Author:
Susanti, Diah Restu

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The Implementation of the Scientific Approach (SA) in English as a Foreign Language (EFL) Classes and Its Influence on Students' Critical Thinking Development Processes

An In-Depth Case Study of An Indonesian State Senior High School

The Implementation of the Scientific Approach (SA) in English as a Foreign Language (EFL) Classes and Its Influence on Students' Critical Thinking Development Processes: An In-Depth Case Study of An Indonesian State Senior High School

Diah Restu Susanti

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Glossary/Acronyms

AMS   Algemene Middlebare School. It is part of the education system of the Dutch colonial era in Indonesia. AMS is equivalent to the senior high school level. AMS was established in the 1930s and only existed in several provincial capitals of the Dutch East Indies

ALM   The Audiolingual Method

ASEAN   The Association of Southeast Asian Nations

BERA   British Educational Research Association

C1 – C6   Cognitive Level 1 – Cognitive Level 6

CA   Communicative Approach

CBSA   Cara Belajar Siswa Aktif (Student Active Learning [SAL])

CLL   Community Language Learning

CLT   Communicative Language Teaching

CT   Critical Thinking

DM   Direct Method

EFL   English as a Foreign Language

ELT   English Language Teaching

FGI   Focus Group Interview

FGD   Focus Group Discussion

FGDI   Focus Group Discussion and Interview

HOTS   Higher-Order Thinking Skills

GBA   Genre-Based Approach

GMT   The Grammar Translation Method

KBK   Kurikulum Berbasis Kompetensi (Competence Based

                                 Curriculum [CBC])

Kemdikbud/Kemendikbud   The Ministry of Education and Culture of the Republic of

                                 Indonesia

KTSP   Kurikulum Tingkat Satuan Pendidikan (School-Based

                                 Curriculum [SBC])

LOTS   Lower-Order Thinking Skills

MBO   Management By Objective

Mendikbud   The Minister of Education and Culture

MULO   Meer Uitgebreid Lager Onderwijs is part of the education

                                 system of the Dutch colonial era in Indonesia. MULO was the

                                 first level secondary school that is equivalent to junior high

                                 school today. MULO uses Dutch as the language of instruction.

	At the end of the 1930s, MULO existed in almost every
	Kawedanaan or regency
OECD	Organisation for Economic Co-operation and Development
Pancawardhana	The Five Education Principles
Pancasila	The Five Basic Ideologies of Indonesia
Permen	Peraturan Menteri (Ministerial regulation)
PIRLS	Progress in International Reading Literacy Study
PISA	Programme for International Student Assessment
PMP Dikdasmen	Penjamin Mutu Pendidikan Dasar dan Menengah (Quality Assurance of Basic and Middle Education)
SA	Scientific Approach
SBC	School Based Curriculum
SW	The Silent Way
TIMSS	The International Mathematics and Science Study
The Old Order	The Old Order in Indonesian political history referred to the Soekarno (the first Indonesian President) administration which lasted from 1945 to 1967
TPR	The Total Physical Response
TSM	Traditional Scientific Method

UUD 1945	Undang - Undang Dasar 1945 (The National Constitution of the Republic of Indonesia)
US	United States of America
UK	United Kingdom

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Abstract

This research was conducted to investigate the implementation of the Scientific Approach (SA) in English as a Foreign Language (EFL) classes and its influence on students' critical thinking development processes. Previous research has examined the implementation of the SA in the areas of EFL teaching (Ratnaningsih, 2017; Suharyadi, 2013), but has not discussed students' critical thinking skills; as such, this study is intended to contribute new understanding.

Founded on the philosophy of constructivism, this in-depth qualitative case study offers insights into the implementation of the SA at one particular school that served as the pilot and reference school for the implementation of the 2013 curriculum in Indonesia. The *standard competencies* and *core competencies* of the 2013 curriculum, along with the knowledge competences based on Bloom's revised Taxonomy (Anderson and Krathwohl, 2001), provided a rich foundation for understanding the process of critical thinking development through classroom activities based on the SA.

Data were elicited from a number of EFL classroom observations (n=8), semi-structured interviews with key administrators and participants (n=6), Focus Group Discussions and Interviews (n=4) and analysis of various documents (n=7). Qualitative conventional content analysis (Hsieh & Shannon, 2005) was used to analyse the interview data from participants, while Thematic analysis (Braun & Clarke, 2006) was used to analyse the data from the classroom observations. Lastly, document analysis (Bowen, 2009) was used to examine relevant documents.

Even though the results showed a positive trend towards the development of the higher levels of cognitive thinking, data indicated that critical thinking skills still focused on the lower levels of *remembering, understanding* and *applying*—the higher levels remained largely underdeveloped. This phenomenon was attributed to several issues including limitations within course documentation, challenges in implementing the SA in EFL lessons, and several factors relevant to the students. Recommendations to enhance implementation are offered for teachers, school managers, and the Indonesian government regarding teacher training, additional monitoring and evaluation procedures, and key updates to documentation respectively.

Author's Declaration

I declare that the work in this dissertation was carried out in accordance with the requirements of the University's *Regulations and Code of Practice for Research Degree Programmes* and that it has not been submitted for any other academic award. Except where indicated by specific reference in the text, the work is the candidate's own work. Work done in collaboration with, or with the assistance of others, is indicated as such. Any views expressed in the dissertation are those of the author.

