that everyone is equally affected by blue light
 - B. To claim that blue light sensitivity improves sleep quality
 - C. To suggest that sensitivity to blue light is irrelevant to sleep
 - D. To inform that individual differences exist in sensitivity to blue light
19. What can be inferred about the impact of social media on mental health?
- A. Social media can contribute to emotional distress and sleep issues.
 - B. Social media has no effect on mental health.
 - C. All social media users experience severe mental health problems.
 - D. Social media is the sole cause of mental health issues.

20. What can be inferred about the potential effectiveness of limiting social media use before bed?

- A. Limiting social media use has no impact on sleep quality.
- B. Completely eliminating social media is the only solution for sleep problems.
- C. Reducing screen time exposure might improve sleep patterns.
- D. People should not use any electronic devices at all before bed.



APPENDIX H

SEMI-STRUCTURE INTERVIEW

A Semi-Structured Interview for Teachers Examining the Needs and Problems of Teaching and Learning in Critical Reading

This semi-structured interview aims to examine teachers' needs and problems in teaching and learning critical reading. The interview is conducted through face-to-face interaction. The data is used as background information for designing the Flex model of blended learning to enhance the critical reading skills of EFL university students.

Interview questions examining the needs and problems of teaching and learning in a critical reading classroom

- 1) What problems do you encounter in teaching critical reading (reading texts, reading tasks, activities, time, resources, and so on)?
- 2) In your opinion, what instructional strategies can promote critical reading skills?
- 3) What problems do you encounter when using digital tools in the critical reading classroom?
- 4) What do you think about digital tools that are applicable in the critical reading classroom?

More comments:

A Semi-Structured Interview for Students

Examining the Needs and Problems in Learning Critical Reading

This semi-structured interview aims to examine students' needs and problems in learning critical reading. The interview is conducted through face-to-face interaction. The data is used as background information for designing the Flex model of blended learning to enhance the critical reading skills of EFL university students.

Interview questions examining the needs and problems in a critical reading classroom.

- 1) What do you think about learning critical reading?
- 2) What difficulties or problems do you face in learning critical reading?
- 3) What types of reading texts can motivate you to read more?
- 4) What do you think about digital tools that can motivate you to learn critical reading?
- 5) To what extent do you practice your critical reading skills after class?

More comments:

APPENDIX I

IN-DEPTH INTERVIEW

The In-depth Interview for Students Examining the Students' Critical Reading Skills

This in-depth interview aims to examine students' critical reading skills after the implementation of the FLEX instructional model. The interview is conducted through face-to-face interaction. The data will be analyzed and interpreted in order to triangulate the critical reading test.

Interview questions for examining students' critical reading skills after implementing the FLEX instructional model.

- 1) How do you distinguish between fact and opinion in various texts?
- 2) How do you identify the author's purposes?
- 3) How do you make an inference and draw the conclusion of the text?
- 4) How do you evaluate an argument about the text?

More comments:

APPENDIX J

STUDENT ATTITUDES QUESTIONNAIRE

Questionnaire for the Students' Attitudes toward the Flex Model of Blended Learning

Instructions

Please respond to the following statements and evaluate your attitudes towards teaching and learning based on the FLEX instructional model. Use the provided criteria to rate your attitudes.

- 5 = Students have the very highest level of attitude.
- 4 = Students have a high level of attitude.
- 3 = Students have an average level of attitude.
- 2 = Students have a low level of attitude.
- 1 = Students have the lowest level of attitude.

Please tick (✓) the box representing the attitudes.

No.	Evaluated Items	Level of Attitudes				
		5	4	3	2	1
The Flex model of blended learning						
1.	The Flex model of blended learning helps you enhance critical reading skills.					
2.	You have the opportunity to learn and practice critical reading skills both in and outside the classroom.					
3.	The proportion of the combination between in-class and outside classroom learning modes is appropriate.					
4.	The contents designed are useful and interesting.					
5.	The tasks and activities designed are useful and interesting.					
6.	The Flex model of blended learning allows interaction with the teacher and with peers.					
7.	The teacher provides sufficient help and support for your learning both in and outside the classroom.					

No.	Evaluated Items	Level of Attitudes				
		5	4	3	2	1
8.	The digital tools used for the Flex model of blended learning are applicable.					
9.	Materials used in the Flex model of blended learning are convenient and allow you to get access anytime and anywhere.					
In-class Instruction						
10.	In-class teaching helps you enhance critical reading skills.					
11.	In-class teaching enables you to become more involved in the learning process.					
12.	You can have a chance to get immediate support or feedback from your teacher and peers.					
Outside-class Instruction						
13.	Outside-class teaching help you enhance critical reading skills.					
14.	You can use digital tools (e.g. E-mail, Padlet, Google Classroom) to communicate with your classmates and teacher.					
15.	Outside-class teaching encourages you to take more responsibility for your own learning.					
16.	Outside-class teaching offers opportunities to repeat and do activities as needed and access material whenever convenient.					

