



ENHANCING EFL HIGH SCHOOL STUDENTS' CRITICAL READING SKILLS
THROUGH VISUAL THINKING



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ENHANCING EFL HIGH SCHOOL STUDENTS' CRITICAL READING SKILLS
THROUGH VISUAL THINKING



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A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of MASTER OF ARTS
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THE THESIS TITLED
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THROUGH VISUAL THINKING

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The aims of this research are as follows: (1) to investigate the effects of Visual Thinking (VT) on the English critical reading skills of students majoring in English; (2) to investigate the effects of VT on the English critical reading skills of students majoring in Engineer Artificial Intelligence (EAI); (3) to compare the effects of VT on English critical reading skills of students majoring in English to those majoring in EAI; and (4) to explore the opinions of EFL students on learning about critical reading skills through VT. The participants were 81 Grade 10 students selected by purposive sampling and divided into two groups: 44 students majoring in English and 37 students majoring in EAI. The instruments in this study included lesson plans, an English critical reading test, a questionnaire, and interviews. The quantitative data was analyzed by mean scores, standard deviations, *t*-test analysis, and the analysis of covariance were used for analysis. The quantitative data was analyzed by content analysis. The results revealed that the post-test mean scores of both groups were significantly higher than the pre-test mean scores. Moreover, there were no statistically significant differences in terms of students majoring in English and EAI. This suggested that VT had positive effects on critical reading skills of students from different backgrounds. The questionnaire and interview responses also showed that students favored this teaching method. This indicates that VT can be an effective method to improve the critical reading skills of EFL high school students.

Keyword : Critical reading, Critical reading skills, Visual thinking, Opinions

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CHAPTER 1

INTRODUCTION

Background of the Study

English plays a significant role in today's society. First, it is considered as one of the most used languages worldwide. According to Rao (2019), English is the language which is used in all fields such as business, education, medical, science and technology, tourism, engineering, and entertainment. There are approximately 1.35 billion English speakers is approximately 1.35 billion around the world (Szmigiera (2021). The recent study of Pratiwi (2021) reveals that people used English to share information and to reach many other people. In addition, Bhutada (2021) surveyed languages used on the top 10 website, and the results shows that English is used online by 60.4 percent. Therefore, gaining English knowledge is beneficial nowadays.

English also plays a significant role in Thailand. To begin with the vital role of English in Thai education, English has long been a compulsory subject in the national curriculum taught in every school since 1921 (Aksornkool, 1980; Chamcharatsri, 2013; Foley, 2005; Wongsothorn, Hiranburana, & Chinnawongs, 2003). There are various topics of English taught in Thailand such as English grammar, vocabulary, reading, writing, and speaking to prepare Thai students, who are EFL students, to be proficient in English. Another main significant role of English in Thailand is its relevance to a career path. According to ASEAN policy, English has been used as a working language by ASEAN countries. As a result, those who have high proficiency in English have better job opportunities than those whose English abilities are low. Therefore, English is very crucial for Thai people as it is required in Thai education, and it can allow them to be successful in their career paths.

English is also used widely on the Internet to access information. As stated by (Rao, 2019),) people of every age utilize the Internet to keep up with the latest trends and innovation. Although the Internet benefits users in various ways, it can lead to some undesirable consequences. To illustrate, while some people can access any type of information on the Internet easily, others can create contents or information easily as well.

Without any accuracy, the information spreads like a real virus. Vosoughi, Roy, and Aral (2018) writes, "Falsehood diffused significantly farther, faster, deeper, and more broadly than the truth in all categories of information." (p.1). Consequently, it is mandatory to have an ability to read critically in the twenty-first century.

Critical reading should be valued as a vital skill for everyone. It is a high-level reading potential consisting of analysis and evaluation skills (Miller, 1977; Smith, 1963; Spache, 1964; Tierney & Pearson, 1994; Varaporn & Sitthitikul, 2019). This ability facilitates readers to administer data and analyze whether the information is reliable, factual, and valuable (Kereluik, Mishra, Fahnoe, & Terry, 2014). Abd Kadir, Subki, Jamal, and Ismail (2014) also agrees that critical reading is a key to survival in the world. This notion was supported by Kenney (2013) who wrote that critical reading is perceived as a crucial first step for learning success for students. Also, Lada (2015) comments that students with critical reading abilities carefully read texts, which leads to a deeper grasp of what they have learnt. Another advantage of critical reading is that students who possess critical reading ability become critical thinkers, and this leads them to succeed in life (Abd Kadir, Subki, Jamal, & Ismail, 2014). A person with critical thinking is likely to have life-long learning and problem-solving skills (Kincheloe & Weil, 2004; Lai, 2009). Therefore, students should be prepared to have critical reading skills.

Regarding Thai Education policy, critical reading is very necessary for students in the twenty-first century. In the National Basic Education Core Education Curriculum B.E. 2551 (A.D. 2008), the Ministry of Education frames the first strand for Language for Communication. In this strand, students should be able to understand and have the capacity to interpret what has been heard or read from various types of media, and the ability to express opinions with proper reasoning. Therefore, critical reading is very essential for and has impact on students.

Scholars have conducted studies in order to improve students' critical reading skills. Most of the studies shows positive results on better development of students' critical reading skills. However, some scholars reveal that EFL students still have problems in critical reading. As noted in Par (2018), an ability to determine main ideas,

identify purposes, make inferences, recognize tones, and draw conclusion of English reading texts of EFL students is still low. Those mentioned skills are considered as subskills of critical reading. Khodary and AbdAllah (2014) also shares the same result that the EFL students could not make inferences from the passage they read, draw conclusion, recognize the author's purposes and tone, all of which are skills of critical reading. This is also supported by the study from Zin, Wong, and Rafik-Galea (2014) which shows the low level of critical reading of EFL students. In Thailand, students still have difficulties in critical reading. According to the PISA examination 2018, the results indicated that Thai students had critical reading problems. There were only 0.2% of all Thai students who were capable of the critical reading level. This level was lower than the previous results in 2012 which was 0.9% of all Thai students. As a result, it is necessary to find a better way to help improve Thai students' critical reading skills.

Many methods and teaching techniques are suggested in order to help improve students' critical skills. One of these techniques is Visual Thinking (VT). In the educational aspect, VT is a teaching method in which the teacher employs images or visualization to help students generate ideas and better understand texts (Sanani, 2019; Gray, 2018; Jeong, 2017; Raiyn, 2016; Bolton, 2011; Su-ya-ai, 2009). In addition, VT provides various advantages. Firstly, VT can speed up people's learning as brains can work well when working together with hands, so that it can help students learn faster (Jeong, 2017). VT can also help learners identify core messages of any information because it helps learners see big pictures first, and then understand complex texts (Jeong, 2017).

Many scholars have claimed that VT can promote critical thinking. People who apply VT to their reading can form a picture mentally during the process of reading. They also have a better understanding, remembering what they have read, and recalling the abstract ideas (Pourhosein Gilakjani & Sabouri, 2016). In other words, this method can help students understand the complicated texts after they picture what they have read in their minds and gain the sense of meaning of the texts which help them be able to read critically.

Moreover, Raiyn (2016) said that VT encourages students to think critically, communicate clearly, and associate words and ideas with images in order to better understand the complex information. VT allows students to organize ideas and systemize complicated texts and make it easier to understand (Movold, 2016). Jeong (2017) explains that students who cannot focus on the long texts or texts with a lot of information can understand each piece of information separately and together at the same time if they picture what they have read. VT also helps students improve their creativity and memory. To sum up, VT can foster students' reading abilities and promote critical thinking as it is a visual tool that can help filter and organize the complex information (Gray, 2018; Jeong, 2017; Raiyn, 2016).

VT is most used in musical, mathematical and kinesthetic thinking. VT has been applied to many branches of education such as History, Science, Geometry, Mathematics, Environmental Education, and Engineering. However, the application of VT to language learning is still limited, especially in Thailand. In order to fill in this gap, this project was to measure the effects of VT on EFL students' English critical reading.

Statement of the Problem

In the twenty-first century where there is a lot of information, critical reading is one of the skills required. Students who have the ability to read critically can gain the useful information and can also deal with the complex texts effectively. Many scholars promote that VT can develop critical thinking. In addition, the studies on the effects of VT on critical reading are still limited in Thailand. This study was to examine whether EFL students will improve their critical reading skills after learning through VT.

Objectives of the study

The overall aim of this study was to measure the effects of VT on EFL students' English critical reading skills. The objectives of this study were:

1. To investigate the effects of VT on English critical reading skills of students majoring in English.

2. To investigate the effects of VT on English critical reading skills of students majoring in Engineer Artificial Intelligence (EAI).

3. To compare the effects of VT on English critical reading skills of students majoring in English to those of students majoring in Engineer Artificial Intelligence.

4. To explore the EFL students' opinions about learning critical reading skills through VT.

Research Questions

1. What are the effects of VT on English critical reading skills of students majoring in English?

2. What are the effects of VT on English critical reading skills of students majoring in Engineer Artificial Intelligence?

3. Are there any differences in the effects of VT on English critical reading skills of students majoring in English and those of students majoring in Engineer Artificial Intelligence?

4. What are the students' opinions about learning critical reading skills?

Definitions of Terms

1. Visual Thinking (VT) refers to a teaching method in which the teacher employs images or visualization to help students generate ideas and better understand texts. According to (Mahmoud, 2018; Mustadi, 2019; Roam, 2008), VT includes 3 steps: questioning, visualizing, and interpreting.

2. Critical reading refers to a high level of reading comprehension in which readers can make meaning from the texts they read, analyze texts, and evaluate the information.

3. Critical reading skills refer to an ability to make inferences, draw conclusions, and identify author's purposes. It includes three skills: identifying author's purposes, making inferences, and drawing conclusions.

4. Opinions refer to the thoughts that a person has for something or someone, which depends on how he or she feels or believes (Cambridge Dictionary, n.d.).

Significance of the study

The findings of this study benefit English teachers in developing their English reading instruction. English teachers can adapt the results of this study to their teaching critical reading skills. Moreover, this study provides useful information about critical reading and VT which can help both teachers and students gain more ideas about its importance of VT and how to adapt this technique to practice. Furthermore, the findings of this study possibly become a guideline for further studies. Finally, this study can create new ideas to teach English critical reading skills in EFL context, especially in Thailand.



CHAPTER 2

LITERATURE REVIEW

The chapter provides the information relevant to this study. The content covers 4 main topics: 1) reading, 2) critical reading, 3) Visual Thinking, and 4) related studies. The details are described as follows:

Reading

This section provides 3 subsections covering the following topics: (1) definitions of reading, (2) Reading Levels, and (3) reading stages

Definitions of Reading

Reading is viewed as one of the four primary skills: listening, speaking, reading, and writing (Sadiku, 2015). Considered as a basic skill, reading has long been studied by many experts, researchers, and educators. As a result, there are a lot of reading's definitions. According to *Cambridge Advanced Learner's Dictionary* (2014), "reading is the skill or activity of getting information from books in which way you understand something" (p.2176). In addition, reading is considered as a process in which readers acquire the meaning from the written texts by looking at all texts (Williams, 1984). Besides, Anderson (1985) gave a clear definition of reading as the process of making meaning from written texts. Grabe (1991) also states that reading was a process which needs an interaction between readers and texts which readers try to understand the meaning. Nuttall (2000) also defines reading as a process associated with communication so that it can provide messages from the writing as well. As a result, it could be summarized that reading is a process in which readers can get a sense of meaning and understand all the written texts that they were reading or looking at.

Reading Levels

According to Smith (1969) as cited in Sari (2016) and Jusmini (2017), there are four levels of reading: literal, interpretative, critical, and creative.

Literal reading level is the simplest since it is the skill of getting the direct meaning of what readers read such as words, ideas, sentences, or facts. As a result,

readers are required to portray the facts related by the writer. At this level, readers can recognize main ideas which are stated in the texts they read, details, effects, and sequence.

In the second level, Interpretative reading, readers need to go beyond what is being said in the texts. Readers are also required to get the deeper meaning from what the writer gives. Besides, readers need to see the relationship between the information and the importance of the details given by the writer. At this level, readers must be able to combine all pieces of information together and be able to draw conclusions in order to find the writer's message and intention.

The third level is critical reading. At this level, readers must be able to analyze and synthesize information which readers get from texts they have read. Readers must also be able to react and reorganize the information in order to express opinions and develop new ideas or value from the writer.

The last level of reading comprehension is creative reading. At this level, readers need to go beyond the previous steps by responding to the message which the writer is trying to portray. In other words, readers are required to get involved with information and use their imagination to rethink new ideas of their own or alternative solutions to the texts.

This study focused on the third level which is critical reading.

Teaching Reading

According to Grabe and Stoller (2011), there are three stages of teaching reading. The following paragraphs explain the details of these three stages.