SIGNED: ██████████████████   DATE: 28 August 2020

Chapter 1

Introduction

This research is focused on the implementation of the Scientific Approach (SA) in teaching English as a Foreign Language (EFL) based on Indonesian 2013 Curriculum. This study aimed to investigate the implementation of the SA in EFL classes in a state senior high school in *Sumedang* Regency, West Java, Indonesia. Additionally, this research also analysed how the SA implementation contributed to the development of students' critical thinking skills, which was evaluated based on the Bloom's revised Taxonomy by Anderson and Krathwohl (2001) as specified in Indonesian 2013 Curriculum. Overall, the topics presented in this chapter are as follows:

Figure 1

The Topics Discussed in the Introduction Chapter

1.1 Background, Context and Rationale for the Research

Curriculum has attracted a plethora of researchers to conduct studies on its planning,

implementation, development, and evaluation (e.g., Guba & Lincoln, 1981; Lam, 2012; Trochim,

2006). In the Indonesian context, this trend commenced in 1947 when the first Indonesian

education system applied its very first curriculum as an independent nation (Mufidha & Astariza,

2016). To date, the Indonesian government has reformed the national curriculum on ten

occasions (Dit. PSMA, 2009) in response to societal changes. The latest curriculum in Indonesia

is called the 2013 Curriculum, aptly named after the year in which it was published. It was

formulated with the aim to develop students' interpersonal, analytical, decision-making, and

communication skills (Kemendikbud[1]/Permen[2] No. 81A/2013, 2013e; Lazim, 2013;

Sparahayuningsih, 2010; Zaim, 2017), and to equip learners with the proficiency needed to meet

global demands (Madkur & Nur, 2014). The Indonesian government, through the 2013

Curriculum, took into consideration the aforementioned skills to be integrated in all school

subjects to elevate learners' competencies (Madkur & Nur, 2014).

In respect to educational quality, the OECD (2014) reported the results of PISA (Programme for

International Student Assessment), from which Indonesian policy makers could reflect that the

country's education system had not been designed to enhance students' critical and analytical

abilities. Hence, compared to other nations, the country was considerably left behind on this

matter. Taking this into account, Madkur & Nur (2014) state that such an outcome was in line

with the fact that those skills were not on the agenda of the previous 2006 curriculum design. For

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[1] Kemendikbud or Kemdikbud is an abbreviation of Kementerian Pendidikan dan Kebudayaan Republik Indonesia or Ministry of National Education of the Republic of Indonesia.
[2] Permen is an abbreviation of Peraturan Menteri or Ministerial regulation.

this reason, the 2013 Curriculum was formulated and, with it, its approach to learning and

teaching was reformed and focused on giving learners more exposure to activities that would

train their analytical and problem-solving skills in the hope that in the future, they could take part

in advancing country's development in science, technology, and other necessary aspects

(Kemendikbud/Permen No. 81 A/2013, 2013).

Furthermore, it was expected that by incorporating critical thinking skills within the curriculum,

learners would be able to increase their competencies to meet future needs and actualise the

Indonesia Golden Generation in 2045 (Kemendikbud/Permen No. 64/2013, 2013b). Thus, critical

thinking is the foundation for learners to develop other skills as expected in the 2013 Curriculum.

The launch and implementation of the 2013 Curriculum involved three periods of ministerial

change. It was first launched in mid-2013 and implemented in the 2013-14 school year and was

limited to pilot schools (6,221 out of 208,000 schools of elementary, junior high and senior high

school levels) that were spread throughout the provinces in Indonesia while other schools still

used the previous curriculum, the 2006 School-Based Curriculum (Wahyuni, 2014). Presently,

Indonesian 2013 Curriculum continues to be reviewed and developed. The recent Ministry of

Education and Culture aims to finish the piloting project for the 2013 Curriculum in the 2019-20

academic year.

To date, the 2013 Curriculum has been revised four times: in 2016, 2017, 2018, and 2019.

Revisions were made to some pedagogical and philosophical conceptual foundations of the 2013

Curriculum which were considered problematic, such as the concepts of *Kompetensi Inti* (core

competencies), *Kompetensi Dasar* (basic competencies), the syllabi, integrative themes, textbook design, and the evaluation and assessment system. Revisions were also made to the practical approach in teacher training methods related to the substance, content, and skills needed (Kemendikbud/Permen No. 16/2019, 2019).

Since the 2013 Curriculum was first published in mid-2013, studies on the 2013 Curriculum implementation have also become of interest to some researchers (e.g., Ratnaningsih, 2017; Seillariski, 2015; and Permatasari, 2014). Additionally, debates on new curriculum policies still occur among education practitioners. One of the issues relates to the use of the Scientific Approach (SA) that should be applied in the process of learning and teaching of all subjects, ranging from elementary to high school level (Kemendikbud/Permen No.103/2014, 2014).

According to the 2013 Curriculum, the SA applies scientific procedures which include "observing, questioning, experimenting, associating, and communicating" (Kemendikbud/Permen 81A/2013, 2013e, p.6). The SA steps in the learning process are adopted from the stages of the scientific method as successfully applied in science classes in other developed countries, such as the UK, Japan, and the United States (Umar, 2016). As such, the 2013 Curriculum adopted this approach for application in the learning and teaching process to facilitate and enhance students' comprehension and their ability to implement knowledge (Kemendikbud/Permen 81A/2013, 2013e). The SA is often adopted in teaching the strategies and procedures that take place in a scientific experiment conducted to test hypotheses or ideas. In the learning and teaching context, the SA is applied to facilitate students' acquisition of new information through the activities of questioning, data collection, analysis, and decision making

which also require students to use their prior knowledge throughout the process (Longman, 2014; Tang *et al.*, 2009). According to the 2013 Curriculum, the rationale for the use of the SA in teaching a subject is to enable the students to become actively involved in the learning process, to train their critical thinking skills, and to enhance their competency and self-directed learning skills like the characteristics of the SA (Kemendikbud/Permen No. 81A/2013, 2013e). While this approach could provide more structured learning activities, challenges were reported by EFL teachers in Indonesia (Zaim, 2017; Sundayana, 2015).

