

Development of Infographic Material to Enhance
Young English as Foreign Language Learners' Reading
Comprehension Through Close Reading Instruction

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ภาษาอังกฤษเป็นภาษาต่างประเทศผ่านการอ่านแบบจดจ่อ



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The objectives of this study were to: 1) develop infographic materials to help teach young English as foreign language learners' reading comprehension skills and 2) examine how effective the developed materials were in increasing young English as foreign language learners' reading comprehension skills focusing upon non-fiction text and 3) examine the effectiveness of close reading instruction in using infographics as reading materials. The participants included 20 year-four students and five foreign teachers who were purposefully selected from an international programme in one of the demonstration schools in Thailand. The instruments used were: 1) semi-structured interviews for teachers, 2) need analysis questionnaires for students, 3) English reading comprehension tests, 4) semi-structured interviews for students, and 5) material evaluation forms for teachers. The qualitative data was analysed through content analysis. The quantitative data was analysed by statistics using percentage, mean, standard deviation, and Wilcoxon signed-rank test. Using Tomlinson's material development framework (2011) Krauss's process of creating infographics (2012) and Sisson and Sisson's close reading instruction (2014) the infographics were developed. The results of the comprehensions tests demonstrated that (1) the students' post-test mean scores of the English reading comprehension tests improved at the significant level of 0.5. (2) the results from students' semi-interview and teachers' material evaluation showed the satisfaction of both students and teachers toward the implementation of the developed infographic materials.

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CHAPTER 1

INTRODUCTION

1.1 Background of the study

For learners, reading is a fundamental skill which is not only required in their learning but their life (Brindley, 1994). It is defined as an ability to draw meaning from the printed page and interpret the information appropriately (Grabe & Stoller, 2019). In other words, reading is both perceptual and cognitive activity change markedly within the ages of young learner (Clay, 1993; Paivio & Desrochers, 1979). In language learning, it is important to develop reading skills for young learners as lacking reading can affect learners' academic growth and success (Pugh, Pawan, & Antommarchi, 2000). Reading is also the crucial step to develop learners' comprehension (Bell, 2001; Elley & Mangubhai, 1983; Iwahori, 2008) as stated that comprehension is the ultimate goal of reading (Grabe & Stoller, 2014; Nunan, 2003). Agreeing with Van Den Broek et al. (2005), their study proved that teaching young learners comprehension skills will benefit young learners' comprehension skills are developed similarly in the same way as an adult's. Young learners engage in very much the same as an adult in terms of inferential processes, meaningful relations and establishing coherence. However, the differences are young learners will generally need the inferences involved to be less complicated and more supported by text or background knowledge. Then, older learners as their experiences grow along, and they become fundamental knowledge for them to develop into the level of comprehension (Van Den Broek et al., 2005).

As comprehension is the goal of reading, and reading comprehension has been described as “a complex intellectual process involving a number of abilities” (Rubin, 2000). These can include filtering and organising the text, interpreting thoughts and feelings, reflection upon the text and establishing relationships with the new information gathered in the page. Reading comprehension can be defined as “an active thinking process through which a reader intentionally constructs meaning to form a deeper understanding of concepts and information presented in a text” (Westwood, 2008).

The school in which the study will be based is an international school using the national core curriculum of United Kingdom. English is taught as an essential language to communicate between British teachers, Thai teachers and students in all subject areas. Most of the students are Thai citizens who entered the school starting at a nursery level and continue their studies until now, which is in key stage two – Year four. The students are all able to decode the sound of the words as they have completed phonics programme. At the level of key stage two, students should be able to explain and express their ideas with clarity and also be able to find the specific information from the texts whilst drawing inferences from the text.

The United Kingdom core curriculum states that the focus of teaching reading should continue to be on pupils’ comprehension as a primary element in reading. The knowledge and skills that pupils need in order to comprehend are very similar at different ages (Education, 2013). According to the curriculum that the school does follow, the Department for Education of UK expects students to read books at an age-appropriate interest level. Students should also be able to read accurately and at a speed that is sufficient for them to focus on understanding what they read rather than on

decoding individual words. They should be developing their understanding, the ability to draw inference and enjoyment of the text (Education, 2013) which means that teachers need to enhance students' reading comprehension through reading abilities and support them to be able to think beyond and further their thought between prior knowledge and reading text to reach comprehension in the level at literal and inferential comprehension.

Therefore, young students studying English as foreign language (EFL) learners of the international primary school are taught English reading skills to enable students reading comprehension of the texts. So, the school aims the students to reach the expected standards of the United Kingdom core curriculum, literal and inferential comprehension which quite challenging for teachers.

1.2 Problem Statement

The school aims the students to gain the knowledge and understand from the specified texts from the unit of learning. The information of the specified non-fiction texts is beneficial and interesting, but some students are able to answer questions based on the texts; however, they sometimes cannot interpret the meaning in the non-fiction texts because of their lack of understanding and use of comprehension skills. Also, they are unable to refer back to the information from the texts. Students who have good comprehension are able to use a variety of cognitive skills as they read. "As they process narrative materials, they may create mental pictures such as visualise scenes, actions and characters. They can critically reflect upon the relevance of what they have read" (Thames et al., 2008).

Nevertheless, some students could not interpret, imagine, or think and link the information they have gained from the text with their understanding and cannot comprehend to fully reach the interpretation level. Besides, the text used as a reading material within the lesson is not stimulating students' thought as it contains only letters that are plain and unattractive with many multisyllabic, rare words or technical terms that students have never learnt before (Grabe, 2009). Those words keep repeating within a paragraph, causing students to be incomprehensible with the text. Moreover, there are no graphic or images that help interpret the meaning of the words or sentences. This affects some of the students' reading experiences to be tedious and frustrating as they can identify words with a slow pace, which makes comprehension very difficult (Sweet & Snow, 2003). The students are unable to link and connect ideas together as they read, and they can remember very little of the details after they have read a passage (Ricketts, Bishop, & Nation, 2008).

Due to the common problems occurring during reading lessons in the school as well as the importance of the reading comprehension within young learners, it is vital to improve and develop learners' reading comprehension using explicit teaching reading strategies to help young EFL learners overcome the difficulties in reading non-fiction (N. K. Duke & Pearson, 2009; Taylor, Stevens, & Asher, 2006). Moreover, it motivated the researcher to develop reading material to aid, facilitate, and advocate learners to gain language knowledge and elicit and build up their background knowledge to bear upon the reading comprehension process (Peregoy & Boyle, 2000).

With the suggestion of the International Reading Association and the National Council of Teachers of English (IRA/NCTE) stated that the twenty-first-century students should be capable of reading and communicating meaning with spoken and

written (English & Association, 1996). The increasing of images means that visual literacy is crucial for obtaining information, constructing knowledge, and building successful educational outcomes (Bamford, 2003). As well as communicating meaning with visual text, it is an important target which aims learners to be able to understand and express the meaning of the graphic in a text (Jewitt & Oyama, 2001). Also, there is a belief that young learners' visual comprehension develops earlier than verbal comprehension (Barry, 1997). Besides, learners' cognitive growth directly related to building reading comprehension, would be effectively stimulated if there is a balanced emphasis between language and verbal and visual experiences (Paivio & Clark, 2006). Since the world's change getting into the digital ages, students increasingly interact more with electronic texts with visual. Visuals can play a crucial role in learning in the digital age. Because humans are typically visually oriented, and the retention of the information presented in the visual form usually exceeds the retention of the information presented verbally (Levie & Lentz, 1982). As one visual aid, an infographic is a data visualisation that presents complex information quickly and clearly, including signs, photos, maps, graphics, and charts. Locoro, Cabitza, Actis-Grosso, and Batini (2017) defined infographics as visualisation tools to visualise data that becoming widely used with both printed materials and digital media. Infographics are visual representations that interstate information derived from data and graphics to convey a message (Locoro et al., 2017).

Infographics are one of the visual aids used within the educational system and has become an essential tool in many instructional media. They are considered one of the most famous means of visual communication (Smiciklas, 2012). Harrison, Reinecke, and Chang (2015) mentioned that infographics help students to make the first

impression with the lesson. More importantly, they stimulate learners' attention and rapidly engage learners with the content of learning (Harrison et al., 2015). Hence, it is interesting and feasible to integrate the infographic within the teaching reading instruction and help students stimulate and engage their learning, ideas, knowledge, and skills and lead to a deeper understanding. Naparin and Saad (2017) and Mayer (1980) mentioned that visuals aids are vehicles for helping students potentially understand expository texts, including non-fiction texts. Infographics created and used by educators and researchers help to develop students' visual literacy skills. In other words, it will help the teachers to teach the students to make more sense of information in the texts. Therefore, the implementation of using infographic material as a learning tool to promote students' reading comprehension would be beneficial (Mayer, 1980; Naparin & Saad, 2017).

Students in year four, aged around eight to nine, learn best using visual aids (Levie & Lentz, 1982). They mentioned that humans are typically visually oriented. Therefore, visuals play an important role in learning by helping the students to exceed the retention of the information presented (Levie & Lentz, 1982). As a matter of fact, visual aids can be any kinds of sensory objects or images which stimulate and support learning. They are important in the education system as they can be used in the classroom to encourage students' learning process and make more comfortable and more interesting lessons. When students can interpret visuals by creating their own ideas related to visuals as well as connecting to the information from the text they have read, they will enhance reading comprehension skills. Besides, visual aids help learners to make links between what is being read and the image itself. Also, visual images can help learners remember the text and develop a deeper understanding of what is meant.

For instance, students may face unknown vocabulary, but when pictures or visuals are presented, they can identify what it is and what it is meant in the text.

Accompanying infographic materials with teaching, which would support and benefit students to increase students' reading comprehension skills is vital. One of the interesting reading instruction approaches is close reading instruction. Burke (2012) noted that closed reading is a thoughtful reading teaching instruction that promotes students to analyse a text critically. It guides students to focus on significant details or patterns in order to develop students' understanding of the text. Moreover, Sisson and Sisson (2014) added that it is purposeful re-readings and analysis of the text with a clear instructional purpose with accompanying questions that set and make each reading meaningful and stimulate students thinking and understanding toward a predetermined goal (Sisson & Sisson, 2014).

In summary, to develop infographic as a reading material accompany with close reading instruction will be integrated and applied as the core of the instruction in the English reading material design for the young students to engage them in the process of reading and increase their reading comprehension skills.

1.3 Rationale

To solve the problems that occurred within the English reading lesson and the lack of suitable reading materials, it is necessary to develop the learning material aiding the teachers to enables the student to comprehend the information text through visual aids, infographics material, along with providing teachers the suitable teaching instruction, which explicitly guides the teachers in teaching reading to scaffold and increase students reading ability and more importantly, to enhance reading

comprehension for young learners. Thus, in this research, the researcher is trying to create the infographic materials as a visual presentation of non-fiction texts to enrich and support learners' reading comprehension of informational text for year-four students based on the material development framework by Tomlinson (2011).

Tomlinson's material development framework will be used as a guideline to create and develop the effective infographic material through six stages starting with stage one through stage six: 1) identification of need for material, 2) Exploration of need, 3) Contextual realization of materials, 4) Pedagogical realization of materials, 5) Production of materials and 6) Evaluation of materials.

The vast usage of close reading instruction nowadays, that is shown in many research projects (Dakin, 2013; Elder & Paul, 2004; Fisher & Frey, 2012, 2014b; Grote-Garcia & Frost, 2015; Sisson & Sisson, 2015). According to Lapp, Grant, Moss, and Johnson (2013), close reading instruction was implemented in science subjects to teach students to read about science information texts. It also helped students to negotiate meaning and orientate themselves to the texts. Additionally, this also enables students to comprehend within the texts in terms of scientific vocabulary. Ensley and Rodriguez (2019) also agreed with Fisher and Frey (2012); (Fisher & Frey, 2014b) that close reading instruction is an effective tool that helps engage students in analysing complex texts, and provides students opportunities to negotiate the meaning of unknown words that lead students to reach the level of understanding of complex texts (Ensley & Rodriguez, 2019; Fisher & Frey, 2012, 2014a; Lapp et al., 2013). Furthermore, close reading instruction steps help scaffold young learners' comprehension follow the level of thinking of cognitive process (Wilfong, 2014) which will reinforce learners' thinking to be systematic. For these reasons, the researcher will create the teacher manual to

implement the developed infographic within the reading lesson following the steps of close reading instruction to guide the teacher in teaching reading lesson to enhance learners' reading comprehension.

To summarise, the developed infographic materials are based on a material development framework of Tomlinson (2011), together with the process of infographic development of Krauss (2012). The teacher manual based on the steps of close reading instruction grounds on the scaffolding (Wood, Bruner, & Ross, 1976) and the higher-order thinking skill (Bloom, 1956), will help students achieve English reading comprehension at the level of literal and inferential of the text. Moreover, it will benefit students by increasing their reading comprehension skills, enabling them to fully comprehend the text, make inferences, and make connections their own knowledge.

1.4 Research Questions

1. How can infographic materials be developed to teach English reading comprehension skills to young English as foreign language learners?
2. To what extent does the developed infographic material enhance young English as foreign language learners' reading comprehension?
3. To what extent, does the close reading instruction which use infographic materials help young learners' reading comprehension?

1.5 Research Objectives

1. To develop infographic materials to help teach young English as foreign language learners' reading comprehension skills

2. To examine how the effectiveness of the developed material help increase young English as foreign language learners' reading comprehension of non-fiction text
3. To investigate how the effectiveness of the close reading instruction help increase young English as foreign language learners' reading comprehension of non-fiction text

1.6 Scope of the Study

Population

The study populations are year-four students and teachers, including a key stage leader, ahead of literacy and English teachers at a public school in an international programme in Bangkok, Thailand.

Variables

There are three variables, as follows:

Dependent variables: infographic materials and close reading instruction

Independent variables: English reading comprehension

Texts

The texts used in this study will follow the four International Primary Curriculum (IPC) units of learning. There will be a non-fiction text of each unit based on the result of the need analysis stage.

1.7 Definition of Terms

Infographic Material

Infographic material refers to an integration of visual representation and text created and developed by the researcher as a tool for both teachers and students to employ as reading materials in the lessons. The designed infographic are based on material development of Tomlinson (2011) accompanying the process of creating an infographic of Krauss (2012) and close reading instruction (Sisson & Sisson, 2014). In this study, infographics represent the information of texts in the visual way to support learners' understanding of non-fiction texts within the reading cycles to enable students' literal and inferential comprehension. The contents of the developed infographic material are based on the unit of learning of the International Primary Curriculum (IPC).

English Reading Comprehension for young learner

English reading comprehension refers to the ability of year four students to comprehend the text at the level of literal comprehension and inferential comprehension based on United Kingdom core curriculum (Education, 2013). In this study, reading comprehension will be measured by the reading comprehension tests which are administrated after the implementation of the developed infographic material within the reading lessons for year-four students.

Close reading instruction

Close reading instruction refers to the English reading instruction, which requires students to read closely to determine what the text says and draw logical inferences from their interaction with the text. The teacher manual of teaching reading will be developed based on steps and cycles of close reading instruction. The students will be taught how to interact with the text complexity and text-dependent questions based on three reading cycles: 1) comprehend text and infographic with evidence on a

surface level, 2) analyse the text and infographic, and 3) get a deeper understanding of the text and infographic.

Young English as foreign language learners

In this study, young English as foreign language learners refers to primary students studying in an international programme of a Thai demonstration school. They are year-four students in the academic year 2020-2021.

1.8 Significance of the Study

According to enhancing students' reading comprehension skills to reach the expected standard of the UK core curriculum, aims are for students to be able to read accurately and at a sufficient speed to focus on understanding, develop their understanding, the ability to draw inference and enjoyment of the text (Education, 2013). Close reading instruction is considered a new reading teaching instruction applied to teach reading as an innovative way. The researcher aims to design and develop infographics related to the text context use within the lessons as a learning tool to increase student reading comprehension skills. Moreover, the researcher would like to explore infographics' effectiveness as a learning and teaching tool with close reading instruction.

CHAPTER 2

LITERATURE REVIEW

In this chapter are the reviews of the theories relevant to the development of the infographic materials. The study firstly covers the material development pointing out the material specifically teaching reading materials that support and enhance students' reading comprehension. Also, the criteria and steps of material development need to be reviewed including the framework of materials development proposed by Tomlinson (2011). Second, the meaning of infographic, the process of creating infographic, and the implementation in a role as reading material for teaching reading for young learners. Third, the topics of students' reading and reading comprehension to explore the current teaching of the skills, the problem occurred, and the theories that influence teaching young learners. Next, the close reading instruction with the subtopics: text complexity, steps of teaching, and the text-dependent question are described the various usages of this instruction as a teaching reading instruction. Lastly, the integration of infographic material within close reading instruction and the implementation of the developed material are described.

2.1 Definition of Material Development

2.1.1 What is learning materials?

One important thing that plays a huge role in language teaching and learning is materials. The word 'materials' in term of the language-learning can refer to various kinds of objects which is used by the teachers or students to facilitate the learning of a language. Generally, when talking about the language learning material, people tend to

think of a course book or an audio. However, materials could obviously be in a form of worksheets, workbooks, images, videos, emails, YouTube, dictionaries, or photocopy exercises. Also, they could be newspapers, food packages, instruction given by a teacher, or discussion between learners which presents about the language that being learned (Tomlinson, 2011).

According to the researcher focus, the role of learning material on the language learning, visual image plays a very important role in language learning and using (Tomlinson & Avila, 2007). It influences on learners' written expression and helps enable students' comprehension skills in the early stages of the acquisition (Barnard, 2007) which concordantly to the previous studies mentioned in the use of an infographic.

2.1.2 Principle of material development

Tomlinson (2011) explained that materials development is a field of study which refers to the principles and procedures required to design, implement, and evaluate language teaching material. It is also explained as a practical undertaking which refers to the sources of language input designed by writers, teachers, or learners to promote effective language learning. Both aspects are interactive in the theoretical studies and the implementation of the classroom materials. From his view, the basic principles of second language acquisition relevant to the development of materials for the teaching of languages are:

1. Those learning a language should be exposed to meaningful and understandable language.

2. Learners should be engaged both actively and in ways that will help memory of learning
3. Learners who achieve normally do so through communication
4. Learners benefit from using mental resources
5. Learners benefit from important input, understanding how to use it
6. Learners need the opportunity to use the language

In addition, there are three principles of materials development from the study of Tomlinson and Avila (2007) which focused on the roles of audio-visual mental aids in language learning and use.

1. The activities should stimulate learners to visualise and/or use inner speech before during and after experiencing a written or spoken text.
2. The activities should encourage learners to visualise and/or use inner speech before during and after using language themselves
3. The activities should help learners to reflect on their mental activity during a task and then to try to make more use of mental strategies in a similar task.

In order to create an effective instructional material, Tomlinson (2011) summarises the processes of material production consist of six steps as shown in Figure

- 1.

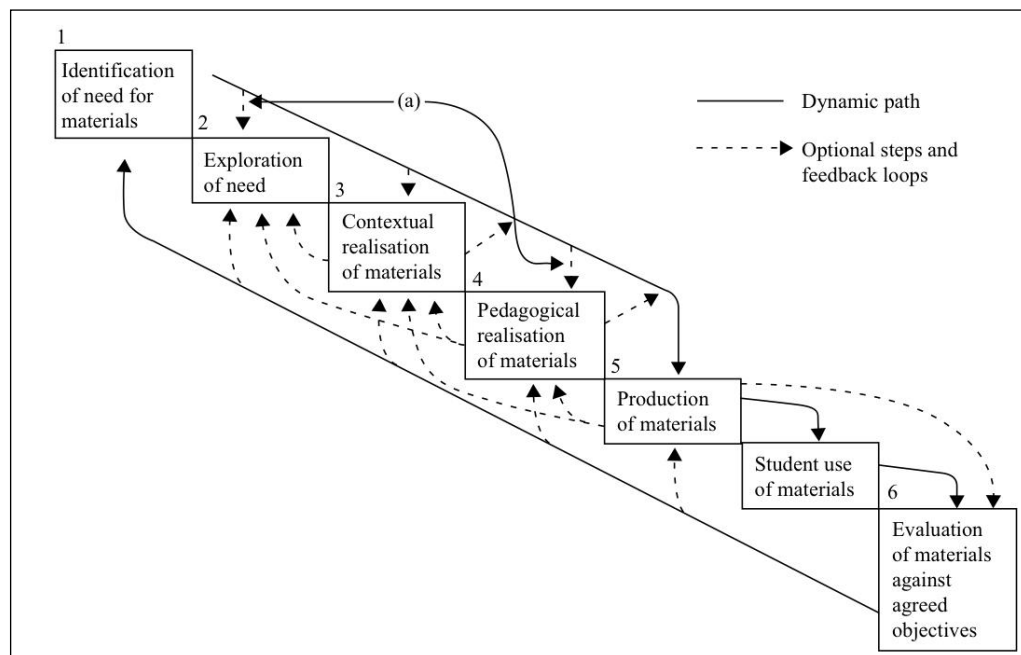


Figure 1 A teacher's path through the production of new or adapted material

1. Identification of need for materials

The teacher must first identify the need for the new material. This should be after extensive research of current materials and resources available. If the teacher finds that no current material is suitable, they must create their own to fit the needs of their students. Using materials that are not suited to the students' needs can lead to a slower rate of learning or additional misconceptions. Some reasons why the materials might not be suitable include:

- The material lacking content.
- The material is not suitable for the age group.
- The material is not suitable for the level of the students.
- The material is not relevant to the context of the unit of work.

2. Exploration of need

The teacher must now explore the specific knowledge, skills and understanding that the students need to achieve from the material. Teachers must think carefully about what they want their students to practice in order for them to achieve the targets that the material is designed for.

3. Contextual realisation of materials

The teacher must then realise how the material can fit into the current context. Some cultural contexts mean that materials are not appropriate (REFS). As the teacher is creating their own material, they will have a good understanding of the context of their students and be sensitive to any differences.

4. Pedagogical realisation of materials

The teacher should then select exercises, activities and practices that are meaningful to the outcome. They should also provide clear instructions on how to achieve the outcome, broken into smaller, manageable steps. In this step, the teacher should also think of the aesthetics of the material, its ease of use, its practicality, and its relevance.

5. Production of materials

The teacher must now decide on the type, layout, size, and physical representation of the material they are going to create, as well as whether to create physical or digital materials. In the current, technology-driven world, materials can be created digitally and sent electronically to those that need them. This negates the need to

create physical materials that may wear down or become unusable over time. For digital materials, other aspects like font, length, visuals, and interactivity must be considered.

6. Student use of materials

The teacher will now give the students the material they have created and begin to evaluate its effectiveness. They should begin to understand how well the material is being used and whether it is achieving the outcomes.

7. Evaluation of the agreed materials

Evaluation of the materials is crucial to ensure the material can be adapted and improved if necessary. The evaluation procedure can be split into 3 parts in line with the Tomlinson and Masuhara (2004) study. These are:

1) Pre-use evaluation - this type of evaluation is based on predicting how well the material will be used by the students. The teacher can also think about any misconceptions that may arise through the use of the material. This is not a reliable evaluation type as it is based on predictions. These predictions can also be biased as they are made by the creator of the material.

2) Whilst-use evaluation - this type of evaluation is carried out during the students use of the materials. During this stage, the teacher should observe:

- The students first impressions of the materials.
- How engaging the materials are for the students.
- Whether the materials motivated the students.
- The clarity of the layout and visual aids.

- If the students can access the content as planned without additional support.
- Whether the material is comprehensible.

This type of evaluation is more reliable than pre-use evaluation.

3) Post-use evaluation - this type of evaluation is carried out after the students have used the materials. During this stage, the teacher can:

- Collect the data from the lesson where the material was used.
- Discuss and assess the students' understanding from the use of the material. Have they achieved the desired outcomes?
- Discuss and assess the students' lack of understanding from the use of the material. Are there still gaps in knowledge?
- Run a 'student voice' where the students are asked to voice their opinion on the material.
- 1:1 interview with the students on their view of the material.
- Ask for questionnaires to be filled in about the material.

This type of evaluation is the most reliable as it provides data that can be used to assess the effectiveness of the material. This data can also be compared to data collected from the use of other materials.

In order to design the reading materials to support the students' reading comprehension skill, the researcher found that interesting teaching reading instructions are key. In order to support a child, a teacher must first ensure that students are engaged,

and this comes from picking topics and materials that are accessible both in terms of ability, genre and points of discussion. In this study, close reading instruction would be the solution.

2.1.3 Reading Material development for enhancing young learners reading comprehension

Teaching language to young learners is possibly even more complex than teaching to older learners because they are still in the early stages of their cognitive development. There are three theories that have had an influence on discussion of what is appropriate and desirable in teaching young learner (Arnold & Rixon, 2008).

- 1) Piaget's cognitive development stages (1963), whereby development in cognition only occurs by understanding, adapting and continually modifying knowledge.
- 2) Vygotsky's' zone of proximal development (1978), identifying a gap between what the young learner have learnt from their own experience and what they could achieve with the help of others which emphasize on the social interaction.
- 3) Bruner's scaffolding (1976), defines the role of the more knowledgeable others in ZPD, focusing on learning how to learn and be scaffolded by teaching

These theories have mentioned about the role of supportive teaching for young children with the understanding of young learners thinking process and their currently knowledge and ability to consider other elements to support and assist them in term of language learning.

Apart from those theories, Aria Arias (2007) proposed the approach to consider the factors of reading material that need to be considered in teaching young learners. Aspects are divided into two types which are factors directly related to the learner and aspects related to the text. For factors directly related to the learner, the material developer needs to be aware of the learners' level, interests, needs and especially the learners' background knowledge which plays a critical role in the reading comprehension process. For the aspects related to the text, the material developer needs to consider the relevance, the content and authenticity.