More comments:

APPENDIX K

EVALUATION FORM FOR THE FLEX MODEL OF BLENDED LEARNING

Evaluation Form for The Instructional Model (Checklist)

Instruction:

This evaluation form is designed for the experts to evaluate the consistency of the instructional model's components and the appropriateness of their descriptions. The areas of evaluation are in the followings:

1. Analyzing needs and problems
2. Formulating objectives
3. Analyzing learning environment
4. Analyzing teachers' and students' roles
5. Analyzing and designing contents
6. Identifying instructional strategies
7. Selecting instructional technology
8. Developing instructional materials and assessment
9. Implementing the instruction
10. Evaluating and revision

The evaluation form consists of two parts. Part one is based on a 3-point rating scale. In this section, please check (✓) in the table to indicate your evaluation of the consistency and appropriateness of each item. Components receiving a score between 0.34 and 1.00 are retained, while those scoring below 0.34 are revised.

- +1 = that item is consistent/appropriate
- 0 = that item is undecided
- 1 = that item is Inconsistent / Inappropriate

Part two includes open-ended forms designed to allow experts to provide additional comments and suggestions.

Part I: Please tick (✓) in the table to identify your evaluation on consistency and appropriateness of each item as following description:

- +1 = that item is consistent/appropriate
 0 = that item is undecided
 -1 = that item is Inconsistent / Inappropriate

Components of the Instructional Model	Consistency of the components of the Instructional model			Appropriateness of the descriptions of each component		
	+1	0	-1	+1	0	-1
1. Analyzing needs and problems						
2. Formulating objectives						
3. Analyzing learning environment						
4. Analyzing teachers' and students' roles						
5. Analyzing and designing contents						
6. Identifying instructional strategies						
7. Selecting instructional technology						
8. Developing instructional materials and assessment						
9. Implementing the instruction						
10. Evaluating and revision						

Part II: Please provide comments or suggestions

()

Evaluator

____/____/____

APPENDIX L

EVALUATION FORM FOR THE INSTRUCTIONAL DOCUMENT

Evaluation Form for Critical Reading Lessons

Instructions:

This evaluation form is developed for the experts to evaluate an appropriateness of critical reading lessons for the Flex Model of Blended Learning in Enhancing EFL Students' Critical Reading Skills. The critical reading lessons consist of four lessons as follows:

1. Distinguish between facts and opinions
2. Make inferences
3. Identify the author's purpose
4. Evaluate author's argument.

The evaluation form consists of two major parts. Part one is based on four-point rating scale criteria with following descriptions:

- 4 = Very appropriate
- 3 = Appropriate
- 2 = Inappropriate
- 1 = Very inappropriate

Part two is open-ended forms for the experts to give additional comments and suggestions. In part one, please check (✓) in the table to identify your evaluation on appropriateness of each item, and please provide comments and suggestions in part two.

Yours Respectfully

Atchara Limpapattarakul

A Ph.D. Student

English for Professional Development Program
School of Liberal Arts, Mae Fah Luang University

LESSON 1: Distinguish Between Facts and Opinions

Part I: please tick (✓) the evaluated items in the table identifying the level of the appropriateness of the instructional manual as following descriptions:

4 = Very appropriate

3 = Appropriate

2 = Inappropriate

1 = Very inappropriate

Items	Rating Scale				Comments
	4	3	2	1	
The contents of the lessons					
The contents are related to the lesson’ s objectives.					
The contents are suitable for the learners’ level of knowledge.					
The contents are concise.					
The contents are accurate.					
The language use in the lessons is appropriate.					
The contents presentation					
The contents are organized in appropriate sequences.					
The content in each part is consistent with other parts.					
The total amount of content in every lesson is suitable for the time given frame.					
The contents provide a simple and understandable explanation.					
The font sizes and styles used for the lessons are suitable.					

Part II: Please provide comments or suggestions

LESSON 2: Identifying the Author's Purpose

Part I: please tick (✓) the evaluated items in the table identifying the level of the appropriateness of the instructional manual as following descriptions:

4 = Very appropriate

3 = Appropriate

2 = Inappropriate

1 = Very inappropriate

Items	Rating Scale				Comments
	4	3	2	1	
The contents of the lessons					
The contents are related to the lesson’ s objectives.					
The contents are suitable for the learners’ level of knowledge.					
The contents are concise.					
The contents are accurate.					
The language use in the lessons is appropriate.					
The contents presentation					
The contents are organized in appropriate sequences.					
The content in each part is consistent with other parts.					
The total amount of content in every lesson is suitable for the time given frame.					
The contents provide a simple and understandable explanation.					
The font sizes and styles used for the lessons are suitable.					

Part II: Please provide comments or suggestions

LESSON 3: Making Inferences

Part I: please tick (✓) the evaluated items in the table identifying the level of the appropriateness of the instructional manual as following descriptions:

4 = Very appropriate

3 = Appropriate

2 = Inappropriate

1 = Very inappropriate

Items	Rating Scale				Comments
	4	3	2	1	
The contents of the lessons					
The contents are related to the lesson’ s objectives.					
The contents are suitable for the learners’ level of knowledge.					
The contents are concise.					
The contents are accurate.					
The language use in the lessons is appropriate.					
The contents presentation					
The contents are organized in appropriate sequences.					
The content in each part is consistent with other parts.					
The total amount of content in every lesson is suitable for the time given frame.					
The contents provide a simple and understandable explanation.					
The font sizes and styles used for the lessons are suitable.					