1. Pre- reading stage

In this stage, teachers are required to state the purpose, draw students' background knowledge and interest, explain the necessary information about texts such as key vocabulary to students, set the reading's goal, form motivation, and explain the text's organization.

2. During- reading stage

In the during- reading stage, teachers need to facilitate students make meaning and comprehend the reading texts. Teachers should also let students connect the information gained from texts and what they already knew. After that, the teachers bring the class to summarize the reading tests.

3. Post-reading stage

In the final stage, teachers have to highlight core information and check student's comprehension. Moreover, teachers should provide the opportunity for students to summarize, analyze, synthesize, and evaluate the quality of the texts they read.

Critical Reading

This section presents 2 subsections covering the following topics: (1) definitions of Critical Reading, and (2) Critical Reading skills

Definitions of Critical Reading

Academically, many scholars provide many definitions of critical reading. According to Pirozzi, Starks-Martin, and Dziewisz (2008), critical reading can be considered as a high level of reading comprehension which requires readers' skills to interpret and evaluate text. Readers who have critical reading will be able to consider which information is important, identify facts and opinions, and determine tones and purposes of writers. Yu (2015) provided a slightly different definition as it is defined as thinking about text which readers are reading. Readers need to consider the texts if they are true or false and interpret the contents they are reading. Another definition by Zintz and Maggart (1984) as cited in Duran and Yalçintas (2014) is quite similar; that is, critical reading was defined as learning to evaluate, make inferences, and draw conclusions based on details from text being read (p.2). Shihab (2011) as cited in Liu (2019) argued that critical reading is a continuing interactive process in which readers make meaning by mentally processing texts (p.342). Par (2018) also defined the definition of critical reading as an active process of making meaning from texts by interpreting, making inferences, giving judgment, analyzing, and evaluating (p. 79). However, Lada (2015) classified critical reading into two ways. Firstly, critical reading relates to an individual's interpretation by the texts being read and readers' background knowledge. Secondly,

critical reading is a readers' emphasis on considering the attention of the author and messages which the author wants to convey. For the previously mentioned, it can be summarized that critical reading is a high level of reading comprehension in which readers can make meaning from the texts they read, analyze texts, and evaluate the information.

In order to read texts critically, readers need to have a variety of skills. Many scholars identify various critical reading skills as follows:

Adams & Patterson (2008, as cited in Lada, 2015, p. 11- 13) provided five reading skills: (1) distinguishing facts from opinion, (2) identifying tone, figurative language, and point of view, (3) making inferences, (4) drawing conclusions, and (5) evaluating arguments. Pirozzi et al. (2008) also provided three skills to comprehend text critically: (1) making inferences, (2) identifying texts' facts and opinions, and (3) identifying author's purpose and tone. According to Carter (2014, as cited in Lada, 2015, p. 11- 13), there are four critical skills: (1) recognizing bias and tone, (2) distinguishing fact from opinion, (3) evaluating arguments, and (4) identifying an intended audience.

Although there are many scholars providing various reading skills needed for comprehending texts deeply, those scholars share some similarities as follows: (1) distinguishing facts from opinions, (2) making inferences, (3) drawing conclusions, and (4) identifying author's purposes. However, three critical reading skills will be implemented in this study including (1) making inferences, (2) drawing conclusions, and (3) identifying author's purposes. Therefore, critical reading skills, in this study, refer to an ability to make inferences, draw conclusions, and identify author's purposes.

Visual Thinking (VT)

This section provides 3 subsections covering the following topics: (1) definitions of Visual Thinking, (2) advantages of Visual Thinking, (3) steps of Visual Thinking, and (4) Visual Thinking tools.

Definitions of VT

Visual thinking has several names to call: picture thinking, visual/spatial learning, or right brained learning. It was first introduced in 1969 by Rudolf Arnheim, a psychologist and physicist from Germany and a professor of Psychology of the Art at the

University of Harvard. However, the concept of VT has been extensively adopted to describe how learners develop their linguistic knowledge, allowing the researchers to fully perceive the learning process and determine the regular meanings of VT in 2 main aspects.

Firstly, there are many scholars who define VT as an ability. To illustrate, (Arnheim, 1969) defined VT as an ability to see visual shapes as images which highlight idea and structure. Additionally, Brousseau (1991) states that VT is an ability which humans imagine visually. Arcavi (2003) also describes VT as an ability to turn messages, texts, or any types of information into visual forms such as images in order to convey information or ideas. Solso, MacLin, and MacLin (2007) also defines VT as an ability to understand visual information in thinking. Later Roam (2008), one of the biggest key persons on VT, defines the meaning of VT as “taking advantage of our innate ability to see- both with our eyes and with our mind’s eyes- in order to discover ideas that are otherwise invisible, develop those ideas quickly and intuitively, and then share those ideas with other people in a way that they simple get” (p.4). In other words, VT is an ability to understand complicated texts or messages by thinking it visually (Roam, 2008). Juandi (2020) defines VT as “a thinking ability that converts verbal statements into image and graphics”.

Another aspect of VT is relevant to the education field. Jeong (2017) defined the term VT as the use of visuals and texts in helping more understanding, and it can be used as a tool to make a summary, to organize ideas, and to deliver information effectively. Quite similarly, Bolton (2011) explains that VT is a result of creation, an idea of images and diagrams in minds. In addition, Su-ya-ai (2009) defined the meaning of VT as a teaching technique which uses images to help students make meaning and interpret meaning into a form of visuals such as timelines, tables, mind mapping, or sketching. Apart from that, Raiyn (2016) talks about VT specifically. From his research, VT is “a teaching style whereby the learner comes to better understand and retain information better by associating ideas, words, and concepts with image”. Gray (2018) defined VT as a teaching way to help learners organize thoughts and improve an ability to think and

communicate. Moreover, Sanani (2019) stated that VT refers to picture learning which means a phenomenon that people learn things by visually processing them. Therefore, in this research, VT is defined as a teaching method in which the teacher employs images or visualization to help students generate ideas and better understand texts.

Advantages of VT

Many scholars mention the importance of VT in various ways. VT is not only a fundamental aspect of understanding and construction concepts (Juandi, 2020), but VT is also the brain's feature of creativity (Xu Wenyi, 2017) which can be used to connect verbal thinking with physical activities, between words and business. Accordingly, it is very important to teach VT to pupils, students, scientists, engineers, and so on (Zhukovskiy & Pivovarov, 2010). In other words, VT can be used in various fields, and there are a lot of advantages. The benefits of VT can be grouped into two main ways: in a general purpose and an educational purpose.

In light of the general purpose, there are several advantages of VT. Firstly, VT can generate and link ideas. Jeong (2017) and Marentette (2018) explain that it might be hard to closely focus on much information at a time. Therefore, the ability to arrange any ideas is the ability which can help separately see each piece of information and together at the same time (Movold, 2016). It can be used to relate existing ideas, as well as generate new thoughts easily and fast (Movold, 2016)(Frey, 2011 & Movold, 2016). Secondly, VT can help clarify ideas. Movold (2016) explained that shapes and colors can stimulate people's brains better than simple texts. This means that VT can help understand each concept more thoroughly. Finally, VT can dramatically increase creativity and better memories because being able to make pictures in mind encourages the brain to function visually. this helps those who think visually not only deeply focus on the information more but also put clearly images in their minds (Movold, 2016). Thus, VT can help people to be more creative, various concepts from different angles, and broaden their knowledge and understanding (Marentette, 2018).

Besides the advantages in general, there are many benefits of VT for educational purposes. Firstly, VT can speed up people's learning. Movold (2016) explains

that when there is a lot of information, it is hard for a brain to function systematically. However, VT can be adapted to learning methods with visual tools which can filter and organize that information, so that the brain can start functioning with the layouts which those who think visually have been using and trimming any information. Thus, VT can help people become fast learners. Jeong (2017) highlights the key of VT that there is absolutely no point in only reading or seeing, but brains can work well when working together with hands. In other words, when learners are learning through both thinking and writing or drawing, they can understand better, so that it can make them learn faster. Another benefit of VT is that VT can help learners identify core messages of any information because VT can help learners see big pictures first, and then help understand complex texts (Jeong, 2017). Gray (2018); (Jeong, 2017; Raiyn, 2016) explain that when people think visually, they can organize or classify the given information and can know which one is the core and which one is the details, so that they can pick the right information when they want to use each information.

Steps of VT

According to Roam (2008), there are 4 main steps in using VT: (1) looking, (2) seeing, (3) imaging, and (4) showing. In the looking step, students need to collect and screen the information. Also, they are required to find the underlying information, messages, or topics mentioned in the whole texts. In this process, students will get what is going on in their environment, what texts or symbols they notice, or all things which happen in front of them because they can scan all the details while they are looking. Roam also suggested some questions in this Looking step. For example, what do you recognize? Are the things in front of you what you expected to see? Can you get them rapidly? After asking these questions, Roam suggests some activities to do in this step. Students should firstly build a big picture and limit the view by screening the details they recognize. Students should collect everything that they can look at such as a title, given pictures, or even a glossary.

The second step is seeing. This step is quite similar to the looking step. In other words, the Seeing step is a reverse side of the Looking step. Students need to

select and cluster the information which they collect from the first step, and they need to identify patterns. As seeing is the step of categorizing and interpreting the input from the looking process, it can help students more understand about the previous input or information. After looking for all the details, they can see and select those inputs afterwards. In this step, Roam (2008) suggests some questions to ask students. Do you know what you are seeing? Do you have enough visual inputs?; Do you need to go back and keep looking? Then Roam also proposes some activities; for instance, students can filter and categorize the relevance, and they can reflect across the 6 W's: the Who and What for objects, how much or how many for quantities, the Where for positions and places, the When for time, the How for causes and effects, and the Why.

Next step is imagining. This process asks students to find what cannot be found from the provided texts or input. In other words, to think of what is possible is the core of this step. Since it is what students imagine, it possibly provides a great outcome. Roam (2008) suggests asking students or participants where they have seen this before.

Showing is the final step. Students, in this step, need to select the right framework such as maps, timeline, charts, etc. to deal with the information. They also need to present and explain their pictures which they get after having done the first three steps. In this step, students can show their creativity visibly and present meaningful information to other classmates. Roam (2008) suggests some questions to ask students or participants in this step: Which visual frameworks will be the most suitable for sharing what they have read or seen?; Does it make sense to you? Roam (2008) also proposed three activities used in this step. The first activity is to select the most suitable framework such as a portrait, a chart, a map, a timeline, a flowchart, or a multiple-variable plot. The right framework should be relevant to the seeing step. In other words, if students see the What and Who, they had better choose portraits. Similarly, if they see the How much, they should use charts. Moreover, if they see the Where, When, How, and Why, they should use maps, timelines, flowcharts, and plots respectively. After selecting the right framework, students should use the framework to create pictures. The last activity for the showing step is to present and explain the pictures.

Apart from the four steps of VT by Dan Roam, there are another three steps of VT which are mentioned and employed by Mustadi (2019). In the first step, teachers need to draw a symbol that represents the topic. This can be keywords, images, or any symbols that everyone could understand. Teachers encourage students to share what they know about the topic that teachers show in class. Teachers should take notes or write what students say on the board. The second step is to connect the topic freely by making a branch in any direction. At this step, students can make their mindscaping by drawing and using symbols, shapes, or keywords. The last step is to link all ideas or elements with lines or arrows which can help students see the big picture.

Additionally, Mahmoud (2018) also addressed 3 steps of VT: (1) posting questions, (2) visualizing, and (3) interpreting. These three steps let students group information into patterns, so students can remember and understand information better and easier. The details are as follows.

In posting questions step, students are required to answer three questions. Teachers begin asking the first question, what is going on in this picture? By asking this question, teachers encourage students to discuss what the picture is about. Students can comment on every element in the picture: colors, shapes, personal connections, experiences, feelings, or even information. The second question is: What do you see that makes you say that? To answer the second question, students are required to look more closely at the picture and find evidence or reasons to support what they have discussed before. This leads students to revise and add new observations. Later, teachers ask students the third question: What further students can find? This question lets students take another closer look at the things they see and the details they hear from other students because it can help students construct their thinking.

The second step of VT is visualizing. This stage can help students build pictures mentally from what they read (Erfani, Iranmehr, & Davari, 2011). The examples of activities used in this step is to ask students to keep their eyes closed and share the picture that shows in their heads. According to Dewi (2017), this second step needs to be done in groups. It can be a group for the whole class or just a small group.

The third step is interpreting. At this step, students are required to interpret what they perceive from what they read or what they hear through VT patterns or VT tools. Like Rome (2008)'s fourth step of VT, showing is the step of making it all clear. Students need to select the right framework such as maps, timelines, charts, etc. to deal with the information. They also need to present and explain their pictures which they get after having done the first three steps. At this process, students can also show their creativity visibly and present meaningful information to the other classmates.