More importantly, visual aids need to be considered within the reading material for young learners as they serve as tool scaffolds for the learner and help teachers to correlate and coordinate accurate concepts. They also make the learning more attractive (Carney & Levin, 2002) and to raise the quality of the material to be effective for young learner and enable them to reach the goal of reading which is reading comprehension. In this way, the aim of the study is to develop infographic as visual aids in order to help enhancing young students' reading comprehension.

2.2 Definition of Infographic

2.2.1 What is an infographic?

Recent years, infographic have evolved to become a means of mass communication (García-Peñalvo & Durán-Escudero, 2017) because the visual representation can convey a complex message in a mere snapshot rather than using several pages of explanation to convey the message (Zayan, 2015). The word 'infographic' is a combination of the words 'information' and 'graphic' which refers to

a form of visual communication meant to capture attention and enhance comprehension as shown in Figure 2.

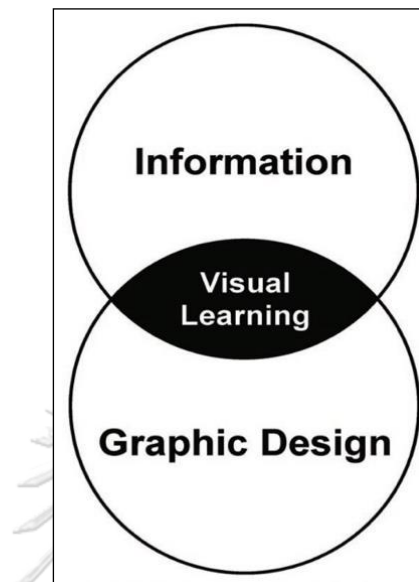


Figure 2 Anatomy of an Infographic (Smiciklas, 2012)

Smiciklas (2012) noted that an infographic is ‘a visualisation of data or ideas that tries to convey complex information to an audience in manner that can be quickly consumed and easily understood.’ Also, it is a composition of concise explanatory text and visual representations that are blended to convey a story-like interactive and easy to understand message. Kumar (2013) described infographics as the visual representation of information or data in a way that helps the users to accumulate information easily. It helps users to process information through visuals faster than texts. Infographic is attraction and powerful as it is made due to the variety of presentations (Parkinson, 2016; Rezaei & Sayadian, 2015; Wertz & Saine, 2014). Together with Krum (2013) defined infographic include a new definition as ‘a larger graphic design that combines data visualisation, illustrations, text, and images together into a format that tells a complete story’. It is also a powerful tool that designers use to

tell their story visually in an infographic. Naparin and Saad (2017) mentioned that with all the positive and beneficial of infographic, it is able to apply and be used as the learning tool in education for teachers and students effectively.

2.2.2 Formats/ Types of Infographics

Lankow, Ritchie, and Crooks (2014) divided infographics into three different formats:

1. Static infographics present information in the form of still images which allow the readers to view and read the information. It works best as a narrative and in some explorative information.

2. Motion infographics present information in the form of movement images or video. Readers view the infographic by viewing, reading and also listening if the infographic contains the voiceover.

3. Interactive infographics present dynamic information that allows readers to interact by viewing, clicking and searching for specific data. It is mostly used to present explorative information.

Kumar (2015) divided infographic into 5 types

1. Statistical infographics show the information using graphs, stat, number, percentage combine with the graphic to represent the explicitly information. Normally, this type of infographic will be used to represent information about numeral or statistic.

2. Timeline infographics show the period of time of one particular thing to represent in terms of time. Timeline graphic shows the information in order of

period of time together with information. This type of infographic normally used to represent the historical information or retelling the story by the presented time.

3. Game board infographics show the information using colourful with various graphic designs together with the information represent as a block of game which users are able to interact with the infographic. The way of representation information in term of game makes information more interesting.

4. Process Infographics show the information in the sequencing processing of information which helps the users clearly understand and easily follow each step of process. The information is usually put in order of the processing starting with the first step up to the final step.

5. Information Infographics show the information using symbols, colourful graphic design, various form of template which fit to the representation of information.

To summarise, infographics are divided into three main types according to their information presentations.

1. Static infographics
2. Motion infographics
3. Interactive infographics

To integrate infographics within the close reading instruction for teaching students reading comprehension, the infographics are designed in types of static infographics to show the information of non-fiction texts.

2.2.3 Process of creating infographic

There are many experts who define the process of how to create infographics.

Krauss (2012) described the process of creating infographics in five steps

1. Get an idea - To think about the topic and information to be used for crating infographic
2. Sketch it out - To sketch an infographic to consider the format and design that suitable with the information.
3. Collect the data - To collect all the data that need to be present in the infographic.
4. Develop proof of concepts - To check the correctness of information, the main concept that need to be represent.
5. Lay it out - To create the infographic by organising information in the format.

Smith and Robertson (2021) described the process with ten steps to design an amazing infographic.

1. Gathering data - Designer selects the information by using program to organise the information and sources, also save all the related images from various sources together with its information for avoiding confusion.

2. Reading everything - Designer must read through all information to get the big picture and the point of the information. Do not read only the highlight facts or skim, because it will cause missing concept and incomplete information. After reading, the designer must gather, synthesise and organise information to prepare for the next step.

3. Finding the narrative - Designer must consider how to represent the information in the interesting and effective way.

4. Identifying problem - Designer must check the correctness of information to be presented and avoiding the redundancy or overloaded information.

5. Creating a hierarchy - Designer must organise and summarise information into order to support the comprehension when the reader accesses the information.

6. Building a wireframe - Once the data has been combed, the most interesting facts selected, and a hierarchy determined, a wireframe is created. The designer builds an understandable visual representation of the important information and its hierarchy to be the outline for the infographic structure.

7. Choosing a format - Designer considers the appropriate format that suitable for the represent information. This decision is guided by the data, which will lead itself to one or a combination of these formats.

8. Determining a visual approach - There are two visual approaches to determining the look and feel of an infographic. It can be the form of charts and graphs, made visually exciting by their execution to represent the raw data. Or the use of illustration or metaphor to disguise and delivered to the readers in an exciting way.

9. Refinement and testing - After creating the infographic, the designer must carefully check all the information and details to make sure that the infographic is effective. The designer may show the infographic to a group of people to get feedback for adjusting and finalise the accomplish infographic.

10. Releasing it into the world - The designer shares the infographic to the related group of people or in the online site. This could be the way to test of your work from getting the comment of readers and definitely, the designer will gain the new way of how to create the new piece of infographic.

In summary, to create the infographic the creator needs to gather up all needed information to be included in the infographic. Then, design all the elements and draft the infographic in order to check the suitability for presenting the information. The creator also needs to check the correctness of the information presented in the draft. Finally, create the infographic using the programme which suitable to the creator technique. In order to create the infographic to build the young students' reading comprehension, the relations between infographic and students' reading comprehension needs to be explored.

2.2.4 Infographic to build reading comprehension

In previous years, many researchers studied about the use of infographic with various areas of language learning. All of the studies display the benefits of using infographic to enhance learners' language learning abilities in different levels. According to Alrwele (2017), the study utilised the infographic as a tool which the result shown that infographic caused a positive impact on learners intellectual, life skills and affective development which lead them to achieve their learning as well as Martix and Hodson (2014) the use of infographic within research-based assignment helped increasing learners' digital competencies and visual digital culture. Again, from the study of Kongwat and Sukavatee (2019), infographic is assigned for learners as a task for them to create within the lesson to summarise and use as a student comprehension

measurement. One more research that emphasis and highlight the use of infographic is from Krauss (2012), infographic not only present the information through visual tool, but also interact with the reader. From its presentation, infographic asks for an active response from the readers. As they read, they are answering oneself question as to find out what they would like to know. The result shed light on the benefits of infographic that student comprehension was improved by the experiment and the information presented through the infographic creation was effective. There is also a study conducted by (Naparín & Saad, 2017) that analyse the use of infographics in a total of 55 articles from 2004 to 2016, the results shown that infographic plays a virtual role on improving learners' comprehension. It encourages learners through its main components as a visualisation of data which stimulate students learning to reach the goal.

2.2.5 How infographics helps young learners to comprehend the text

Because young learners have such little background knowledge and the knowledge of the living world whilst their conception is developing, they would need a numerous amount of visual information to present their thoughts (Piaget, 2000). Moreover, 75% of information is processed by the brain comes from the visual format (R. Williams, 2009). As infographic allows young learners to immediately comprehend messages by detecting presented data within various simple ways. Also, infographic shows their content and design to attract attention and interest from learners. More importantly, comprehension is the first crucial aspect for infographic design (Lankow et al., 2014). As the researcher has mentioned about the benefits of using infographic as visual aids within the education, the feedbacks from many researches show the positive aspects of learners' comprehension. Pateşan, Balagiu, and Alibec (2018)

conducted the research about visual aids in language education shown that visual aids help to display the complex information clearly with is enable young learner to be able to easily understand the complex. And from its visual presentation, young learners are able to make connection with their prior knowledge and build on the new knowledge. Together with the text, visual aids assist young learner to build on their cognitive process by linking the information of the text with presented visuals (Pateşan et al., 2018).

With two originate elements of infographic, ‘information and graphic’, it transfers information to reader in two ways: verbal unit and visual image. This information transfer process can be described as Dual coding theory of Paivio and Clark (2006).

Allan Paivio's Dual-Coding Theory

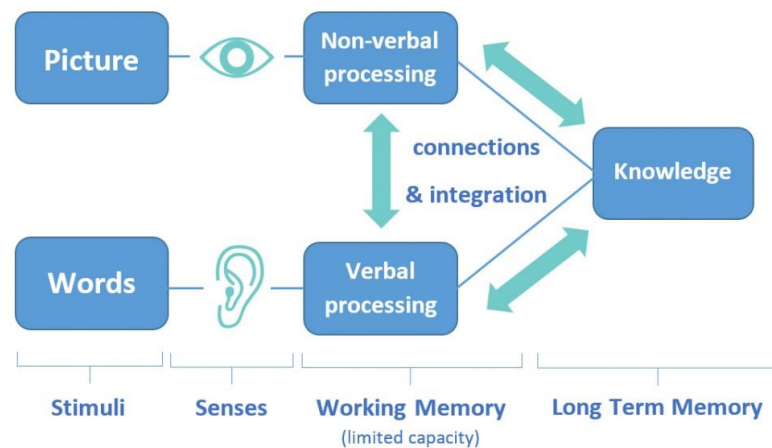


Figure 3 Allan Paivio's Dual-Coding Theory (2006)

As shown in Figure 3, this theory shows the relation of two distinct subsystems, a verbal system which directly deals with language and a nonverbal system which

directly deals with non-linguistic objects and events (Paivio & Clark, 2006; Paivio & Desrochers, 1979). Both systems are also involved in language acquisition, play different roles in receiving information. The interplay between two systems associates with the degree that they have developed bring about the cognition. Cognitive growth in dual coding theory is described as a building process which builds upward and constituting knowledge, increasingly complex and powerful feed-forward system. This concept is also reflected in Piaget's concept of cognitive development.

For young learners, dual coding theory can clearly describe in context of reading as readers learn to read concrete words faster when words are accompanied by referent pictures. Learners develop on nonverbal system (image) as the foundation for later cognitive skills that include language. In addition, to instruct young learners to form images during reading helps enhancing reading comprehension. Moreover, to implement infographic which is the combination of pictures, mental imagery, and verbal elaboration is believed to be an effective way to promote reading comprehension of young learner (Paivio & Clark, 2006).

In order to create the strong infographic presenting the information from text to help young learners to be able to comprehend the text, creators should consider the foremost structure, accuracy, reliability, depth, functionality and decoration for that information. Especially, timeline and process infographic would be appropriate to be used as patterns for presenting information text. Then, generate the visual data presents information with using clear word to describe and to help bringing both personality and clarity to an infographic (Naparín & Saad, 2017). The contribution of infographic can become guideline for teachers and importantly a material to support young learners to

comprehend information texts. Before creating the infographic, the students' comprehension in which the study would base on should be considered in order to create the infographic to serve and solve the problems in the right paths which leads to the next topic, reading skill and reading comprehension for young learners.

2.3 Definition of Reading Skills for Young Learner

2.3.1 Reading skills in the national curriculum of the United Kingdom

According to the national curriculum of the United Kingdom, which is followed by the school, the language and literacy part states that teachers should develop students' spoken language, reading, writing and vocabulary as integral aspects of the teaching of every subject. English is both a subset in its own right and the medium for teaching; for students, understanding the language provides access to the whole curriculum. Fluency in the English language is an essential foundation for success in all subjects. Also, for reading skills, it mentions that researcher should develop students' reading in all subjects to support their acquisition of knowledge. Students should be taught to read fluently, understand extend prose (both fiction and non-fiction) and be encouraged to read for pleasure (Education, 2013). Maintain positive attitudes to reading and understanding what he/she reads by listening to and discussing a wide range of fiction, poetry, plays, non-fiction and reference books or textbooks.

Students in the United Kingdom curriculum need to be able to enjoy reading, have a positive attitude and should be able to read various types of books. In addition to this, students should be able to find the meaning and understand texts with increasing complexity, identify different forms of text and be able to discuss it, explaining the meaning of words in context. Key skills such as inference, prediction, asking questions

and summarising are important when learning how to read a text and are vital for all learners. For non-fiction texts, students are asked to retrieve, record information from the text, discuss their finding, and evaluate the text itself (Education, 2013).

2.3.2 General Problems in Teaching Reading/ Students' problems

Throughout the conducted research within reading skills with young students, the researchers found the problem of students' reading skills. The majority of problems are with reading comprehension. As stated in the study of Meichenbaum and Biemiller (1998); Sweet and Snow (2003), reading development predominantly occurred mainly between year-three and year-five, but they found that an emergence of comprehension difficulties around the middle of this period is sometimes referred to as the fourth-grade slump (Meichenbaum & Biemiller, 1998; Sweet & Snow, 2003). The student faces critical comprehension challenges from expository texts, which are over two reader-based competencies: prior knowledge level and reading decoding ability that caused difficulty in text comprehension. The problem about students' lack of bank of vocabulary to comprehend the text mentioned in Chawwang (2008) study, the students cannot interpret the meaning of the text. Because they have an insufficient vocabulary in the text which the result is concordant with the study of Grabe (2009), Hudson (2009) and Koda (2005) stated that 'it is necessary to ensure that learner has sufficient vocabulary to read well'. Hsueh-Chao and Nation (2000) reported that the 98%-99% of the words in texts that students are required to know before adequate comprehension was possible (Chawwang, 2008; Grabe, 2009; Hudson, 2009; Koda, 2005). Moreover, the study of Compton, Appleton, and Hosp (2004) reveals that the texts used in the elementary school within the reading lesson are unsuitable to students ages as they contain high-frequency words, multisyllabic words, and long sentences affects to

teaching reading which caused students' reading problems. Both student's reading fluency and comprehension are decreased.

2.4 Definition of Reading Comprehension for Young Learner

2.4.1 Young Learners' Reading Comprehension

Comprehension is one of the most crucial complex language abilities to extract or build meaning from a text (Grabe, 2016). Blanton, Wood, and Taylor (2007) defined reading comprehension as an active thinking process through which a reader intentionally constructs meaning to form a deeper understanding of concepts and information presented in a text (Blanton et al., 2007). Besides, reading comprehension is described as a complex interaction among automatic and strategic cognitive processes that help readers produce a mental representation of the text (Van den Broek & Espin, 2012). The readers have to process the information through a filter, interpret, organise and reflect the information within the page when they read. The efficient interpretation of text involves a combination of word recognition skills, linking of new information to prior knowledge, and application of appropriate strategies such as locating the main idea, making connections, questioning, inferring, and predicting (Westwood, 2008).

As it is known, three types of comprehension are literal comprehension, inferential comprehension and critical comprehension. According to the United Kingdom core curriculum, the basic level of comprehension that expects elementary students to achieve is literal comprehension. Literal comprehension is where the reader is able to understand the factual information presented in a passage of text. Moreover, the next steps that the curriculum aims the students to develop their reading ability to the level of inferential comprehension. At this level of comprehension, it requires the

students to go beyond the page, using the information from the text effectively, be able to infer other details or deduct cause and effect and anticipate the upcoming event or cause. For the high level of comprehension, critical comprehension, students are aimed to appraise from what they have read such as appreciating the authors' point of view, comparing and contrasting text information or make judgements from the text (Education, 2013).

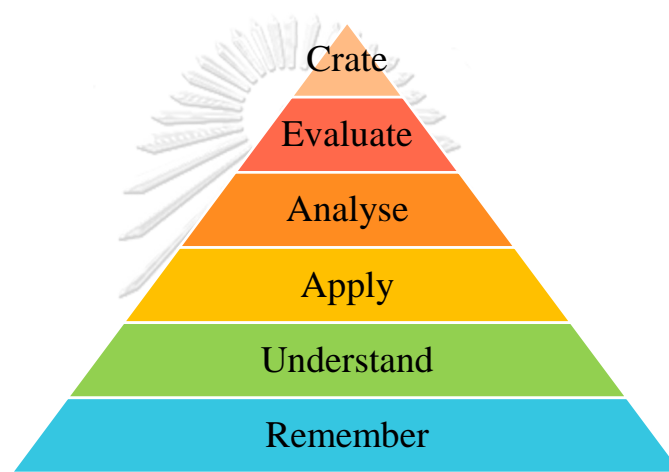


Figure 4 Bloom's revised taxonomy (2001)

According to Bloom's revised taxonomy of educational objective (L. W. Anderson & Bloom, 2001) described the level of cognitive learning in six thinking levels. It is presented to help students strive to achieve more sophisticated understanding levels shown in Figure 4. To compare the level of reading comprehension skills with the level of cognitive process, it could be described that the literal comprehension level is concordant to the level of remember and understand, the inferential comprehension is concordant to the level of application and analyse whilst critical comprehension is concordant to the level of evaluate and create.

In Westwood (2008) mentioned that factors which cause poor comprehension in young learners are limited vocabulary knowledge, lack of fluency, lack of familiarity with the subject matter, difficulty level of the text (readability), inadequate use of effective reading strategies, weak verbal reasoning and problems in recalling information after reading (Westwood, 2008). As teachers, we have to adjust the teaching technique to avoid and reduce all of these factors to promote students' reading comprehension.

2.4.2 Reading Comprehension Process for young learners

Constructing meaning is one of the complex processes within the reading comprehension, which is considered the reader thinks before, during and after reading (Fountas & Pinnell, 2001). Besides, it is described as a process of interaction between the information of the text and the reader's prior knowledge, experience and expectations of reading the text (R. C. Anderson & Pearson, 1984). To enable young learners to acquire reading comprehension, teachers need to understand young learners' cognition. According to Flavell (1963), Piaget's theory of cognitive development, which emphasis on learners' cognitive development, schemas, a set of linked mental representations of the world, are the important elements in learners' cognitive development. Learners use them to link, understand, and respond to the situation. As children get older, they have opportunities to experience the world in which their schemas grow more numerous and elaborate along their ages. For young learners, their cognition is developed into the stage of the concrete operational stage. This means that they are able to work things out internally in their head. When they read, they can understand, link and image the scenes using their schema and build new knowledge simultaneously.

2.4.3 Teaching Reading Comprehension for Young Learners

As the Education (2013) stated that ‘the focus on teaching English should continue on students’ comprehension as a primary element in reading. With the requirement on the core curriculum in the reading comprehension part, mostly requires students to be able to read and understand what they read, identify the specific information, themes, types of text, discuss, draw the inference, predict, identify how language use, and retrieve and record information from the text. It touches upon the level of literal comprehension and inferential comprehension that teachers need to teach students to reach the expected goal from the curriculum (Education, 2013). Teachers have applied and implemented various teaching strategies to encourage students’ learning and elicit and increase students’ understanding of the text. Strategies such as previewing text before reading, self-questioning, self-monitoring, rehearsing information, constructing graphic organisers to connect ideas, and summarizing key points (Ellis, 2005; Neufeld, 2005; Pressley & Hilden, 2007) have all proved valuable. But teaching reading comprehension strategies is not easy as R. J. Williams, Schnake, and Fredenberger (2005) noted that ‘Strategies are difficult for the teacher to implement, it is quite challenging’ which is bought directly to the teacher ability to implement strategies and also the ability to analyse the suitable way according to the differences of students’ need, abilities and preferences (R. J. Williams et al., 2005).

As mentioned previously, in order to increase reading comprehension, teachers need to consider learners’ language comprehension included linguistic knowledge and world knowledge as well as their ability to read the text. With young learners, the use of scaffolding in teaching is to support and lead learners through the zone of proximal development which enables learners to be able to solve and achieve goals that would

be beyond their unassisted efforts (Wood et al., 1976). In teaching, teachers must consider the elements of the task to match or initially beyond the learners' capability and needs. Thus, allowing learners to concentrate and complete the tasks that are in the range of their competence. Once the learners are able to achieve the given task, the teachers can scaffold them by giving more challenge to build up their ability to achieve the task by their own capabilities. In reading lessons, language comprehension is included in the linguistic knowledge and world knowledge. In addition, their ability to read the text needs to be considered together with the teaching instruction which leads teachers to scaffold and build up young learners' comprehension as well as the support of effective teaching and learning material. They will support young learners' learning and foster teachers to maintain teaching.

Thus, lead to the study, developed infographic material would play the role in aiding the students both language abilities and world knowledge. With the information representation, infographic scaffolds young students' comprehension and helps building their experience about the certain information to enable their comprehension of the text. In addition to enable young students' comprehension to the expected level, teaching instruction also a crucial tool for teachers to use as a teaching path to strengthen teaching with the developed infographic material.

2.5 Definition of Close Reading Instruction

2.5.1 What is close reading instruction

By the 1920s, I.A. Richards, a Cambridge professor, brought the concept of reading texts closely and purposefully to literature. Soon after, a student of his, William Empson, wrote of his experiences with Richards and soon his work migrated to the

United States where it continued to gain popularity and became a key tune in the literacy theory known as New Criticism. In 2010, The Common Core State Standards (CCSS) shifted instruction back to the tenets of New Criticism with its adherence to text-dependent questioning and close reading. Close reading therefore came to the foreground as the key to unlock texts, at a time when students faced difficult language filled with complicated and critical texts both in the classroom and in their daily interactions in everyday life; there were taking place in the digital media with the growth of the social world and mass media but to name a few.

Close reading requires that students “read closely to determine that the text says explicitly, to make logical inferences from their interactions with a text and cite specific textual evidence when writing or speaking to support conclusions drawn from the text” spreading, cognitive scaffolding, and discussion. All three of these conditions are vital in order for students to understand complex texts and build the habits needed for deep comprehension (Fisher & Frey, 2014a). Conform to the scaffolding, Wood et al. (1976), those habits from close reading instruction will help enable the readers to solve a problem and become an independent reader. Fisher and Frey (2014a) stated that the objective of a close reading session is to afford students with the opportunity to assimilate new textual information with their existing background knowledge and prior experiences to expand their schema and to build the necessary habits of readers when they engage with a complex piece of text. Sisson and Sisson (2014) mentioned that close reading is purposeful re-reading as analysis of short pieces of complex text. With a clear instructional purpose set for the close reading of a passage, each reading centres in a question or task that gives the students closer and closer to the instructional target. Text of all kinds is becoming more complex every day. Also, Sisson and Sisson, (2014)

added that close reading provides a reliable method for student to examine texts in meaningful ways.

Close reading instruction that has been used as a reading teaching instruction which benefits students in every age from its strategies. Nowadays, close reading is implemented more with elementary students as its benefits that support students reading skill. Moreover, it builds students necessary habits of readers as Elder and Paul (2004) recommended. Close reading instruction allows student to identify their own purpose for reading the text, determine the author's purpose, develop their own schema, and consider the thought systems of a discipline. From the research of Fisher and Frey (2012) revealed that elementary teachers teach all these habits routinely as they are important to reading development. Also, the teachers must analyse the text, determine the purpose of reading and plan the steps of teaching that suitable and appropriate to the students.

In this study, infographics are added in certain steps as reading materials in order to provide visual representation of the text information. Both verbal and non-verbal process delivering the information of the infographic would help scaffold and enhance young students' reading comprehension to reach the expected level of comprehension.

2.5.2 Steps of Close reading instruction

According to Sisson and Sisson (2014), close reading has ten steps to develop a well-designed lesson incorporating strategies as shown in Figure 5. These steps begin with the identifying the text and end with providing time for discussion, ensuing pupils are engaged in the text and that they are utilising key skills during their time of learning.