Part II: Please provide comments or suggestions

LESSON 4: Evaluate Author's Argument

Part I: please tick (✓) the evaluated items in the table identifying the level of the appropriateness of the instructional manual as following descriptions:

4 = Very appropriate

3 = Appropriate

2 = Inappropriate

1 = Very inappropriate

Items	Rating Scale				Comments
	4	3	2	1	
The contents of the lessons					
The contents are related to the lesson’ s objectives.					
The contents are suitable for the learners’ level of knowledge.					
The contents are concise.					
The contents are accurate.					
The language use in the lessons is appropriate.					
The contents presentation					
The contents are organized in appropriate sequences.					
The content in each part is consistent with other parts.					
The total amount of content in every lesson is suitable for the time given frame.					
The contents provide a simple and understandable explanation.					
The font sizes and styles used for the lessons are suitable.					

Part II: Please provide comments or suggestions

()

Evaluator

Evaluation Form for the Instructional Manual

Instruction:

This evaluation form is developed for the experts to evaluate the appropriateness of the instructional manual of the Flex Model of blended learning in enhancing EFL students' critical reading skills.

The evaluation form consists of two major parts. Part one is based on four-point rating scale criteria with following descriptions:

4 = Very appropriate

3 = Appropriate

2 = Inappropriate

1 = Very inappropriate

Part two is open-ended forms for the experts to give additional comments and suggestions. In part one, please check (✓) in the table to identify your evaluation on appropriateness of each item, and please provide comments and suggestions in part two.

Yours Respectfully

Atchara Limpapattarakul

A Ph.D. Student

English for Professional Development Program

School of Liberal Arts

Mae Fah Luang University

Part I: please tick (✓) the evaluated items in the table identifying the level of the appropriateness of the instructional manual as following descriptions:

4 = Very appropriate

3 = Appropriate

2 = Inappropriate

1 = Very inappropriate

Components of the Instructional Model	Rating Scale				Comments
	4	3	2	1	
1. Details in the manual are clear and useful for teacher to use the instructional model effectively.					
2. Explanation of teaching materials preparation helps teachers to know what materials they need to prepare for their teaching and learning process.					
3. Description of instructional materials indicates the essential components required for effective teaching.					
4. Explanation of the evaluation provides teachers clear understanding of the preparation required for evaluation tools, methods, and processes.					
5. Suggestion to the role of the teacher, students and the environment of the classroom is clear understanding					

Part II: Please provide comments or suggestions

()

Evaluator

____/____/____

Evaluation Form for Lesson Plans

Instruction:

The evaluation form is developed for the experts to evaluate an appropriateness of the lesson plans for the Flex model of blended learning development in enhancing EFL students' critical reading skills. The components of the lesson plans are as follows:

1. Topic
2. Time period
3. Enabling Objectives
4. Terminal Objectives
5. Contents
6. Teaching materials
7. Instructional procedures
8. Instructional strategies
9. Assessment

The evaluation form consists of two major parts. Part one is based on four-point rating scale criteria with following descriptions:

- 4 = Very appropriate
- 3 = Appropriate
- 2 = Inappropriate
- 1 = Very inappropriate

Part two is open-ended forms for the experts to give additional comments and suggestions. In part one, please check (✓) in the table to identify your evaluation on appropriateness of each item, and please provide comments and suggestions in part two.

Yours Respectfully

Atchara Limpapattarakul

A Ph.D. Student

English for Professional Development Program

School of Liberal Arts

Mae Fah Luang University

Part I: please tick (✓) the evaluated items in the table identifying the level of the appropriateness of the lesson plans as follow description:

4 = Very appropriate

3 = Appropriate

2 = Inappropriate

1 = Very inappropriate

Components of the lesson plans	Rating Scale				Comments
	4	3	2	1	
1. Lesson plan consists of all essential components for instruction.					
2. An arrangement of the lesson plan components is appropriate.					
3. Topics of the lesson plans are appropriate.					
4. Objectives are appropriate, observable, and measurable.					
5. The lesson plans' objectives specify the desire outcome for the students.					
6. The time allocation for each learning modes is appropriate for the different contents and activities.					
7. Contents for each learning mode is appropriate for learners (1st year students).					
8. Contents for each learning mode is related to the objectives of the lesson plans.					
9. Teaching method enable students to involve in learning process and are supported the objectives of the lesson plans.					
10. Teaching materials are appropriate for teaching and learning activities.					
11. Teaching and learning processes in each learning mode is appropriate and let the students participate in the process.					