The steps of VT are various by many educators as mentioned in the earlier paragraphs. As a result, the steps of VT used in this study are created by the combination of Mahmoud (2018), Mustadi (2019), and Roam (2008) as follows.

The first step is questioning. Teachers show the relevant pictures or write a topic on the screen or the board. Then, teachers ask students the three questions: What is going on in this picture?; What do you see that makes you say that?; What further can you find? Teachers ask students to share what they know from the picture or the topic they see. Teachers write the answers on the screen and discuss with students about the topic of the passage. After that, teachers let students read the reading passages.

The second step is visualizing done after students finish reading the given passage. Teachers ask students to work in small groups, close their eyes, and share the pictures that occur in their mind after reading. At this step, teachers can let students draw the pictures they see on the same paper with their friends and let them connect pictures freely and make some branches in any direction.

The last step is interpreting. Teachers ask students to interpret what they read in preferable frameworks by using VT tools. This step, teachers show some examples of frameworks such as mind maps, timelines, charts, graphic organizers, sketchnotes, and diagrams. Then teachers let students fill in information that they perceive from reading. When finishing, teachers ask students to show or present their work or frameworks to their classmates.

Visual thinking tools

In order to teach by VT, VT tools are very important. VT is how to think through visual operations; it, therefore, lets humans use their ability to see, understand, and analyze the data or information received (Makarova, Makarova, & Varaksa, 2017). Similarly, Caine and Caine (1995) as cited in Vasquez & Comer & Troutman, (2010) stated those who cannot recognize patterns tend to fail organizing the input, so they cannot be able to connect input to something noteworthy and meaningful. As a result, VT tools could help students create patterns and develop thinking and learning.

As VT tools have been used widely, many experts have suggested the most useful VT tools for the past few years. Jeong (2017) suggested mind maps and flowcharts as tools to help think visually. Hunter (2018), a design strategist, suggested nine effective VT tools: mind mapping, the inspiration board, the Napkin sketch, the conceptual framework, the Low-Fidelity Prototype, the Empathy map, the process diagram, the relationship map, and the storyboard. Tantipongwanich (2019) claimed that sketchnote is one of the effective VT tools. Garciaros (2020) also suggested five VT tools that every teacher should know: sketch noting, inspiration boards, mind maps, concept maps, and diagrams. Furthermore, Armstrong (2020) addressed six VT tools: virtual or physical whiteboards, infographics and empathy maps, organizational charts, Kanban boards or sticky notes, interactive diagrams and charts, and visual maps or mind maps. In this study, mind maps, sketch notes, and organizational charts will be applied in VT instruction.

Related studies

There are various studies showing that EFL students still lack critical reading skills. For example, Zin et al. (2014) investigated the level of critical reading skills among Malaysian ESL learners. The study focused on examining analytical and inference skills of EFL students. The participants were asked to do the self-developed critical comprehension test. The results showed that students' critical reading skills were low when they were asked to identify the author's purposes and the main ideas.

Par (2018) studied the differences between the field independent (FI) and field dependent (FD) learners in the area of critical reading skills. The participants were

60 undergraduate EFL students who took a critical reading course. The results showed that FD students had higher critical reading skills than FI students. However, all still had low critical reading skills especially in terms of identifying main ideas, recognizing author's tones and purposes, making inferences and drawing conclusions when they read English reading texts.

Moreover, in the EFL context, many researchers have conducted a lot of studies which investigated whether the critical reading skills would be improved after instructing by various approaches. This means that critical reading is still problematic and needs to be studied and enhanced more among EFL students.

Lada (2015) conducted a study to explore if critical reading could be improved by the instruction of project-based learning. The participants were 20 non-English major students in one faculty of a public university in Bangkok, Thailand. The research instruments were observations, interviews, response journals, and questionnaires. The results showed that the project-based learning instruction could enhance student's critical reading skills.

Varaporn and Sitthitikul (2019) investigated if multimodal tasks could enhance Thai university students' critical reading ability. The researcher employed pre- and post-reading tests to examine the effects and used se-mi structured interviews to collect students' perception on the multimodal tasks. The results showed that multimodal tasks could enhance critical reading skills and enhance analytical thinking skills.

Ahmad (2019) conducted a study to compare the effect of two notetaking strategies (Cornell Notes vs. REAP) on EFL secondary school students' critical reading skills. The participants were 123 first year EFL secondary school students. Participants were asked to do the pretest and posttest. The results showed that both Cornell Notes and REAP strategies improved the critical reading skills of EFL secondary school students.

Furthermore, there are studies which applied VT in education. Some fall into the branches of language teaching, while many are in other areas. The studies involving VT in their research are as follows.

VT can be implemented in teaching environmental education. Junsuthonpoj (2020) studied the fourth-year students' development and attitudes in learning an Environmental Management course with VT methods. The outcome revealed that the participants' posttest scores were higher than the pretest scores. This means that the participants were able to understand the lessons and VT could encourage the participants to find the essence relevant to the topic. Moreover, the satisfaction of the participants was reflected in positive ways which led students to have good attitudes on learning Environmental Management courses.

In Mathematics Education, VT was widely acknowledged as well. Huang (2015) studied VT of the definite integral concept. The researcher aimed at investigating students' difficulties and strength regarding visualization and identifying types of visual images they used during solving the problem. The participants were first year calculus students. The instrument was a questionnaire containing problems and interviews to investigate the VT of the participants. The results showed that the main problem of the participants was VT. In other words, the participants could not transfer the abstracted information to presentations. As a result, it lowered the performance of solving definite integral problems. With the results, the participants were suggested to improve their ability to think visually which could be beneficial to solving complicated math problems.

VT could be used in teaching history courses. The study from Dilek (2010) indicated how VT related to the process of learning history. The participants who were in grade six were requested to draw pictures describing past events that they have learned. The author collected and analyzed drawings from the participants. The results showed that drawing was an effective way to improve a student's VT skill and it could visualize the past events and historical problem solving.

In the English language fields, Su-ya-ai (2009) investigated the effect of using VT on students' reading ability and creative writing ability. The participants were 28 first year undergraduate students majoring in Information Technology who took English II course at Rajamangala University of Technology Lanna, Chiang Mai campus, Chiang Mai.

The results showed that the students' English reading ability and English creative writing ability increased after learning through VT.

Mahmoud (2018) studied the effect of VT on developing the adult learners' English language fluency. This study focused on designing a program based on VT activities which aimed that learners could expand and organize their ideas in order to write fluently. The research instruments were a test, a rubric, and a questionnaire. The Arabic students who were participants in this research were taught a five-week intensive English course. The study showed that the application of VT proved to be an effective method to develop the adult learners' writing fluency. The participants also reflected their satisfaction with the effectiveness of the instructional program.

Another example is the study of Mustadi (2019) which aimed to improve critical thinking abilities by using VT. The author used a free essay, interviews, and Guttman's Attitudes Scale as an instrument. The participants of this study were 40 university's students in Research subjects. The results of the study showed that the use of VT techniques could enhance the students' critical thinking more than 60% for all indicators: the ability of analyzing, assessing self-regulation by themselves, inferring, evaluating, describing, and interpreting.

From the provided studies above, it can be concluded that VT can be used in many fields. However, the studies in the field of English teaching, especially critical reading, are limited. This led the researcher to investigate the effects of VT on EFL students' critical reading and opinions about learning critical reading through VT.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter describes the research methodology consisting of the study including research design, participants of the study, research instruments, data collection, data analysis, and ethical consideration.

Research design

This study employed a mixed-method approach for data collection and data analysis. To illustrate, both quantitative and qualitative methods were used to investigate the effects of the use of VT on the students' critical reading skills, and to explore their opinions about learning through VT. The tools for collecting quantitative data used in this study included a reading critical reading tests and a questionnaire. The qualitative data included an open-ended questionnaire part and interviews. The research model is shown below.

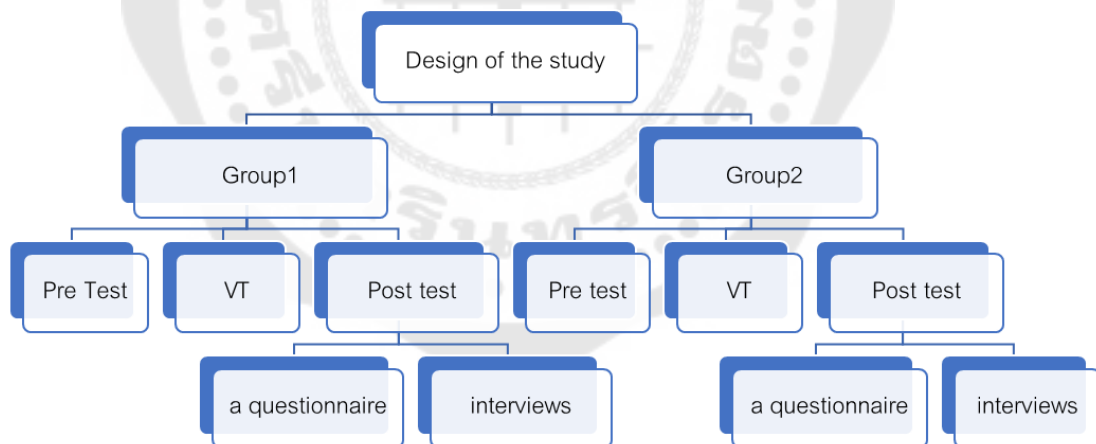


Figure 1 Design of the Study

Population and Participants of the Study

The population was 735 tenth-grade students whose age was 15 to 16 years old in a demonstration school, in Bangkok, Thailand. The reason to select the demonstration school (Secondary) was because of the school's policy. One of the school's visions aims at preparing their students to become global citizens. Vongsatan, Mangkhang, and Dipyamandala (2020) explained one of the characteristics of global citizens that they

should be able to seek knowledge by themselves. Therefore, the abilities to read and critical thinking are very important.

The participants were 81 students in grade 10 selected by a purposive sampling method. The participants were divided into two groups: 44 students majoring in English and 37 students majoring in EAI. Each group was taught by VT. They registered in the Supplementary English II course during the second semester of the 2021 academic year. The reasons to choose these participants were (1) these two-major students are required to enroll the Supplementary English II and the objective of this course is to develop students' critical reading skills, and (2) these two-major students had different backgrounds to ensure accuracy of the results. Students majoring in English are those who were interested in English language and focused on studying about English while students majoring in EAI were those who were interested in a computer science and technology, so they were appropriate to be participants.

Research Instruments

The instruments used in the present research were lesson plans based on VT, an English critical reading test, a students' opinions questionnaire about learning critical reading skills through VT, and interviews. The instruments are described as follows:

1. Lesson plans

This implementation was taught in the second semester in the 2021 academic year. Five lesson plans were designed by the researcher, and VT was integrated in each lesson. Each lesson plan lasted 90 minutes. The lesson plans were designed based on the indicators and expected outcomes identified in the school's curriculum and the Basic Education Core Curriculum B.E. 2551 (Ministry of Education, 2008). The duration was 5 weeks. Each week lasted 90 minutes. The reading skill contents were author purposes, making inferences, and drawing conclusions.

Table 1 Teaching Contents

Critical reading skills contents	Duration
Author's purposes	90 minutes
Making Inferences	180 minutes
Drawing conclusions	180 minutes

To design all lesson plans, three stages of reading by Grabe and Stoller (2011) and VT steps by Mahmoud (2018), Mustadi (2019), and Roam (2008) were employed as a framework. To illustrate, the process of teaching is divided into three stages: pre-reading, during-reading, and post reading and the three steps of VT--questioning, visualizing, and interpreting-- are integrated to these three reading stages.

In the pre-reading stage, the step of questioning is integrated. The teacher shows the relevant images such as pictures, or videos, or the teacher just introduces the topic by writing a topic on the screen or the board. Then, the teacher continues asking students the three questions: What is going on in this picture?; What do you see that makes you say that?; and what further can you find?; Then, teacher lets students share what they know from the picture or the topic they see to the class. The teacher writes student's answers on the screen. This stage can help students be ready to read the given passage and get overall ideas of what they are going to read.

In the during-reading stage, the second and third step of VT which are visualizing, and interpreting are integrated. The teacher asks students to read the reading passage. During this step, the teacher lets students visualize what they read. It can be done in groups or individually depending on the passages. After that, the step of interpreting is applied to the teaching. The teacher asks students to interpret what they read in preferable frameworks by using VT tools. The teacher shows some examples of frameworks such as mind maps, timelines, charts, graphic organizers, sketch notes, and diagrams. Then the teacher lets students fill in the framework with the information from reading. After finishing, the teacher asks students to show or present their work or frameworks to their classmates.

In the post-reading stage, students are required to do many activities which are relevant to the texts they have read such as answering questions, debating, designing posters, or reacting to the given problems.