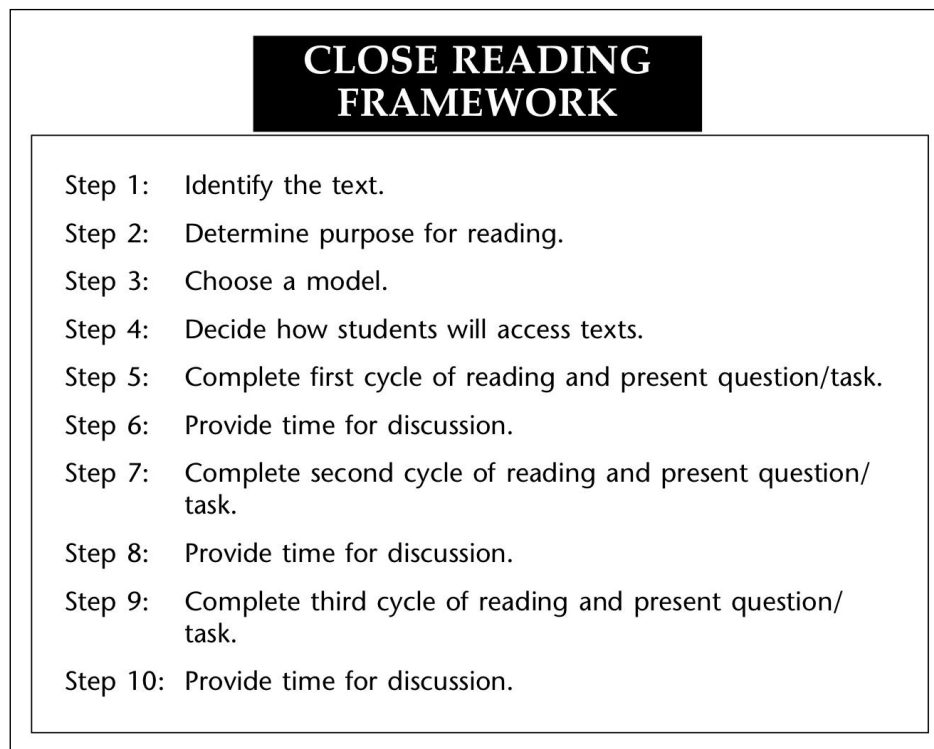


Figure 5 Ten Steps of Close Reading Instruction (Sisson & Sisson, 2014)

Step 1: *Identify the Text*. Close reading strategies are designed for complex texts that necessitate instructional support and extended time for students to analyse the text, absorb its intent, and reflect on its meaning especially, with the text that teachers think students will struggle and may fail to understand the context. To choose the text for close reading lesson, you need to check whether the text is challenging, require re-reading and need discussion to ensure students for a complete understanding. Sisson asked, ‘Is the text truly challenging?’ in order to ensure that teachers were choosing suitable texts for the students, to make sure that were both complex enough and compelling enough to keep them engaged and understanding the intent behind the passage of the text.

Step 2: *Determine Purpose for Reading*. For the close reading lesson, you need to determine the purpose or goal of the reading and use it as a roadmap for planning the

entire close reading activity. It will help ensuring each step of teacher furthers your efforts to reach your purpose and accomplish with the passage. Sisson was concerned about the understanding and appreciation of particular genres of writing and asked, ‘Is it a particular reading objective, e.g. identifying theme, narrative elements, text structure, author’s purpose?’ that the teacher and students are focusing on; this is key when determine a purpose, otherwise there is no target or objective for the reader.

Step 3: *Choose a Model*. There are many types of texts, each text has its own features, ambiguities, and challenges. Literary genres need to be considered related to the teaching.

Step 4: *Decide How Students Will Access Texts*. Ways of accessing the text can be shared reading, collaborative groups and reading cycles. The teacher will decide the activity that engages students most in engagement and enjoyment of the text, building up their independent reading. For primary grades, you may decide to begin with and read aloud as it helps increasing their vocabulary (Beck, McKeown, & Kucan, 2013; De Temple & Snow, 2003; Greene Brabham & Lynch-Brown, 2002; S  n  chal, 1997; Sharif, Ozuah, Dinkevich, & Mulvihill, 2003). Moreover, it can help students practice their phonics, decoding, and listening skills as stated in Gambrell, Morrow, and Pennington (2002); Stanovich, Cunningham, and West (1998); Teale (1986) that ‘read aloud can increase students’ listening comprehension skills.

Step 5: *Complete first cycle of reading and print question or task*. After students access the text, teachers will begin the task by analysing new vocabulary or creating pictures to analyse the text itself. This is the way in which a reader can reflect their

learning or knowledge on the text, whilst also engaging their prior knowledge. This will help to prepare students to discuss the details of meaning of the text.

Step 6: *Provide time for discussion.* This is the time that the teacher provides the pupils with time for discussion, encouraging their critical thinking and sharing responses, checking their thoughts and ideas. For those who are struggling in their learning, the teachers

can engage their learners in a think-pair-share activity, or smaller group discussions in order to scaffold their ideas when reading the text.

Step 7: *Complete second cycle of reading and present question/task.* Teachers will create a task to allow students to get closer to the main focus or purpose of the goal of the reading. This step must link between the first and final reading of the text.

Step 8: *Provide time for discussion.* Again, teachers will allow students to have time to discuss the texts; this will encourage pupils to fix misunderstandings and also improve their understanding of the text further.

Step 9: *Complete third cycle of reading and present question/task.* In this step, students should be able to interpret the text, with a deeper understanding. Students should be able to understand the purpose of the text, the author's intentions and be able to create a higher level of thinking.

Step 10: *Provide time for discussion.* Students will use their prior knowledge of the previous steps to speak confidently about the passage or text, meeting targets of the reading. If students cannot accomplish their learning during this cycle, teachers can add in more steps in order to ensure learning has taken place.

From Sisson & Sisson (2014) close reading framework, the ten steps of close reading instruction can be managed into the three phases of close reading for three purposes shown in Figure 6. From step one to step four are the steps that teachers would prepare and consider both texts and steps of teaching. Whilst step five to step ten can be categorised into three cycles of reading and applied in the lesson with the students; a first cycle on step five and six, a second cycle on step seven and eight, and a third cycle on step nine and ten which aim the students to explore the text in the different purposes of each reading. Each step of reading leads students to get closer and closer to the texts.

Smekens Education Solutions Inc. (2014) agreed that the framework of steps of close reading which divided close reading procedure into three phases shown in Figure 6.

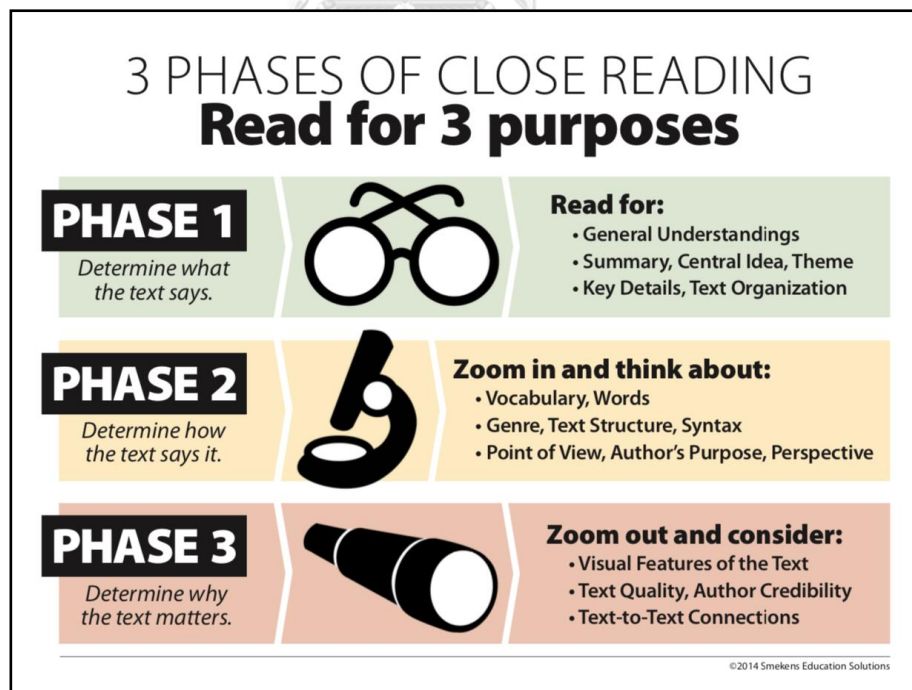


Figure 6 Three phases of close reading (Smekens Education Solution Inc., 2014)

Each phase allows students to focus on different purposes of reading. In phase one, first cycle of reading, the students comprehend on a surface level. They read to paraphrase or retell specific details of the text. They have to get the general understanding, find the key details and be able to summary the text. In phase two, second cycle of reading, the students will analyse the text. They have to think about the types of the text, point of view and author's purpose. In the last phase, third cycle of reading, the students read to get the deeper comprehension of the text. They have to determine why the text matters by considering the text features, make the connection with the text and integrate new understanding from the text with other texts and bigger ideas.

As mentioned in the reading comprehension section, describes that the level of reading comprehension is concordant to six thinking levels of cognitive domain from Bloom's taxonomy, the cycles of close reading instruction also be able to match with both of them. As revealed by Basaraba, Yovanoff, Alonzo, and Tindal (2013) described that the first cycle of reading that aims the students to comprehend text with the evidence on a surface level can be categorise with Bloom's taxonomy in the steps of knowledge and comprehension. Next, the second reading cycle of reading that aims students to analyse the text can categorise within the steps of application and analysis. Lastly, the third reading cycle which aims students to get deeper understand of the text can be put together with the synthesis and evaluation steps. The researcher created the figure to compare all details within Figure 7.

Level of comprehension	Cognitive level of Bloom's taxonomy	Reading cycle of close reading instruction
literal comprehension	knowledge	first reading cycle: comprehend text with evidence on a surface level
	comprehension	
inferential comprehension	application	second reading cycle: analyses the text
	analysis	
critical comprehension	synthesis	third reading cycle: get deeper understanding of the text
	evaluation	

Figure 7 The comparison of elements and steps of level of comprehension, cognitive level of Bloom's taxonomy and reading cycle of close reading instruction

Significantly, to implement close reading instruction with the elementary students must be accompanied by other essential instructional practises that vital to reading development such as interactive read-aloud, share readings, and teacher modelling and think-aloud (Fisher & Frey, 2012). These interactive activities will activate elementary students and engage them more with the lesson.

2.5.3 Text Complexity

Teaching reading skills is to teach students of how to construct the meaning of the text. With the close reading instruction, the texts need to be complex to challenges students. Text complexity has an impact on elementary students' comprehension (Amendum, Conradi, & Hiebert, 2018). It helps them scaffold their ability of constructing meaning gradually. To analyse the text complexity according to Flood, Heath, and Lapp (2015) the qualitative features of a text are the aspects that have to be measured. But they cannot be measure by a simple formula. In order to measure, there

are five aspects to be considered: text structure, language features, meaning, author's purpose and knowledge demands. Text structure is the first key aspect to be considered. It is to see how the text is organised. A text can be one or more compositor structures which include description, sequence, compare, cause and effect or problem and solution, together with the text layout and visual support. Second important aspect is language features. It is about considering word choices and the style of writing that author uses in their writing. It will be even more challenging of the author includes unfamiliar vocabulary. Meaning is an important aspect as it will show a deeper story; it will encourage pupils to think about themes that relate to their own lives such as friendship. An author's purpose is challenging for reader as it asks them to understand why the author is writing. Lastly, knowledge demands are an important consideration when navigating a text because sometimes pupils will have no prior knowledge of the subject and other times will have plenty which will lead to misunderstanding.

Before implementing the texts within the English reading lesson with close reading instruction, teachers have to determine the complexity of the text and decide the strategies of teaching. Text complexity rubrics is various used as a tool to measure the text complexity. This helps teacher to be able to clearer determine the appropriate text's level with the students. To start with the low level of text-complexity helps scaffolding, increasing the text-complexity along with their reading abilities and building students' confidence and background knowledge. In the study, the text complexity of non-fiction text is considered before taking into the action of material development. This is to ensure the appropriateness of the text being used for teaching young English as foreign language learners.

2.5.4 Text-Dependent Question

Apart from the texts, the comprehensions questions seem to be the prominent feature (Tomlinson & Masuhara, 2013). Those questions are usually used as post-reading question to emphasis comprehension (Wallace, 2001). With close reading instruction, a text-dependent question is a question that asks students directly about the text. The characteristic which is a key elements of the text dependent question that Fisher and Frey (2014) agree upon as shown in the Figure 8 is helping direct students back to the text locate evidence.

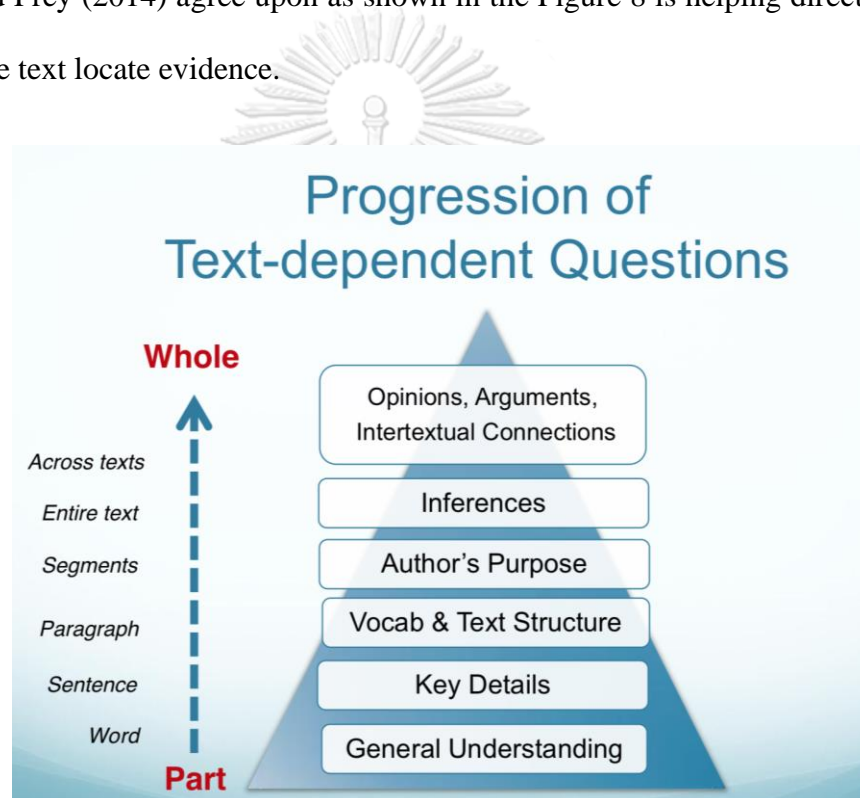


Figure 8 Progression of Text-dependent Questions (Fisher & Frey, 2012)

These questions will help students grab an overview of a text; students should be able to identify a sentence of paragraph where they have found information to support their ideas or analysis. Text dependent questions will help students not only in English as a subject, but is beneficial in other subjects such as history, science and

technical subjects which need students to find evidence for certain information from the text. These kinds of questions help students practice their skills to cite from texts, starting from grade 4 onwards which helps improve students' comprehension. Normally, text dependent question will ask for key ideas and main details of the text, which encourage students to connect element in order to analyse and develop their thought within the text. In terms of reading, scaffolding is one main thing that reading should provide in order to understand a text. With the help of visual aids, it will allow students to access their learning in both visual and text, furthering their understanding and ensuring they fully comprehend the text. Using visual aids and text dependent questions with close reading, students will be able to accomplish their targets in reading.

Since the purpose of this study is to draw the concepts of developing the infographic material as a reading material aims to increase young EFL learners' reading comprehension of non-fiction text. The development will be based on material development framework of Tomlinson (2012) and the developed infographic material will be used within the teaching by the close reading instruction. The implementation of the developed infographic material within the reading lesson for young EFL learners is grounded on the scaffolding and students' cognitive development.

2.5.5 The implementation of infographic material within the steps of close reading instruction to help EFL student English comprehension

To enable young EFL students' comprehension of non-fiction text, the researcher sees the beneficial of implementing infographic (Krauss, 2012) within reading lesson using close reading instruction (Sisson & Sisson, 2014) in the English reading lesson.

Starting with text complexity, which has a significant impact on students' comprehension, is a valid way. Teachers need to measure using rubrics on the qualitative feature of the text according to its complexity. This will help teacher in order to match the texts with the students' abilities. Next, close reading instruction, there are subtopics that facilitate close reading instruction to be effective: cycles of reading and text dependent question. Teachers have to plan what to teach and what is the expectation of each cycle of reading. As mentioned, each reading cycle has its own purpose which is relate to students' comprehension of the text but only the essential instructional practise to be designed to fit with both learner and the texts. Scaffolding will emerge along with each step that leads the students from the surface meaning of the text to the deeper understanding. Within each reading cycle, text-dependent question will play an essential role there. It is tools for each reading cycles that stimulate students to dig down the text to find the meaning. Their understanding will construct related to the levels within cognitive domain starting from what the students will know until they are able to evaluate the information of the text. To enable the young learners' comprehension of the text, infographic will be designed according to the text. The infographic will help clarify the text meaning, help student to organise ideas, make abstract ideas more concrete and provide extra information not included in the text (N. Duke et al., 2009).

RESEARCH FRAMEWORK

The research framework shows the relationship between Tomlinson's material development framework (2011) with the process of creating infographic (Krauss, 2012) and close reading instruction (Sisson & Sisson, 2014) which are implemented to enhance EFL learners' reading comprehension as shown in Figure 9.

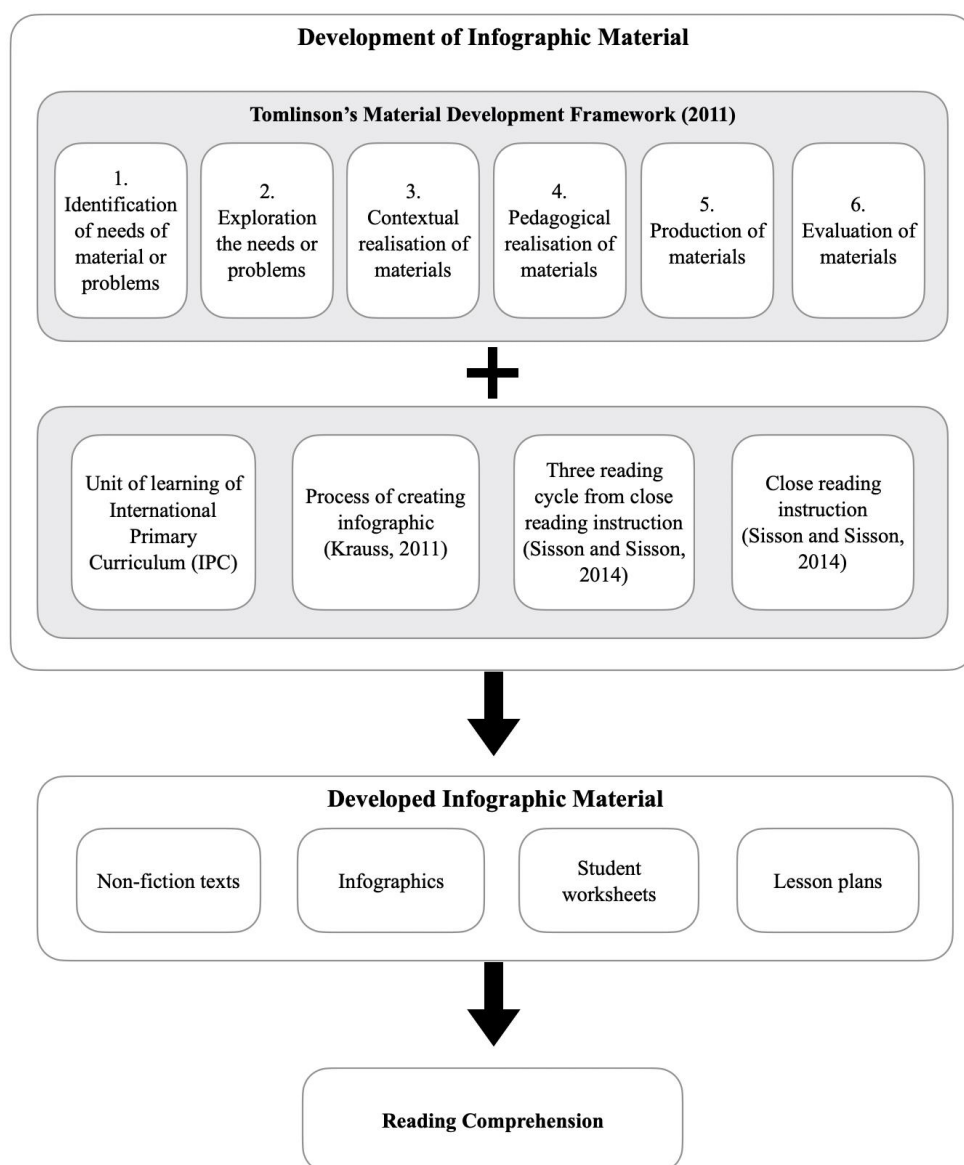


Figure 9 Research framework

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research methodology of the study. The description covers research design, population and participants, research procedures, research instruments for each stage of the study, together with methods of data collection and data analysis.

The present study's main objectives are to develop infographic material for English reading lessons to enhance students' reading comprehension of non-fiction text and seek teachers and learners' opinions toward using the developed infographic material.

3.2 Research design

The research process consisted of two phases, including material development and material implementation and evaluation. Six stages of Tomlinson's material development framework were divided into two phases: the development of material encompasses stage one to stage five, and the evaluation of the effectiveness of the developed material focuses upon stage six.

Phase 1: The development of materials

Stage 1: Identification of needs

- 1.1 Design the interview questions for teachers
- 1.2 Validity of the interview questions for teachers by three experts
- 1.3 Interview four teachers using interview questions
- 1.4 Design the needs analysis questionnaire for students
- 1.5 Validity of the needs analysis questionnaire for students by three experts
- 1.6 Administer the needs analysis questionnaire with 20 year-four students

Stage 2: Exploration of the needs

- 2.1 Review literature and theories about material developing
- 2.2 Conduct a document study

Stage 3: Contextual realisation

- 3.1 Identify the unit of learning from IPC (contents and texts)

Stage 4: Pedagogical realisation

- 4.1 Determine, design, and draft infographics
- 4.2 Design the exercise and activities
- 4.3 Write the lesson plans and create worksheets

Stage 5: Material Production

- 5.1 Physically design and model the infographic materials
- 5.2 Validate developed infographic material by the experts



Phase 2: The evaluation of the effectiveness of the developed material

Stage 6: Evaluation of the effectiveness of the developed material

- 6.1 Before implementing
 - 6.1.1 Design English reading comprehension tests
 - 6.1.2 Validate English reading comprehension test by three experts
 - 6.1.3 Data collection and data analysis of the English reading comprehension tests
 - 6.1.4 Design students' interview questions
 - 6.1.5 Design the material evaluation form for teachers
 - 6.1.6 Validate the interview questions and material evaluation form
 - 6.1.7 Data collection and data analysis of the interview questions
 - 6.1.8 Data collection and data analysis of the material evaluation form
 - 6.1.9 Conducting teachers' training
 - 6.1.10 Conduct pilot study with 10 year-three students
- 6.2 While implementing
 - 6.2.1 Administer Pre-test
 - 6.2.2 Implement the developed infographic materials; 4 units
 - 6.2.3 Administer Post-test
- 6.3 After implementing
 - 6.3.1 Interview students
 - 6.3.2 Administer material evaluation form
 - 6.3.3 Writing up the result

Figure 10 Research process of developing the infographic materials

3.3 Population

The study population consisted of year-four students and teachers, including key stage leaders, head of literacy and English teachers in an international programme in Bangkok,

Phase 1: The development of materials

Participants

The purposive sampling method was employed. There were two groups of the participants within this phase.

- 1) There were 4 teachers, including 2 year-four classroom teachers, a key stage two leader, and a head of literacy of Srinakharinwirot University Prasarnmit Demonstration School (Elementary): Prasarnmit Primary International Programme. The researcher informed the participants of the objectives, procedures, and purposes of the research. The participants were asked to complete a consent form to permit the collection of data.
- 2) There were 20 year-four students, ages eight to nine years old from Srinakharinwirot University Prasarnmit Demonstration School (Elementary): Prasarnmit Primary International Programme. The researcher sent the letter and the consent form to the participants' guardians to inform the background, research objectives, procedures, purposes, details of the different stages that the researcher must observe, risks and danger as well as the benefits to be obtained from the research. The participants' guardians were asked for permission to collect data. All the letters and consent forms were responded to by the participants' guardians and returned to the researcher.

Research Instruments

There were two research instruments within phase 1 of the study. Both research instruments were developed in order to obtain the needs from both teachers and students towards the material development.

1) Interview questions for teachers

The design of interview questions for teachers

To obtain information to develop suitable infographic materials as an English reading material for year-four students to use within the reading lesson, the researcher conducted the interview questions to interview the four purposefully selected teachers including 2 year-four classroom teachers, a key stage two leader, and a head of literacy. The interview data was used to construct the elements of the developed infographic materials. The prearranged open-ended questions were used in the semi-structured interview focusing on problems in teaching young learners in reading lesson on non-fiction text, the needs for developing materials from their perspective, and the obstacles in the lesson that need to be solved by the creation of the material. The interview questions are as follow:

Question 1: What are the steps of teaching non-fiction reading text?

Question 2: What are the challenges have you seen while you are teaching the non-fiction text?

Question 3: How can you typically assist the student learning process, what are some drawbacks?

Question 4: What are some ways to improve the current material?

Any specific texts of topics needed?

Question 5: What are the important elements of the non-fiction text that need to be the focus? What priority?

Question 6: How do you assess/ evaluate students' reading comprehension?

Validity of the interview questions for teachers

Three experts in the field of English teaching and material development were asked to validate and evaluate each question for interviewing the teachers. The experts rated their opinion towards the congruence of the content and the objective based on the criteria 1 = suitable and accepted, 0 = revise and -1 = reject.

After that, the researcher calculated the points of the Item Objective Congruence (IOC) index. The items of the questions that received ≥ 0.5 were accepted, whereas the items which received < 0.5 were revised or rejected. The results of the total index of item-objective congruence (IOC) from the experts' opinion was at 1.00 which indicated that 100% of the questions were acceptably congruent with the objectives. The value of IOC for the interview questions for teachers was illustrated in Appendix H.