In English Language Teaching (ELT), the main challenge is when the teachers are required to implement the SA in EFL classes. In the EFL context, the SA is still considered as a new learning and teaching approach for educators, learners, and school administrators as well as students' parents since the SA is, as aforementioned, usually implemented in subjects requiring students to make discoveries and test ideas or hypotheses like in Natural Science (Sarwati, 2016). In addition, "...the term 'scientific' is more familiar with natural sciences, social sciences and management" (Suharyadi, 2013, in Ratnaningsih, 2017, p.34). The necessity to apply the SA has triggered controversy among teachers because many teachers have faced difficulty in applying the approach (Muliatina, 2016; Oktadiana *et al.*, 2016). For instance, reportedly, teachers experienced difficulties in developing their instructions by using the SA steps (Sundayana, 2013; Prahastiwi *et al.*, 2015). A similar result is also reported in a study conducted by Sundari (2012) which discovered that Indonesian teachers' knowledge in designing and practising effective learning and teaching is relatively low. Unfortunately, this finding was unheard and left unevaluated and unconsidered by the Indonesian government in the process of implementing the 2013 Curriculum (Sundayana, 2013). Therefore, the use of the SA and the purpose of its

implementation were the reasons for conducting this research to see whether the rationale reflects the reality. Therefore, it was considered worthwhile to investigate the implementation of the SA in EFL classes along with its influence on students' critical thinking development as expected by the curriculum.

While studies on curriculum implementation have previously been conducted, there is little knowledge and comprehensive explanation about how the whole process of curriculum implementation is carried out and how critical thinking is taught and integrated into school subjects (Adler & Flihan, 1997; MacMath, 2011). Therefore, this study is intended to investigate the implementation of the SA and its influence on the students' critical thinking development. The intent is that this research is expected to make a positive contribution by filling in the current knowledge gap on this subject.

This study, which investigates the implementation of the SA in EFL classes, is original as it provides evidence-based explanation on the implementation of the SA in the EFL context in relation to Indonesian 2013 Curriculum and its influence on students' critical thinking development. The originality of this study lies in the implementation of the SA itself which has never been applied in language classes, and on how this study aimed at finding out the influence of the SA on students' critical thinking skills. Contributions of this study are from two points of view: the actual implementation of the SA and the influence the SA has on the development of students' critical thinking in EFL.

This research was conducted in an A-accredited school that meets the national standard established by the Indonesian government. The quality of the selected school is, to some degree, representative of the quality of Indonesian schools nationwide since the school has similar characteristics of general high schools in Indonesia. Furthermore, the school was assigned by the Indonesian government to be a pilot school that implemented the 2013 Curriculum. This study was nonetheless an in-depth case study; as a result, this study cannot represent the variations in quality of education across Indonesia.

1.2 Objectives and Research Problems

This study aimed to investigate the implementation of the SA in EFL classes at a national standardised school, which also became a model school for implementing the 2013 Curriculum, in Sumedang Regency, West Java Province, Indonesia. The following research questions were addressed:

1. How do EFL teachers implement the SA in their classes?
2. What challenges do EFL teachers experience when implementing the SA in their classes and how do they overcome the challenges?
3. How does the SA in EFL classes contribute to students' critical thinking development processes?

1.3 Theoretical and Conceptual Framework

To begin the discussion on curriculum, it is essential to shed light on the definition of "curriculum". Based on the National System of Education Act of Indonesia No. 20/2003, "Curriculum is a set of plans and arrangement covering education goals, contents, learning

material, and learning methods intended as the guidelines in implementing the teaching and

learning processes to achieve the goals that have been set." (Government of Indonesia/UU

Sisdiknas, 2003, p.2). In other words, curriculum is the underlying paradigm on which decisions

for the educational process are based.

Curriculum Development in Indonesia and EFL in the Indonesian Curriculum

'Constant change' is an inherent attribute of the Indonesian Curriculum. As previously

mentioned, the Indonesian government has changed the national curriculum multiple times since

1947 (Dit. PSMA, 2009). The purpose of the changes has been to adjust Indonesian education to

meet the demands of global development and progress as they evolve. The curriculum changes

have also reflected an awareness that developments and changes that occur at the community and

national levels are inseparable from the influence of global change, the development of science

and technology, as well as art and culture. This is in line with Alvior (2014) who argues that

curriculum changes cannot be separated from the conditions of economics, environment, politics,

socioeconomics, and other issues of poverty, climate change, and sustainable development of a

society. These changes reflect a demand to improve the national education system to meet the

changing needs of society.

Like the development of the general curriculum in Indonesia, the EFL curriculum in Indonesia

has also experienced several changes, and these changes are aligned with the establishment of

schools in Indonesia starting in the early 19th century during the Colonisation Era. English in

Indonesia is taught as a foreign language. In the realm of teaching, a foreign language is a

language that is not used as a normative communication tool in the country in which the

language is taught (Thanasoulas, 2001). In the Indonesian context, the aims of foreign language learning are for students to acquire basic communication skills and master the four basic language skills: listening, reading, writing, and speaking (Dit. PSMA, 2009). Furthermore, as per the expectations set out in the 2013 Curriculum, EFL classrooms should be designed to enhance students' communication skills in a real-world context (Zaim, 2013).

The teaching policy of EFL in Indonesia has evolved over time and changes in policy have been greatly influenced by economics and politics. The changes can be divided into three eras of Indonesian government: the Dutch Era (1600s-1942), the Japanese Era (1942-1945), and the Independence Era (1945-Present). The Colonization Era (the Dutch and Japanese eras) highlights that changes to English teaching were influenced by colonial powers with different political and social agendas that reflected their influence and positions of authority in Indonesia (Sujatmoko, 2011). As will be discussed in more detail in Chapter 2, language curriculum development has been mapped into seven periods from 1963 to the current 2013 Curriculum, and four approaches are represented within those periods, including the Audiolingual Approach, the Communicative Approach, a combined Communicative and Genre-Based Approach, and the SA. The latter is the newest approach in the EFL curriculum. The steps of the SA that are proposed by the government in the 2013 Curriculum serve as a guideline for observing the implementation of SA in EFL classrooms for this study.