2. An English critical reading test

An English critical reading skill test was used as the pretest and the posttest. It included 20 items with multiple choices to investigate critical reading competence covering 3 main skills: identifying author's purposes, making inferences, and drawing conclusion. In order to compare the pretest score to the posttest score, test- retest could be used because the duration from taking pretest to posttest was long enough to let students to complete the test again. The same questions seemed to be appropriate to be used as the researcher wanted to evaluate if the critical reading skills of the students improves after VT was applied in the lessons. The components of the test are also shown in Table2.

Table 2 Components of the test

Components of the test	Items
Author's purposes	7 items
Making inferences	7 items
Drawing conclusion	6 items

3. A questionnaire

A questionnaire was designed to explore students' opinions in the implementation of VT in a classroom. There were two parts. The first part included 10 five-point Likert items. Students were asked to respond to a series of statements using responses ranging from 1 to 5. For positive statements, 1 means strongly disagree, 2 means disagree, 3 means not sure, 4 means agree, and 5 means strongly agree. For negative statements, 1 means strongly agree, 2 means agree, 3 means not sure, 4 means

disagree, and 5 means strongly disagree. Furthermore, the second part, an open-ended question, was used to ask students' comments and suggestions.

4. Interviews

A semi-structured interview was used to explore the students' opinions about learning through VT. The interview was conducted in Thai language to avoid a language barrier in conveying a message. There were 5 open-ended questions to investigate their opinions. Ten volunteer students from each major were interviewed and the interviews were audio-recorded.

Data Validity

To determine the validity of data in this study, the Item-Objective Congruence Index (IOC) was employed to review every question in the English critical reading test, the lesson plans, the questionnaire, and the interview questions by 3 experts who teach English. Considered suitable, the items with scores higher than or equal to 0.5. However, if there was any item with a score less than 0.5, it should be edited in accord with the advice.

Data reliability

To determine the reliability, all research instruments were tested with 31 students who were not the participants in this study. The reliability coefficient Cronbach's alpha was employed to analyze the data from the test. The reliability of the English critical reading test and the questionnaire to explore students' opinions about learning through VT was 0.79 and 0.78 respectively. Since Cronbach's alpha value was higher than 0.7, the English critical reading test, and the questionnaire were appropriate to employ in this study.

Data collection

This study took seven weeks. The participants were asked to complete the critical reading pretest in the first week. Next, students were taught English critical reading skills through VT from the second week to the sixth week. After that, the participants were asked

to take the posttest and to complete the questionnaire. Also, ten volunteers were interviewed about learning critical reading skills through VT in the last week. The details were shown below:

Table 3 Data Collection

Week	Contents	Duration
1st	Pretest	45 minutes
2nd	Author's Purposes	90 minutes
3rd - 4th	Making Inferences	180 minutes
5th - 6th	Drawing Conclusion	180 minutes
7th	Posttest, the questionnaire, the interview	90 minutes

Data analysis

The data obtained from the English critical reading test were analyzed by means, standard deviation, the t-test analysis, and the analysis of covariance. The t-test analysis was employed to determine whether there were differences in the critical reading skills before and after the experiment while the analysis of covariance was used to determine whether there were any significant differences in students' critical reading skills between two groups of students.

The data from the questionnaire were analyzed as follows.

For positive statements

Table 4 Positive Statement Score

Scores	Opinions
1	strongly disagree
2	disagree
3	not sure
4	agree
5	strongly agree

For negative statements

Table 5 Negative Positive Score

Scores	Opinions
1	strongly agree
2	agree
3	not sure
4	disagree
5	strongly disagree

The level of students' opinions was determined by the use of the following criteria:

Table 6 Students' Opinions Criteria

Mean scores	Levels
0.00-0.99	Highly negative
1.00-1.99	Negative
2.00-2.99	Average
3.00-3.99	Positive
4.00-4.99	Very Positive

Finally, the data from the interviews were analyzed by using content analysis.

Ethical Considerations

All students were asked to volunteer in this study. They were able to refuse to take part in the study and to withdraw whenever they wanted to. Before the experiment, written consent from accepting students and their parents was obtained to ensure that they understood the objectives of the study and agreed to participate in the study. Students were clarified about objectives and details of the research, and they were also explained about the study's process clearly. Accordingly, they were informed that they had rights to ask for clarification and were not forced to do the questionnaire or to be interviewed. More importantly, all data derived from this study were confidential and were destroyed after the study completed.

CHAPTER 4

FINDINGS

This study was conducted to measure the effects of VT on English critical reading skills of students majoring in English, to investigate the effects of VT on English critical reading skills of students majoring in Engineer Artificial Intelligence, and to compare the effects of VT on English critical reading skills of students English to those of students majoring in Engineer Artificial Intelligence. In addition, this study aimed to explore the EFL students' opinions about learning critical reading skills through VT.

In this chapter, there are two sections. The first section is about EFL students' English critical reading skills including the effects of VT on English critical reading skills of students majoring in English, effects of VT on English critical reading skills of students majoring in Engineer Artificial Intelligence, and the comparison of the effects of VT on English critical reading skills of students English to those of students majoring in EAI. The second part presents the EFL students' opinions about learning critical reading skills through VT. The findings are presented based on the objectives.

EFL students' English critical reading skills

To examine the effects on all EFL students' English critical reading skills, the data from the pre-test and the post-test were analyzed using mean scores, standard deviation, and the t-test analysis. The results are displayed in Table 7.

Table 7 Descriptive Statistic of English Critical Reading Skills of Students Mean Score

Group	Pre-test		Post-test	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
English Major Students	10.59	2.85	17.00	2.41
EAI Major Students	10.05	2.00	16.24	1.80

Table 7 reveals that the pre-test mean score of English Major students was 10.59 ($SD= 2.85$), the pre-test mean score of EAI Major students was 10.05 ($SD=$

2.00), the post-test mean score of English Major students was 17.00 ($SD=2.41$), the post-test mean score of EAI Major students was 16.24 ($SD=1.80$).

The effects of VT on English major students' English critical reading skills

Table 8 The Comparison of the Pre-test Mean Score to Post-test Mean Score of English Major Students

Time	N	Mean	Max	Min	S.D.	t-value	Df	p-value
Post-test	44	17.00	20	12	2.41	26.27	43	0.00**
Pre-test	44	10.59	15	4	2.85			

* $p < 0.05$

From table 8, the results reveal that there were statistically significant differences in the pre-test and the post-test mean scores of English major students ($t(43) = 26.27, p < 0.05$). The pre-test mean score was 10.59 ($SD = 2.85$), while the post-test mean score was 17.00 ($SD = 2.41$). As a result, students significantly improved their critical reading skills.

Table 9 The Comparison of the Pre-test Critical Reading Skills Mean Score to Post-test Critical Reading Skills Mean Score of English Major Students

Part	Time	N	Mean	Max	Min	S.D.	t-value	Df	p-value
Author's purposes	Post-test	44	6.16	7	3	0.94	9.88	43	0.00**
	Pre-test	44	4.64	7	3	1.01			
Making Inferences	Post-test	44	5.48	7	4	1.15	13.92	43	0.00**
	Pre-test	44	3.07	5	0	1.28			
Drawing conclusion	Post-test	44	5.36	6	4	0.84	16.83	43	0.00**
	Pre-test	44	2.89	5	1	1.15			

* $p < 0.05$

Table 9 shows that English major's students significantly improved all skills—author's purposes ($t(43) = 9.88, p < 0.05$), making inferences ($t(43) = 13.92, p < 0.05$), and drawing conclusion ($t(43) = 16.83, p < 0.05$) after using the treatment. In particular, the drawing conclusion is the skill students improved most. Therefore, the overall results indicate the positive effects of VT on English major students' critical reading skills.

The effects of VT on EAI major students' English critical reading skills

Table 10 The Comparison of the Pre-test Mean Score to Post-test Mean Score of EAI Major Students

Time	N	Mean	Max	Min	S.D.	t-value	Df	p-value
Post-test	37	16.24	20	14	1.80	20.82	36	0.00**
Pre-test	37	10.05	12	2	2.00			

The analysis reveals that there were statistically significant differences in the pre-test and the post-test mean scores of EAI major students ($t(36) = 20.82, p < 0.05$). the pre-test mean score was 10.05 ($SD = 2$) while the post-test mean score was significantly higher than the pre-test mean score. The results indicate that VT has positive effects of VT on EAI major students' critical reading skills.

Table 11 The Comparison of the Pre-test Critical Reading Skills Mean Score to Post-test Critical Reading Skills Mean Score of EAI Major Students

Part	Time	N	Mean	Max	Min	S.D.	<i>t</i> -value	Df	<i>p</i> -value
Author's purposes	Post-test	37	6.11	7	4	0.88	8.16	36	0.00**
	Pre-test	37	4.46	6	1	1.12			
Making Inferences	Post-test	37	5.27	7	2	1.10	10.77	36	0.00**
	Pre-test	37	3.14	5	1	1.86			
Drawing conclusion	Post-test	37	4.86	6	3	0.89	9.88	36	0.00**
	Pre-test	37	2.46	4	0	1.19			

Table 11 reveals that EAI major's students significantly improved all skills—author's purposes ($t(36) = 8.16, p < 0.05$), making inferences ($t(36) = 9.88, p < 0.05$), and drawing conclusion ($t(36) = 10.77, p < 0.05$) after using the treatment. The results also reveal that the skill they improved most is drawing conclusion. This indicates the positive effects of VT on EAI major students' critical reading skills.

The comparison of the effects of VT on English major students' English critical reading skills to those of VT on EAI major students' English critical reading skills

To compare the effects of VT on English major students' English critical reading skills to English major students' English critical reading skills, the analysis of covariance was applied. The results are presented in the Table 12 and Table 13..

Table 12 Unadjusted and Covariance Adjusted Descriptive Statistic

Group	Before Treatment	After Treatment	After Treatment
		(Unadjusted)	(Adjusted)

	N	Mean	S.D.	Mean	S.D.	Mean	S.E.
English major students	44	10.59	2.85	17.00	2.41	16.84	0.22
EAI major students	37	10.05	2.00	16.24	1.80	16.43	0.24

*Covariates appearing in the model are evaluated at the following values: Pre-test = 10.35

Table 13 The Analysis of Covariance of English Major Students and EAI Major Students

Source of Variance	SS	Df	MS	F	Sig
Before Treatment	200.84	1	200.84	94.39	0.00**
Between Groups	3.40	1	3.40	1.60	0.21
Error	165.97	78	2.13		

$p < 0.05$

The analysis of covariance shows that the significant difference in the gain of both groups was not found ($F(1) = 1.60, p < 0.05$). Therefore, the results indicate that the effects of VT on English major students and EAI Major students were similar, which means that VT had similar effects on students with different background.

EFL students' opinions about learning critical reading skills through VT.

After using the treatment, the questionnaire data were gathered in order to review students' opinions about learning English critical reading skills through VT.

The questionnaire

The data collected from the questionnaire were analyzed by the mean scores and standard deviations. The data from the questionnaire were scored as followed: for the positive statements, Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strongly Disagree = 1; for the negative statements, to measure the level of students' opinions in

the same way as the positive statements, the scores were reversed- Strongly agree = 1, Agree = 2, Neutral = 3, Disagree = 4, Strongly Disagree = 5. The level of students' opinions was determined by using the following criteria: 0-.99 = Very Negative, 1.00- 1.99 = Negative, 2.00-2.99 = Average, 3.00-3.99 = Positive, 4.00-4.99 = Very positive. The data from the interviews were analyzed by content analysis. The results are revealed in Table 14.



Table 14 Students' Opinions about Learning Critical Reading Skills Through VT

Items	N	M	SD	Level
1. Activities in class allowed me to practice critical reading skills.	84	4.66	0.54	Very Positive
2. Activities in class were not useful to improve my critical reading skills.*	84	4.69	0.53	Very Positive
3. I enjoyed doing activities in critical reading class.	84	4.69	0.50	Very Positive
4. Activities in critical reading class were too difficult.*	84	4.78 ^{MAX}	0.49	Very Positive
5. Learning critical reading skills through VT wastes my time. *	84	4.66	0.60	Very Positive
6. Activities in critical reading class encouraged me to have more confidence in critically reading English.	84	4.53	0.59	Very Positive
7. I wanted to study English subject because I like activities in class.	84	4.63	0.58	Very Positive
8. Activities in critical reading class were boring. *	84	4.75	0.53	Very Positive
9. The teacher's techniques were ineffective in improving my critical reading skills.*	84	4.67	0.59	Very Positive
10. I could apply activities I learned in critical reading class to reading in daily life.	84	4.42 ^{MIN}	0.59	Very Positive
Total	84	4.65	0.45	Very Positive

*Negative Statements

Table 14 reveals that all EFL students' opinions about using VT to enhance critical reading skills were very positive ($M=4.65$), and every statement was in the very positive level. To illustrate, the five highest mean score statements were: "Activities in critical reading class were too difficult" ($M=4.78$),* "Activities in critical reading class were boring" ($M=4.75$),* "I enjoyed doing activities in class" ($M=4.69$) and "Activities in class were not useful for improving my critical reading skills" ($M=4.69$),* and the statement "The teacher's techniques were ineffective in improving my reading skills" ($M=4.67$),* respectively. The lowest mean score statement was "I could apply activities I learned in critical reading class to my daily life" ($M=4.42$); however, it was in the very positive level.