Data collection and data analysis of Interviewing teachers

The researcher conducted an individually semi-structured interview with the teachers. The researcher explained the purpose of the interview at the beginning of the interview. Permission to use a voice recorder to record the

interview was given by those involved. Each interview lasted around 20-30 minutes.

The data from the interview voice recordings were then transcribed into text. The researcher used the content analysis to analyse and categorise the data. Also, the interview data was used in the process of material development.

2) Needs analysis questionnaire for students

The design of the needs analysis questionnaire for students

The researcher constructed the need analysis questionnaire after the teachers' interview. The purpose of the questionnaire was to investigate students' needs, preferences, and obstacles that affect their reading comprehension skills in reading lesson for developing the infographic materials to increase their reading comprehension skills. The researcher designed the questionnaire in the form of survey questions. Students were required to give to response based on their own attitude. There were three parts in the questionnaire as follow:

Part 1: five tick boxes about problems in reading non-fiction texts

Part 2: three-Likert scales for students' reading preferences

Part 3: ten circle choice items for students' opinion for developing reading materials

Validity of the needs analysis questionnaire for students

The results of the total index of item-objective congruence (IOC) from the experts' opinion was at 0.86 meaning that they were acceptably congruent with the objectives. However, one expert suggested to change the questionnaire pattern of part two from three-Likert scale into tick boxes as it would be

beneficial for calculating the result. Thus, the researcher decided to change it according to the expert's suggestion. The value of IOC for the questionnaire for students was illustrated in Appendix I.

Data collection and data analysis of the needs analysis questionnaire

The researcher distributed the needs analysis questionnaire to 20 year-four students who were purposively selected to complete the questionnaire. The researcher explained the purpose, instruction, and the questionnaire elements to the students before completing the questionnaires. The researcher described the questionnaire items and had students complete each item one by one to make sure that the students understand the purpose and the meaning of each item. The students anonymously completed the needs analysis questionnaire.

After getting the responses from the students, the data from the needs analysis questionnaire for students was analysed using percentages.

Phase 2: The evaluation of the effectiveness of the developed material

Participants

The purposive sampling method was employed. There were two groups of the participants within this phase.

- 1) There were 5 teachers, including the 2 year-four classroom teachers, the key stage two leader, the head of literacy, and a support teacher of Srinakharinwirot University Prasarnmit Demonstration School (Elementary): Prasarnmit Primary International Programme. The teachers used the developed infographic materials within the year-four reading lessons.
- 2) There were the 20 year-four students from Srinakharinwirot University Prasarnmit Demonstration School (Elementary): Prasarnmit Primary

International Programme. The students were taught by year-four teachers using the developed infographic materials throughout the period of five weeks.

Research Instruments

There were three research instruments within phase 2 of the study. The research instruments were developed in the step of before implementing the developed material in order to explore attitude, feedback and the effectiveness of the material after the implementation from both teachers and students.

1) English reading comprehension tests

The design of English reading comprehension tests

The tests were developed to evaluate the effectiveness of the usage of developed infographic material within reading lesson. The content of reading comprehension tests was designed according to the selected non-fiction text. They were designed for pre-test and post-test, before and after the implementation of the developed infographic material within reading lesson. The tests were organised into two modules. Each module consisted of two units of learning.

Each reading comprehension test of each IPC unit was designed in the form of a task, matching, or arranging activities. For example, matching the picture with a sentence or arranging pictures based on the sequences of information. Within each unit test, the students had to answer two questions. The questions were designed based on the text-dependent and aimed to promote answers that relied on inference an opinion around the non-fiction text. Students were instructed to complete the activities and answer the questions. Both tests

were aimed to assess students' literal comprehension and inferential comprehension of the text.

Validity of the English reading comprehension tests

Three experts in the field of English teaching and material development were asked to validate and evaluate each question for interviewing the teachers. The experts rated their opinion towards the congruence of the content and the objective based on the criteria 1 = suitable and accepted, 0 = revise and -1 = reject.

After that, the researcher calculated the points of the Item Objective Congruence (IOC) index. The items of the questions that received ≥ 0.5 were accepted, whereas the items which received < 0.5 were revised or rejected. The results of the total index of item-objective congruence (IOC) from the experts' opinion was at 0.83 indicating that all the four-unit tests were accepted by the experts with minor comments mostly in terms of grammar and spelling. Then, the researcher revised and adjusted the test according to the experts' suggestions. The value of IOC for the English reading comprehension test was illustrated in Appendix J.

Data collection and data analysis of the needs analysis questionnaire

The researcher had 20 year-four students to do the English reading comprehension test before and after the implementation of the developed material within the reading lessons.

Students' scores from the English reading comprehension test were compared using a Wilcoxon Signed-Ranks test to see whether there was a significant difference between them. This was to indicate whether participants

in the study had improved their reading comprehension skills to a significant level.

2) Interview question for students

The design of interview question for students

The interview questions for students were developed to investigate and explore students' opinion and feedback after implementation of the developed material into the reading lesson. Also, to explore the factors of the developed materials which benefit their comprehensions. There were five questions.

Question 1: How do you feel about using infographics in reading lessons?

Question 2: What do you like the most about using infographics in reading lessons? and why?

Question 3: What do you not like about using infographics in the reading lessons? and why?

Question 4: How do you think using infographics in reading non-fiction text has helped you to improve your English reading comprehension? If yes, how?

Question 5: How can we make the infographics better for you next time?

Validity of the interview question for students

The results of the total index of item-objective congruence (IOC) from the experts' opinion was at 0.86 meaning that they were acceptably congruence with the objectives. However, one of the experts suggested to change some of the word choices to be more appropriate to interview young students so the

researcher adjusted the wording in the question according to the expert's suggestions. The value of IOC for the interview question for students was illustrated in Appendix K.

Data collection and data analysis of the interview question for students

After the students finished the post-test of the last unit, the researcher conducted an individually semi-structure interview with 20 year-four students. During the interview, the researcher recorded the interviewees' answers to use within the data analysis process.

The interview responses were analysed using content analysis. The researcher transcribed the audio from interviews and coded the data from the transcription. The researcher then generated and reviewed the data to discover key ideas, patterns, and relationships from the interview results. Finally, the researcher wrote an analysis of the data. The analysis formed the finding and the feedback section focusing on the implementation of the developed infographic materials.

3) The material evaluation form for teachers

The design of the material evaluation form for teachers

The material evaluation form was designed to evaluate the effectiveness of the developed materials based on Masuhara and Tomlinson (2008). This aimed to measure the materials' effects on the users after the material implementation. The material evaluation form was designed into questionnaires in which the respondents were asked to rate the level of their satisfaction with ten items on the scales from four (strongly agree) to one (strongly disagree).

The respondents could write any additional suggestions or comments in the response space for open-ended question.

Validity of the material evaluation form for teachers

The results of the total index of item-objective congruence (IOC) from the experts' opinion was at 0.83 which was considered acceptably congruent with the objectives. The value of IOC for the material evaluation form for teachers was illustrated in Appendix L.

Data collection and data analysis of the material evaluation form for teachers

After completing the implementation of the developed infographic materials, year-four teachers who taught the English reading lesson using the developed materials, a key stage leader and a head of literacy were asked to evaluate the developed material using the material evaluation form in terms. This was used to evaluate the effectiveness of enhancing students' reading comprehension. The feedback from the form was used to analyse the findings.

Each item of the material evaluation form for English teachers were descriptively analysed using SPSS programme. Mean (\bar{x}) and standard deviation (S.D.) were used to analyse data regarding teachers' opinions.

3.4 Research Procedures

In this study, the researcher developed the infographic material based on the framework of material development by Tomlinson (2011) divided into six stages with the integration of Krauss's process of creating infographic (2012) and Sisson and Sisson's close reading instruction (2014). Each stage could be described as follows:

Stage 1: Identification of needs of material or problems to be solved by the creation of the materials

In the first stage, the researcher explored the needs and problems of the non-fiction reading materials in the reading lesson from teachers and students. For teacher, the researcher did semi-structured interview with the four English teachers using the developed interview questions. For students, the researcher had the students to do the developed needs analysis questionnaire for students.

Stage 2: Exploration of the needs or problems by identifying language, functions, skills that should be included in the developed materials

In this stage, there were the three main needs that need to be explored. The school which the study is based on, follows the international curriculum of United Kingdom in addition to the International Primary Curriculum (IPC). The researcher explored the aims and standards of language teaching for English from the UK curriculum Education (2013) and each unit of learning from the IPC in the areas of language, meaning, functions and skills that were used during the implementation of reading materials. Next, the researcher explored the teachers' needs from the data of the teachers' interview and lastly, the researcher explored the students' needs from the data of the student's questionnaire. Alongside the exploration of needs, the researcher explored theories of how young EFL learners can enhance reading comprehension ability, focusing mainly on the instructions given when teaching reading. This helped support and develop the skills used when students attempt reading comprehension.

Stage 3: Contextual realisation by examining and selecting ideas, contents, or texts that provide familiarity and appropriateness to the learners' context

To ensure that the contents included in the materials were appropriate, the researcher followed the consideration processes.

3.1 Identify the unit of learning from the International Primary Curriculum (IPC) and choosing the appropriate texts and formulating the contents of learning

For identifying the unit of learning and choosing the appropriated texts, the researcher attended a meeting with a key stage leader accompanied by the head of literacy and year four teachers. The meeting considered the unit of learnings and the texts of each unit of learning, which were to be used to teach the students in the reading lessons. Once the unit of learning were identified, the texts of the units which the curriculum scheduled were examined. The selections of texts were based on criteria, first, content of the non-fiction text must fit to the specified aims and objectives of the curriculum; second, the complexity of the non-fiction text was appropriated to apply with close reading instruction using Sheena Hervey Generation Ready's text complexity rubric (2013); third, the readability of the non-fiction text must be suitable for the year four students using Flesch's formula (Flesch, 1979); and lastly, the non-fiction text must need necessary material in teaching.

Table 1 Flesch reading ease of readability score and interpretation

Score	Interpretation
90 - 100	Very easy
80 - 89	Easy
70 - 79	Fairly easy

Score	Interpretation
60 - 69	Standard
50 - 59	Fairly difficult
30 - 49	Difficult
0 - 29	Very confusing

Stage 4: Pedagogical realisation by examining and selecting meaningful exercise and activities with clear explanations

In this stage, the teaching theory of reading instruction, the process of creating an infographic, the result of the interview and the needs analysis questionnaires from stage one was applied to design the developed material.

4.1 Determining, designing, and drafting the infographic material which relevance to the text.

In this step, the researcher designed and drafted the infographic for every unit of learning from the IPC. From Dual-coding theory (Paivio & Clark, 2006), young learners learn to read concrete words well when words are accompanied by referent pictures. To help young EFL learners to enhance reading comprehension of non-fiction texts, the researcher analysed the text in relation to the suitability for their ages and key vocabulary of each non-fiction text. The key vocabulary in particular plays a vital role on the developed infographic materials which conformed to the process of creating infographics from (Krauss, 2012). The researcher had to interpret the text and consider how to deliver and present the information from the non-fiction text through the visual aid elements of infographic such as symbol, information organisation, the hierarchy, and other elements to use as guidelines as a suitable format for the infographic

development. For each unit of learning, the researcher came up with the designing plan for the infographic.

4.2 Designing the exercise and activities to develop students' language learning that relevant and suit to the elements of infographic material and the steps of close reading instruction

In terms of pedagogy, the researcher studied the teaching instruction of close reading instruction (Sisson & Sisson, 2014). The cycle of teaching reading consists of three phases (Smeken Education Solution Inc, 2014). Each phase of close reading instruction was accompanied by text-dependent question (Fisher, Frey and Lapp, 2012). It helps and supports the teaching of young learners. This aims to enhance and scaffold the reading comprehension (Wood et al., 1976) to the level of literal and inferential comprehension and is able build up to critical comprehension according to Bloom's taxonomy (2001) and the reading acquisition framework of Hoover and Gough (2011). To focus on phases of close reading instruction, the first phase aims students to be able to comprehend text with evidence of a surface level understanding, to get the general understanding, summarise and tell the key details of the text. The second phase aims to aid students to be able to analyse the text, vocabulary, text structure and author's perspective. Lastly, the third phase aims to help students to be able to get deeper understanding of the text, consider the text's features and make connection cognitively and build knowledge upon their own schema. Moreover, the developed infographic was used as a main reading material coordinated and implemented alongside the text and worksheets of each unit of learning from the IPC. It was designed to follow the three phases of close reading instruction.

To implement the developed infographic material into the reading lesson, the researcher had to consider and determine exercises and activities to integrate the developed infographic material within the teaching instruction. The researcher considered the applicable essential instruction practices that were vital to reading development and made the connection between the reading material and the teaching instruction to increase students' reading comprehension.

4.3 Write the lesson plans for each unit of learning by implementing the developed infographic material within the steps of close reading instruction for teaching reading

The researcher wrote the lesson plans and created worksheets for each unit of learning to guide the teachers in reading lessons and to follow the steps and cycles of close reading instruction (Sisson & Sisson, 2014).

Stage 5: Materials production concerning the physical and academic aspects of the developed materials

The information from the previous stages were used to develop four units of infographic material based on the selected texts of the units of learning. The developed infographic materials were developed through the process of creating infographic by Krauss (2012) using all the findings and information from previous steps.

Stage 6: Evaluation of the effectiveness of the developed materials

The effectiveness of the developed infographic materials was evaluated within three stages of the implementation: 1) before the implementation, 2) during the implementation and 3) after the implementation.

6.1 Before implementing the developed material

Before implementing the developed material with the participants, the English reading comprehension test for each unit of learning and the material evaluation form was designed and developed to use as a pre-post test to see the improvement of the students' reading comprehension before and after the implementation. Also, the interview questions for students and the material evaluation form were developed within this stage to find the feedback after the implementation.

6.1.1 Conducting teachers' training

After all the research instruments were developed, the researcher conducted the teacher training and a workshop within the weekly continuing professional development (CPD) session. The teachers including the key stage leader, the head of literacy, year-four classroom teachers and a support teacher were invited to the training. All the teachers were given the teacher manual which included all the developed materials as both hard copies and electronic files. The procedure of implementing infographic material in English reading lesson was described and trialed among teachers.

- 1) The introduction of the developed materials; infographics, lesson plan, worksheets, activities sheets and reading comprehension test
- 2) The objective of the developed materials
- 3) Close reading instruction and the steps of teaching
- 4) Steps of implementing the developed infographic material within each reading cycles

5) How to evaluate students' reading comprehension skills using the test

6.1.2 Pilot study

After the infographic material was developed and validated by the panel of experts, the pilot study was conducted with a participating group of year three students (non-study group). There were 10 students in a high ability group of students from both years 3A and year 3B. Their English reading skills are comparable to the middle group of year-four students. The researcher piloted one module of unit teaching which contains two units of learning: footprint from the past and living together.

6.2 While implementing the developed infographic materials

During this step, the developed material, the English reading comprehension test and the material evaluation form were implemented.

6.2.1 Administering pre-test English reading comprehension test

There were two modules of unit teaching, and each module consisted of two units of learning. At the starting time of each module, the teacher had the students do the English reading comprehension test to assess students' reading comprehension of non-fiction texts before the developed infographic material implementation. Each unit had an English reading comprehension test in the form of an activity based on the unit of learning and two comprehension questions.

6.2.2 Implement the developed infographic material

In the English reading lesson, the developed materials were used as a learning material to help students learn reading skills following close reading instruction. Each unit took three to five periods to finish including the pre-test and post-test procedure.

6.2.3 Administering post-test English reading comprehension test

At the end of each module, the teacher had the students do the English reading comprehension test to assess students' reading comprehension about the texts after the developed material implementation. Each unit has one English reading comprehension test in the form of an activity based on the unit of learning.

The data collection process in this present study is as follows:

Table 2 Developed infographic materials implementation and data collection process

Module	Unit of learning: Text	Pre-test	Developed material implementation	Post-test
1	1. Active Planet: Natural Disasters	11 th – 12 th January 2021	13 th – 18 th January 2021	25 th – 26 th January 2021
	2. Land, sea, and sky: Clouds and Atmosphere	11 th – 12 th January 2021	19 th – 22 nd January 2021	25 th – 26 th January 2021
2	3. Footprint from the Past: Fossil	27 th – 28 th January 2021	29 th – 4 th February 2021	11 th – 12 th February 2021
	4. Living Together: Skeleton	27 th – 28 th January 2021	5 th – 10 th February 2021	11 th – 12 th February 2021

6.3 After implementing the developed infographic materials

6.3.1 Interview students to gain information about how they comprehend the text based on the developed infographic material

During 16th-18th February 2021, right after the students finished the final post-test, the researcher interviewed students using the interview questions. The interview questions helped the researcher to identify the thought process of students during the test. Also, it allowed the researcher to see the effects of implementing the developed infographic material within the reading lessons and the affects on students' reading comprehension.

6.3.2 Administering material evaluation form

In the last week of the material implementation, all the teachers who taught the English reading lesson using the developed materials, a key stage leader and a head of literacy were asked to evaluate the developed material using the material evaluation form in terms of the effectiveness in enhancing students' reading comprehension. The feedback from the form was used to analyse the data.

6.3.3 Writing up the results and findings

After the implementation of the developed material and the completion of the material evaluation form, the researcher wrote up the results and the findings.

CHAPTER 4

RESEARCH FINDINGS

4.1 Introduction

This chapter reports the results based on three main research questions. The first research question was: How can infographic materials be developed to teach English reading comprehension skills to young English as foreign language learners? The results of research question 1 were analysed from the data gained during phase 1: The development of materials.

The second research question was: To what extent does the developed infographic material enhance young English as foreign language learners' reading comprehension? The results of research question 2 were analysed from the students' interviews and teachers' material evaluations form. The third research question was: To what extent, does the close reading instruction which uses infographic materials help young learners' reading comprehension? The results of research question 3 were analysed from the results of the English reading comprehension test with some parts of the students' interview and teachers' opinions from the material evaluation form.

According to the research questions, the results of the study were organised into three parts. The first part is to answer the first research question, which mainly focuses on the development of infographic materials. The second part focuses on answering research question 2, which asked about the effectiveness and effects of the developed infographic materials on young English as foreign language learners' reading

comprehension. Last, the third part focuses on the effectiveness of close reading instruction in teaching reading for young learners using infographic material.

4.2 Results of Research Question 1

To answer the research question 1, the data was presented based on the six stages of Tomlinson's framework of materials development (2011) which integrated with the process of creating an infographic of Krauss (2012) and close reading instruction of Sisson and Sisson (2014) were explained as follows.

Stage 1: Identification of needs of material or problems to be solved by the creation of the materials

The data came from the interview conducted with the four teachers and the questionnaires distributed to 20 students.

1.1 Result from the teachers' interview

Three topics emerged from the teachers' semi-structured interviews. These topics were steps of teaching non-fiction text, problems in teaching young learning read comprehension texts, and needs for developing reading material.

A) Steps of teaching non-fiction text

From all the interviews, it was clear that there were no specific patterns or steps of teaching reading non-fiction text within the lesson. The steps of teaching were decided based on the pedagogy and choices of the teachers themselves. Most of the teachers started the lesson by introducing the title of the non-fiction text to the students. Some of them went through the keywords of the non-fiction before telling the title of the text, whilst a few

of them started with activities such as making a prediction. When led into the non-fiction text, some of the teachers decided to do read and pause, allowing them to ask questions, while some of the teachers decided to read through the text and ask the question at the end of the lesson. As they taught differently, it would be difficult to assess both teachers' teaching and students' learning. The key stage leader mentioned that the school should adopt reading teaching strategies that would work in terms of helping students to increase comprehension. Key stage leader stated that:

“...It would be great if we could have a strategy for teaching that all the teachers could go [teach] in the same path. The one that [is] suitable and beneficial for our children...” (Interview transcript, 18/09/20)

“... As a school, actually a year group... It is necessary for the students to be taught in the same way which is effective for them to learn ... and it would benefit on how we assess their understanding...” (Interview transcript, 18/09/20)

B) Problems in teaching young learners reading non-fiction text

From the interview asking about how the teacher teaching non-fiction reading lessons, problems were revealed:

- Time-consuming in some teaching steps

“...I have to reveal in 20 – 30 words a summary of what they will read about...” (Interview transcript, 18/09/20)

“...I have to write them [keywords] on the board alongside the definition and perhaps synonyms ...” (Interview transcript, 18/09/20)

“...Searching pictures on the internet to show [students] what does it look like also takes time... It would be great that I can have them [materials] ready... (Interview transcript, 18/09/20)

- *Text's difficulty is above the student's level of comprehension*

“...students may feel overwhelmed [that] there are too many new words for them to learn...” (Interview transcript, 18/09/20)

- *Students have no background knowledge of specific topics and vocabulary*

“...the student has not at least ever heard or seen one for example... they will not get it...” (Interview transcript, 18/09/20)

- *No reading material support the teaching*

“...the text itself is too hard for students to find the clue... they would not be able to infer any meaning ... actually only the text is not enough...” (Interview transcript, 18/09/20)

“... I myself have to search for the pictures on Google to show the students exactly the meaning of some of the words... Sometimes, only talking about it doesn't help [students] ... showing them is a much better way to help them truly understand what does the text means...” (Interview transcript, 18/09/20)

- *No consistency assessment: teacher used different ways of assessing students' comprehension*

“...If the students can explain the topic back to me, I know that they have understood the text. If their response is “I know, but I don’t know how to explain” I know that they have not understood the concept properly...” (Interview transcript, 18/09/20)

“...I assess them by asking them to explain or compare two different things... or something assign them to do the research ...” (Interview transcript, 18/09/20)

“...I do a short quiz 6 – 10 questions at the end of reading lesson...” (Interview transcript, 18/09/20)

C) Needs for developing reading material

From the interview talking about teachers' needs on reading materials, needs of reading material were revealed:

- *Relevant to the current learning*
- *Show the information in terms of pictorial representation to enable students to compare*

“...expose them (students) to the topic [with] a visual representation of the information they are about to read would help them a lot...” (Interview transcript, 18/09/20)

- *Clarify keywords*

“...it should be some material that clarifies new vocabulary throughout...” (Interview transcript, 18/09/20)

- *Represent non-fiction text in an organised way*
- *Stimulates students' background knowledge*

For the unit of learning, the teachers mentioned almost all units of learning from the International Primary Curriculum in the interview, which was selected for the year four students. The researcher made the decision that the conclusion of the selected topics would be made for in the meeting as it need to be discussed in a team. The conclusion of the selected unit of learning and the non-fiction text of each unit needed discussion and would be made within the team meeting.

1.2 Result from the needs analysis questionnaire for students

The scoring details from the needs analysis questionnaire for students are as follows:

1.2.1 The result of the problem in reading non-fiction texts shown in Table 4 shows that the students were concerned about the non-fiction texts without the pictures the most, rated at 90%. This was followed by the problems of many rare words in non-fiction texts rated and the level of difficulty of the non-fiction text rated at 80% and 70% respectively.

In Table 3 is Part 1: This part consisted of five tick boxes about the problem in reading non-fiction text.

Table 3 Results of five tick boxes about the problem in reading non-fiction text.

No	Items	Number of students (20)	Percentage (100%)
1	There are no pictures to help me understand in non-fiction texts.	18	90%
2	There are many rare words in non-fiction texts.	16	80%
3	The non-fiction texts are too hard to read.	14	70%
4	I cannot guess the word meaning from the non-fiction texts.	13	65%
5	The non-fiction texts are boring	11	55%

1.2.2 For students' reading preferences, the result shown in Table 4 shows that the students prefer pictures in the non-fiction text to help them understand the text information with the highest percentage of 100% and 90%.

In Table 4 is Part 2: This part consisted of four tick boxes about students' reading preferences

Table 4 Results of four tick boxes about students' reading preferences

No	Items	Number of students (20)	Percentage (100%)
1	Pictures help me to understand the text.	20	100%
2	I like to read the text with pictures.	18	90%

No	Items	Number of students (20)	Percentage (100%)
3	Pictures make reading non-fiction text easier.	18	90%
4	I like when the teacher sets the target for reading.	11	55%

1.2.3 The students' opinion towards the development of the reading material, shown in Table 5 shows that the students preferred normal and bold font with a fancy font design. They showed a preference in having key words with definitions or descriptions as part of the reading material. The clear drawing illustrations with word labels were chosen. For the layout design of the infographic, the students preferred to see the information of the non-fiction text presented into the big picture as a whole to represent all of the text.

In Table 5 is Part 3: There are ten circle choices to observe students' opinions for developing reading materials.

Table 5 Results of ten circle choices to observe students' opinions for developing reading materials.

Students' preferences						
No	Most Preferred	Number of students (20) / Percentage		Least Preferred	Number of students (20) / Percentage	
1	Regular font	17	85%	Cursive font	3	15%
2	Keywords	17	85%	No key words	3	15%
3	Clear picture representation	17	85%	Hint picture representation	3	15%
4	Fancy font	15	75%	Simple font	5	25%

Students' preferences						
No	Most Preferred	Number of students (20) / Percentage		Least Preferred	Number of students (20) / Percentage	
5	Label wording	15	75%	No label wording	5	25%
6	Many describing words	12	60%	A few describing words	8	40%
7	Normal font	11	55 %	Bold font	9	45%
8	Meaning	11	55%	No meaning	9	45%
9	Drawing illustrations	14	70%	Real pictures	6	30%
10	Represent as a big picture	14	70%	Represent into sections	6	30%

The conclusion of the needs analysis stage from both teachers' interviews and needs analysis questionnaire for students has shown that the teachers would like to develop the teaching instruction in reading lessons. The interview data has shown that the teacher would like to have a new effective method of instruction that would be compatible well with the reading material. The material should support the teachers' teaching within the lesson and also increase students' reading comprehension. Also, from the students' perspective, it reflected the students' opinion and attitude towards reading lessons. The students also wanted the reading materials, which are able to help them to understand the information within the non-fiction text. In particular, the students' opinion showed that they preferred the reading material in a visual way with a result raised 85% of clear picture representation followed by 70% of keywords and representation of the information in the big picture and other features included.