Components of the lesson plans	Rating Scale				Comments
	4	3	2	1	
12. The instructional strategies which are supported to the objectives.					
13. The assessment that is related to the instructional model' objectives.					
14. The assessment that is related to the lesson plans' objectives.					
15. The use of language in the lesson plans is appropriate.					

Part II: Please give comments and suggestions



()

Evaluator

/ /

APPENDIX M

EVALUATION FORM FOR THE RESEARCH INSTRUMENTS

Evaluation Form for Critical Reading Test (Pre-test and Posttest)

Instruction:

This evaluation form is developed for the experts to evaluate the content validity of the critical reading test. The topics for designing the critical reading test are according to PLOs, CLOs, and the course description of critical reading skills for English teacher course. They are comprised of four lessons (critical reading skills) as follows:

1. Distinguish between facts and opinions
2. Make inference
3. Author's purpose
4. Evaluating arguments

The evaluation form is composed of two parts. Part one is based on the Index of Item Objective Congruence (IOC) criteria. The items whose scores are higher than 0.50-1.00 are reserved and those whose are lower than 0.50 are adjusted. Part two is opened forms for experts to give additional comments and suggestions

In part one, please tick (✓) in the table to identify your evaluation on content validity of each item as following description:

+1 = the item is congruent

0 = the item is undecided

-1 = the item is incongruent

In part two, please provide more comments or suggestions.

Yours Respectfully

Atchara Limpapattarakul, A Ph.D. Student

English for Professional Development Program

School of Liberal Arts

Mae Fah Luang University

Part I: Please tick (✓) in the table to identify your evaluation on contents validities of each item as following description:

+1 = the item is congruent

0 = the item is undecided

-1 = the item is incongruent

Text 1:

Should you avoid eating chocolate?

Dark chocolate and similar cocoa products are contaminated with lead and cadmium, two neurotoxic metals that are linked to cancer, chronic disease, or reproductive and developmental issues, especially in children, a new study found.

As natural elements in the Earth's crust, lead, cadmium and other heavy metals are in the soil in which crops are grown and thus can't be avoided. Some crop fields and regions, however, contain more toxic levels than others, partly due to the overuse of metal-containing fertilizers and ongoing industrial pollution.

However, despite growing on land with fewer pesticides and other contaminants, organic versions of dark chocolate had some of the highest levels, according to the study published Wednesday in the journal *Frontiers in Nutrition*.

Dark chocolate is known for being rich in plant nutrients called flavonoids, antioxidants and beneficial minerals and has been linked to improved cardiovascular health, cognitive performance and less chronic inflammation.

The research team examined only pure dark chocolate products as they contain the highest amount of cacao, the raw, unprocessed part of the cacao bean. Candies or baking chocolates with other ingredients were eliminated. The study did not disclose the names or manufacturers of the tested products.

"The average levels of lead and cadmium in cocoa-containing products in the new study are at or above the average amounts the US Food and Drug Administration finds for lead and cadmium in the most highly contaminated foods they test," said Jane Houlihan, the national director of science and health for Healthy Babies Bright Futures.

That risk of heavy metal exposure rises, however, if a person is medically comprised, pregnant, or a small child, said Tewodros Godebo, an assistant professor of environmental geochemistry at Tulane University School of Public Health and Tropical

Medicine in New Orleans. He authored a July study which analyzed 155 samples of chocolate and found higher levels of cadmium but little lead in dark chocolates.

Over time, consuming low levels of cadmium can damage the kidneys. The Environmental Protection Agency calls the metal a probable human carcinogen.

Children can absorb about 50% of ingested lead after a meal and up to 100% on an empty stomach, experts say. There is no safe level of lead, especially for children, according to the World Health Organization.

“In particular, lead can affect children’s brain development, resulting in reduced intelligence quotient (IQ), behavioral changes such as reduced attention span and increased antisocial behavior, and reduced educational attainment,” WHO states on its website.

<https://edition.cnn.com/2024/07/31/health/cacao-dark-chocolate-lead-heavy-metals-wellness/index.html>

No	Critical Reading Skills	Components of the lesson plans	Criteria			Comments
			+1	0	-1	
1	Identify the author’s purpose	Based on the information presented in the text, what is the author’s overall conclusion about consuming dark chocolate? A. Dark chocolate is a healthy food that should be consumed regularly. B. Dark chocolate should be avoided due to its high levels of heavy metals. C. Dark chocolate can be consumed in moderation, but pregnant women and children should exercise caution. D. More research is needed to determine the safety of dark chocolate consumption.				

No	Critical Reading Skills	Components of the lesson plans	Criteria			Comments
			+1	0	-1	
2	Main idea and details	Why did the research team examine only pure dark chocolate products? A. They are the most popular type of chocolate. B. They contain the highest amount of cacao. C. They are easier to analyze. D. They are the least expensive type of chocolate.				
3	Main idea and details	What are the potential health effects of lead exposure in children? A. Reduced intelligence, behavioral problems, and developmental issues B. Increased risk of diabetes and heart disease C. Weight gain and obesity D. Skin allergies and rashes				
4	Distinguish between facts and opinions	Which of the following is a fact about chocolate? A. Chocolate is the most delicious food. B. Everyone should eat chocolate every day. C. Dark chocolate is the healthiest type of chocolate. D. Chocolate contains lead and cadmium.				
5	Distinguish between facts and opinions	Which of the following is an opinion about the health risks of lead and cadmium exposure? A. The government should regulate the levels of lead and cadmium in chocolate. B. There is no safe level of lead exposure, especially for children. C. Lead and cadmium can damage the kidneys. D. People should avoid eating chocolate altogether.				