Teaching Critical Thinking and Bloom's Taxonomy in Indonesian 2013 Curriculum
In the 2013 Curriculum, the knowledge competencies are based on the revised Bloom's Taxonomy by Anderson and Krathwohl (2001). Bloom's Taxonomy itself covers six levels of

skills: *knowledge, comprehension, application, analysis, synthesis*, and *evaluation*. As defined by Bloom and his Taxonomy, critical thinking skills are an integral part of both higher- and lower-order thinking. As set out by Indonesian 2013 Curriculum for the senior high school level, it is required that students can critically think about a set of facts or other information to make an informed decision to go through the six levels of cognitive thinking as defined by Anderson and Krathwohl (2001) through the revised Bloom's taxonomy: *remembering, understanding, applying, analysing, evaluating,* and *creating* (Kemendikbud/Permen No. 81A/2013, 2013e).

The reason for this is supported by international studies such as research conducted by the Programme for International Student Assessment (PISA) reported in 2009, 2012, and 2015, trends in The International Mathematics and Science Study (TIMSS) in 2007 and 2011, as well as the Progress in International Reading Literacy Studies (PIRLS) in 2019. The 2009 PISA results, for example, found evidence that of the six levels of abilities tested, almost all Indonesian students (95%) were only able to reach level 3 (Levels 1-3 are considered low-order thinking skills which include *remembering, understanding,* and *applying*, while Levels 4-6 are called high-order thinking skills and include *analysing, evaluating,* and *creating*). Although the results of the PISA tests indicate that Indonesia's ranking has improved in the three test periods (2009, 2012 and 2015), these gains are not yet significant. This situation is one of the reasons that drives the Indonesian government to enhance the level of cognitive thinking for senior high schoolers to reach higher levels of cognitive thinking and subsequent levels of attainment. The revised Bloom's Taxonomy by Anderson and Krathwohl (2001) as set in the 2013 Curriculum was used to analyse how the SA implementation contributed to the development of students' critical thinking skills as required by the curriculum. Based on the 2013 Curriculum, critical thinking is

not a single skill that is separately taught in class. Therefore, theory on teaching critical thinking, as proposed by Abrami *et al*. (2008) on mixed immersion and infusion methods, serves as a foundational theory that also underlines the teaching of critical thinking in EFL classes.

1.4 Overview of Research Design

A qualitative case study approach was used to uncover an in-depth explanation on the process of the SA implementation in EFL classes in Indonesia and evaluate how this process contributes to the development of students' critical thinking. A qualitative case study approach allowed the researcher to have adequate space to conduct a systematic inquiry on multiple aspects and viewpoints by providing various data types (Stake, 2000) for triangulation purposes: interviews, classroom observations, and document reviews. For this reason, the SA implementation can be explained more thoroughly to complement previous studies which mostly focused on looking at teacher's activities and difficulties in implementing the SA (Muliatina, 2016; Sundayana, 2013).

A purposeful sampling strategy as described by Glesne (1999) and Creswell & Poth (2018) was chosen. Furthermore, criteria suggested by Ross (2005) for choosing participants which includes direct participation in the process of SA implementation and school activities and programmes were considered. Research participants include four English teachers teaching at different grade levels (grades 10th, 11th, and 12th), students from each observed class (n=152 total), the school principal, and the vice principal of curriculum affairs. In this regard, the constraint of time was also considered upon deciding the field of research. While the chosen approach limits this research in offering generalisations from its findings, this constraint helped the researcher focus on possibilities for obtaining more in-depth explanations about the SA implementation.

Interviews

Interviews were used to gather primary data for this research as this method provided the opportunity for extended conversations between parties involved to gain in-depth information relating to the SA implementation (Schostak, 2006). Specifically, the semi-structured interview was chosen as it supported research participants in explaining their understandings of the SA implementation process and how it influenced students' critical thinking development in a much wider framework (Fontana & Prokos, 2007; Galletta, 2013).

Furthermore, Focus Group Discussions (FGDs) and Focus Group Interviews (FGIs) were combined and named Focus Group Discussion and Interviews (FGDIs) – this was intended to gather data from the students with different demographics including their sexes and their levels of learning attainment (high, middle, and low). There were four FGDIs conducted which focused on providing detailed data relating to students' perceptions, opinions, and attitudes towards the implementation of the SA in their EFL classes (see Kitzinger, 1995 in Dilshad & Latif, 2013; Stewart & Shamdasani, 1990). The interviews were conducted in the Indonesian language so that comprehensive and thorough information could be obtained from the participants (Tsang, 1998). All interviews were audio-recorded and stored securely by adhering to the University's ethical guidelines.

Classroom Observations

The researcher conducted classroom observations to gather another primary data to provide more authenticity, making the data more valid and reliable (Cohen *et al*., 2011). Data gathered from this activity can also be used to triangulate teachers' beliefs and perceptions elicited during the

interviews regarding the implementation of the SA (Cohen *et al*., 2011; Robson, 2002). Four

EFL classes were observed, with a focus being placed on activities as presented in the

observation rubrics (see Appendices A and B). In addition, the observations were semi-structured

and audio-recorded to be further analysed in the form of transcriptions and rubrics. Consent

forms were distributed and explained to the teachers and the students prior to conducting this

research.

Documents

Documents related to Indonesian 2013 Curriculum form the other data source of this research.