Stage 2: Exploration of the needs or problems by identifying language, functions, skills that should be included in the developed materials

In order to respond back to the needs of teachers and students, the researcher found the benefits of infographic (Krauss, 2012) as a reading material to be used with close reading instruction (Sission and Sisson, 2014) that would develop and help scaffold young English as foreign language learners' reading comprehension. This was consistent with the comments and opinions towards the reading material collected from the teachers' interview and students' questionnaire. Moreover, the literature review on the recent effective teaching instruction for reading comprehension gave the guideline to select close reading instruction as a strategy and steps of instruction as suggested by Sisson and Sisson (2014).

Infographic

The infographic combines information and the graphic design gathered to make the learning visual (Smiciklas, 2012). Those two principles of infographics were accordant to Allan Paivio's dual-coding theory (2006). Information of the infographic was considered as a verbal processing, whilst the graphic design was considered as a non-verbal process. For the final result, the interplay between the two processes, verbal and non-verbal processing, would develop and bring about cognition for the students.

Close reading instruction

Apart from the infographic, the cycles of close reading instruction together with the text-dependent questions were implemented. The text-dependent questions which were concordant to the aim of each cycle of close reading instruction would lead the

students' thinking process and scaffold student's cognition to reach the levels of reading comprehension as shown in Figure 11.

Level of comprehension	Cognitive level of Bloom's taxonomy	Reading cycle of close reading instruction
literal comprehension	knowledge	first reading cycle: comprehend text with evidence on a surface level
	comprehension	
inferential comprehension	application	second reading cycle: analyses the text
	analysis	
critical comprehension	synthesis	third reading cycle: get deeper understanding of the text
	evaluation	

Figure 11 The comparison of cycle of close reading instruction, purposes of each reading cycle and the level of comprehension

Stage 3: Contextual realisation by examining and selecting ideas, contents, or texts that provide familiarity and appropriateness to the learners' context

In this stage, the selection of the units of learning and non-fiction text from the International Primary Curriculum (IPC) was shown as follow.

3.1 The selection of units of learning

Out of 40 units provided in the international primary curriculum (IPC), the school with the agreement of the key stage leaders schemed eight units of learning for year four students to study throughout an academic year. In order to choose the unit of learning for developing the infographic material, the researcher attended the meeting with the key stage leader, the head of literacy and two year-four teachers. During the

meeting, there was discussion about the specified aims and objectives of the year four curriculum. Definition, details, difficulty and appropriateness of each unit of learning were considered in order to supplement the reading lesson with the newly developed material as the year four students are young foreign English learners. The eight units of learning are:

- | | |
|--|----------------------|
| 1) Paintings, pictures and photographs | 5) Brainwave |
| 2) Living together | 6) Active planet |
| 3) Footprint from the past | 7) Land, sea and sky |
| 4) Digital gamers | 8) Fashion |

The decision was made by everyone, and the four topics agreed upon were: 1) Living together, 2) Footprint from the past, 3) Active planet and 4) Land, sea, and sky.

3.2 The selection of the texts

The texts within the unit of learning were assigned by the international primary curriculum (IPC). Some unit assigned only one text, while some assigned two or three texts. During the meeting appropriate non-fiction texts were also discussed. The discussion focused on where the developed material would be most beneficial to students in their reading lessons. The meeting conferred about the text for each unit of learning base on the four criteria: content, complexity, readability, and necessary materials. The selected texts and the results of the criteria were shown in the Table 6.

Table 6 The selected texts for unit of learning

Unit of learning	Text	Content	Complexity	Readability of the text	Necessary Material
Active planet	Natural Disaster	Appropriate	Appropriate	71.2 (Fairy easy to read)	Needed
Land, sea and sky	Clouds	Appropriate	Appropriate	68.8 (Standard/average)	Needed
Footprint from the past	Fossils	Appropriate	Appropriate	67.2 (Standard/average)	Needed
Living together	Skeleton	Appropriate	Appropriate	72.6 (Fairy easy to read)	Needed

From the result, the researcher designed the text files of the four selected texts to match in a set of the others developed reading materials.

Stage 4: Pedagogical realisation by examining and selecting meaningful exercise and activities with clear explanations

4.1 The creation of four infographics

The process of creating infographic for the four non-fiction texts following Krauss (2012) was shown in the Table 7.

Table 7 The infographic production following the process of creating infographic of Krauss (2012)

The process of creating infographic	Unit of learning		
	Active Planet: Natural disaster	Water World: Clouds	Footprint from the past: Fossils
1. Get an idea	<ul style="list-style-type: none"> Analysed the text Listed five main natural disasters Considered the main point information of each disaster to be presented Considered the key vocabulary to be included 	<ul style="list-style-type: none"> Analysed the clouds non-fiction text Sorted types of cloud information into the three main group according to their height Researched and considered the characteristic of each type of clouds. 	<ul style="list-style-type: none"> Analysed the fossil non-fiction text Listed three main ideas from the text: meaning, types and process of fossil forming Analysed and classified the information text of the process of fossil forming into six stages Considered rare words and key vocabulary
			<ul style="list-style-type: none"> Analysed the skeleton non-fiction text Listed the types of bones Considered the key information and key vocabulary that needed to be presented explicitly

Unit of learning			
The process of creating infographic	Active Planet: Natural disaster	Water World: Clouds	Footprint from the past: Fossils
Living Together: Skeleton			
<p>2. Sketch it out</p> <ul style="list-style-type: none"> • Decided the layout, focused on the characteristic of each natural disaster • Organised the position of both illustration and key vocabulary • Insert relevant statistic data for discussion 	<ul style="list-style-type: none"> • Determined the presentation of clouds by classifying group of clouds according to their height • Sketched and edited the features of clouds from the photographs to show their particularity characteristic 	<ul style="list-style-type: none"> • Sketched and decided the presentation of the information into two main parts: types of fossils and process of fossil forming (six stages) • Organised the presentation of the infographic 	<ul style="list-style-type: none"> • Determined to present the types of bones together with the body part diagram to link and elicit students background knowledge • Determined to label the specific name of bones • Organised the position of each element for clearly presentation
<ul style="list-style-type: none"> • 3. Collect data • Created the component of infographic such as 	<ul style="list-style-type: none"> • Researched and elected the information and 	<ul style="list-style-type: none"> • Researched about types of fossils and the 	<ul style="list-style-type: none"> • Researched human skeleton, human body

The process of		Unit of learning		
creating infographic	Active Planet: Natural disaster	Water World: Clouds	Footprint from the past: Fossils	Living Together: Skeleton
	<p>illustration for each type of natural disaster and key vocabulary</p> <ul style="list-style-type: none"> • Collected the relevant statistic data from the reliable sources. 	<p>photographs of types of clouds</p> <ul style="list-style-type: none"> • Edited photographs for making the illustration of the infographic 	<p>stages of fossil forming</p> <ul style="list-style-type: none"> • Researched the pictures of types of fossils • Illustrated the pictures of each stage of fossil forming 	<p>part and organ information</p> <ul style="list-style-type: none"> • Researched specific types of bone included in the text • Illustrated human body and types of bone • Matched the position and relevant organ with bones
<ul style="list-style-type: none"> • 4. Develop proof of concept 	<ul style="list-style-type: none"> • Checked the correctness of the information presented 	<ul style="list-style-type: none"> • Checked the correctness of the information presented 	<ul style="list-style-type: none"> • Checked the correctness of the information presented 	<ul style="list-style-type: none"> • Checked the correctness of the information presented

Unit of learning			
The process of creating infographic	Active Planet: Natural disaster	Water World: Clouds	Footprint from the past: Fossils
	<ul style="list-style-type: none"> • Checked the appropriateness of the illustrate components • Sought advice from the experts to make sure about the presentation of the information 	<ul style="list-style-type: none"> • Checked the appropriateness of the illustrate components • Sought advice from the experts to make sure about the presentation of the information 	<ul style="list-style-type: none"> • Checked the appropriateness of the illustrate components • Sought advice from the experts to make sure about the presentation of the information
	<ul style="list-style-type: none"> • Created the natural disaster infographic using photoshop and illustrator programme 	<ul style="list-style-type: none"> • Created the cloud infographic using photoshop and illustrator programme 	<ul style="list-style-type: none"> • Crated the fossil infographic using photoshop and illustrator programme
<ul style="list-style-type: none"> • 5. Lay it out 	<ul style="list-style-type: none"> • Created the natural disaster infographic using photoshop and illustrator programme 	<ul style="list-style-type: none"> • Created the cloud infographic using photoshop and illustrator programme 	<ul style="list-style-type: none"> • Crated the skeleton infographic using photoshop and illustrator programme
			Living Together: Skeleton

4.2 Designing the exercise and activities and writing the lesson plan

In close reading instruction, the teacher scaffolded students learning using four strategies during the lesson. The four scaffolded strategies included repeated reading, collaborative conversations, annotations, and text-dependent questions (Fisher and Frey, 2012). The researcher implemented those strategies within the developed teaching material.

4.2.1 Worksheet

The worksheet itself was the tool that allowed the students to follow each step of close reading instruction. There were two worksheets for each unit of learning. The first one was the worksheet that the students would use during the reading lesson and another one was for their writing task. The first worksheet was developed following the cycle of close reading. It was designed into three main sections.

First was the annotation. According to close reading instruction, annotation was one of key features of close reading. Students regularly underline, circle, and write margin notes. This was a way for students to observe and find the evidence from the text to build up their understanding (Sisson and Sisson, 2012). The students must take note of keywords, important information, opinion or even note questions that demonstrated they were curious about the text.

Second was the reading cycle box. The students must note down the answer from the text-dependent questions which the teacher scaffolds during the lesson following each reading cycle. This helped the students jot down their ideas, comprehend the information, identify small details from the text or form and develop their opinions.

Last was the summary box. This helped the students to extract their comprehension and summaries received information from the non-fiction text in their own words.

4.2.2 Lesson Plan

The lesson plan was one of the materials that included all four strategies in order to scaffold students' reading comprehension. The lesson plan was planned to follow the steps of close reading instruction (Sisson and Sisson, 2014) divided into five steps which were: 1) warm up, 2) first read, 3) second read, 4) third read and 5) production. In every step, the researcher blended the four strategies within the lesson for example, the students repeated reading the text as there were three reading cycles set for them each to read with a different purpose. Besides, in every reading cycle, the students had collaborative conversations. They had to discuss with their partners or the teacher and share their thoughts and ideas. During each cycle of reading, they had to annotate their answers or thoughts for the text-dependent question planned within each reading cycle in the designed worksheet. Importantly, there were the 'Link to the infographic' in the lesson plan. The linking point was where the students link from text to infographic and receive information from words which was verbal process and illustrations which was non-verbal process. The interplay between two system, verbal, and non-verbal processing, helped students develop their cognition and their comprehension (Paivio, 1979, 2006). During the teaching of reading non-fiction texts, it was necessary that teachers provided the infographic alongside the non-fiction reading text and this helped the students to enhance their reading comprehension. This was aimed to help stimulate student's cognition, scaffold their understanding, and build their knowledge using the

designed visual infographic material to guide and support more in order to reach the expected level of reading comprehension.

Stage 5: Materials production concerning the physical and academic aspects of the developed materials

The information from the previous stages were used to develop four units of infographic material based on the selected texts of the units of learning. The developed infographic materials were developed through the process of creating infographic by Krauss (2012) using all of the findings and information from previous steps. Adobe Photoshop, Adobe Illustrator and Procreate were the programmes mainly used in the infographic development. Some of the infographic components such as pictures and symbols were created by the researcher and some of them were purchased from Canva, an online graphic design platform. The developed infographic, worksheets, texts, and lesson plans were compiled together and became the teachers' manual. The process of material development and integrated theories were shown in Figure 12.

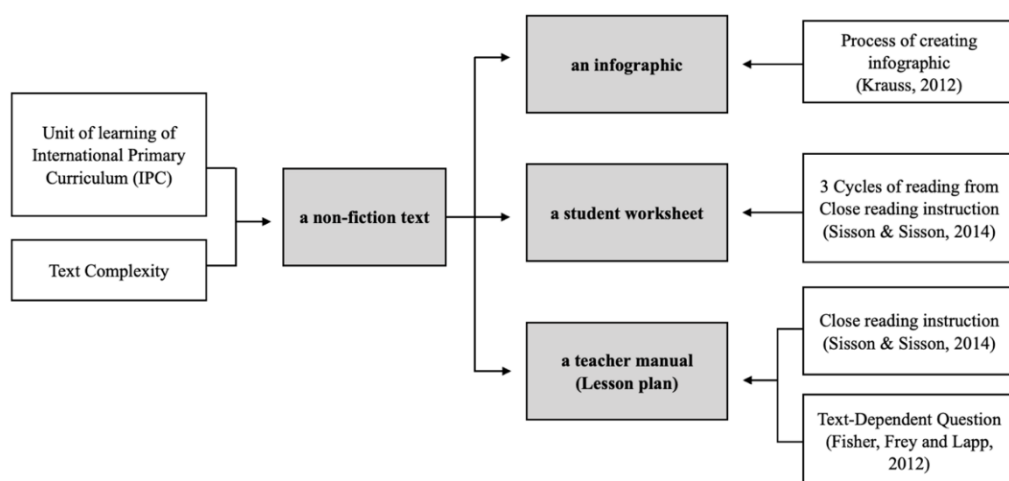


Figure 12 The process of the development of the instructional research instruments

After the developed infographic materials were produced, three experts were asked to validate and evaluate the developed infographic material using an index of congruence (IOC). The results of the total index of item-objective congruence (IOC) from the experts' opinion was at 0.89 which indicated that the developed materials were accepted with minor adjustments.

From the pilot study, using KR-20 of Kuder-Richardson; degree of difficulty (p), and power of discrimination (r). The results showed that the reading comprehension test had the degree of reliability ≥ 0.4 , degree of difficulty between 0.6 and 0.8, which Lawthong (2548) suggested that the power of discrimination from 0.2 onward is appropriated to be used for the implementation in the main study.

Moreover, in order to find the statistically differences of the pre-test and post-test score of the pilot test, Wilcoxon signed ranks test, a non-parametric statistical tool to calculate the result which counterpart of t-test in parametric test (Larson-Hall, 2015), was applied to find the significant. The result showed the pre and post-test of the pilot test were significantly different at .005 level which shown that developed infographic materials had a significant effect on the results. The results indicated that the developed infographic materials were appropriated for use within the study.

4.3 Results of Research Question 2

The second research question was 'To what extent does the developed infographic material enhance young English as foreign language learners' reading comprehension?' which aimed to investigate the effectiveness of the developed infographic materials. In order to examine the quality of the developed infographic material, two research materials were constructed. The two research materials were:

1. Interview questions for students
2. Material evaluation form for English test

4.3.1 The result from students' interview questions

From the content analysis of interview data, the results showed the students feedbacks, the elements of the developed infographic materials that affects to their reading comprehension skill and the benefits of the developed infographic materials in the percentages which were explained as follows:

1. Feedbacks towards the developed infographic materials

The data from the students' interview indicated that 100% of the students have the positive feedbacks towards the developed infographic materials. The students stated that:

“... It's good. It makes me understand the text and I think it is so cool to have it in every lesson....” Student interview transcript 01, 16/04/21).

“...I actually feel good about it. It is good that you made it.” Student interview transcript 06, 16/04/21).

“... I feel like it is so good.” Student interview transcript 13, 16/04/21).

“...I think I feel good about it.” Student interview transcript 17, 17/04/21).

“... I feel happy we have a new thing in the lesson. I like it so much.” Student interview transcript 20, 18/04/21).

2. Elements of infographics which effect to the improvement of students' English reading comprehension skills

From the interview data, the students mentioned the elements of infographics that affected to their English reading comprehension skill. The elements were presented with frequency and percentage as shown in Table 8.

Table 8 Frequency and percentages of infographic elements mentioned by the students from the interview data

Factors	Number of students who mentioned	Percentages
1. Picture and words represent meaning and highlight important details	18	90%
2. Presentation of the information	16	80%

From the Table 8, each factor could be described as follows:

1) Picture and word represent meaning and highlighting important details

90% of the students mentioned about the pictures and word represent meaning. The developed infographic materials allowed the students to receive information in two systems: verbal and non-verbal processing. Both systems interplay and build cognition for the students so the students are able to comprehend the text.

“Infographic is like a *picture* dictionary. I can understand the meaning of the words and also the whole text. All the main ideas of the text are presented in *picture* in the infographic. I like it so much. (Student interview transcript 02, 16/04/21)

“I can answer the correct answer because I understand the text from the *picture* of infographic. I don’t have to read the text again; I just look at infographic and I can find the answer. This is so good.” (Student interview transcript 18, 18/04/21)

“New words in the non-fiction text are the hardest thing to understand. I don’t know the meaning of the new words, and it is hard to find the meaning in the text. I like to have infographic because infographic shows the *pictures* with *keywords*. I can understand the meaning of *words* and the text too.” (Student interview transcript 20, 18/04/21)

2) Presentation of the information

From the interview data, 80% of the students mentioned about the presentation of the information as an infographic which benefit to the students’ comprehension.

“When I read non-fiction text, I looked at infographic too. The infographic told me all important things in the text in order. It is *easy for me to understand* and remember.” (Student interview transcript 05, 16/04/21)

“I like the fossil infographic because it shown me the pictures in steps. It made me *understand* how fossil is formed. I will not get it if I read the text only. It is too hard for me to read.” (Student interview transcript 09, 16/04/21)

“I don’t like reading the text. A lot of alphabet makes me feel bored. I like the infographic because it is *interesting*. I like to read with pictures with a little word. (Student interview transcript 11, 17/04/21)

“Infographic is like a *story book* that tells us all about the whole story [text]. It helps me to understand the whole text.” (Student interview transcript 14, 17/04/21)

“I can answer the correct answer because I understand the text from the infographic. I don’t have to read the text again; I just look at infographic and I can find the answer. This is so good.” (Student interview transcript 18, 18/04/21)

4.3.2 The result from the material evaluation form for teachers

In order to investigate the attitude of teachers towards the effectiveness and quality of the developed infographic material, the material evaluation form was constructed to ask the English teachers who were the users of the teacher’s manual. The five teachers; two year-four classroom teachers, a key stage two leader, a head of literacy and a support teacher who were involved with the year four reading lesson completed the forms. The results were calculated into mean and standard deviation and finally compared using following criteria:

3.50 – 4.00	means	strongly agree
2.50 – 3.49	means	agree
1.50 – 2.49	means	disagree
1.00 – 1.49	means	strongly disagree

Table 9 present the mean score, standard deviation and interpretation of teachers as presented in the material evaluation form.

Table 9 The statistical results of teachers' material evaluation form

No.	Criteria for evaluating the developed infographic materials	\bar{x}	S.D.	Interpretation
1.	Through the materials, my students' reading comprehension of non-fiction text has satisfactorily improved.	3.80	0.44	strongly agree
2.	The developed infographic materials help my students connect new knowledge of the unit of learning with IPC subject.	4.00	0.00	strongly agree
3.	The developed infographic materials cause my students to have motivation to read non-fiction texts.	4.00	0.00	strongly agree
4.	The developed infographic materials are beneficial to be implemented in close reading teaching instruction.	3.80	0.44	strongly agree
5.	The developed infographic materials are able to represent the non-fiction text well and help students understand and engage more with the text.	3.80	0.44	strongly agree
6.	When my students come across with an unfamiliar word while reading non-fiction text, they are able to find or guess its meaning using infographic.	4.00	0.44	strongly agree
7.	The developed infographic materials are suitable and beneficial to be used as a reading material within all steps of close reading teaching instruction.	3.60	0.54	strongly agree

No.	Criteria for evaluating the developed infographic materials	\bar{x}	S.D.	Interpretation
8.	The developed infographic materials help my students to comprehend the non-fiction text to the level of literal and inferential comprehension.	3.60	0.54	strongly agree
9.	The developed infographic materials are concordantly use with close reading instruction to teach reading lesson.	4.00	0.00	strongly agree
10.	I am satisfied to use developed infographic materials as a reading material to teach reading non-fiction text.	4.00	0.00	strongly agree
	Total	3.86	0.13	strongly agree

Table 9 shown the mean score of material evaluation form from all English teacher who used the teachers' manual for year four reading lessons at Prasarnmit Primary International Programme in academic year 2020. It was found that English teachers strongly agreed or were very satisfied ($\bar{x} = 3.86$, S.D. = 0.13) with the implementation of the developed infographic material.

In summary, the mean score of the material evaluation form is above 3.50 indicating that teachers strongly agreed with the implementation of the developed material and were very satisfied with the quality and the result of the implementation.

4.4 Results of Research Question 3

The third research question was ‘To what extent, does the close reading instruction which use infographic materials help young learners’ reading comprehension?’ which aimed to investigate the effectiveness of the close reading instruction that help increase young English as foreign language learners’ reading comprehension of non-fiction text. In order to examine the quality of the close reading instruction, the result of English reading comprehension test, students’ interview data and, teachers’ comments from the material evaluation form were used to answer this question.

4.4.1 The result of the English reading comprehension test

The developed infographic materials were implemented into the year four English reading lessons following the implementation plan. The results are presented quantitatively. The researcher evaluated students’ reading comprehension through the pre-test and post-test score collected from the English reading comprehension test. The results were calculated for mean and standard deviation of scores from the pre-test and post-test. To find if the pre-test and post-test scores are statistically different, Wilcoxon signed rank test was applied since the student number was less than 30. Wilcoxon signed ranks test in a non-parametric test that is a statistical tool to calculate the result which is a counterpart of t-test parametric (Larson-Hall, 2015). The results of the four Unit of English reading comprehension tests are presented below:

Unit 1 Result:

Table 10 Descriptive Statistics of English reading comprehension test score of Unit 1

English reading comprehension Test	Min	Max	Mean	S.D.
Pre-test	2	7	4	1.59
Post-test	7	12	10.2	1.77

Note: n=20 Total score = 12

As in the Table 10, student number is 20; the total score of the test is 12 points. For pre-test, the minimum score is 2, and the maximum score is 7. For post-test, the minimum score is 7, and the maximum score is 12. It can be found that the mean score of post-test, 10.2 (S.D. = 1.77), is higher than the pre-test, 4 (S.D. = 1.59). The improvement in score shows that in unit 1 the students' English reading comprehension improved after the material implementation.

To find if the pre-test and post-test scores are statistically different, Wilcoxon signed ranks test result are reported in Table 11.

Table 11 Statistical difference between the pre-test and post-test scores of Unit 1 using Wilcoxon signed ranks test

Rank		N	Mean Rank	Sum of Ranks
Unit 1 Posttest -	Negative Ranks	0 ^a	.00	.00
Unit1 Pretest	Positive Ranks	20 ^b	10.50	210.00
	Tile	0 ^c		
	Total	20		

-
- a. Unit 1 Posttest < Unit 1 Pretest
 b. Unit 1 Posttest > Unit 1 Pretest
 c. Unit 1 Posttest = Unit 1 Pretest
-

Test Statistics	
	Unit 1 Posttest - Unit 1 Pretest
Z	-3.956 ^b
Asymp. Sig. (2-tailed)	< .001
a. Based on negative ranks	
b. Wilcoxon Signed Rank Test.	

Table 11 shows that, in unit 1, all 20 students scored higher in the post-test than in the pre-test. The pre-test and post-test are significantly different at < .001 level ($p < 0.05$). It shows that the developed infographic materials had significant effect on the result, as can be seen from the great difference between the pre-test and post-test scores. In other word, the developed infographic materials significantly improved the students' English reading comprehension.

Unit 2 Result:

Table 12 Descriptive Statistics of English reading comprehension test score of Unit 2

English reading comprehension Test	Min	Max	Mean	S.D.
Pre-test	2	6	3.4	0.99
Post-test	5	12	9.2	2.09

Note: n=20 Total score = 12

As in the Table 12, student number is 20; the total score of the test is 12 points. For pre-test, the minimum score is 2, and the maximum score is 6. For post-test, the

minimum score is 5, and the maximum score is 12. It was found that the mean score of post-test, 9.2 (S.D. = 2.09), is higher than the pre-test, 3.4 (S.D. = 0.99). The improvement in score shows that in unit 2 the students' English reading comprehension improved after the material implementation.

To find if the pre-test and post-test scores are statistically different, Wilcoxon signed ranks test result is reported in Table 13.

Table 13 Statistical difference between the pre-test and post-test scores of Unit 2 using Wilcoxon signed ranks test

Rank		N	Mean Rank	Sum of Ranks
Unit 2 Posttest –	Negative Ranks	0 ^a	.00	.00
Unit 2 Pretest	Positive Ranks	20 ^b	10.50	210.00
	Tile	0 ^c		
	Total	20		
a. Unit 2 Posttest < Unit 2 Pretest				
b. Unit 2 Posttest > Unit 2 Pretest				
c. Unit 2 Posttest = Unit 2 Pretest				
Test Statistics				
		Unit 2 Posttest - Unit 2 Pretest		
Z		-3.952 ^b		
Asymp. Sig. (2-tailed)		< .001		
a. Wilcoxon Signed Rank Test.				
b. Based on negative ranks				

Table 13 shows that, in unit 2, all 20 students scored higher in the post-test than in the pre-test. The pre-test and post-test are significantly different at < .001 level

($p < 0.05$). It shows that the developed infographic materials had a significant effect on the result, as can be seen from the great difference between the pre-test and post-test scores. In other words, the developed infographic materials significantly improved the students' English reading comprehension.