In conclusion, students' opinions about using VT in critical reading classes were very positive. They thought that this teaching method helped them learn critical reading and they enjoyed activities in classes. In addition, students also thought that VT helped them develop critical reading skills and favored this teaching method.

The semi-structured interviews

In this study, there were ten interviewed students: five English major's students and five EAI major's students. Moreover, all students were asked the same three main questions: (1) How do you feel about learning critical reading through VT?, (2) Does VT help you improve critical reading skills?, and (3) What are benefits you gain from learning critical reading through VT. The data from the interviews were analysed by content analysis. It was found the interview results supported the questionnaire results. The details are as follows:

First, all ten students (100%) had positive opinions about learning through VT. They (100%) all expressed that they enjoyed studying critical reading through VT. Nine students (90%) also expressed that they liked to study critical reading through VT. Two students (20%) explained that times flew so fast when they were in the critical reading class; this means that they enjoyed the lessons. Moreover, all students (100%) thought that VT created good atmosphere in critical reading classes. They added that they felt comfortable during studying critical reading classes. Moreover, five students (50%) expressed that they had fun and were relaxed during the critical reading class. These

responses suggest that they enjoyed activities in classes, and this teaching method created good classroom environment.

In addition, interviewee addressed that VT helped them improve critical reading skills. Ten students (100%) explained that they knew the purposes of the texts they read and sensed that they could do the critical reading test better. In addition, 8 students (80%) assured that they could make inferences from the given texts better, and 7 students confirmed that they could draw conclusion from the English passages that they read. Besides the three critical reading skills, 7 students (70%) said that they understood the long and complex reading passages after they had done all given VT activities. They explained that visual tools in class could help them read and understand critical reading passages better. They could link each piece of information from the passages and create big picture in their mind while reading the passage.

Furthermore, students taught that they gained benefits from learning critical reading through VT. Eight students (80%) mentioned that VT motivated them to learn English critical reading. To illustrate, students explained that they had thought that critical reading class would be boring and difficult at first, but critical reading classes taught by VT changed their negative minds and made them study without anxiety. They addressed that the pictures, videos, and activities such as drawing mind mapping helped them read the long and difficult passages in shorter time than before and better understand the passages. Moreover, 6 students (60%) mentioned that they gained more world knowledge and knew some interesting facts from the given activities and friends from the critical reading classes.

The analysis of the questionnaire and the interviews points out the opinions of students were at a positive level. Firstly, students enjoyed activities in classes and flavored this teaching method. VT changed their negative thoughts about critical reading classes, and they studied critical reading classes without anxiety. More importantly, VT motivated students to learn critical reading and participate in class activities. In addition, students thought that VT activities helped them develop critical reading skills. This is, the activities and visual tools in classes helped them read and

understand critical reading passages better. They could connect each piece of information from the passages and form big pictures in their mind.



CHAPTER 5

CONCLUSION AND DISCUSSION

The objectives of this study were to measure the effects of VT on EFL students' critical reading skills, and to investigate opinions of students about VT. The conclusion of the study, the effects of VT on EFL students' critical reading skills, and student's opinions about studying critical reading through VT are presented in this chapter. Moreover, finding discussion, limitation of the study, and recommendations for future studies are also described.

Conclusion

This study was conducted for the following research questions:

- (a) What are the effects of VT on English critical reading skills of students majoring in English?
- (b) What are the effects of VT on English critical reading skills of students majoring in EAI?
- (c) Are there any differences in the effects of VT on English critical reading skills of students majoring in English and those of students majoring in EAI?
- (d) What are the students' opinions about the use of VT to enhance critical reading skills?

The participants were 81 students in a demonstration school in Bangkok, Thailand selected by a purposive sampling method. The 81 participants were divided into two groups: a group of 44 English major students and a group of 37 EAI major students.

The research instruments comprised lessons plans based on VT, an English critical reading test, a questionnaire to explore students' opinions about learning critical reading skills through VT, and interviews. Mean scores, standard deviation, the t-test analysis, and the analysis of covariance were used to analyze all quantitative data. Content analysis was used to analyze the qualitative data in this study.

The findings of the study were as follows:

Firstly, VT had positive effects on EFL English major students' critical reading skills. Mean scores from the post-test was significantly higher than mean scores from the pre-test.

Secondly, VT had positive effects on EFL EAI major students' critical reading skills. Mean scores from the post-test was significantly higher than mean scores from the pre-test.

Third, the results indicate that the critical reading skill improvement in both groups were at the same level. This means that VT had positive effects on different background students.

Fourth, the results shows that students had positive opinions about this teaching method. They favored critical reading classes using VT. The analysis from the questionnaire and the interviews reveals that students favored this teaching method. They thought VT helped them improve critical reading skills and better understand passages. They also reported that VT benefited them and motivated them to learn in critical reading classes.

In summary, VT effectively improved critical reading skills of both English major students and EAI major students. In addition, students had positive opinions about VT.

Discussions

According to the results, VT helped students in both groups develop their critical reading skills. Various reasons can explain these results.

The first reason was the three steps of VT applied to this study: questioning, visualizing, and interpreting. From the interview response, students also revealed that they liked the activities in critical reading class. All these steps benefit students to gain critical reading skills in various ways. The first step of VT, questioning, helped develop students' critical thinking. In this step, pictures relevant to the reading topic were shown to the students, and students were asked four main questions. Students needed to observe all parts of the pictures, colors, and texts in order to answer those questions. Then they needed to think before they answered the questions. There were no right or wrong answers in this step, so students could answer from any angles that they saw. Students

also had chances to listen to different ideas from other students. This created critical thinking because they could see various concepts from new angles and broaden the scope of their comprehension like the explanation from Marentette (2018). This can be supported by the interview responses which students addressed that they had chances to think and to listen new aspects from other classmates which broadened their knowledge. The second and third step of VT, visualizing and interpreting, allowed students to generate and link ideas which helped students speed up their learning. However, reading passages were long and contained a lot of information, it was very difficult for students to focus on the main points. This can be seen from the questionnaire results which students thought that English critical reading classes were not too difficult, and VT was useful to improve their critical reading skills. Movold (2016) explained that when there is lot of information, a human's brain cannot function systematically. In this study, the VT activities enabled students to map out, organize all information, and generate ideas, so that students were able to see each piece of information separately and together at the same time like the idea of Movold (2016). In addition, similar to the ideas of Frey (2011) and Movold (2016), the group work activities such as discussion, drawing from what they have read, and putting the information in frame works provided students with the opportunities to express their opinions, shared ideas, and learned from each other in class in order to better understand the complex reading passages. For example, in every class, students were asked to draw pictures from the passage they read and to interpret what they read in a preferable framework such as mind maps, graphic organizers, charts, or sketch notes. Besides opportunities for discussion, like the idea of Movold (2016), all activities and visual tools in this study can filter and organize the long and complex passages, so the brains of students started functioning with the layouts and activate students to think visually and trim the information.

Secondly, VT allowed students understand reading passages better. This was similar to the idea of Joeng (2017) who explained that when students are learning through thinking and drawing, they can understand text easier better and faster. In the present study, during the lessons, students were asked to interpret what they read in frameworks

such as mind maps. Students could identify core messages of the reading passages because VT helped them see big pictures first, and then understand complex texts visually as the explanation of Roam (2008), Raiyn (2016), Jeong (2017), Gray (2018), and Juandi (2020) state that when students think visually, they can organize the information and can know which one is the core and which one is the details, so that they can pick the right information. This can be seen from the questionnaire “Activities in classes were useful for improving my critical reading skills” which ranked at a very positive level. Therefore, students in this study could learn and read better.

Third, VT enhanced students’ creativity. Movold (2016) and Marentette (2018) explained that when students draw pictures or create image and graphs, this stimulates the visual part of the brain. Therefore, students can produce more creativity, see concepts from new angles, and broaden the scope of their comprehension. This can be seen from the interview responses that students addressed that VT led them improve their creativity. Also, this was obviously seen in this study when students were asked to discuss after reading the passages. Students could share their new and interesting information and ideas to their classmates. This helped students in this study better read critically.

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Scrutinizing into the results of each skill, it was found that students in both groups significantly improved all skills; however, they improved drawing conclusion most. This means that students achieved an interpretative reading level as students were able to go beyond the texts they have read (Smith, 1969 as cited in Sari, 2016 and Jusmini, 2017). According to Fotheringham (2019), “drawing conclusions means arriving at a decision

justified by the evidence” (p.96). In this study, students developed drawing conclusion skill most. This is because VT helped students to be able to make decisions based on hints from a reading passage and students’ experiences. Students learned through thinking, writing, and drawing, so they could understand the text better. The three steps of VT helped them see each piece of information separately and together at the same time, and then understand complex texts. Using the evidence and students’ past experiences, they could draw a reasonable conclusion.

In the aspect of students’ opinions about VT, from the questionnaire and interview, the results revealed that students had very positive opinions about studying critical reading skills through VT as it motivated students to learn critical reading, and they enjoyed critical reading classes more than before. This can be seen in the interview results in which students reported that they felt comfortable in critical reading classes because they were confident to share their ideas to others more than before. They also revealed that they learned in the safe environment, had less stress and no anxiety. From the interview, they explained that there were no right or wrong answers when discussion, so they felt very comfortable to answer the questions and share their ideas. Moreover, students explained that they enjoyed the class and felt very active in class as they could do a lot of activities in groups. With positive opinions about learning VT, students from both English and EAI major students effectively improved their critical reading skills after instructed by VT and achieved their learning.

In summary, according to critical reading test, the questionnaire, and the se-mi interview results, the analysis pointed out that this teaching method helped students develop critical reading skills, and they flavoured critical reading classes instructed by VT.

Although the study showed the effectiveness of VT, there were some challenges. Firstly, by implementing VT in the critical reading class, students were asked to work in groups; however, the teacher faced problems with grouping students. For example, due to differences in students, some students might not be willing to work in groups, and they wanted to work individually. The second challenge is time management. Students spent

more time in each activity, so they did not finish assignment as planned. Lastly, some students did not want to express their opinions in English. They were afraid of mistakes and lacked confidence to communicate with the teacher and class. Therefore, the teacher needed to encourage them. Although there are some challenges which the teacher needs to spend more time preparing lessons and encouraging students, the outcomes are fruitful.

Implication of the Study

Regarding to this study, VT had positive effects on students' critical reading skills. Therefore, the findings might promote teachers and educators to employ VT to improve the teaching of English language. Due to the benefit of teaching critical reading through VT, this teaching technique can be an alternative for teachers to create more positive classroom environment, promote learning motivation, and improve critical reading performance.

Limitation of the Study

There was some limitation found in this research. To begin with the first limit, the study investigated only grade 10 students; therefore, the finding may not be able to cover other levels. Secondly, no control group to compare with is another limitation since this research was conducted with two experimental groups. Thirdly, there were only three critical reading skills, namely finding authors' purposes, making inferences, and drawing conclusion evaluated in this study. Therefore, the results cannot ensure other critical reading skills, namely distinguishing facts from opinions, identifying bias and tone, identifying figurative language, and evaluating arguments.

Recommendation

The research findings reinforced the positive effects of enhancing EFL High school students' critical reading skills through VT; however, further studies can be done to extend knowledge in the field of EFL learning. Firstly, it might be interesting to explore potential of VT in other skills such as writing, listening, or speaking. Furthermore, this study

included only high school students, so it might be interesting to investigate the effectiveness of VT to enhance students' critical reading skills at different levels or in different subjects. Lastly, as the time duration of this research was only 7 weeks, other study can be operated for a longer period to assure the results.