No	Critical Reading Skills	Components of the lesson plans	Criteria			Comments
			+1	0	-1	
6	Identify the author's purpose	Choose the most likely primary purpose of the author in writing this text: A. To promote the health benefits of dark chocolate. B. To encourage consumers to avoid eating chocolate altogether. C. To inform readers about the potential health risks of consuming chocolate. D. To persuade the government to regulate the chocolate industry.				
7	Evaluate an argument	Which of the following is an argument presented in the text? A. Dark chocolate is a healthy food because it is rich in antioxidants. B. All chocolate products are safe for consumption. C. Organic chocolate is always healthier than conventional chocolate. D. The health risks of lead and cadmium outweigh the potential benefits of eating chocolate.				
8	Evaluate an argument	Which argument does the text support? A. Consumers should completely avoid eating chocolate. B. The government should ban the sale of chocolate products. C. It is important to be aware of the potential health risks associated with chocolate consumption. D. The chocolate industry is not responsible for the presence of heavy metals in chocolate.				

No	Critical Reading Skills	Components of the lesson plans	Criteria			Comments
			+1	0	-1	
9	Make inference	The study found that organic dark chocolate had some of the highest levels of heavy metals. What can be inferred about the safety of organic dark chocolate compared to non-organic dark chocolate? A. Organic dark chocolate is generally safer than non-organic dark chocolate. B. Non-organic dark chocolate is likely to have higher levels of heavy metals than organic dark chocolate. C. Organic dark chocolate might pose a higher risk of heavy metal exposure compared to non-organic dark chocolate. D. The safety of organic versus non-organic dark chocolate cannot be determined from the study.				
10	Make inference	The text states that children can absorb up to 100% of ingested lead on an empty stomach. What can be inferred about the relative risk of lead exposure for children compared to adults? A. Children are at a lower risk of lead exposure compared to adults. B. Children absorb lead more efficiently, making them more at risk from lead exposure than adults. C. Adults absorb lead more efficiently than children. D. The risk of lead exposure is the same for both children and adults.				

Text 2

How social media affects sleep quality

Beyond unpleasant and distressing dreams, the Flinders study and other related research shows that poorer sleep quality and sleep disruptions are also generally more common among people who overuse social media applications.

“A large body of research supports the association between screen-based media consumption time as a whole and poorer sleep health in minors and possibly in adults as well,” says Anthony Levasseur, a sleep researcher at the Center for Advanced Research in Sleep Medicine in Montreal, Canada.

Indeed, Khan's 2024 study of more than 200,000 social media users shows that social media habits and behaviors that interfere with work and school responsibilities and negatively impact interpersonal relationships can cause enough stress to boost one's odds of getting a lousy night's sleep. Another study shows that when teens learn of missed opportunities or events on social platforms, they experienced a fear of missing out (FOMO) intense enough they can lose sleep.

“Any socially- or emotionally triggering experience can lead to rumination, which could affect both your ability to fall asleep or stay asleep,” says Lauren Hale, co-author of a recent related study and the graduate program director of the Population Health and Clinical Outcomes Research program at Stony Brook University in New York. She says sleep is affected by social media use in more practical ways as well such as through push notifications, noises and vibrations, or other alerts that interrupt or prevent sleep.

Even more plain, Chen says “if your eyes are open doing something else, you're not sleeping.” She also says that highly engaging content with fast-paced imagery results in a more alert brain “that is not primed for sleep.”

Another related issue is “disrupted circadian rhythm due to the blue light emitted from your electronic device,” explains Ben Carter, a professor of medical statistics at King's College London in the United Kingdom. This light stimulates the blue-light-sensitive ganglion cells of the retina, which are photoreceptors in the eye that communicate with the gland responsible for the production of melatonin, explains Levasseur. “This ends up suppressing the production of melatonin, which is the hormone that stimulates drowsiness,” he explains.

While research shows that some people are more sensitive to blue light stimulation than others, affected melatonin levels have nevertheless been shown to increase alertness at bedtime, making it more difficult to fall or stay asleep.

*[https://www.nationalgeographic.com/science/
article/social-media-related-nightmares](https://www.nationalgeographic.com/science/article/social-media-related-nightmares)*

No	Critical Reading Skills	Components of the lesson plans	Criteria			Comments
			+1	0	-1	
11	Main idea and details	What is the main idea of the text? A. The benefits of social media use. B. The impact of social media on sleep quality. C. The importance of a good night's sleep. D. The different types of social media platforms.				
12	Main idea and details	What are some of the factors that contribute to poor sleep quality due to social media use? A. The fear of missing out (FOMO) and push notifications. B. Engaging content and the blue light emitted from screens. C. Stressful interactions and negative social experiences. D. All of the above.				