Unit 3 Result:

Table 14 Descriptive Statistics of English reading comprehension test score of Unit 3

English reading comprehension Test	Min	Max	Mean	S.D.
Pre-test	1	7	2.9	1.94
Post-test	5	8	6.75	1.37

Note: $n=20$ Total score = 8

As in the Table 14, student number is 20; the total score of the test is 8 points. For pre-test, the minimum score is 1, and the maximum score is 7. For post-test, the minimum score is 5, and the maximum score is 8. It can be found that the mean score of post-test, 6.75 (S.D. = 1.37), is higher than the pre-test, 2.9 (S.D. = 1.94). The improvement in score shows that in unit 3 the students' English reading comprehension improved after the material implementation.

To find if the pre-test and post-test scores are statistically different, Wilcoxon signed ranks test result is reported in Table 15.

Table 15 Statistical difference between the pre-test and post-test scores of Unit 3 using Wilcoxon signed ranks test

Rank		N	Mean Rank	Sum of Ranks
Unit 3 Posttest –	Negative Ranks	0 ^a	.00	.00
Unit 3 Pretest	Positive Ranks	20 ^b	10.50	210.00
	Tile	0 ^c		
	Total	20		

a. Unit 3 Posttest < Unit 3 Pretest
b. Unit 3 Posttest > Unit 3 Pretest
c. Unit 3 Posttest = Unit 3 Pretest

Test Statistics	
Unit 3 Posttest - Unit 3 Pretest	
Z	-3.949 ^b
Asymp. Sig. (2-tailed)	< .001

a. Wilcoxon Signed Rank Test.
b. Based on negative ranks

Table 15 shows that, in unit 3, all 20 students scored higher in the post-test than in the pre-test. The pre-test and post-test are significantly different at < .001 level ($p < 0.05$). It shows that the developed infographic materials had significant effect on the result, as can be seen from the great difference between the pre-test and post-test scores. In other word, the developed infographic materials significantly improved the students' English reading comprehension.

Unit 4 Result:

Table 16 Descriptive Statistics of English reading comprehension test score of Unit 4

English reading comprehension Test	Min	Max	Mean	S.D.
Pre-test	2	6	3.4	0.99
Post-test	7	12	10.5	2.04

Note: n=20 Total score = 12

As in the Table 16, student number is 20; the total score of the test is 12 points. For pre-test, the minimum score is 2, and the maximum score is 6. For post-test, the minimum score is 7, and the maximum score is 12. It can be found that the mean score of post-tests, 10.5 (S.D. = 2.04) is higher than the pre-test, 3.4 (S.D. = 0.99). The improvement in score shows that in unit 4 the students' English reading comprehension improved after the material implementation.

To find if the pre-test and post-test scores are statistically different, Wilcoxon signed ranks test result is reported in Table 17.

Table 17 Statistical difference between the pre-test and post-test scores of Unit 4 using Wilcoxon signed ranks test

Rank		N	Mean Rank	Sum of Ranks
Unit 3 Posttest –	Negative Ranks	0 ^a	.00	.00
Unit 3 Pretest	Positive Ranks	20 ^b	10.50	210.00
	Tile	0 ^c		
	Total	20		

a. Unit 4 Posttest < Unit 4 Pretest

b. Unit 4 Posttest > Unit 4 Pretest

c. Unit 4 Posttest = Unit 4 Pretest

Test Statistics	
Unit 4 Posttest - Unit 4 Pretest	
Z	-3.934 ^b
Asymp. Sig. (2-tailed)	< .001
a. Wilcoxon Signed Rank Test.	
b. Based on negative ranks	

Table 17 shows that, in unit 4, all 20 students scored higher in the post-test than in the pre-test. The pre-test and post-test are significantly different at < .001 level ($p < 0.05$). It shows that the developed infographic materials had significant effect on the result, as can be seen from the great difference between the pre-test and post-test scores. In other word, the developed infographic materials significantly improved the students' English reading comprehension.

Table 18 Score differences between the pre-test and the post-test scores of English reading comprehension test of the four units

Unit	Pre-test		Post-test		Mean Difference
	Mean	S.D.	Mean	S.D.	
1	4	1.59	10.2	1.77	6.2
2	3.4	0.99	9.2	2.09	5.8
3	2.9	1.94	6.75	1.37	3.85
4	3.4	0.99	10.5	2.04	7.1

In summary, according to the Table 18, it can be seen that young EFL students' reading comprehension of non-fiction texts had improved since the implementation of the developed infographic material in the reading lessons.

4.4.2 The result from students' interview questions

As the developed infographic materials were developed following the close reading instruction. There were elements that supported young English as a foreign language learning and to enhance English reading comprehension. From the content analysis of interview data, the results showed the students feedbacks towards the elements of the close reading instruction that affects to their reading comprehension skill in the percentages shown in Table 19.

Table 19 Frequency and percentages of close reading instruction elements mentioned by the students from the interview data

Factors	Number of students who mentioned	Percentages
1. Questioning	15	75%
2. Reading cycles	13	65%

1) Questioning

75% of the students mentioned about the Text-dependent questioning. It was the tool that was implemented with close reading instruction. They were implemented in every cycle of reading when the teacher teaches the students. The questions help the students to think step by step and with a specific purpose during each reading cycle. Importantly, the questions help students scaffold their understanding of the text.

“Some questions we can answer from the text but some questions we cannot find the answer in the text. We have to think of the answer by ourselves. I think it is *challenging*.” (Student interview transcript 06, 16/04/21)

“...Teacher asked so many questions, more than before. But I understand and I can answer the questions...” (Student interview transcript 11, 18/04/21)

“In one text, we read three times, but it is not boring because the teachers asked different questions each time. It is *challenging*. I can think the answer out of the text by myself too.” (Student interview transcript 18, 18/04/21)

“The teacher asked me different *questions* when we read. It is confusing at the start but when I write a paragraph about the text, I can write it. I think the *questions* help me to understand the text.” (Student interview transcript 19, 18/04/21)

2) Reading cycle

65% of the students mentioned that reading cycle helped with their comprehension which is built upon each reading cycle. The students expressed their learning reading in the interview.

“We *read three times* in one text, I understand more and more each time I read... the teacher asked the question that helped me think.” (Student interview transcript 04, 16/04/21)

“It could be ... because *we read many times*, and we have the infographic to show what is what so I can answer the questions even they [the questions] gets harder and harder every time the teacher asked.” (Student interview transcript 08, 16/04/21)

“I like the new reading lesson; we can *read three times*. It is different from last term that we read only one time and answer the question. I understand more.” (Student interview transcript 13, 17/04/21)

“...We read three times, but it is not boring because the teachers asked different questions each time. It is *challenging*.” (Student interview transcript 18, 17/04/21)

4.4.3 The teachers' comments from the material evaluation form for teachers

The last part of the questionnaires was the open-ended questions; teachers may or may not have provided any comment. In the material evaluation form, teachers provided their comments and suggestion as follows:

Teacher I said that the developed materials were very effective with the steps of close reading instruction which applied in the reading lesson. To add on is to ask the students to create their own infographic as the summary of reading for each unit because infographic is considered as a good tool for summarising information too.

Teacher II said the teacher's manual (the developed infographic materials) is so beneficial for teaching reading. As it is a set of all materials needed for the lesson. It is so facilitating and effective in term of rising the students' comprehension. It also served with the differentiation of the students. They all can comprehend the non-fiction text, this is perfect!

Teacher III suggested that it would be perfect if we could have this set of materials for all reading lesson even fiction or non-fiction or any types of text.

Infographics plays a great role in either helping the students to read or comprehending the information of the text. I absolutely love it!

Teacher IV stated that teaching reading followed the close reading instruction reading cycles is brilliant teaching method which is beneficial for students' understanding especially with the questions provided in the teacher's manual.

In summary, close reading instruction which provided the teachers concrete teaching steps benefits teachers' teaching in reading lesson. Also, the students were able to answer the question and enjoyed with the reading cycle that encourage and scaffold their understanding of the text. The material users, both teachers and students were all satisfied with the implementation of the developed infographic material.

4.5 Additional findings

After the implementation, the data from the students' interview and teachers' comments from the questionnaire reveals the advantages of the developed infographic materials which were implemented into the reading lesson.

1) Change students' attitude towards reading lesson

The content analysis of the interview revealed that most answers from the students' interviews were impressed by the implementation of the developed infographic materials within the reading lessons. The students mentioned in the interview that the developed infographic materials made the reading lesson enjoyable.

“I like reading lesson this term more because it is fun. I am *happy* when I can answer the questions...” (Student interview transcript 02, 16/04/21)

“It is good when we have a new stuff [material] in reading lesson, it used to be a boring lesson and now it is not anymore ... everyone *enjoys* [with] the lesson...” (Student interview transcript 05, 16/04/21)

“Reading lesson is easier for me this term because of the infographic, *I am proud* [that] I understand, and I can answer the questions when the teacher asked me.” (Student interview transcript 13, 17/04/21)

“I hate non-fiction before because it is boring and hard. But I *like* it now. I enjoy it more than before.” (Student interview transcript 18, 18/04/21)

2) Engage students in learning

The second topic that was mentioned by the students in the interview was the engaged atmosphere that emerged during the reading lesson. This is because close reading instruction allowed the students to have a conversation with their peers during the lesson. Collaborative conversation is one of the scaffolds that supports students in reading (Fisher and Frey, 2014). They were able to share and exchange their ideas between each other.

“When the teacher says talk to your partner, I am so ready because I have a lot to *share with my friends*... and to hear from my friends too.” (Student interview transcript 06, 16/04/21).

“...Reading lesson last term, the teacher read to us and we read follow [read along] the teacher. We answered the questions when we finish reading. It [was] very hard for me to write the answer because I didn't know what to answer. But this term, *we read together*, and I can *talk with my friend* and check

to understand [whether] I am right or wrong...". (Student interview transcript 17, 17/04/21)

"I *talk with my friend* about the pictures in the infographic. I asked my friend and I *share my ideas* with my friend. We helped each other to read." (Student interview transcript 19, 18/04/21)

3) Develop students' self-confidence

From the interview, the students mentioned that they felt comfortable with their learning and enjoyed the reading lessons. Their confidence was evident and obvious as they spoke up about reading lessons with joy in their voices. Most of them mentioned the pictures which was one of the main elements in the infographic that helped their comprehension of the text.

"The students spoke up more. Their self-assured raised." (A teacher's comment from the questionnaire)

"I *can answer* the correct answer because I *understand* the text from the infographic. I don't have to read the text again; I just look at the infographic and I can find the answer. This is so good." (Student interview transcript 18, 18/04/21)

"Because we read many times, and we have an infographic to show what is what so I *can answer* the questions even they [the questions] gets harder and harder every time the teacher asked." (Student interview transcript 08, 16/04/21)

“I am not good at reading text. Infographics is good because there are many pictures that *I can understand*. It helps me a lot so *I can answer* the questions that the teacher asked.” (Student interview transcript 03, 16/04/21)

4) Time-saving

Using the developed infographic material within the lesson reduced time wasted. The interview revealed the differences in activities and teaching steps during the lesson between before and after implementation of the developed infographic material.

“I really impressed with these hands-on materials; it helps reducing my PPA time (planning, preparation, and assessment’s time) so I can focus more on the teaching.” (A teacher’s comment from the questionnaire)

“Hard words in the text are always hard for me to know the meaning. But infographic helps me to understand it *quicker*. The pictures in the infographic were very clear to know the meaning.” (Student interview transcript 10, 16/04/21)

“Luckily! we now have the infographic in the reading lesson, the teacher doesn’t need to google the picture of the keywords anymore.” (Student interview transcript 07, 16/04/21)

“The teacher taught us to annotate the keywords and note ideas in the worksheet. We don’t have to read the whole text again to find the answer just looked back at what I jot down in the worksheet.” (Student interview transcript 14, 17/04/21)

“I can answer the correct answer because I understand the text from the infographic. I don’t have to read the text again; I just look at the infographic and I can find the answer. This is so good.” (Student interview transcript 01, 16/04/21)

4.6 Summary

This chapter presents the results and findings from each stage of the study in response to the research questions. The first section presents the process of developing the developed infographic materials according to Tomlinson’s material development framework (2011), including needs analysis results and the teaching instruction of close reading instructions applied. Based on this information, the developed infographic materials for four units of learning are physically produced and compiled into a teacher’s manual. The teacher’s manual consisted of infographics, texts, worksheets, lesson plans and comprehension tests.

The second section shows the feedbacks of the material implementation. There are the results from students’ interviews and teachers’ questionnaires. The students’ interview data showed the students attitude towards the materials and the effective elements of the developed infographic materials towards their English reading comprehension skills. Also, the result of the teachers’ questionnaire showed the satisfaction of the teacher towards the developed infographic materials.

The third section showed the results of English reading comprehension tests which showed the improvement of students’ English comprehension after learning reading following close reading instruction that implemented with the developed material. Furthermore, the comments from the material evaluation form from the

teachers showed the positive attitudes or greater satisfaction towards the materials' quality in terms of effectiveness in enhancing the students' English reading comprehension.



CHAPTER 5

SUMMARY DISCUSSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarises this study in three parts. The first part is a brief summary and a discussion of the study; the second part is about the implication of the developed material; the final part includes the recommendations for further studies.

5.2 Summary of the study

The study aims to developed infographic materials to enhance young English as foreign language learners' reading comprehension. The primary objective of the study is to find out how to develop infographic materials for teaching non-fiction texts in year four reading lessons. To do so, Tomlinson's principles of materials development (2011) were used as the underlying principle with the implementation of the process of infographic development (Kruass, 2012) and close reading instruction (Sisson and Sisson, 2014). The secondary objective is to examine how the effectiveness of the developed infographic materials are in helping to develop and improve young English as foreign language learners' reading comprehension skills of non-fiction texts. The last objective of the study is to investigate the effectiveness of close reading instruction to help increase young English as foreign language learners' reading comprehension of non-fiction text. Hence, there are two main parts in this study: material development and material implementation and evaluation.

5.2.1 Materials development

The needs of teachers and students were examined via both content analysis and percentages. The results of needs exploration and document study influenced the development of the infographic materials used as reading materials to enhance young students' reading comprehension and support teachers' teaching. The infographic materials were developed

following Tomlinson's principles of materials development (2011) as the underlying principle with the implementation of the process of infographic development (Krauss, 2012) and close reading instruction (Sisson and Sisson, 2014). The contents of the materials based on the selected units of learning from the International Primary Curriculum (IPC) included four non-fiction texts: 1) Natural disaster, 2) Clouds, 3) Fossils, and 4) Skeleton. Eventually, the infographic materials were designed and produced consisted of 1) texts, 2) infographics, 3) worksheets, and 4) lesson plans. Three experts in the field of English language teaching and material development validated and evaluated the developed infographic materials with the IOC index at 0.89. The researcher conducted teachers' training for the teachers who teach English reading lessons for year-four students. Then, the researcher did the pilot study with ten high-ability year-three students. The information obtained from the pilot study was used to adjust the material.

5.2.2 Materials implementation and evaluation

The developed infographic materials were implemented with 20 year four students and five English teachers at Srinakharinwirot University Prasarnmit Demonstration School (Elementary): Prasarnmit Primary International Programme (PPiP) in the academic year 2020. Year four students were separated into two classes: Year4A and Year4B classes. The teachers implemented the material into reading lessons. Each unit of learning lasted for three to four periods. During the implementation of the developed infographic materials, the English reading comprehension test was done before and after the implementation.

After the implementation was finished, the year four students were interviewed by the researcher to explore students' opinions and to gain critical feedback. Also, the material evaluation forms were administered to the English teachers to evaluate the quality of the developed infographic materials.

5.3 Finding

1. In response to research question 1: How can infographic materials be developed to teach English reading comprehension skills to young English as foreign language learners? The integration between the material development framework of Tomlinson (2011), the process of creating an infographic of Krauss (2012) and close reading instruction of Sisson and Sisson (2014) could effectively produce the infographic materials for teaching non-fiction text for young English as foreign language learners.

2. In response to research question 2: To what extent does the developed infographic material enhance young English as foreign language learners' reading comprehension? Two results confirmed the effectiveness of the developed infographic material. First, the result from students' interview questions indicated that the students were delighted with the developed infographic materials. The students highlighted that the representation of pictures and words and the presentation of the complete text information are the elements of the infographic that help scaffold their reading comprehension of non-fiction text. Also, the result of $\bar{x} = 3.86$ from the material evaluation form indicated that English teachers were highly satisfied and had a positive attitude towards the quality of the developed infographic materials in enhancing young English as foreign language learners.

3. In response to research question 3: To what extent, does the close reading instruction, which uses infographic materials help young learners' reading comprehension? Three results confirmed the effectiveness of the close reading instruction. First, the result of the four units English reading comprehension test showed that post-test scores were higher than the pre-test score, meaning that the student's reading comprehension had improved. Second, the result from students' interview questions mentioned that questioning within the lessons and the reading cycles are the elements that supported and improved their reading comprehension. Lastly, the teachers' additional comments from the questionnaire emphasized the effectiveness of the

developed infographic materials and showed that the teachers were very satisfied with the developed infographic materials.

In summary, the findings indicated that the developed infographic materials could be successfully developed by using the principle of the material development of Tomlinson (2011) followed by the process of creating an infographic of Krauss (2012) and close reading instruction of Sisson and Sisson (2014) as the underlying principles. Also, the developed infographic material positively affected young students' English reading comprehension when integrated with close reading instruction.

5.4 Discussion

In this section, the results concerning the effectiveness of the developed materials are discussed in three aspects: the process of instructional materials development, the infographic in a role of reading material, close reading instruction towards young students reading comprehension and the integration of infographic and close reading instruction effect to the level of young students' comprehension.

5.4.1 The process of instructional materials development

Since the results reported earlier, the developed infographic materials were successfully and effectively produced to teach young English as foreign language learners. The result can be implied that within the process of infographic materials development, the framework of material development proposed by Tomlinson (2011) can be used as a primary principle integrated with the process of creating an infographic by Krauss (2012) and close reading instruction by Sisson & Sisson (2014) as the underlying principles.

The reason was that Tomlinson's (2011) framework provides a systematic method that helps individuals design, carry out and implement meaningful and effective instructional materials. However, the framework alone is insufficient when aiming to produce more specific infographic material related to learning English as a foreign language. So, it is key to integrate

the process of creating an infographic by Krauss (2012) and the use of close reading instruction by Sisson & Sisson (2014). Both help create specific instructional infographic materials; specifically, in the elements of the developed infographic and the reading teaching instruction.

The study has found positive results in instructional material development. For example, Suphipat and Chinokul (2019) employed Tomlinson's framework as a principle framework implemented with Six-T's approach to developing English content-based reading materials for Buddhist student monks. Also, Al-Mousawi (2020) integrated Tomlinson's material development framework with a text-driven framework to develop reading material. The results of both studies showed that the developed instructional materials following Tomlinson's framework were effective and satisfied the users of the materials. These studies suggest that Tomlinson's (2011) framework could be integrated with other frameworks to develop effective instructional materials for English language teaching.

5.4.2 The infographic in a role of reading material

As mentioned earlier, the infographic is the combination of information and graphic design which convey complex information to an audience in a manner that can be quickly consumed and easily understood (Smiciklas, 2012). In the same way, the result of the study also affirmed the benefits of the infographic. As in the result, the students indicated that two elements of the infographic that help them understand the non-fiction text were 1) Picture and word represent meaning and 2) Presentation of the information. The interplay between verbal and non-verbal processes (Paivio & Clark, 2006) has helped young students to comprehend the complex information of a non-fiction text. As well as the studies including Hamid et al. (2020) employed infographics as supporting material in teaching Arabic grammatical learning. Pertiwi and Kusumaningrum (2021) applied infographics as a project in speaking activities to promote students' speaking skills. Hertavira (2019) employed infographics as an instructional material in order to enhance students' reading comprehension, and López Cupita and Puerta Franco

(2019) used infographics as visual aids to develop students' reading skills and also enhance reading comprehension. Additionally, Cahyani, Myartawan, and Saputra (2021) applied infographics in an online jigsaw setting learning with Indonesian English as foreign language learners, with results showing a positive impact on students' reading comprehension. All studies showed the benefits of applying infographics as a material in the teaching of language, which can confirm that the infographic can enhance the students to comprehension.

5.4.3 Close reading instruction towards young students reading comprehension

The finding of the study showed positive results on students' reading comprehension as the close reading instruction was implemented as a teaching instruction in reading lessons and applied with the usage of the infographic. From the result of the English comprehension test, the students achieved higher scores in the post-test, and they were able to answer the text-dependent questions which showed their reading comprehension ability had improved. From the students' interview data, questioning and reading cycles were mentioned as key elements that enhance young students' reading comprehension. In the same way as the study of Mariage, Englert, and Mariage (2020), using close reading to scaffold young students' comprehension was effective by the set steps and phases of the close reading. The student followed the steps as a reading routine. The reread with targets of each phase enabled their comprehension to the expected levels. Likewise, for the young Korean EFL learners, using close reading instruction to allowed students to reread the texts was the key to success. Close reading instruction is an effective teaching instruction that improves students' comprehension of the text (McKee, 2019). Also, the study of Dakin (2013) proved that close reading instruction allowed the students to build upon the level of comprehension.

5.4.4 The integration of infographic and close reading instruction effect to the level of young students' comprehension

The results showed the effectiveness of the developed infographic material. Using infographics as reading materials had been proved as an effective way for enhancing young students' comprehension. As was mentioned by most of the students, picture representation had helped them to understand the meaning of the keywords. It also represented the whole information of the texts as the big picture, which allows the students to see what the non-fiction text is about. From the study, the infographic itself can transfer information and enable students' literal comprehension but might not support the students into inferential comprehension. López Cupita and Puerta Franco (2019) mentioned in the discussion part of their study that an infographic was the tool to represent the information. But transferring information to the student by effective teaching was the duty of the educator. The study of Manickam and Aziz (2020) also use the infographic to enhance young student comprehension but still need multiple methods in teaching to help to deliver information and enable student understanding of the text.

Therefore, in my study, the infographic material needed to integrate with close reading instruction to promote the students' inferential comprehension by the use of reading cycles and questioning. Together, infographic and close reading instruction complemented each other, enable the students to gain more insight into text information, scaffold the students' comprehension and unlock their higher level of inferential comprehension. So, it suggested that the infographic developed from the process of creating an infographic by Krauss (2012) and close reading instruction by Sisson & Sisson (2014) could be integrated to develop instructional material to enhance students' reading comprehension.

5.5 Pedagogical Implication

The results of the study led the researcher to the following suggestions with regards to the development of infographic instructional materials development.

1. According to Paivio's dual-coding theory (2006), the delivery of the infographic could be both a verbal process which is text and a non-verbal process that relies on visual elements. To create the infographic, the creator must consider methods to present the specific and important information from the non-fiction text. For example, some of the keywords must be presented as a picture as the learners would pick the meaning up fast. Some of the information might fit to be presented in a phrase or a short sentence as it might not be recognizable as a picture. It is important to recognize that some information is better to tell explicitly explained to avoid confusion, whereas information would be interpretable by the students involved.

2. To create good quality infographic instructional materials, it is necessary to seek advice from experts, especially in English teaching and material development. Both experts in the different fields would provide alternative points of view and offer suggestions that would benefit the developed infographic. With the combination of both experts' ideas, the integration of the theory of teaching and the theory of material development would meet a suitable point. Having been developed with both theories in mind, the infographic materials produced would be appropriate and effective.

3. To handle the reading lesson of young students with different levels of English proficiency, materials developers should provide flexible lesson plans by involving multiple levels and many items of text-dependent questions or merging some activities into the questioning session. The purposes of the flexibility are reducing stress: some of the students might not be able to answer a certain question or take more time to figure out the answer, having multiple levels and many items of questions would help the teacher to offer a suitable question for a student. It also gives them opportunities for all students for answering questions. Moreover, some of the activities such as 'voting for the answer' or 'checking the answer with your partner' would help to engage all students together. This flexible lesson plan would be more beneficial, especially with young learners.

4. From the teachers' questionnaire comments, the teacher suggested that an infographic would be beneficial for young students in the use of summarising their understanding of the text. The teachers could have the students create their infographics to summarise what they understand from the text. This would be great for the student to practice expressing their notion or concept using verbal and non-verbal elements.

5.6 Limitation of the study

1. The need analysis questionnaires for students provided useful information for developing the infographic materials. As Williams (2009) stated, the content and design of the infographic should attract learners' attention and interest, the researcher used the questionnaire to discover the students' problems, preferences, and opinions. For creating the infographic, the researcher aimed to serve the students' opinions towards the design and presentation of the reading material. However, as the study aimed to develop the infographic for the non-fiction text, the design and presentation of the infographic cannot entirely follow the students' opinion. The information should be presented considering the appropriateness and correctness as its priority. Some elements, such as bold text was a necessity to highlight important information not only for the decoration. To conclude, the information of students' problems and preferences gained from the questionnaire was appropriate and suitable for use when developing the infographic material except for the students' opinion toward the design and presentation.