Specifically, this data includes syllabi provided by the government and lesson plans developed

by the teachers. The analysis of the lesson plans focused on the standard competencies,

indicators, objectives and teaching procedures (the SA's steps) as described in

Kemendikbud/Permen No. 65/2013 (2013c). The data collected were used to triangulate and

conclude whether the observations, interviews, and curriculum documents were in harmony with

one another.

Data Analysis

There were three data analyses conducted in this research: thematic analysis (Braun & Clarke,

2006), qualitative conventional content analysis (Hsieh & Shannon, 2005), and document

analysis (Bowen, 2009). Thematic analysis provides a clear organisation and comprehensive

description of the data and it endorses accessibility and theoretical flexibility in its approach

(Braun & Clarke, 2006). For this reason, this type of data analysis was used for the classroom

observations. Meanwhile, qualitative conventional content analysis was conducted to analyse

data obtained from the interviews to provide in-depth understandings about participants'

perceptions, thoughts, and feelings through examining and interpreting the language or the words

used (Hsieh & Shannon, 2005). In addition, document analysis was utilised to analyse the data

from the curriculum documents (syllabi and lesson plans) since it could provide more in-depth

description about the SA implementation in EFL classes (see Bowen, 2009).

1.5 Ethical Issues

Prior to conducting this research, ethical issues were anticipated and taken into consideration. As

Creswell and Poth (2018, p.54) denote, "ethical issues in qualitative research can be described as

occurring prior to conducting the study, at the beginning of the study, during data collection, in

conducting the data analysis, in reporting the data, and in publishing a study."

Before conducting the research, an ethics form was submitted to and approved by the

University of Bristol Ethics Committee. Ethical approval in research, generally, covers three

main points of ethical issues: "respect for persons, concern for welfare, and justice" (Creswell &

Poth, 2018, p.54). Respect for persons means that the researcher, through the whole process of

the research, acknowledged the right and privacy of research participants – in this case the

teachers, the students, the school principal, and the vice principal for curriculum affairs. In line

with this, the notion of concern for welfare required the researcher to create a research

environment and procedures that acknowledged participants' sense of security (Crow & Wiles,

2008; Mercer, 2007). Finally, justice meant that the researcher made sure the rights of the

research participants were covered and protected (Creswell & Poth, 2018).

The beginning of the study required initial communication with the school and individual participants of the research. The purpose of the research was clarified to the participants from the very beginning. In this research, participation was fully voluntary and without any risk. This research was conducted with full respect for the participants and without any discrimination by excluding the factors of "ethnicity, religion, and gender in the research and through maintaining a professional attitude and respect while conducting the research" (Creswell & Poth, 2018, p.54). Data from teachers, students, the school principal, and the vice principal for curriculum affairs were collected by audio recording as agreed upon by participants. Participants who did not give consent were not included in the study (n=2). In addition, observation rubrics and note-taking were used for supporting the data with full consent of the participants.

In the data collection phase (which in this research was conducted through interviews, observations, and documents) it was essential to obtain participants' consent before administering said research activities to collect data in the school. In addition, it was also important to communicate to other parties in the school how the research process would bring no disruption to the school's activities (Creswell & Poth, 2018). Steps were taken to avoid disruption such as communicating in advance with the participants, using anonymity, and assuring confidentiality to ensure everything ran effectively and without any disruption.

In analysing the data, some ethical issues arose. To prevent any risk and protect the right of the participants, this research used pseudo names and created "… composite profiles and cases…" (Creswell & Poth, 2018, p.57).

In the publication of the research, BERA's (2018) ethical guidelines were used as a reference point and were adhered to ensure that no concerns or conflicts of interest arose upon the publication of the results of this research. Results, conclusions, and recommendations obtained from this research have been shared with the relevant parties.

1.6 Methodological Limitations

The chosen research methodology has consequences in terms of the ability of this research to generalise its result despite its comprehensive conduct. For instance, since attainment specific to students' critical thinking skills was not included in this research, the provided explanation on how the SA affected the development of students' critical thinking skills is limited to the teachers', students', principal's, and vice principal's perceptions where they relied on their own knowledge, experience, and willingness in terms how much information they wanted to share (Brinkmann & Kvale, 2015). Furthermore, the explanation on how the SA was implemented in EFL classrooms generated from this qualitative study cannot be generalised (Creswell & Poth, 2018). It can nonetheless be illuminative for other schools in Indonesia and beyond given the curricular issues raised and the commonalities which many schools are likely to share.

Another limitation to consider is the potential researcher bias that related to the researcher's previous professional role that could have influenced the participants' responses. Since some of the participants were the researcher's colleagues whom she knows well, she "…reflect[ed] upon the process of conducting this research and [made] clear how the different levels of [her own] position might affect the choices [she] made" (Mercer, 2007, p.1). For instance, the researcher ethically decided on points at which to transparently explain to the teachers/the participants –

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who were her colleagues – about her position in the research. The researcher prioritised how to deal with data collection naturally and ensured that the participants of her research were not at risk. This was achieved by having good communication with them about the research (Mercer, 2007). It was necessary to ethically manage her contextual closeness with the participants during the research in order to manage researcher bias.

1.7 Pilot Study

Piloting was conducted to test the methods and techniques of research intended for application in the field and to support modifications based on the result of the trial (Blaxter *et al*., 2010). In this research, a pilot study was carried out on 20th and 27th of March 2019 by conducting classroom observations (n=2) at one school, followed by interviews (n9) and then the collection of supporting documents (syllabi and lesson plans, n=2). The selected school for piloting had criteria like the school selected to provide data for the actual research – both were A-accredited, held to the national standard, and were chosen by the government as model schools for the 2013 Curriculum implementation.