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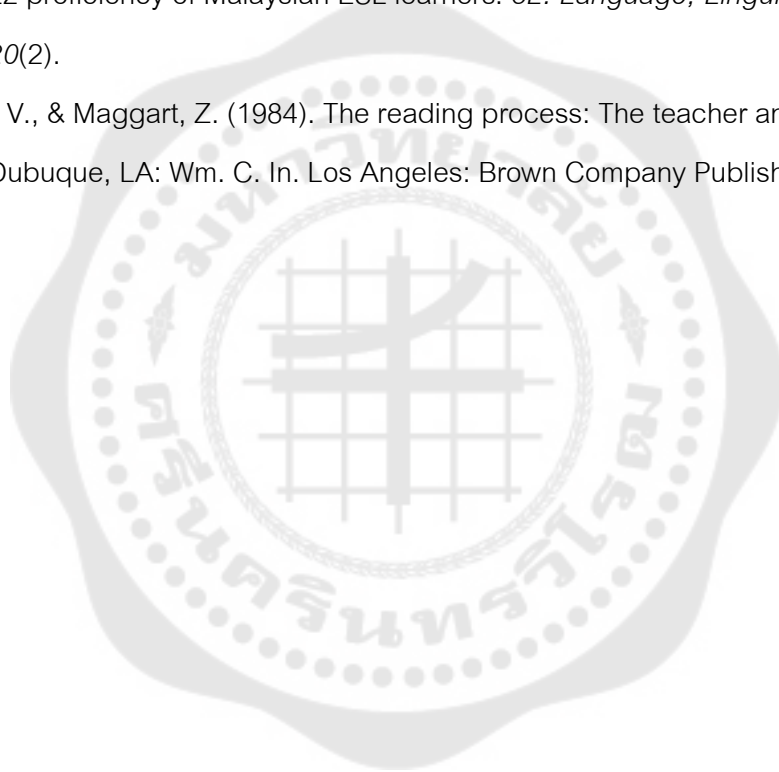
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APENDICES

Appendix A
A lesson plan sample



Appendix

Lesson Plan (Week 1)

Unit 3: Sound Waves

Class: 10th Grade students

EN 31204

Time 90 minutes

Instructor: Miss Tigamas Srithongkul

Learning objectives:

After learning this lesson, students will be able to identify author's purposes supported by the facts or texts they have read.

Learning Contents:

- Reading Focus: Identifying author's purposes
- Vocabulary:
 - radar (n.): a piece of object-locating equipment
 - weather forecast (n.): a description of expected weather conditions
 - radio wave (n.): a low-energy electromagnetic wave, especially when used for long-distance communication
 - bounce (v.): to (cause to) move up or away after hitting a surface
 - control tower (n.): a building at an airport from which the movements of aircrafts are controlled

- canyon (n.): a long, deep crack in the earth's surface
- echo (n.): the repetition of a sound caused by its bouncing off a hard surface
- crude (adj.): rough, unfinished
- innovative (adj.): introducing or using new ideas, ways of doing something

Learning concept:

Learning English through reading is fundamental skills. Moreover, in the age of digital texts which students can always access to digital source, critical reading is very necessary to students. Author's purposes is one of the critical reading skills which needs to be improved as it lets students understand the meaning of what is not explicitly stated in texts they have read.

Objectives	Teaching Activities	Material	Duration
Students are able to identify author's purposes supported by the facts or texts they have read.	Pre-reading: 1. Teacher tells students that they are going to practice one of the critical reading skills which is author's purposes.	- PowerPoint presentation - a video about radar - A piece of paper	15 minutes

Objectives	Teaching Activities	Material	Duration
	<p>2. Teacher tells students what an author's purpose is.</p> <p>3. Teacher has students work in group of 5-6.</p> <p>4. Teacher shows a video of radar.</p> <p>5. Teacher asks students three questions: (1) what's going on in this video? Teacher lets each group answer this question and continue asking (2) what do you see that makes you say that? Teacher lets each group share their ideas about this question and continue asking (3) what further can you find? Each group share their ideas.</p> <p>6. Teacher has students guess what they are going to read is about.</p>		

Objectives	Teaching Activities	Material	Duration
	7. Teacher shows the reading passage		
	<p>During-reading:</p> <p>1. Teacher has students read the reading passage "Inventing Radar".</p> <p>2. After finishing reading, students are required to draw what they see in minds while they are reading on the same paper with members of the group.</p> <p>3. Teacher has students discuss what they draw with their members and teacher asks students if they can connect their ideas with others.</p> <p>4. Teacher has students interpret what they read together in a preferable framework by choosing one of the VT</p>	<p>- PowerPoint Presentation</p> <p>- A piece of paper</p> <p>- Moving Up Critical reading book 1</p>	<p>45 minutes</p>

Objectives	Teaching Activities	Material	Duration
	<p>tools such as mind maps, graphic organizers, charts, or sketch notes.</p> <p>5. Teacher has students show their frameworks to their friends.</p> <p>6. Teacher has students complete their reading exercises: answering reading skills questions, answering comprehension questions, completing the summary.</p>		
	<p>Post-reading:</p> <p>1. Teacher concludes what has been taught.</p> <p>2. Teacher has students work in group and lets them discuss about what inventions benefited from radar and how?.</p> <p>3. Students present their opinions</p> <p>4. Students take a vocabulary test.</p>	<p>- PowerPoint Presentation</p> <p>- A vocabulary test</p>	<p>30 minutes</p>

Lesson Plan (Week 2)

Unit 3: Viruses

Class: 10th Grade students

EN 31204

Time 90 minutes

Instructor: Miss Tigamas Srithongkul

Learning objectives:

After learning this lesson, students will be able to make inferences supported by the facts or texts they have read.

Learning Contents:

- Reading Focus: Making inferences
- Vocabulary:
 - consider (v.): to think about something
 - victim (n.): somebody or something harmed or adversely affected (ผู้ที่ตกเป็นเหยื่อ)
 - rash (n.): a reddish itchy patch on the skin
 - internal (adj.): located inside
 - bleed (v.): to lost blood
 - cure (n.): the healing of a disease
 - transmit (v.): to pass from one to another

- fluid (n.): a liquid

- remote (adj.): far away

- goggles (n. pl.): protective eyeglasses

- protective (adj.): providing or intending to provide protection

- symptom (n.): an indication of illness felt by a patient

- nausea (n.): a feeling that one is going to vomit, sick to one's stomach

- vomit (v.): to expel (food, liquid from the stomach) through the mouth

- infect (v.): to give somebody a sickness or a disease

- speculate (v.): to consider possibilities

Learning concept:

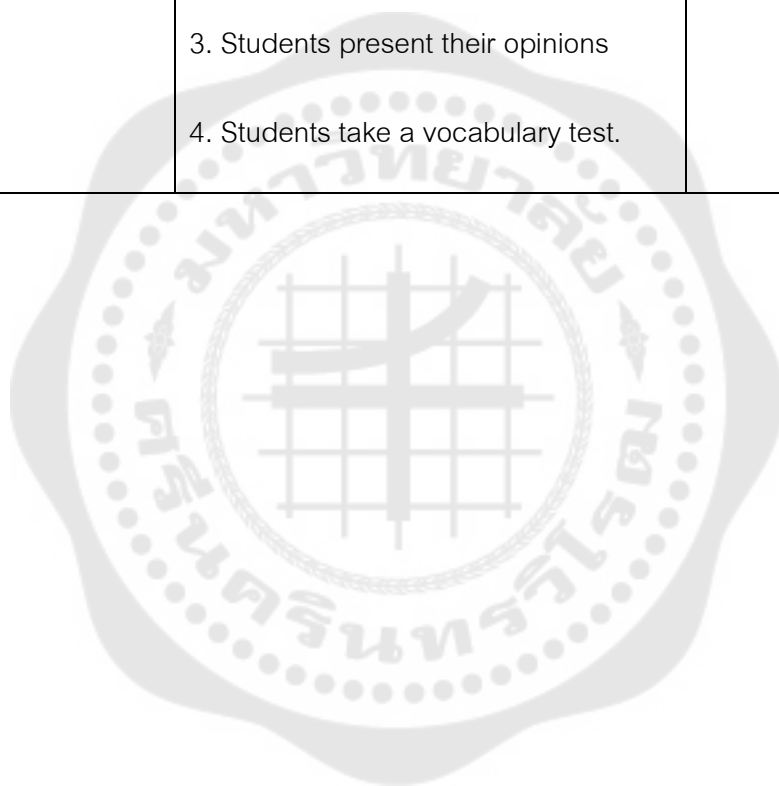
Learning English through reading is fundamental skills. Moreover, in the age of digital texts which students can always access to digital source, critical reading is very necessary to students. Making inferences is one of the critical reading skills which needs to be improved as it lets students understand the meaning of what is not explicitly stated in texts they have read.

Objectives	Teaching Activities	Material	Duration
<p>Students are able to make inferences supported by the facts or texts they have read.</p>	<p>Pre-reading:</p> <ol style="list-style-type: none"> 1. Teacher tells students that they are going to practice one of the critical reading skills which is making inferences. 2. Teacher tells students what making inferences is. 3. Teacher has students work in group of 5-6. 4. Teacher shows a video of Ebola virus. 5. Teacher asks students three questions: (1) what's going on in this video? Teacher lets each group answer this question and continue asking (2) what do you see that makes you say that? Teacher lets each group share their 	<ul style="list-style-type: none"> - PowerPoint presentation - a video about Ebola virus - A piece of paper 	<p>15 minutes</p>

Objectives	Teaching Activities	Material	Duration
	<p>ideas about this question and</p> <p>continue asking (3) what further can you find? Each group share their ideas.</p> <p>6. Teacher has students guess what they are going to read is about.</p> <p>7. Teacher shows the reading passage</p>		
	<p>During-reading:</p> <p>1. Teacher has students read the reading passage “Ebola Virus”.</p> <p>2. After finishing reading, students are required to draw what they see in minds while they are reading on the same paper with members of the group.</p> <p>3. Teacher has students discuss what they draw with their members and</p>	<p>- PowerPoint Presentation</p> <p>- A piece of paper</p> <p>- Moving Up</p> <p>Critical reading book 1</p>	<p>45 minutes</p>

Objectives	Teaching Activities	Material	Duration
	<p>teacher asks students if they can connect their ideas with others.</p> <p>4. Teacher has students interpret what they read together in a preferable framework by choosing one of the VT tools such as mind maps, graphic organizers, charts, or sketch notes.</p> <p>5. Teacher has students show their frameworks to their friends.</p> <p>6. Teacher has students complete their reading exercises: answering reading skills questions, answering comprehension questions, completing the summary.</p>		
	<p>Post-reading:</p> <p>1. Teacher concludes what has been taught.</p>	<p>- PowerPoint Presentation</p> <p>- A vocabulary test</p>	<p>30 minutes</p>

Objectives	Teaching Activities	Material	Duration
	<p>2. Teacher has students work in group and lets them discuss about how to protect yourself from diseases causing by viruses.</p> <p>3. Students present their opinions</p> <p>4. Students take a vocabulary test.</p>		



Lesson Plan (Week 3)

Unit 3: Viruses

Class: 10th Grade students

EN 31204

Time 90 minutes

Instructor: Miss Tigamas Srithongkul

Learning objectives:

After learning this lesson, students will be able to make inferences supported by the facts or texts they have read.

Learning Contents:

- Reading Focus: Making inferences
- Vocabulary:
 - resistance (n.): ability to fight against disease
 - antibiotic (n.): a medication that destroys bacteria
 - view (v.): to consider or think
 - breakthrough (n.): an advance
 - significant (adj.): important
 - inflection (n.): a disease or sickness received by someone or something
 - implication (n.): an indirect suggestion

- adapt (v.): to become familiar with a new situation
- superbug (n.): a type of bacteria that cannot easily be killed by antibiotics
- expose (v.): to make somebody experience something
- prescribe (v.): to order the use of a particular medication

Learning concept:

Learning English through reading is fundamental skills. Moreover, in the age of digital texts which students can always access to digital source, critical reading is very necessary to students. Making inferences is one of the critical reading skills which needs to be improved as it lets students understand the meaning of what is not explicitly stated in texts they have read.

Objectives	Teaching Activities	Material	Duration
Students are able to make inferences supported by the facts or texts they have read.	Pre-reading: 1. Teacher tells students that they are going to practice one of the critical reading skills which is making inferences.	- PowerPoint presentation - a video about antibiotics - A piece of paper	15 minutes

Objectives	Teaching Activities	Material	Duration
	<p>2. Teacher tells students what making inferences is.</p> <p>3. Teacher has students work in group of 5-6.</p> <p>4. Teacher shows a video of antibiotics.</p> <p>5. Teacher asks students three questions: (1) what's going on in this video? Teacher lets each group answer this question and continue asking (2) what do you see that makes you say that? Teacher lets each group share their ideas about this question and continue asking (3) what further can you find? Each group share their ideas.</p>		

Objectives	Teaching Activities	Material	Duration
	<p>6. Teacher has students guess what they are going to read is about.</p> <p>7. Teacher shows the reading passage</p>		
	<p>During-reading:</p> <p>1. Teacher has students read the reading passage "Resistance to Antibiotics".</p> <p>2. After finishing reading, students are required to draw what they see in minds while they are reading on the same paper with members of the group.</p> <p>3. Teacher has students discuss what they draw with their members and teacher asks students if they can connect their ideas with others.</p>	<p>- PowerPoint Presentation</p> <p>- A piece of paper</p> <p>- Moving Up Critical reading book 1</p>	<p>45 minutes</p>

Objectives	Teaching Activities	Material	Duration
	<p>4. Teacher has students interpret what they read together in a preferable framework by choosing one of the VT tools such as mind maps, graphic organizers, charts, or sketch notes.</p> <p>5. Teacher has students show their frameworks to their friends.</p> <p>6. Teacher has students complete their reading exercises: answering reading skills questions, answering comprehension questions, completing the summary.</p>		
	<p>Post-reading:</p> <p>1. Teacher concludes what has been taught.</p> <p>2. Teacher has students work in group and lets them discuss about the do(s) and don't(s) for taking antibiotics.</p>	<p>- PowerPoint Presentation</p> <p>- A vocabulary test</p>	<p>30 minutes</p>

Objectives	Teaching Activities	Material	Duration
	3. Students present their opinions 4. Students take a vocabulary test.		