No	Critical Reading Skills	Components of the lesson plans	Criteria			Comments
			+1	0	-1	
13	Distinguish between facts and opinions	Which of the following is a fact about social media use and sleep quality? A. Social media is the only factor that affects sleep quality. B. People who use social media excessively are more likely to experience sleep problems. C. All social media platforms have the same negative impact on sleep. D. There is no scientific evidence to support the link between social media and sleep issues.				
14	Distinguish between facts and opinions	Which of the following is an opinion about social media use? A. Social media can be addictive. B. Screen-based media consumption time is associated with poorer sleep health. C. Push notifications can disrupt sleep. D. Blue light emitted from electronic devices can affect melatonin production.				
15	Evaluate an argument	What is the main argument presented in the text? A. Social media has a negative impact on sleep quality. B. Social media is not harmful to sleep. C. People should spend more time on social media. D. Sleep is not important for overall health.				
16	Evaluate an argument	What evidence does the author provide to support the claim that social media use can negatively impact sleep? A. Personal stories of individuals who have experienced sleep problems due to social media use.				

No	Critical Reading Skills	Components of the lesson plans	Criteria			Comments
			+1	0	-1	
		B. Citing studies that show a correlation between social media use and poorer sleep quality. C. Expert opinions from sleep researchers and psychologists. D. All of the above.				
17	Identify the author's purpose	What is the primary purpose of the author in writing this text? A. To persuade readers to completely avoid social media. B. To inform readers about the relationship between social media and sleep quality. C. To entertain readers with stories about sleep problems. D. To promote new technological solutions for improving sleep.				
18	Identify the author's purpose	What is the author's purpose in stating that some people are more sensitive to blue light stimulation than others? A. To argue that everyone is equally affected by blue light B. To claim that blue light sensitivity improves sleep quality C. To suggest that sensitivity to blue light is irrelevant to sleep D. To inform that individual differences exist in sensitivity to blue light				
19	Make inference	What can be inferred about the impact of social media on mental health? A. Social media can contribute to emotional distress and sleep issues. B. Social media has no effect on mental health. C. All social media users experience severe mental health problems.				

No	Critical Reading Skills	Components of the lesson plans	Criteria			Comments
			+1	0	-1	
		D. Social media is the sole cause of mental health issues.				
20	Make inference	What can be inferred about the potential effectiveness of limiting social media use before bed? A. Limiting social media use has no impact on sleep quality. B. Completely eliminating social media is the only solution for sleep problems. C. Reducing screen time exposure might improve sleep patterns. D. People should not use any electronic devices at all before bed.				

Part II: Please give comments and suggestions for the critical reading test

()

Evaluator

____/____/____

Evaluation Form for a Semi-Structured Interview
Investigating students' needs and problems in learning critical reading

Instructions

1. The evaluation form is created for evaluating the main questions for a semi-structured interview investigating students' needs and problems in learning critical reading.
2. The expert is required to evaluate the completeness of the interview questions and the appropriateness of language use.
3. The expert is required to write comments and suggestions in the evaluation form.