In conducting the pilot study, a focus was placed on the use of the classroom observation rubrics and interview protocols. The focus was on the aspects of these procedures that worked effectively and the areas that needed modification or adaptation before conducting the actual data collection.

Some issues raised during the classroom observations and interviews were related to the practical matters of the class situation, places to conduct the interviews in and methods used for the

interviews. In addition, gaining permission to conduct the research became an important consideration since the process covered an extended period and was tiered.

There were some points to be learned from the pilot study, especially related to the implementation of the data collection techniques in the field as follows:

a. Timing and Place for the Data Collection

During the piloting, the observed class was very noisy since each classroom was separated by only a wood partition and noise from outside the room could be heard easily. To handle that, the researcher tried to find a more conducive setting, such as conducting the observations in more soundproof language laboratories.

Furthermore, the Focus Group Interview (FGI) with the students was challenging. It was difficult to obtain detailed information from the students. Therefore, appropriate methods and strategies were required to reveal the information needed from the students in the actual data collection.

In addition, arranging a meeting with the school principal was also challenging. Although the appointment was made in advance, it was cancelled three times without notice at the scheduled meeting time due to *ad hoc* commitments. This was also after waiting for hours at the scheduled time. From this experience, it was clear that simple preventative strategies needed to be put in place such as a more fixed schedule for conducting the interview.

b. The Use of Recorder/Recording Tools

A digital recorder was used during the pilot interviews. The interviewees agreed to be audio-recorded and they were familiar with this type of data collection tool. Notes were also taken as another form of recording the interviews. This additional recording tool was utilized just in case there were any difficulties with the digital tool during the interview such as a low battery or limited memory to store the data. This worked well in the pilot and this would suitably accommodate the recording needs of the forthcoming research. However, from the pilot classroom observation, it was discovered that the recording tools were not particularly useful due to the large size of the classroom as well as the level of noise. Therefore, it was determined that notetaking and observation rubrics would be used in the study to gain the data needed from the classroom observations.

In general, the aim of the pilot study was to trial the appropriateness of the questions, the classroom observation rubrics and recording tools, and to provide early suggestions on the viability of this research. In addition, it also facilitated the researcher's experiences in conducting semi-structured interviews and how to build a good rapport with the participants. As Jacob and Ferguson (2012) point out, building a good rapport with the interviewees can facilitate better responses from them. Feedback and results from the pilot study were used to improve the research instruments and data collection process of the actual research.

1.8 The Structure of the Dissertation

The argument and analysis proposed in this dissertation are developed in the following way: Chapter 1 presents a picture of the empirical research carried out, including the objectives and problems that affected the implementation of this study which intended to study the implementation of the SA in EFL classes and its influence on students' critical thinking development. Along with a critical review, some existing literature on this topic and related research are also presented in Chapter 2. This chapter explores the theoretical basis of the issues discussed in this study and helps to elaborate the theories and findings of previous researchers which support this research study. Following this, the purpose of Chapter 3 is to present the chosen research methods including the methodological approach and research design which were adopted for this research. Subsequently, Chapter 4 aims to present the data gathered from the actual data collection (classroom observations, interviews, and document analysis) as primary research. Critical analysis and discussion on the findings with comparative links to the theories and related research in similar fields (as presented in the Review of Related Literature) are elaborated in Chapter 5. Chapter 6, the final chapter of this dissertation, presents the main conclusions derived from the findings, some recommendations for further research, and limitations regarding this study.

Chapter 2

Review of Related Literature

This chapter discusses contested issues related to critical thinking and the implementation of the Scientific Approach (SA) in the Indonesian 2013 Curriculum. It begins with an analysis of the emergence of the Indonesian 2013 Curriculum. Furthermore, it deliberates various issues related to the implementation of the SA in selected high schools in Indonesia. This discussion is intended to give an overview of previous studies on the implementation of the SA in English as a Foreign Language (EFL) classes. Issues regarding students' critical thinking skills development are discussed along with an analysis of previous research related to those issues. In addition, this chapter considers issues about how to assist students' critical thinking in the classroom. The topics of the discussion are presented in Figure 2.

Figure 2

The Topics Discussed in the Review of Related Literature
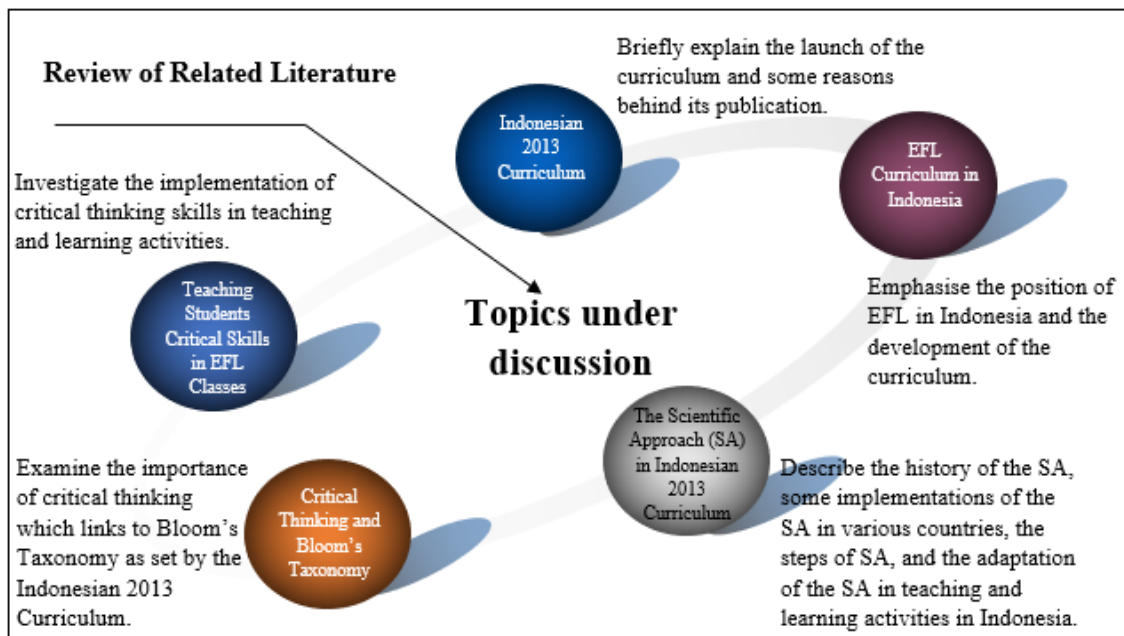
2.1 The Trajectory of Curriculum Development in Indonesia