Lesson Plan (Week 4)

Unit 4: Sharks

Class: 10th Grade students

EN 31204

Time 90 minutes

Instructor: Miss Tigamas Srithongkul

Learning objectives:

After learning this lesson, students will be able to draw a conclusion supported by the facts or texts they have read.

Learning Contents:

- Reading Focus: Drawing conclusion
- Vocabulary:
 - prey (n.): animals killed for food by other animals
 - predator (n.): an animal that lives by killing and eating others
 - license plate (n.): a metal or plastic plate on the front and back of a vehicle that shows its license number
 - nervous (adj.): anxious about or afraid of something
 - sensory (adj.): connected with the physical senses of the touch, smell, taste, hearing and seeing

- vision (n.): the ability to see

- highly tuned (adj.): extremely sensitive and able to react quickly

- nostril (adj.): one of the openings in the nose

- sensitive (adj.): able to sense or feel in a stronger than normal way

- receptor (n.): a sense organ or nerve ending in the body that reacts to changes such as heat or cold and makes the body react in a particular way

- give off (phrv.): to send out (a smell, heat, light, etc.)

- sense (v.): to be aware of)

- struggle (v.): to use much physical or mental effort and energy to do something

- impulses (n.): a short electrical, radio or light signal which carries information or instructions between the parts of a system

- ampullae (n. pl.): a special sensing organ in the skin of a shark

- pore (n.): a tiny opening

- hammerhead shark (n.): a shark with flat parts sticking out from either side of its head with eyes at the ends

- electroreception (n.): a sensory system used by some animals to detect movement

- approximately (adv.): used to show that something is almost, but

not completely, accurate or correct

- surfer (n.): a person who goes surfing

- surfing (n.): the sport of riding on waves while standing on a narrow board called a surfboard

- surfboard (n.): a long narrow board used for surfing

Learning concept:

Learning English through reading is fundamental skills. Moreover, in the age of digital texts which students can always access to digital source, critical reading is very necessary to students. Drawing a conclusion is one of the critical reading skills which needs to be improved as it lets students understand the meaning of what is not explicitly stated in texts they have read.

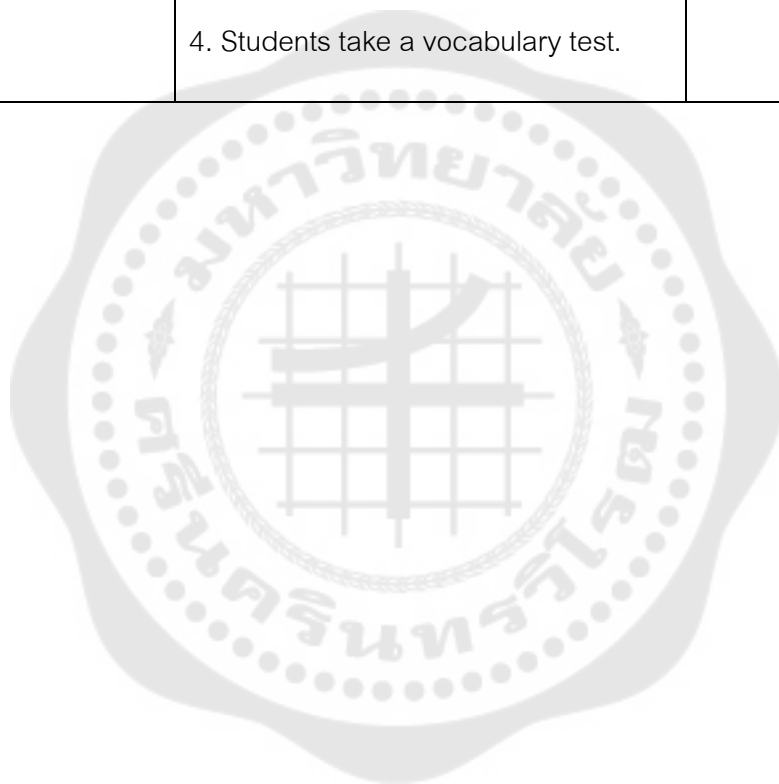
Objectives	Teaching Activities	Material	Duration
Students are able to draw a conclusion	Pre-reading: 1. Teacher tells students that they are going to practice one of the critical	- PowerPoint presentation	15 minutes

Objectives	Teaching Activities	Material	Duration
<p>supported by the facts or texts they have read.</p>	<p>reading skills which is drawing a conclusion.</p> <p>2. Teacher tells students what drawing a conclusion is.</p> <p>3. Teacher has students work in group of 5-6</p> <p>4. Teacher shows a video of sharks.</p> <p>5. Teacher asks students three questions:</p> <p>(1) what's going on in this video?</p> <p>Teacher lets each group answer this question and continue asking (2) what do you see that makes you say that?</p> <p>Teacher lets each group share their ideas about this question and continue asking (3) what further can you find? Each group share their ideas.</p>	<p>- a video about sharks</p> <p>- A piece of paper</p>	

Objectives	Teaching Activities	Material	Duration
	<p>6. Teacher has students guess what they are going to read is about.</p> <p>7. Teacher shows the reading passage</p>		
	<p>During-reading:</p> <p>1. Teacher has students read the reading passage” How Sharks Attack Their Prey”.</p> <p>2. After finishing reading, students are required to draw what they see in minds while they are reading on the same paper with members of the group.</p> <p>3. Teacher has students discuss what they draw with their members and teacher asks students if they can connect their ideas with others.</p>	<p>- PowerPoint Presentation</p> <p>- A piece of paper</p> <p>- Moving Up Critical reading book 1</p>	<p>45 minutes</p>

Objectives	Teaching Activities	Material	Duration
	<p>4. Teacher has students interpret what they read together in a preferable framework by choosing one of the VT tools such as mind maps, graphic organizers, charts, or sketch notes.</p> <p>5. Teacher has students show their frameworks to their friends.</p> <p>6. Teacher has students complete their reading exercises: answering reading skills questions, answering comprehension questions, completing the summary.</p>		
	<p>Post-reading:</p> <p>1. Teacher concludes what has been taught.</p> <p>2. Teacher has students work in group and lets them discuss about the given situation “If they accidentally found a</p>	<p>- PowerPoint Presentation</p> <p>- A vocabulary test</p>	<p>30 minutes</p>

Objectives	Teaching Activities	Material	Duration
	<p>shark while they were surfing in the sea, how could they survive from the shark?”.</p> <p>3. Students present their opinions</p> <p>4. Students take a vocabulary test.</p>		



Lesson Plan (Week 5)

Unit 3: Sharks

Class: 10th Grade students

EN 31204

Time 90 minutes

Instructor: Miss Tigamas Srithongkul

Learning objectives:

After learning this lesson, students will be able to draw conclusions supported by the facts or texts they have read.

Learning Contents:

- Reading Focus: Drawing conclusion
- Vocabulary:
 - debate (n.): an argument, discussion
 - concern (n.): worry
 - delicacy (n.): special food that tastes great and is hard to get
 - treat (n.): something special, such as a gift or pleasant occasion
 - exotic (adj.): seeming exciting and unusual because it is connected with foreign countries
 - perceive (v.): to understand or think of someone or something in a particular way

- conservationist (n.): a person who takes an active part in the protection of the environment
- nosedive (v.): (of an aircraft) to fall suddenly with the front part pointing toward the ground
- steer (v.): to follow a particular direction
- gill (n.): the breathing organ of fish
- up in the air (idm.): undecided, uncertain
- ongoing (adj.): continuing to exist or develop

Learning concept:

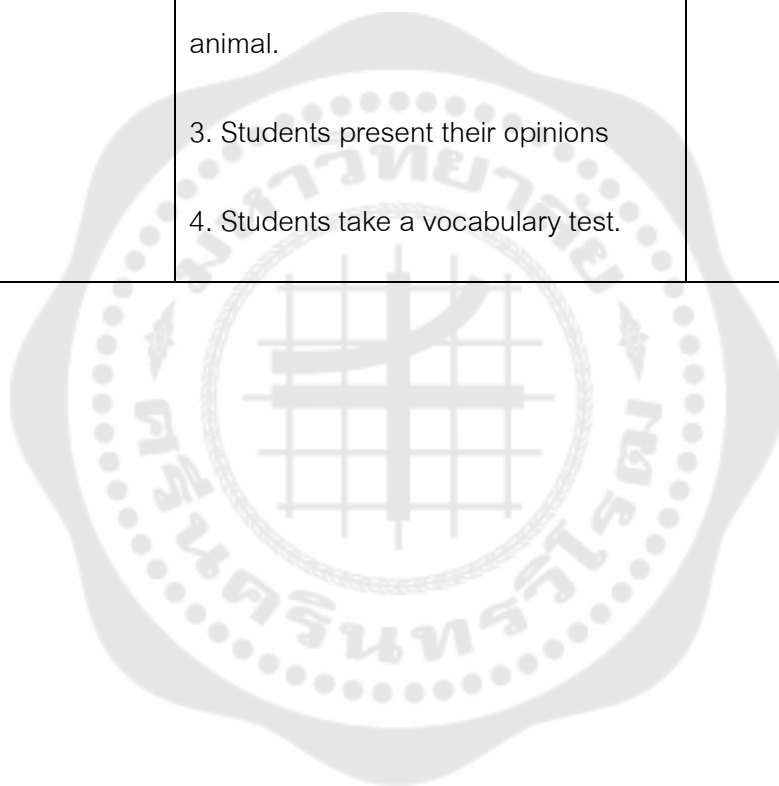
Learning English through reading is fundamental skills. Moreover, in the age of digital texts which students can always access to digital source, critical reading is very necessary to students. Drawing a conclusion is one of the critical reading skills which needs to be improved as it lets students understand the meaning of what is not explicitly stated in texts they have read.

Objectives	Teaching Activities	Material	Duration
<p>Students are able to draw a conclusion supported by the facts or texts they have read.</p>	<p>Pre-reading:</p> <ol style="list-style-type: none"> 1. Teacher tells students that they are going to practice one of the critical reading skills which is drawing a conclusion. 2. Teacher tells students what drawing a conclusion is. 3. Teacher has students work in group of 5-6 4. Teacher shows a video of finning 5. Teacher asks students three questions: (1) what's going on in this video? <p>Teacher lets each group answer this question and continue asking (2) what do you see that makes you say that?</p> <p>Teacher lets each group share their ideas about this question and</p>	<ul style="list-style-type: none"> - PowerPoint presentation - a video about finning - A piece of paper 	<p>15 minutes</p>

Objectives	Teaching Activities	Material	Duration
	<p>continue asking (3) what further can you find? Each group share their ideas.</p> <p>6. Teacher has students guess what they are going to read is about.</p> <p>7. Teacher shows the reading passage</p>		
	<p>During-reading:</p> <p>1. Teacher has students read the reading passage” The Debate over Shark Fin Soup”.</p> <p>2. After finishing reading, students are required to draw what they see in minds while they are reading on the same paper with members of the group.</p> <p>3. Teacher has students discuss what they draw with their members and</p>	<p>- PowerPoint Presentation</p> <p>- A piece of paper</p> <p>- Moving Up Critical reading book 1</p>	<p>45 minutes</p>

Objectives	Teaching Activities	Material	Duration
	<p>teacher asks students if they can connect their ideas with others.</p> <p>4. Teacher has students interpret what they read together in a preferable framework by choosing one of the VT tools such as mind maps, graphic organizers, charts, or sketch notes.</p> <p>5. Teacher has students show their frameworks to their friends.</p> <p>6. Teacher has students complete their reading exercises: answering reading skills questions, answering comprehension questions, completing the summary.</p>		
	<p>Post-reading:</p> <p>1. Teacher concludes what has been taught.</p>	<p>- PowerPoint Presentation</p> <p>- A vocabulary test</p>	<p>30 minutes</p>

Objectives	Teaching Activities	Material	Duration
	<p>2. Teacher has students work in group and lets them discuss about endangered animals and lets them make a poster about an endangered animal.</p> <p>3. Students present their opinions</p> <p>4. Students take a vocabulary test.</p>		



Appendix B
An English Critical reading Test



An English Critical reading Test

Directions: Choose the best alternatives.