Yours Respectfully

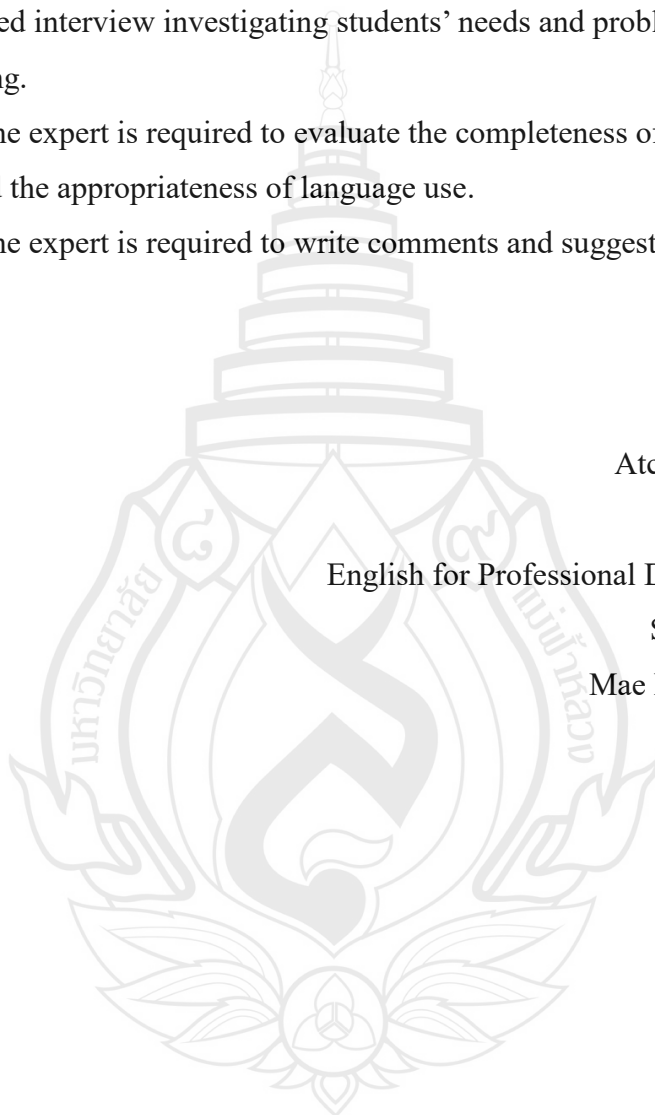
Atchara Limpapattarakul

A Ph.D. Student

English for Professional Development Program

School of Liberal Arts

Mae Fah Luang University



_____ / _____

Evaluation Form for a Semi-Structured Interview
Investigating teachers' needs and problems in teaching critical reading

Instructions

1. The evaluation form is created for evaluating the main questions for a semi-structured interview investigating teachers' needs and problems in teaching critical reading
2. The expert is required to evaluate the completeness of the interview questions and the appropriateness of language use.
3. The expert is required to write comments and suggestions in the evaluation form.

Yours Respectfully

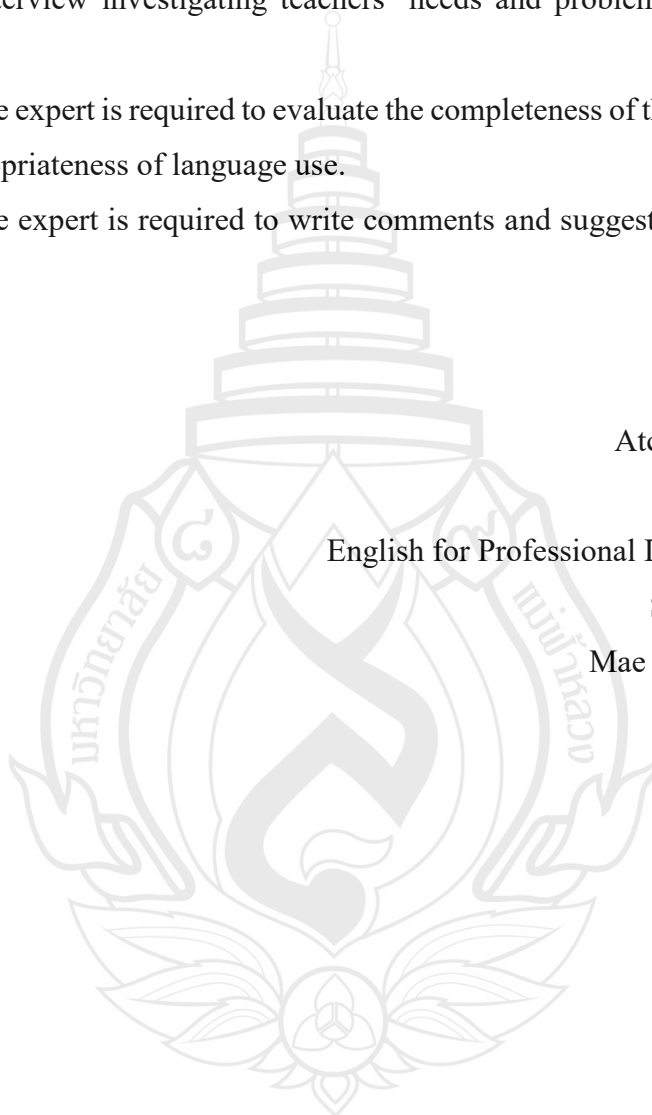
Atchara Limpapattarakul

A Ph.D. Student

English for Professional Development Program

School of Liberal Arts

Mae Fah Luang University



$$\left(\begin{array}{c} \text{ } \end{array} \right)$$

Evaluator

/ /

Evaluation Form for an In-depth Interview

Instructions

1. The evaluation form is created for evaluating the main questions for investigating student's critical reading skills constructed during the teaching and learning using the Flex model of blended learning after the implementation
2. The expert is required to evaluate the completeness of the interview questions and the appropriateness of language use.
3. The expert is required to write comments and suggestions in the evaluation form.