2. In this study, the researcher sought feedback after the implementation of the developed infographic material by interviewing the students. For teachers, the researcher created the questionnaire, which provided solid feedback. To receive insight feedback from the users, the researcher should consider interviewing the teachers after the implementation of the developed infographic materials.

5.7 recommendation for further study

1. The infographic was designed using the programmes from the electronic device which the files could be exported as an electronic file in the form of a portable document format (PDF) or a picture (JPEG). It could be printed out on paper to use as a learning material for the students. Nowadays, classrooms have become smart, employing the use of technology devices such as computers, smart boards, and even the internet. It provides opportunities for teachers to create the lessons and aids the teachers in terms of material preparation. The electronic infographic could be shown on the screen or even on students' devices without printing, so it reduces the waste of paper.



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APPENDICES

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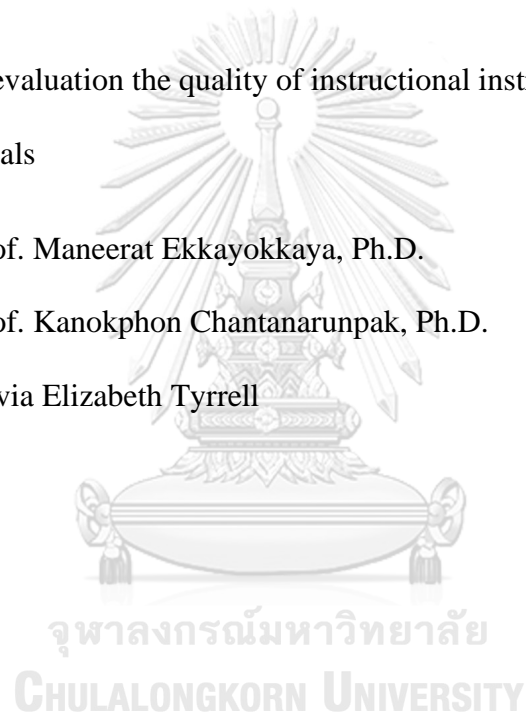
APPENDIX A List of experts

List of experts of validation the research instrument

1. Asst.Prof. Ruedeerath Chusanachoti, Ph.D.
2. Asst.Prof. Rathapol Pradubwate, Ph.D.
3. Mr. Sam Calum Westmancoat

List of experts of evaluation the quality of instructional instrument: developed infographic materials

1. Asst.Prof. Maneerat Ekkayokkaya, Ph.D.
2. Asst.Prof. Kanokphon Chantananarunpak, Ph.D.
3. Ms. Olivia Elizabeth Tyrrell



APPENDIX B Request for permission to collect research data

ที่ อว 64.6/0587



คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ถนนพญาไท กรุงเทพมหานคร 10330

10 กุมภาพันธ์ 2564

เรื่อง ขอความร่วมมือในการเก็บข้อมูลวิจัย

เรียน ผู้อำนวยการโรงเรียนสาธิตมหาวิทยาลัยศรีนครินทรวิโรฒ ประสานมิตร (ฝ่ายประถม)
โครงการหลักสูตรนานาชาติ PPIP

สิ่งที่ส่งมาด้วย เครื่องมือที่ใช้ในการวิจัย

ด้วยนางสาวณัฐวรรณ สุขสงวน นิสิตหลักสูตรครุศาสตรมหาบัณฑิต สาขาวิชาการสอนภาษาอังกฤษเป็นภาษาต่างประเทศ ภาควิชาหลักสูตรและการสอน อยู่ระหว่างการดำเนินงานวิทยานิพนธ์เรื่อง “การพัฒนาสื่ออินโฟกราฟฟิกเพื่อเสริมสร้างความเข้าใจในการอ่านของผู้เรียนรุ่นเยาว์ที่เรียนภาษาอังกฤษเป็นภาษาต่างประเทศ” โดยมี รองศาสตราจารย์ ดร.สุมาลี ชีโนกุล เป็นอาจารย์ที่ปรึกษา

ในการนี้นิสิตมีความจำเป็นต้องเก็บข้อมูลด้วยแบบสัมภาษณ์ และแบบสอบถาม กับอาจารย์ชาวต่างชาติ และนักเรียนระดับชั้น Year 4 ของโครงการหลักสูตรนานาชาติ

จึงเรียนมาเพื่อขอความอนุเคราะห์จากท่านโปรดอนุญาตให้นิสิตได้ทำการเก็บข้อมูลวิจัยดังกล่าว เพื่อประโยชน์ทางวิชาการต่อไป และขอขอบคุณมาในโอกาสนี้

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.วิชัย เสวงงาม)

รองคณบดี

ปฏิบัติการแทนคณบดี

กลุ่มภารกิจบริการการศึกษาาระดับบัณฑิตศึกษาและวิชาชีพ ฝ่ายวิชาการ

โทร. 0-2218-2565 ต่อ 6734

เบอร์โทรศัพท์ผู้วิจัย: 087-6077601 email: nattawantatee@gmail.com

APPENDIX C Interview questions for teachers**Interview Question for Stakeholders**

- Question 1: What are the steps of teaching non-fiction reading text?
- Question 2: What are the challenges have you seen while you teaching the non-fiction text?
- Question 3: How can you typically assist student learning process, what are some drawbacks?
- Question 4: What are some ways to improve the current material? Any specify texts of topics needed?
- Question 5: What are the important elements of the non-fiction text that need to be focus? What priority?
- Question 6: How do you assess/ evaluate students' reading comprehension?

APPENDIX D Needs analysis questionnaire for students

Needs analysis questionnaires for students

Section 1: Problem in reading non-fiction text

Direction: Put the ✓ in the of the sentences which you agree

- The non-fiction texts are boring.
- The non-fiction texts are too hard to read.
- There are many rare words in non-fiction texts.
- I cannot guess the word meaning from the non-fiction texts.
- There are no pictures to help me understand in non-fiction texts.
- Others, please specify.....

Section 2: Reading preferences

Direction: Put the ✓ in the of the sentences which you agree

- I like when the teacher set the target for reading.
- I like to read the text with picture.
- Pictures help me to understand the texts.
- Pictures make reading non-fiction text easier.

Section 3: Students' opinions

Direction: Read the statements and circle to choose your preference from the choices provided.

1. I prefer **normal** or **bold** fonts.
2. I prefer **normal** or **fancy** fonts.
3. I prefer **regular** or **cursive** font
4. I prefer the infographic **with key words** or **without key words** from the text.
5. I prefer to have the key words **with meaning** or **without meaning**.
6. I prefer **a few** or **many** describing words in the infographic.
7. I prefer **real pictures** or **drawing illustrations** to be presented in the infographic.
8. I prefer the **clear** or **unclear** pictures to represent the meaning of the words in the infographic.
9. I prefer picture or illustration **with label wording** or **without label wording**.
10. I prefer the information from the text to be presented in the infographic **as a big picture** or **divided into sections**.

APPENDIX E Example of English reading comprehension tests with answer

keys

Active Planet: Natural Disaster

Reading comprehension test

Step 1

Instruction: Match the picture cards of the natural disasters with the correct causes and effects cards that represented the natural disaster within 10 minutes.

<p><u>Cause</u></p> <p>An overflow of a body of water such as a river or lake, or by excessive amounts of rainfall over a short period of time.</p>	<p><u>Effect</u></p> <p>They destroy houses and buildings, and carry soil away from farming land. It can also cause the shortage of drinking water.</p>
<p><u>Cause</u></p> <p>It caused by an earthquake, underwater volcanic eruption, or landslide.</p>	<p><u>Effect</u></p> <p>Destructive waves hit the coast, destroy houses and cause people to death.</p>
<p><u>Cause</u></p> <p>A huge violent storm that forms over warm seas and oceans.</p>	<p><u>Effect</u></p> <p>It can cause winds of over 100 miles per hour and damage people's properties and life.</p>

Cause

A sudden violent movement of the earth's surface

Effect

Many buildings are destroyed, a lot of people get killed and injured. It can also cause the tsunami and volcano eruption.

Cause

When lava and gas suddenly erupt from the earth surface through a vent in a volcano.

Effect

Fast-moving lava can kill people and falling ash can make it hard for people to breathe.



**Step 2**

Instruction: Answer the following questions

Question 1

Can one natural disaster cause another?
Please give some examples?

Question 2

What are the negative effects of the natural disaster to the human being?

Active Planet: Natural Disaster



Test Answer for step 1: Matching picture cards

**Cause**

An overflow of a body of water such as a river or lake, or by excessive amounts of rainfall over a short period of time.

Effect

They destroy houses and buildings, and carry soil away from farming land. It can also cause the shortage of drinking water.

**Cause**

It caused by an earthquake, underwater volcanic eruption, or landslide.

Effect

Destructive waves hit the coast, destroy houses and cause people to death.

**Cause**

A huge violent storm that forms over warm seas and oceans.

Effect

It can cause winds of over 100 miles per hour and damage people's properties and life.

**Cause**

A sudden violent movement of the earth's surface

Effect

Many buildings are destroyed, a lot of people get killed and injured. It can also cause the tsunami and volcano eruption.

**Cause**

When lava and gas suddenly erupt from the earth surface through a vent in a volcano.

Effect

Fast-moving lava can kill people and falling ash can make it hard for people to breathe.



Test Answer for step 2: Answering questions

Question 1

Can one natural disaster cause another? Please give some examples?

Answer

Yes, it can. The earthquake can cause the tsunami because if the earthquake happens under the ocean the landslide will cause the big wave in the ocean which will hit the land. The earthquake can also trigger volcanic eruptions to be exploded.

Question 2

What are the negative effects of the natural disaster to the human being?

Answer

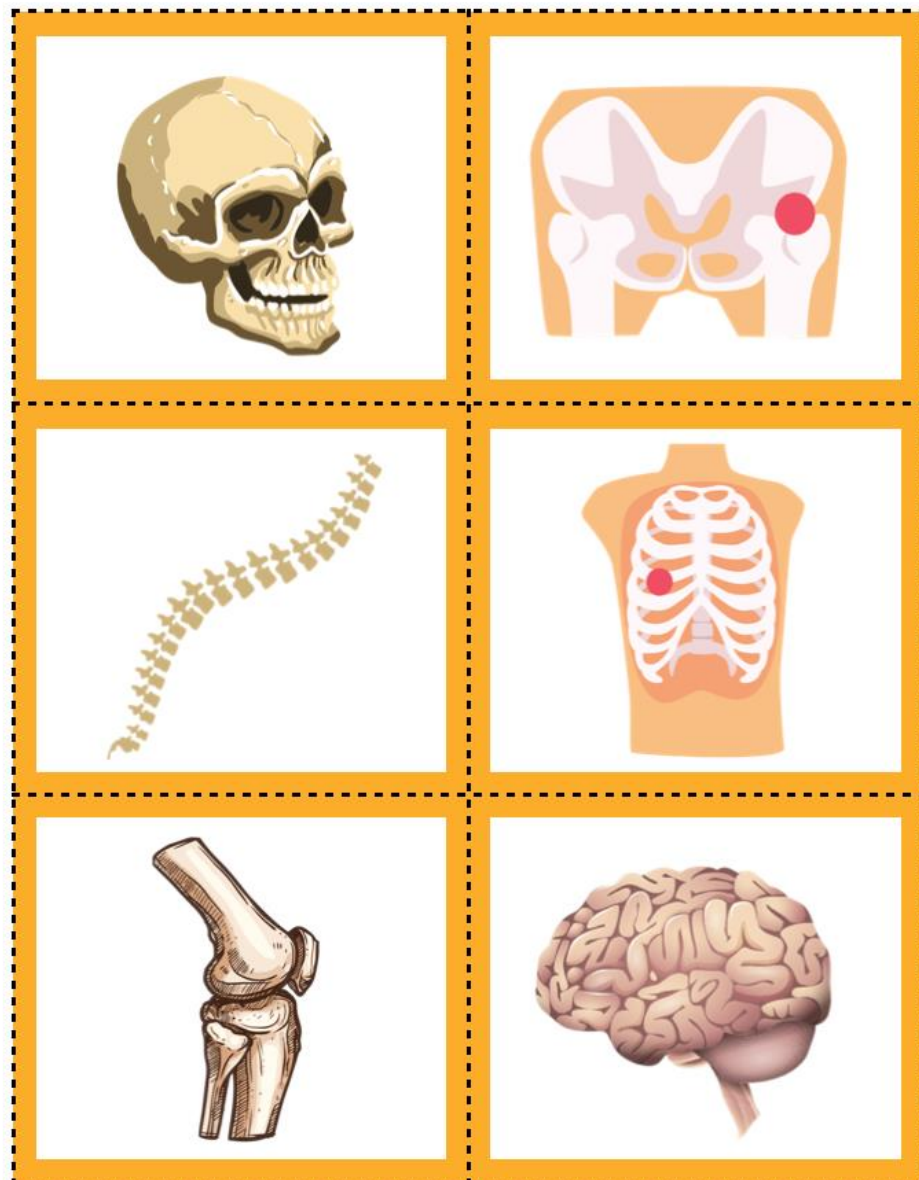
The negative effects from the natural disaster are the destruction of property, the personal injury or illness and the loss and lack of resources.

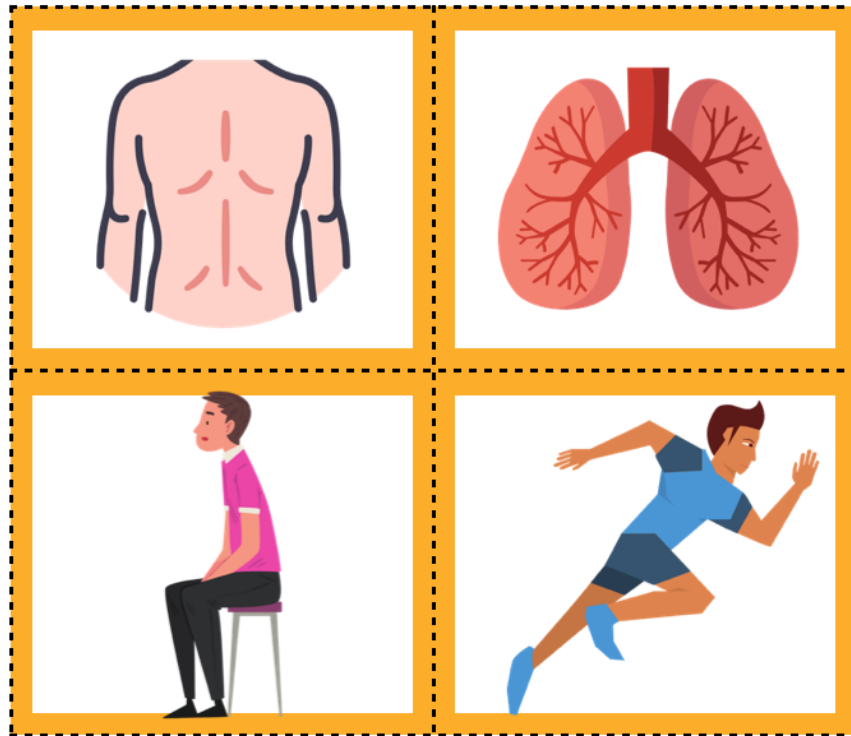


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Reading Comprehension Test**Step 1**

Instruction: Look at the pictures provided and match the pictures that relate to each other within 10 minutes.



**Step 2**

Instruction: Answer the following questions

Question 1

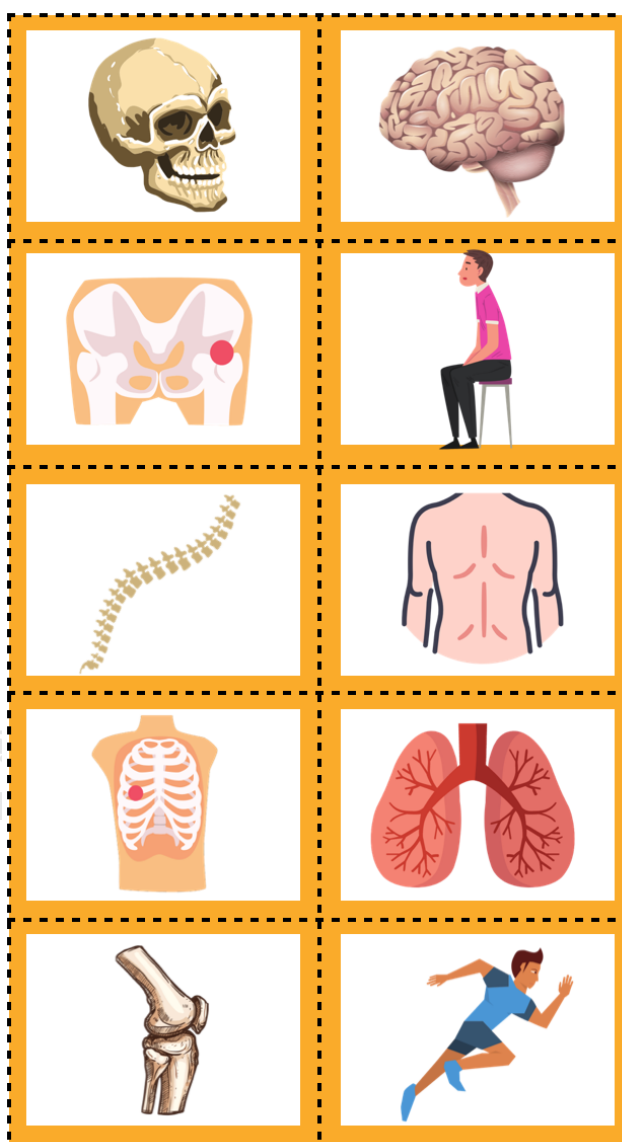
What bones are used for organ protection?

Question 2

Are bones dead or alive cells? please explain.



Test Answer for step 1: Matching picture cards



**Test Answer for step 2: Answering questions****Question 1**

What bones are used for organ protection?

Answer

The bones that are used to protect the organ are the skull and ribs. The skull protects the brain and the ribs protect the organ around the chest.

Question 2

Are bones dead or alive cells?
Please explain.

Answer

Bones are alive because bones can grow and change shapes. It is also able to heal itself when it breaks.

APPENDIX F Interview Questions for Students

Interview Question for Students

Question 1: How do you feel about using developed infographic materials in reading lesson?

Question 2: What do you like the most about using developed infographic materials in reading lesson?

Question 3: What do you don't like about using developed infographic materials in the reading lesson?

Question 4: How do you think the using developed infographic materials in reading non-fiction text helped you to improve your English reading comprehension? If yes, how?

Question 5: How can we make the developed infographic materials better for you next time?

APPENDIX G Material evaluation form for teachers

Material Evaluation for Teachers

(Development of Infographic Material to Enhance Young English as Foreign Language Learners' Reading Comprehension)

Guideline for evaluation

Please put a tick (✓) in the rating box (+1, 0, -1) in order to identify the appropriateness in your opinion. Please also specify comments for each item for further adjustment and improvement.

+1 means Appropriate

0 means Not sure

-1 means Inappropriate

No.	Topic	Level			Comments and suggestions
		+1	0	-1	
1.	Through the materials, my students' reading comprehension of non-fiction text has satisfactorily improved.				
2.	The developed infographic materials help my students connect new knowledge of the unit of learning with IPC subject.				
3.	The developed infographic materials cause my students to have motivation to read non-fiction texts.				
4.	The developed infographic materials are beneficial to be				

	implemented in close reading teaching instruction.				
5.	The developed infographic materials are able to represent the non-fiction text well and help students understand and engage more with the text.				
6.	When my students come across with an unfamiliar word while reading non-fiction text, they are able to find or guess its meaning using infographic.				
7.	The developed infographic materials are suitable and beneficial to be used as a reading material within all steps of close reading teaching instruction.				
8.	The developed infographic materials help my students to comprehend the non-fiction text to the level of literal and inferential comprehension.				
9.	The developed infographic materials are concordantly use with close reading instruction to teach reading lesson.				
10.	I am satisfied to use developed infographic materials as a reading material to teach reading non-fiction text.				

Comments:

.....

.....

.....

.....

Thank you so much for your time and kind assistance.

.....
 (.....)

APPENDIX H The experts' evaluation of the interview questions for stakeholders

Question	Experts			\bar{x}	Interpretation
	1	2	3		
Question 1: What are the steps of teaching non-fiction reading text?	+1	+1	+1	1.00	Suitable and accepted
Question 2: What are the challenges you have seen while you teaching the non-fiction text?	+1	+1	+1	1.00	Suitable and accepted
Question 3: How can you typically assist the student learning process during lessons.? What are some of the drawbacks?	+1	+1	+1	1.00	Suitable and accepted
Question 4: What are some ways to improve the current reading material?	+1	+1	+1	1.00	Suitable and accepted
Question 5: What are the important elements of the non-fiction text that need to be focus on? What priority?	+1	+1	+1	1.00	Suitable and accepted
Question 6: How do you assess/ evaluate students' reading comprehension?	+1	+1	+1	1.00	Suitable and accepted

APPENDIX I The experts' evaluation of the needs analysis questionnaire for students

Objectives	Contents	Experts			\bar{x}	Interpretation
		1	2	3		
Part 1: Reading ability 1. To get information about the participants' reading ability	1. I enjoy reading class at school.	0	+1	+1	0.67	Accepted
	2. I am a confident reader.	0	+1	+1	1.00	Accepted
	3. I like reading non-fiction text.	0	+1	+1	1.00	Accepted
	4. I find non-fiction reading is challenging.	0	+1	+1	1.00	Accepted
	5. I feel confident when I share ideas with my peers after reading non-fiction text.	0	+1	+1	0.5	Accepted
	6. I always understand what targets for my reading.	0	+1	+1	1.00	Accepted
	7. I can tell the key words from the texts.	0	+1	+1	1.00	Accepted
	8. I am able to find the meaning for new words.	+1	+1	+1	1.00	Suitable and accepted
	9. I can share my ideas of the text with my peers confidently.	0	+1	+1	0.67	Suitable and accepted

Objectives	Contents	Experts			\bar{x}	Interpretation
		1	2	3		
Part 1: Reading preference 1. To identify students' reading preference 2. To identify students' learning styles	10. I like it when the teacher sets me target for reading.	+1	+1	+1	1.00	Suitable and accepted
	11. I like to read text with pictures.	+1	+1	+1	1.00	Suitable and accepted
	12. Pictures help me to understand the texts.	+1	+1	+1	1.00	Suitable and accepted
	13. Pictures make reading non-fiction text easier.	+1	0	+1	0.67	Suitable and accepted

Experts' comments

1. These look like attitude forward reading. Not the need analysis for material development.
2. Same meaning then use item no.9 only.

APPENDIX J The experts' evaluation of the reading comprehension test

No.	Criteria for validating	Experts			\bar{x}	Interpretation
		1	2	3		
1.	The test is appropriate to assess reading comprehension.	0	+1	+1	0.67	Need revision
2.	The instructions are clear and understandable.	+1	+1	+1	1.00	Suitable and accepted
3.	The time allocation is suitable for the length of the test.	+1	+1	+1	1.00	Suitable and accepted
4.	The pictures are appropriate.	0	+1	+1	0.67	Need revision

Experts' comments

1. The test should be adjusted to concordant to the set definition of term.

APPENDIX K The experts' evaluation of the interview questions for students

Question	Experts			\bar{x}	Interpretation
	1	2	3		
Question 1: How do you feel about using infographic in reading lesson?	+1	+1	+1	1.00	Suitable and accepted
Question 2: What do you like the most about using infographic in reading lesson?	+1	+1	+1	1.00	Suitable and accepted
Question 3: What do you don't like about using infographic in the reading lesson?	0	+1	+1	0.67	Accepted
Question 4: How do you think the using infographic in reading non-fiction text helped you to improve your English comprehension? If yes, how?	-1	+1	+1	1.00	Suitable and accepted
Question 5: How can we make the infographic better for you next time?	0	+1	+1	0.67	Accepted

APPENDIX L The experts' evaluation of the material evaluation for teachers

No.	Criteria for validating	Experts			\bar{x}	Interpretation
		1	2	3		
1.	Through the materials, my students' reading comprehension of non-fiction text has improved.	0	+1	+1	0.67	Accepted
2.	The materials help my students connect new knowledge of the unit of learning within the IPC subject.	+1	+1	+1	1.00	Suitable and accepted
3.	The materials caused my students to have increased motivation to read non-fiction texts.	+1	+1	+1	1.00	Suitable and accepted
4.	The materials are beneficial to be implemented in close reading teaching instruction.	+1	+1	+1	1.00	Suitable and accepted
5.	The infographics are able to represent the non-fiction text well and help students understand and engage more with the text.	0	+1	+1	0.67	Accepted
6.	When my students come across with an unfamiliar word while reading non-fiction text, they are able to find or guess its meaning using infographic.	+1	+1	+1	1.00	Suitable and accepted
7.	The infographics are suitable and beneficial to be used as a reading material within all steps of close reading teaching instruction.	0	+1	+1	0.67	Accepted
8.	The infographics help my students to comprehend the non-fiction text to the level of literal and inferential comprehension.	0	+1	+1	0.67	Accepted
9.	The infographics are concordantly use with close reading instruction to teach reading lesson.	0	+1	+1	0.67	Accepted
10.	I am satisfied to use infographic as a reading material to teach reading non-fiction text.	+1	+1	+1	1.00	Suitable and accepted

APPENDIX M The expert's evaluation for the teacher manual: unit plan and materials

No.	Criteria for validating	Experts			\bar{x}	Interpretation
		1	2	3		
Learning objective						
1.	Is the learning objective aligned well with the topic?	+1	+1	+1	1.00	Suitable and accepted
2.	Is the learning objective suitable with the level of learners?	0	+1	+1	0.67	Accepted
3.	Does the learning objective support language learning?	+1	+1	+1	1.00	Suitable and accepted
4.	Is the learning objective measurable?	+1	+1	+1	1.00	Suitable and accepted
Content						
5.	Is the content difficulty and language level appropriate for the learners?	0	+1	+1	0.67	Accepted
6.	Is the content appropriate for learning objectives?	+1	+1	+1	1.00	Suitable and accepted
Materials						
A. Infographic						
7.	Is the infographic appropriate?	+1	+1	+1	1.00	Suitable and accepted
8.	Is the infographic relevant to the topic?	+1	+1	+1	1.00	Suitable and accepted
9.	Is the infographic relevant to the text?	+1	+1	+1	1.00	Suitable and accepted
10.	Are the design and organization of infographic understandable?	0	0	+1	0.33	Need revision
11.	Is the language used in the infographic appropriate and understandable?	0	+1	+1	0.67	Accepted
B. Text						
12.	Is the language appropriate and at the right level for the students?	0	+1	+1	0.67	Accepted

No.	Criteria for validating	Experts			\bar{x}	Interpretation
		1	2	3		
13.	Is the font size appropriate?	+1	+1	+1	1.00	Suitable and accepted
14.	Are the layout and design appropriate and clear for reading?	+1	+1	+1	1.00	Suitable and accepted
C. Student worksheet						
15.	Do the worksheets support close reading instruction?	+1	+1	+1	1.00	Suitable and accepted
16.	Do the worksheets help building students reading habits according to the close reading instruction? (annotation)	+1	+1	+1	1.00	Suitable and accepted
Activity						
17.	Are the activities appropriate for the level of learners?	0	+1	+1	0.67	Accepted
18.	Do the activities help learners to enhance reading comprehension?	+1	+1	+1	1.00	Suitable and accepted
Teaching instruction						
19.	1 st reading for literal comprehension	+1	+1	+1	1.00	Suitable and accepted
20.	2 nd reading for inferential comprehension	+1	+1	+1	1.00	Suitable and accepted
21.	3 rd reading for critical comprehension	+1	+1	+1	1.00	Suitable and accepted
Assessment						
22.	Is the assessment appropriate to the learning outcome?	+1	+1	+1	1.00	Suitable and accepted
Time						
23.	Is time allocation appropriate?	+1	+1	+1	1.00	Suitable and accepted

Experts' comments

1. The natural disaster infographic needs revision on the organisation and the presentation. Also, the pictures of stages of how fossils form do not really informative.