Curricula tend to be set as the basic standard on which every decision for the educational process are based (Dubin & Olshtain, 1986). In the Indonesian context, the curriculum is regulated based on Law No. 20 year 2003 on the National Education System, especially Chapter X, Article 36, which particularly states that "the development of curriculum is based on National Standards and the curriculum for all degrees, courses, and types of education is also developed based on diversification principles and adjusted to schools' and students' potential" (Government of Indonesia/UU Sisdiknas, 2003, p.6). It is also mentioned in Law No. 20 year 2003 that the curriculum is arranged as a guideline in implementing the learning and teaching process to achieve the goals. Richards (2001, p.xi) goes even further to suggest that "among various sources of education, curriculum is the most significant element which contributes to improving learners' ability and potency". Regarding its full scope, Yalden (1987, p.18) outlines that the curriculum covers "…the goals, objectives, content, processes, resources, and means of evaluation of all the learning experiences planned for pupils both in and out of school and community through classroom instruction and related program[me]s". In Indonesia, the importance of curriculum has been written into legislation through the National System of Education Act of Indonesia Number 20/2003, which enshrines the curriculum as a set of guidance for teachers and other parties involved in terms of what competencies to achieve, learning resources, and the teaching approach (Government of Indonesia, 2019).

As previously alluded to (see 1.4), the Indonesian curriculum was officially first established in 1947 and has undergone ten changes from 1947 to the present following changes that happened

in its society – these are divided into three periods: The Old Order[3] (1945-1966), The New

Order[4] (1967-mid-1998) and Reform Era[5] (1998-present) (Soekisno, 2007). Figure 3 offers a

diagram of curriculum development and the dynamic nature of change for each curriculum that

has been used in Indonesia and applied at all levels of schooling (elementary, junior, and senior

high schools):

Figure 3

Curriculum Development in Indonesia
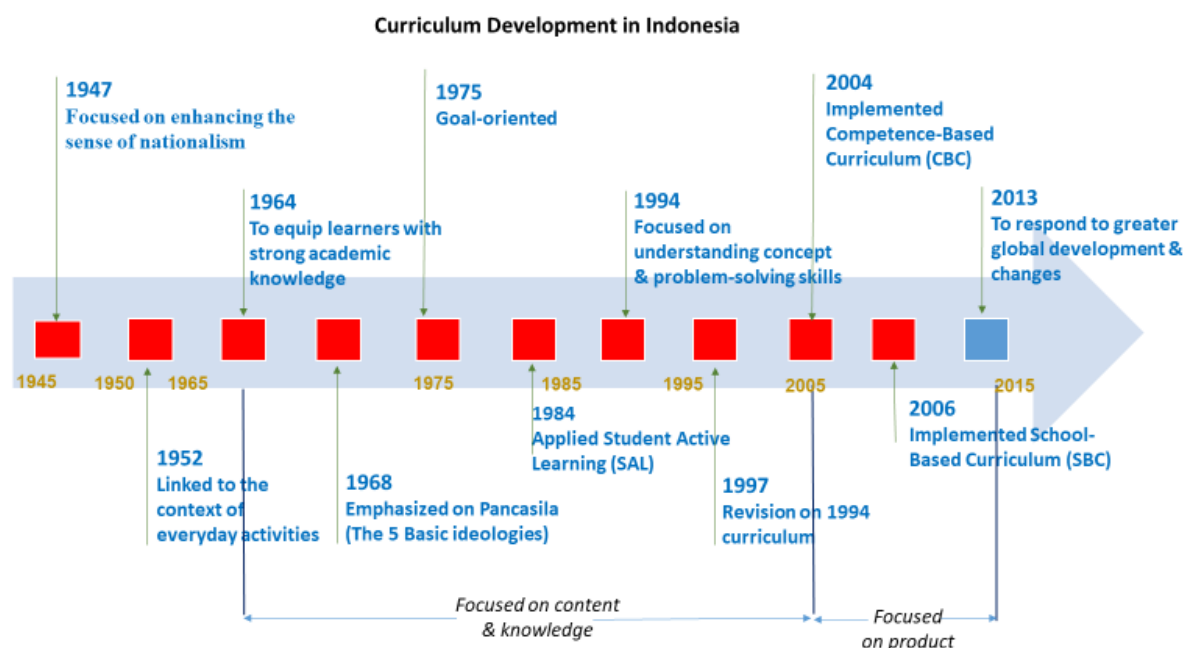
Note. The data were taken from "*Perkembangan Kurikulum di Indonesia*" [Curriculum

Development in Indonesia] by Gunawan, 2016 and Madkur & Nur, 2014.

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[3] The Old Order in Indonesian political history refers to President Soekarno's (the first President of the Republic of Indonesia) administration which lasted from 1945 to 1965 (Purnaweni, 2014).
[4] The New Order refers to the reign of the second Indonesian President, Soeharto, which lasted from 1966-mid-1998) (Purnaweni, 2014).
[5] Reform Era or the post-Soeharto era began with the resignation of authoritarian President Soeharto in 1998 during which the country had been in a period of transition (1998-2010) (Purnaweni, 2014).