Yours Respectfully

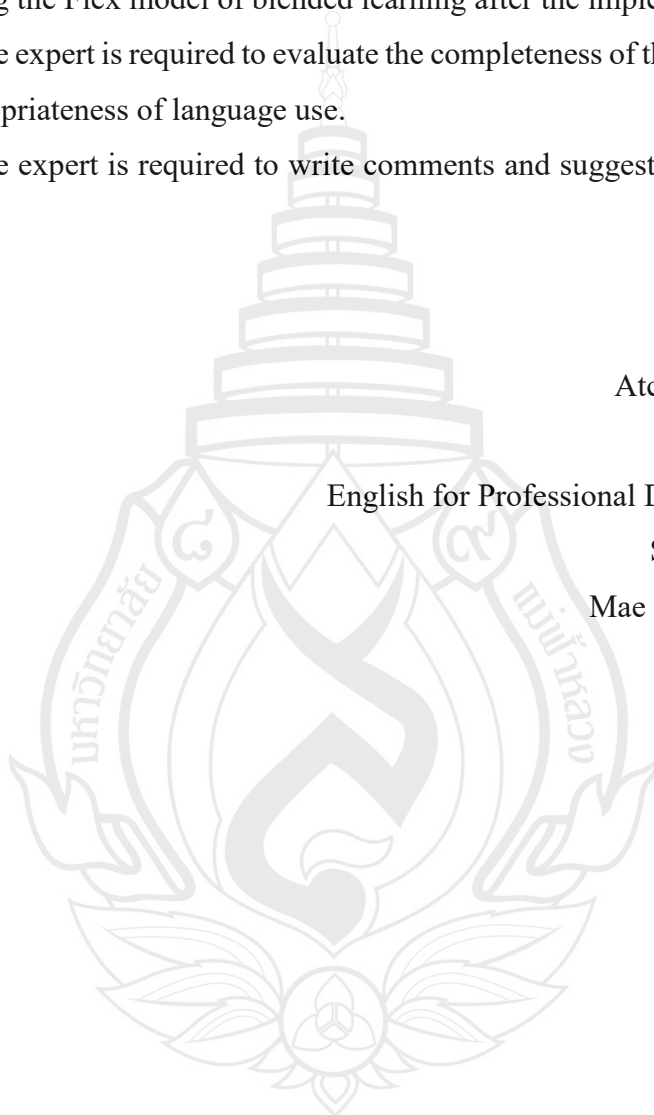
Atchara Limpapattarakul

A Ph.D. Student

English for Professional Development Program

School of Liberal Arts

Mae Fah Luang University



Evaluation Form for an In-depth Interview

1. Completeness of the interview questions

2. The appropriateness of language use

3. Suggestions

()

Evaluator

____/____/____

Evaluation Form for Questionnaire for Attitudes towards the Flex Model of Blended Learning

Instruction:

This evaluation form is developed for the experts to evaluate the congruence between the items and the objectives of the questionnaire. The questionnaire is used for investigating students' attitudes toward the Flex model of blended learning. The evaluation form consists of two parts. Part one is based on the Index of Item Objective Congruence (IOC) criteria and part two is opened forms for experts to give additional comments and suggestions.

In part one, please tick (✓) in the table to identify your evaluation on each item and give comments or suggestions for improving them. The descriptions of Index of Item Objective Congruence (IOC) criteria are as follows:

+1 = the item is congruent

0 = the item is undecided

-1 = the item is incongruent

The items obtaining the IOC scores between 0.5-1.00 are reserved, while the ones getting the ICO scores lower than 0.5 are revised. In part two, please provide additional comments and suggestions.

Yours Respectfully

Atchara Limpapattarakul

A Ph.D. Student

English for Professional Development Program

School of Liberal Arts

Mae Fah Luang University

Part I: Please tick (✓) in the table to identify your evaluation on each item and give comments or suggestions for improving items.

+1 = the item is congruent

0 = the item is undecided

-1 = the item is incongruent

No.	Items	Criteria			Comments and suggestions
		+1	0	-1	
The FLEX Model of Blended Learning					
1	The Flex model of blended learning helps you enhance critical reading skills.				
2	You have the opportunity to learn and practice critical reading skills both in and outside the classroom.				
3	The proportion of the combination between in-class and outside classroom learning modes is appropriate.				
4	The contents, tasks, and activities designed are useful and interesting.				
5	The Flex model of blended learning reinforces interaction between teacher and peers.				
6	The teacher provides sufficient help and support for your learning both in and outside the classroom.				
7	The technologies used for the Flex model of blended learning are applicable.				
8	Materials used in the Flex model of blended learning are convenient and allow you to get access anytime and anywhere.				
In-class Instruction					
9	In-class instruction helps you enhance critical reading skills.				
10	In-class instruction enables you to become more involved in the learning process.				
11	You can have a chance to get immediate support or feedback from your teacher and peers.				
Outside-class Instruction					
12	Outside-class instruction help you enhance critical reading skills.				

No.	Items	Criteria			Comments and suggestions
		+1	0	-1	
13	You can use synchronous and asynchronous tools to communicate with your classmates and teacher.				
14	Outside-class instruction encourages you to take more responsibility for your own learning.				
15	Outside-class instruction offers opportunities to repeat and do activities as needed and access material whenever convenient.				

Part II: Please provide comments and suggestions

Evaluator

/ /

CURRICULUM VITAE

NAME	Atchara Limpapattarakul
EDUCATIONAL BACKGROUND	
2011	Master of Education Teaching English Chiang Mai University
2005	Bachelor of Arts English Mae Fah Luang University
WORK EXPERIENCE	
2011-Present	English Lecturer Chiang Rai Rajabhat University
2007-2008	International Affairs Officer Mae Fah Luang University
2006-2007	International Affairs Officer Chiang Rai Rajabhat University