APPENDIX N Students' score of English reading comprehension test*Students' score of English reading comprehension test score of Unit 1*

Student	Pre-test			Post-test		
	Matching (10)	Question (2)	Total (12)	Matching (10)	Question (2)	Total (12)
S01	5	0	5	10	2	12
S02	4	0	4	10	2	12
S03	3	0	3	8	1	9
S04	3	0	3	8	1	9
S05	6	1	7	10	2	12
S06	5	0	5	10	2	12
S07	4	0	4	10	2	12
S08	3	0	3	7	2	9
S09	2	0	2	8	1	9
S10	3	0	3	8	1	9
S11	2	0	2	7	1	8
S12	4	0	4	10	2	12
S13	5	0	5	10	2	12
S14	6	1	7	10	2	12
S15	6	1	7	10	2	12
S16	3	0	3	8	1	9
S17	4	0	4	8	1	9
S18	4	0	4	8	2	10
S19	2	0	2	6	1	7
S20	3	0	3	7	1	8

Students' score of English reading comprehension test score of Unit 2

Student	Pre-test			Post-test		
	Matching (10)	Question (2)	Total (12)	Matching (10)	Question (2)	Total (12)
S01	3	0	3	8	2	10
S02	4	0	4	8	2	10
S03	2	0	2	7	1	8
S04	3	0	3	7	2	9
S05	5	1	6	10	2	12
S06	4	0	4	10	2	12
S07	4	0	4	8	2	10
S08	2	0	2	7	1	8
S09	3	0	3	8	2	10
S10	2	0	2	5	1	6
S11	3	0	3	4	1	5
S12	4	1	5	8	2	10
S13	3	0	3	8	2	10
S14	4	0	4	10	2	12
S15	3	0	3	10	2	12
S16	3	0	3	6	1	7
S17	3	0	3	7	2	9
S18	4	0	4	8	2	10
S19	3	0	3	5	1	6
S20	4	0	4	7	1	8

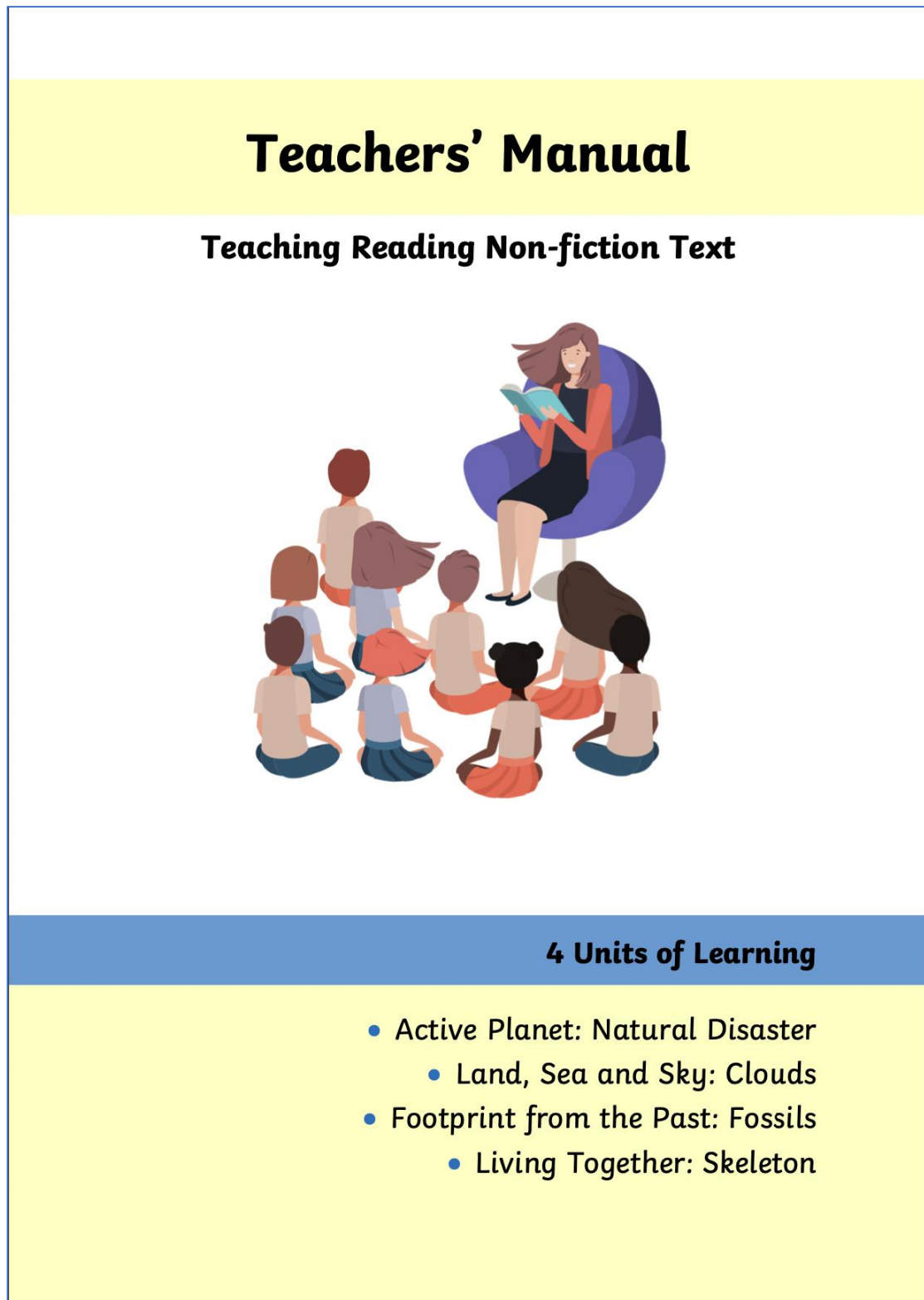
Students' score of English reading comprehension test score of Unit 3

Student	Pre-test			Post-test		
	Matching (6)	Question (2)	Total (8)	Matching (6)	Question (2)	Total (8)
S01	3	0	3	6	2	8
S02	4	0	4	6	2	8
S03	2	0	2	4	1	5
S04	3	0	3	6	1	7
S05	3	0	3	6	2	8
S06	6	1	7	6	2	8
S07	6	1	7	6	2	8
S08	2	0	2	4	2	6
S09	2	0	2	4	2	6
S10	1	0	1	4	1	5
S11	2	0	2	4	1	5
S12	3	0	3	6	2	8
S13	2	0	2	6	2	8
S14	3	0	3	6	2	8
S15	6	1	7	6	2	8
S16	2	0	2	4	1	5
S17	1	0	1	4	1	5
S18	2	0	2	6	2	8
S19	1	0	1	4	2	6
S20	1	0	1	4	1	5

Students' score of English reading comprehension test score of Unit 4

Student	Pre-test			Post-test		
	Matching (10)	Question (2)	Total (12)	Matching (10)	Question (2)	Total (12)
S01	4	0	3	10	2	12
S02	4	0	4	10	2	12
S03	2	0	2	6	2	8
S04	4	0	3	10	2	12
S05	6	1	6	10	2	12
S06	4	0	4	10	2	12
S07	4	0	4	6	2	8
S08	2	0	2	10	2	12
S09	4	0	3	6	1	7
S10	4	0	2	10	2	12
S11	2	0	3	6	1	7
S12	6	1	5	10	2	12
S13	4	0	3	10	2	12
S14	6	1	4	10	2	12
S15	6	1	3	10	2	12
S16	2	0	3	6	1	7
S17	4	0	3	8	2	10
S18	4	0	4	10	2	12
S19	2	0	3	8	1	9
S20	4	0	4	8	2	10

APPENDIX O cover of teachers' manual

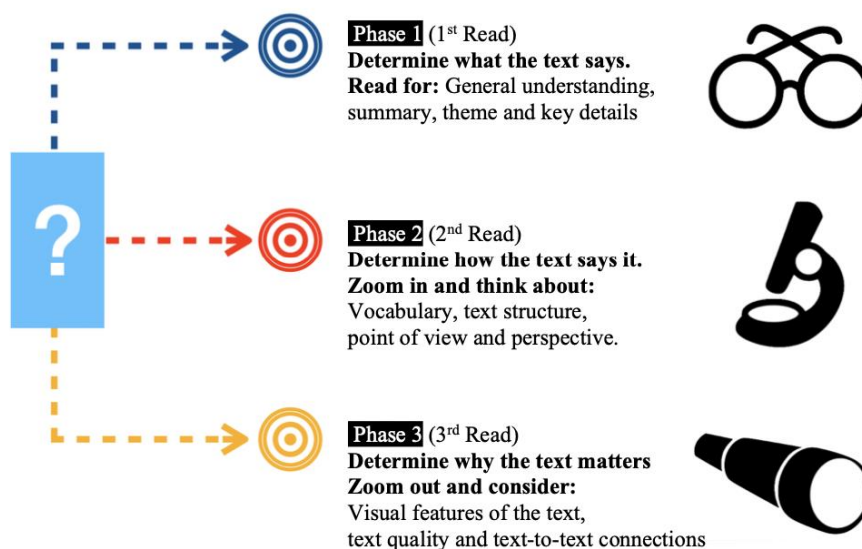


APPENDIX P Teachers' manual material guide

Material Guide

- **Lesson Plan**

The lesson plan will follow steps of teaching from close reading instruction which consists of 3 phases of reading. There are questions provided within each steps of teaching match with the purposes of reading in each step. The questions are based on the progression of text-dependent question.



- **Text**

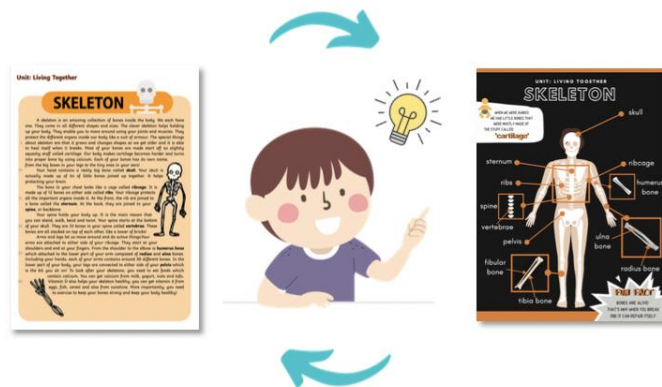
In each unit of learning, there is a non-fiction text that required for year 4 students to read and comprehend.

- **Infographic**

The infographic is developed according to the non-fiction text of each unit. There will be the information of non-fiction text with the key vocabulary and the visual picture provided to help students' comprehension. During the lesson, the students will use the infographic as a main reading material or reference to help them comprehend the non-fiction text. In the lesson plan, **Link to the infographic** will show when the infographic is used.



In the lesson, the students can refer the information from reading non-fiction text to the infographic. The combination of words from the text and images from the infographic will help students to comprehend the non-fiction text better.



- **Worksheet**

In the lesson, the teacher will need worksheet for the students to annotate the information of what they have read from the text. Besides, the writing task is also provided within the worksheet for students to practice writing and summarise their knowledge after reading the non-fiction text.

- **Reading comprehension test**

The reading comprehension test will be in the form of matching card activities. The teachers will have to print out the card and have the students to do the matching activities. During the reading comprehension test, the researcher will ask the students the question in order to collect data about students' reading comprehension of non-fiction text.

APPENDIX Q Example of lesson plan provided in teachers' manual

Living Together: Skeleton	
Unit 4: Lesson Plan	
Unit: Living Together (Skeleton)	
Subject: Reading lesson	Time: 3 periods
Topic: Skeleton	Level: Year 4
<hr/>	
1. Learning Goal:	
Students will be able to explain what a skeleton is and give detail about it.	
2. Enabling Objective:	
2.1 Students will be able to retrieve and record information from the text	
2.2 Students will be able to ask question to improve their understanding of a text	
2.3 Students will be able to write a paragraph about their opinion toward the passage.	
3. Learning Content:	
3.1 Vocabulary: cartilage, skull, ribcage, ribs, sternum, vertebrae, humerus bone, radius, ulna and pelvis	
3.2 Function: giving reason	
4. Materials:	
4.1 'Skeleton' reading material	
4.2 'Skeleton' infographic	
4.3 Student worksheet	
5. Evaluation:	
5.1 Student will be evaluated during each step of reading using question - answer activities	
5.2 A paragraph of writing 'What is the most important bone in the skeleton?'	

6. Instructional Strategies

- 6.1 Re-read the text together
- 6.2 Model close reading habits
- 6.3 Ask questions to meet the target of each step of close reading
- 6.4 Encourage students to do an annotation during reading

7. Teaching Procedures:

7.6 Warm-up (20 minutes)

- Teacher talks about the text 'Skeleton' and tells students about how close reading will be implemented into the lesson.

"Good _____, everybody! Today we are going to read the text about Skeletons and bones, do you have any ideas about what they are?"

Suggested answers: stones, calcium, help us to grow etc.

"Well done, thank you for sharing your ideas. In the text 'Skeletons' is going to talk about types of bones we have and their use.

"And today, we are going to use Close reading instruction to read the text. There will be three phases/steps of reading which you will be asking questions based on the text information"

- Teacher gives students the student worksheet (annotation sheet), then describes each part of the paper to students.

"On the worksheet you will see three boxes, the first box is called 'Keywords' box which you can put important or unknown words in the box, 'Note' is where you put all the big idea, information that you think it is important and you need to remember or something it confuse you. Don't forget to put the number of the paragraph and identify the line so when we come back to figure it out it will help you to find it. You

also can make note in the passage paper. and for the column

‘Summary’ we will fill in the summary that you have got after we read through the passage”

- Students are allowed to *circle* the unknown vocabulary, *highlight* the important parts and mark anything they notice in the text.
- Teacher informs students about the expected from reading the text.

“After finish reading the text, I want you to write a paragraph base on your understanding of what you think the most important bone in the body is.”

- Teacher hands the infographic to the student and has students.

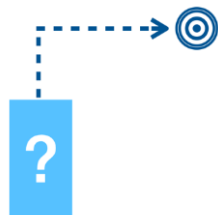


Link to the infographic, teacher introduces the infographic to the students. Teacher have the students read the information on the infographic and discuss with their partners. Then, teacher has the students write the related vocabulary or key vocabulary on the worksheet.

7.7 Close reading procedure (110 minutes for 3 lessons)

1st step (Phase 1):

- Teacher shows the essential questions for the first round of reading.



1. What is a skeleton?

Expected answers: Bones that hold our body in the right place and protect us from injury.

2. How does a skeleton help?

Expected answers: Answers will vary



3. Name 3 examples of bones and state their purpose.

Expected answers: E.g. Skull – to protect the head and your brain, Ribcage – To protect very important organs such as your heart and lungs.

- Teacher has students whisper read through the text to get the general idea of the text. After students finish reading, teacher has students do '*think - pair - share*' their ideas that they have got from the first reading.



Link to the infographic, teachers have students identify types of skeletons with pictures on the infographic, describe the pictures and have them share their ideas with partners.

Teacher role: Teacher checks students' fluency and assists with decoding skill and be a good example of pronouncing word when do the read aloud.

2nd step (Phase 2):

- Teacher read aloud to the students for second reading to help students read more closely to answer the questions
- After second reading, teacher has students answer the questions, explain and discuss about the part that they do not understand.

1. How many bones are in your spine?



Expected answers: 33 bones

2. How does your body hold itself up?

Expected answers: Using the spine.

3. Why does the author use personal pronouns in the text such as 'you' and 'your'?



Expected answers: To make the reader feel like the text is about them.



Link to the infographic, teachers have students identify each type of bone with pictures in the infographic, describe details shown in the pictures, match pictures with the text.

- Teacher can have them share their answer one by one and discuss with the whole class

Teacher role: Teacher reads to students and helps students find the clue for answering the questions.

3rd step (Phase 3):

- Teacher has students analyse the question provided below and re-read the text to find the answer and/or build their own ideas from the text.
- Students share their ideas with friend and share their answers of the questions.



1. How would you move without a spine? Could you?

Expected answers: Answers will vary

2. What would happen if you lived an unhealthy lifestyle?

Expected answers: Answers will vary



- Teacher has students analyse and think of the author's purpose of this passage.



Link to the infographic, have students make inference to their knowledge of the skeleton and/or what they have seen/read before about skeletons, have them discuss in a small group.

7.3 Production (20 minutes)

- Teacher has students to write a paragraph about their opinion of what bone is the most important in the skeleton.

8. Assessment

Focusing on both form and meaning, teacher assesses students writing by checking their ideas and understanding from the reading passage.



APPENDIX R Example of non-fiction text provided in teachers' manual

Unit: Living Together

SKELETON



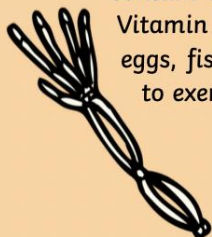
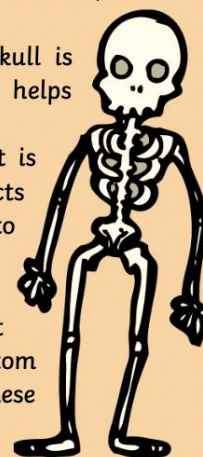
A skeleton is an amazing collection of bones inside the body. We each have one. They come in all different shapes and sizes. The clever skeleton helps holding up your body. They enable you to move around using your joints and muscles. They protect the different organs inside our body like a suit of armour. The special things
 5 about skeleton are that it grows and changes shapes as we get older and it is able to heal itself when it breaks. Most of your bones are made start off as slightly squashy stuff called cartilage. Our body makes cartilage becomes harder and turns into proper bone by using calcium. Each of your bones has its own name, from the big boxes in your legs to the tiny ones in your ears!

10 Your head contains a really big bone called **skull**. Your skull is actually made up of its of little bones joined up together. It helps protecting your brain.

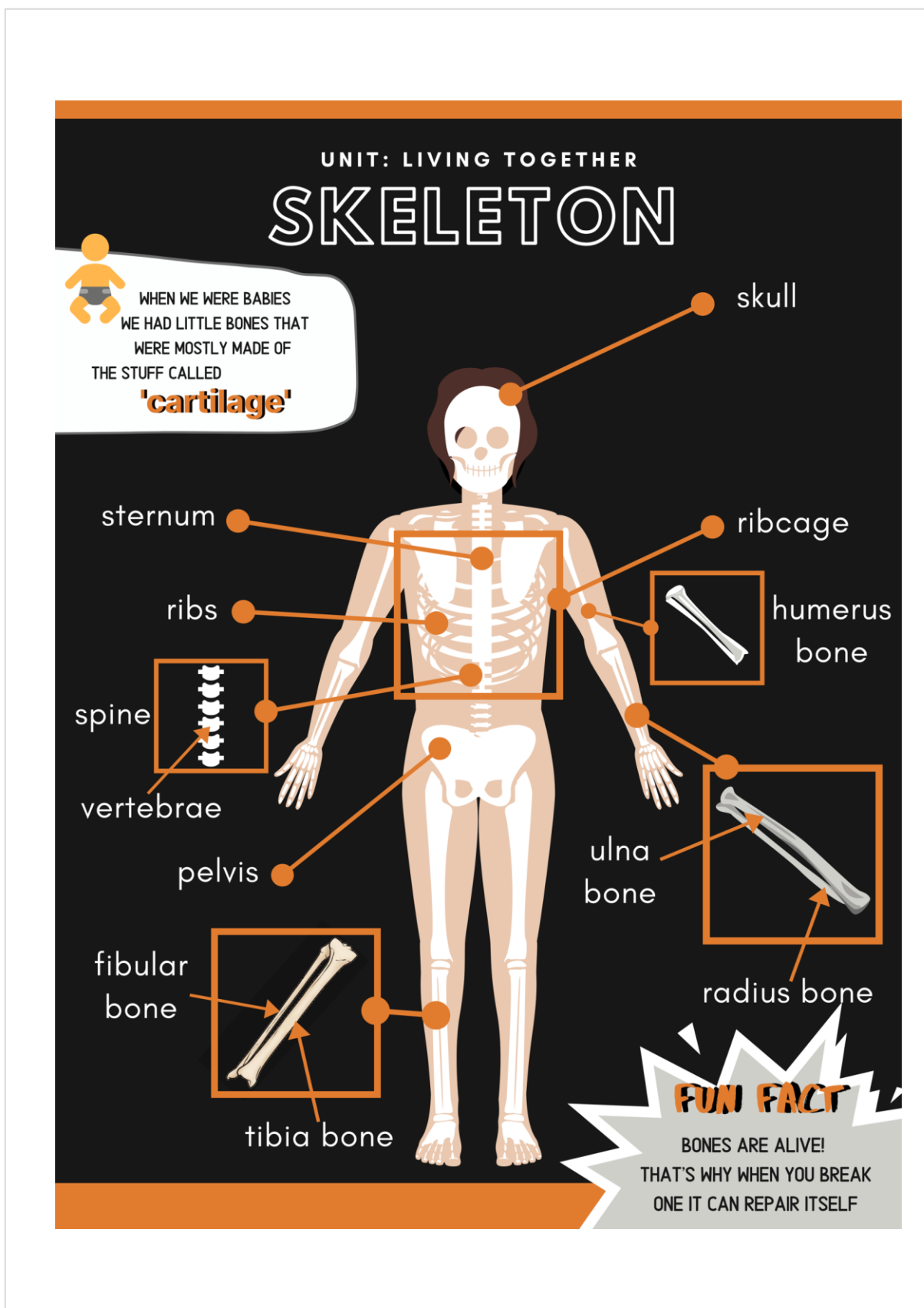
The bone in your chest looks like a cage called **ribcage**. It is made up of 12 bones on either side called **ribs**. Your ribcage protects
 15 all the important organs inside it. At the front, the rib are joined to a bone called the **sternum**. At the back, they are joined to your **spine**, or backbone.

Your spine holds your body up. It is the main reason that you can stand, walk, bend and twist. Your spine starts at the bottom
 20 of your skull. They are 33 bones in your spine called **vertebrae**. These bones are all stacked on top of each other, like a tower of bricks!

Arms and legs let us move around and do active things. Your arms are attached to either side of your ribcage. They start at your shoulders and end at your fingers. From the shoulder to the elbow is **humerus bone**
 25 which attached to the lower part of your arm composed of **radius** and **ulna** bones. Including your hands, each of your arms contains around 30 different bones. In the lower part of your body, your legs are connected to either side of your **pelvis** which is the bit you sit on! To look after your skeletons, you need to eat foods which contain calcium. You can get calcium from milk, yogurt, nuts and tofu.
 30 Vitamin D also helps your skeleton healthy, you can get vitamin d from eggs, fish, cereal and also from sunshine. More importantly, you need to exercise to keep your bones strong and keep your body healthy!



APPENDIX S Example of infographic provided in teachers' manual



APPENDIX T Example of worksheets provided in teachers' manual

Unit: Living Together

Name:

SKELETON

**Keywords****Note****1st Read:** Determine what the text says**2nd Read:** Determine how the text says it**3rd Read:** Determine why the text matters**Summary**

Name:

Unit: Living Together

SKELETON



'What is the most important bone in the skeleton?'

A large rectangular area with a dashed border, intended for a student to write their answer to the question above.

A series of horizontal lines with a dotted midline, providing a space for a student to write their answer.

VITA

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