Test	Critical reading Sub-skills
<p>Passage 1 (Item 1-2)</p> <p>The new product by BB Cosmetics will improve the texture of your hair in only two weeks. If you use this daily, your hair will be softer, silkier, and easier to manage. Best of all, it will be shinier and look healthier.</p>	
<p>1. What is the writer's purpose?</p> <p>a. To educate</p> <p>b. To entertain</p> <p>c. To persuade</p> <p>d. To inform</p>	Author's purposes
<p>2. From the details provided, what is most likely to be the product mentioned in the advertisement.</p> <p>a. shampoo</p> <p>b. hair dye</p> <p>c. hair straightener</p>	Drawing Conclusion

Test	Critical reading Sub-skills
d. a hair clip	
<p>Passage 2 (Item 3-4)</p> <p>For most of history, shoes have been used to symbolize social status, power, and wealth. The material used to make shoes, the amount of decoration, and the color and height of shoes all served to indicate the importance and wealth of the people who wore the shoes. During some periods in history, high heels expressed the idea of a life of great leisure and luxury. For example, from the 1300s to the 1700s, some wealthy women in Europe wore shoes so high that they couldn't walk without support.</p>	
<p>3. What is the writer's purpose?</p> <p>a. To persuade</p> <p>b. To inform</p> <p>c. To recommend</p> <p>d. To entertain</p>	Author's purposes
<p>4. What can be concluded from the passage about shoes?</p> <p>a. Shoes can't indicate your identity.</p> <p>b. Only shoes can be used to show your social status, power, and wealth.</p> <p>c. The higher your shoes are, the wealthier you are.</p>	Drawing Conclusion

Test	Critical reading Sub-skills
d. High heels can't support your walk.	
<p>Passage 3 (Item 5)</p> <p>For temporary relief of nasal congestion and to make breathing easier in head colds and hay fever. In most cases, the weaker solutions are fully satisfactory and are preferred, namely 1/8% for infants, 1/4% for children, and 1/2% for adults.</p>	
<p>5. What is the main purpose of this passage?</p> <p>a. To recommend dosage for the medication</p> <p>b. To warn against side effects</p> <p>c. To explain storage procedures</p> <p>d. To advise against using the medication</p>	Author's purposes
<p>Passage 4 (Item 6-7)</p> <p>This is to inform you that some university services will be discontinued or restricted. Linen and towel service will now be available on only a once-a-week basis in dormitories. There will be only two main dish selections instead of three in the cafeteria, and only two meals on Saturday and one on Sunday. In addition, lifeguards will be available for swimming pool duty only as posted in the gym. Other changes will be announced in the student daily paper.</p>	
6. What is the purpose of the passage?	Author's purposes

Test	Critical reading Sub-skills
<p>a. To announce restricted services</p> <p>b. To inform cafeteria restrictions</p> <p>c. To determine student requirements</p> <p>d. To provide extra student assistance</p>	
<p>7. What might be the reason why university students are informed by this announcement?</p> <p>a. Because the fewer number of students.</p> <p>b. Because of the budget cuts.</p> <p>c. Because of students' safety.</p> <p>d. Because of the pandemic.</p>	Making inferences
<p>Passage 5 (Item 8-9)</p> <p>Peter was a qualified meteorologist who worked for a local TV news program. Everybody liked Peter, but he had a terrible weather forecasting record. He became the target of jokes when a newspaper began keeping a record of his predictions and showed that he'd been wrong almost 300 times in one year. It got to the point where no one in the viewing audience believed any of his predictions. Eventually, all his forecasting mistakes got him fired. He moved to a different city in another part of the country and applied for a job at one of the local TV stations.</p>	

<p>Test</p>	<p>Critical reading</p> <p>Sub-skills</p>
<p>When he was asked the reason for leaving his previous job, Peter said, “The climate didn’t agree with me.”</p>	
<p>8. What is the purpose of the passage?</p> <p>a. To entertain</p> <p>b. To persuade</p> <p>c. To inform</p> <p>d. To warn</p>	<p>Author’s purposes</p>
<p>9. What can be inferred from the passage about Peter.</p> <p>a. Peter was once offered a position in the TV industry.</p> <p>b. Peter liked to tell jokes to his colleagues.</p> <p>c. Peter quitted from his work because of hie personal reasons.</p> <p>d. Peter applied for a new job and changed his personality which was not to tell jokes anymore.</p>	<p>Making inferences</p>
<p>Passage 6 (Item 10-12)</p> <p>Air Ticket</p> <p>See more of America and getting there to see it has never been easier. From our 8 gateways in the US, Los Angeles, San Francisco, Seattle, Chicago, Minneapolis, Detroit, New York and Honolulu, you can see more of America for</p>	

Test	Critical reading Sub-skills
<p>less than you could have ever imagined. Buy a ticket to any of our gateways and extend your trip with the North America "USA PASSES" You can visit 3 or more northern cities starting from only US\$279. For more information, please contact your travel agency or North American Airlines ticketing office at 254-0789.</p>	
<p>10. According to the passage, North American Airlines_____.</p> <p>a. has discovered 8 gateways in the United States</p> <p>b. invites tourists to tour 8 American cities</p> <p>c. is offering 8 cities as gateways to other cities</p> <p>d. enables its passengers to see more in 8 gateways.</p>	Drawing Conclusion
<p>11. What is the purpose of the passage?</p> <p>a. To entertain</p> <p>b. To advertise</p> <p>c. To inform</p> <p>d. To warn</p>	Author's purposes
<p>12. What can be inferred from the expression 'for less than you could have ever imagined'?</p> <p>a. at lower prices</p>	Making inferences

Test	Critical reading Sub-skills
<p>b. with little effort</p> <p>c. for only a few imaginative people</p> <p>d. faster than one might think</p>	
<p>Passage 7 (Item 13-15)</p> <p>African Lions</p> <p>Concerns over African Lions</p> <p>Today, there are only half as many African lions than there were 25 years ago. The International Union for the Conservation of Nature (IUCN) estimates that fewer than 25,000 lions remain in Africa, which is why the organization classifies them as vulnerable to extinction.</p> <p>The role trophy hunting plays is controversial. Mismanaged hunting in the past has caused lions to disappear from some habitats, while hunters and those involved in the industry say hunting fees generate money for lion conservation.</p> <p>National Geographic Explorer Craig Packer, however, has said the amount generated by hunting is so "underwhelming... that it's no wonder that despite years of lion hunting being allowed in some countries, the lion population has plummeted."</p>	

Test	Critical reading Sub-skills
<p>Further fueling this conflict between lions and humans is the loss of prey across the species' range. African lions prey on large herbivores, a population that's being hunted for an increasingly commercial bushmeat trade. The IUCN estimates these populations have declined by as much as 52 percent in East Africa and 85 percent in West Africa. With less food available in the wild, lions may be more likely to turn to hunting domesticated animals like livestock.</p> <p>Conservation</p> <p>Helping humans learn how to live with lions is key to ensuring their survival. Conservation organizations are working to change attitudes toward lions through compensation initiatives. Some of these models offer communities financial rewards when their local lion populations rise, while others pay farmers to replace their livestock that have been killed by lions.</p>	
<p>13. What can be concluded from the article above?</p> <p>a. African lions has been hunting for domesticated animals naturally.</p> <p>b. There are threats to survival of African lions.</p> <p>c. IUCN is an organization in providing food for animals.</p> <p>d. 25 years ago, there were fewer lions than the present.</p>	Drawing Conclusion
<p>14. We can infer from the passage that: _____.</p>	Making inferences

Test	Critical reading Sub-skills
<p>a. Lions in Africa can hunt, kill, and eat wild dogs after killing them.</p> <p>b. Hunting lions are being allowed in every country worldwide.</p> <p>c. On a basis, buffaloes and zebras are examples of the targets for African lions to prey for eating.</p> <p>d. A major cause of habitat losses of wild lions is unprofessional hunting management.</p>	
<p>15. What can be concluded about the conservations?</p> <p>a. By living with lions, it can help us make sure of the lions' existence.</p> <p>b. They replaces their livestock that have been killed by lions.</p> <p>c. Community gathering is the way to change people's attitude towards the lions.</p> <p>d. Without the help from conservation organizations, the lion population can still be decreased.</p>	Drawing Conclusion
<p>Passage 8 (Item16-20)</p> <p>How Do We Hear?</p> <p>Hear a pin drop. Hear some car keys jingle. Hear a bird chirping outside.</p> <p>Humans have the ability to hear sound waves between 20 Hz and 20,000 Hz. We use sound waves to communicate, to sense danger (i.e. a tree falling) or even to</p>	

Test	Critical reading Sub-skills
<p>drive a car. Our ears help us detect sounds coming from many directions. Humans can tell if a pin dropping is in front, behind or on either side of them. This is all due to air pressure and our ability to sense changes around us. If a pin drops to our left, the sound wave from the pin will take longer to reach our right ear than our left ear. That is how we know the pin fell on the left side. Then how do our ears actually work?</p> <p>Of course, sound waves change depending on the material that sound travels through. Most people hear sounds when they travel through the air. But sound waves can travel through any medium. Sound waves can travel through solids, through liquids and through gases. But sound cannot travel through a vacuum like outer space. In space, there is no sound. When sound waves travel through air, the sound waves are actually vibrating. The waves travel in the direction of where the waves are going. This vibration can be caused by many things. Maybe a loudspeaker in a stereo system causes the sound to vibrate. It could be the sound of a car engine starting up or a person speaking. When a person speaks, their vocal cords in their throat vibrate. All these sources emit sound waves.</p>	

Test	Critical reading Sub-skills
<p>Sound waves are like a “disturbance” travelling through the air. Each disturbance sends energy from one location to another location (i.e., from one speaker to another person). When a sound wave enters the human ear, it is called a compression wave. In a recording studio, the walls of the room are often covered with very thick foam. This means that no sounds from outside the recording studio will come in and disturb the singers. All of these examples show how sound waves reach the human ear.</p>	
<p>16. According to the passage, what can be inferred from the passage?</p> <ul style="list-style-type: none"> a. Hearing a pin drop shows how humans detect sound waves. b. How our ears know the sound. c. How sound waves reach the human’s ears. d. Humans have the special ability to hear all kinds of sound waves. 	Making inferences
<p>17. What is the writer’s purpose of this passage?</p> <ul style="list-style-type: none"> a. To tell us about types of sound. b. To inform about how sound waves work. c. To tell us about vibrating vocal cords. 	Author’s purposes

Test	Critical reading Sub-skills
d. To explain more about three types of medium.	
<p>18. We can conclude that _____.</p> <p>a. We can hear sound waves from 20,000 Hz.</p> <p>b. Sound waves can travel through any medium including a vacuum.</p> <p>c. Sound waves cannot send any energy without vibrating.</p> <p>d. Humans can identify the location of the pin dropping from their sense.</p>	Drawing Conclusion
<p>19. What might happen to a person's vocal chords when they speak?</p> <p>a. Sound from the vocal cords vibrates.</p> <p>b. Compression waves come out of the throat.</p> <p>c. The throat gets dry and rough.</p> <p>d. Sound disturbs the person listening.</p>	Making inferences
<p>20. What factors determine how sound waves travel?</p> <p>a. The density of the moisture in the air.</p> <p>b. The material surrounding a person's ear.</p> <p>c. Other vibrating objects that sound waves hit.</p> <p>d. The density of material that sound waves pass through.</p>	Making inferences

Appendix C
A Questionnaire



A questionnaire

Students' opinions about learning critical reading through Visual Thinking.

Part 1: Please ✓ the choice of the following statements that is closest to your opinions.

Items Statements	Rating Scales				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. Activities in class allowed me to practice critical reading skills.					
2. Activities in class were not useful for improving my critical reading skills.					
3. I enjoyed doing activities in critical reading class.					
4. Activities in critical reading class were too difficult.					

Items Statements	Rating Scales				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
5. Learning critical reading skills through Visual Thinking wastes my time.					
6. Activities in critical reading class encouraged me to have more confidence in critically reading English.					
7. I wanted to study English subject because I like activities in class.					
8. Activities in critical reading class were boring.					
9. The teacher's techniques were ineffective in improving my reading skills.					

Items Statements	Rating Scales				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
10. I could apply activities I learned in critical reading class to my daily life.					

Part 2 : Please write your response.

Are there any comments or ideas about this class that you would like to say? (It can be
in Thai)



Appendix D
Interviews

Interviews

Directions: Ask five volunteers from each group about learning critical reading through

Visual Thinking

1. How do you feel about learning critical reading through Visual Thinking?

2. Does Visual Thinking help you improve critical reading skills?

3. What are the benefits you gain from learning critical reading through Visual Thinking?

VITA