Indonesia has consistently updated its national curriculum in line with how social and cultural environments have developed in society since it became an independent nation in 1945 (Soekisno, 2007). In this respect, amendments were made to the 1947, 1952, 1964, 1968, 1975, 1984, 1994, 2004, 2006, and 2013 curricula with the aim of meeting social demands and changes by evaluating and formulating more relevant educational goals and approaches. *Pancasila* (Indonesian state philosophy) and the 1945 Constitution are the two foundations for all of Indonesian national curriculum designs. Table 1 presents a comparison of the curricula from 1947 to present.

Table 1

Comparison of Indonesian Curricula from 1947-Present

1947 – 1994 Curricula	2004 – 2006 Curricula	2013 Curricula
Curriculum as content	Curriculum as product	Curriculum as contextual praxis
Strengthened the sense of nationalism using *Pancasila* and Indonesian 1945 Constitution became the philosophy of education	Strengthened the sense of nationalism that oriented education with national development	Strengthens the competencies to improve national and global quality of education and citizens
Planning-oriented	Result-oriented	Competence Based/Basis-oriented
Teacher-centred	Student-centred	Student-centred

1947 – 1994 Curricula	2004 – 2006 Curricula	2013 Curricula
Emphasised planning	Emphasised results/ outcomes	Emphasises conformity of planning, process and results/ outcomes
Similarity in content/topic	Similarity in results/ outcomes	Similarity in content/topic, process and results/outcomes
Monitoring relied on the implementation of a syllabi and standard lesson plans	Monitoring relied strictly on the results of the National Examination	Monitoring relies on the results of the process and outcomes which are assessed comprehensively
Used topics as contexts	Used topics as contexts	Uses popular/daily themes as context

Note. Adapted from "Perkembangan Kurikulum di Indonesia" [Curriculum Development in Indonesia] by Wahyuni, 2015.

Table 1 clearly lays out the history of curriculum change in Indonesia. As mentioned earlier, curriculum changes are related to change at both the local and international levels, and are greatly influenced by societal, environmental, economic and political factors at various times throughout Indonesian history. Unfortunately, the trends in the data show that Indonesia is challenged to effectively keep up with the changing demands on its educational system. The low quality of education in Indonesia is still the main factor that impedes the progress of education. Various surveys on international studies show that the quality of education in Indonesia is relatively low (Samani, 2015; Tola, 2008).

With respect to educational quality, international studies such as the research conducted by the Program for International Student Assessment (PISA) in 2003, Trends in the International Mathematics and Science Study (TIMSS) in 2007, as well as the Progress in International Reading Literacy Studies (PIRLS) in 2006 have ranked Indonesia low in the group of participating countries (Tjalla, 2010). The results of the PISA tests, for example, reveal that since taking part in the PISA test in year 2000, Indonesian learners performed poorly in activities requiring critical and analytical abilities. This is illustrated in Figure 4:

Figure 4

Trends in Performance in Reading, Mathematics and Science in Indonesia
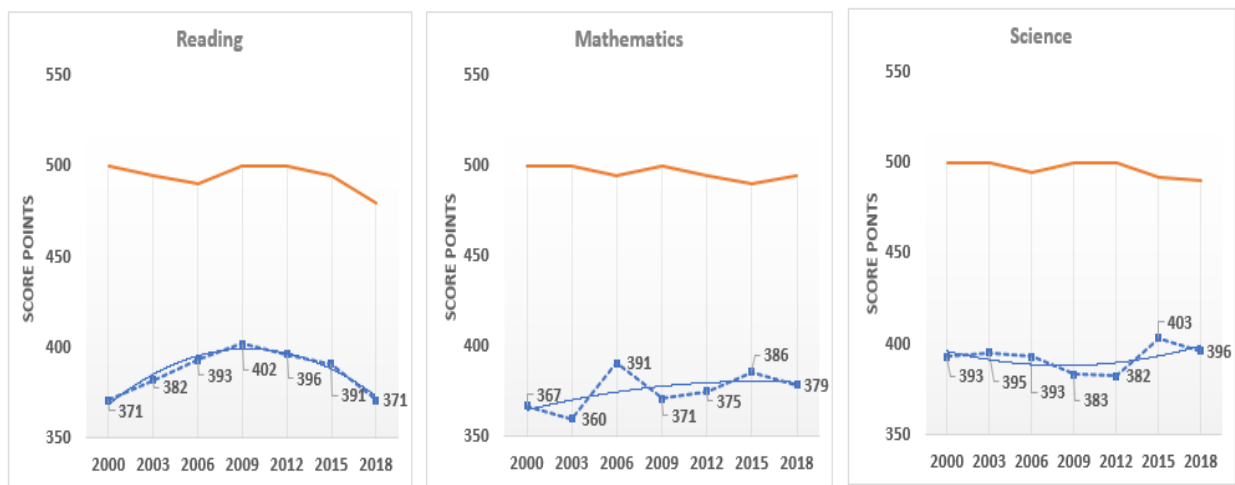
Note. ⸻ illustrates the general trend on how Indonesia performed in reading, mathematics, and science in the given period. ⇢ describes Indonesia's average performance. ⸺ demonstrates how OECD countries performed on average (value measured in average mean score). * indicates statistically significant differences between Indonesian's average scores and the estimates of PISA 2018 (Source: OECD, 2018).

The PISA results reveal that since 2000, Indonesian performance in Reading, Mathematics, and Science has constantly changed, and as illustrated in the graphs, the scores for Reading, Mathematics and Science show a slight increase since 2000 in Mathematics and Science scores with Reading holding steady at 371. However, all three scores have decreased from 2015 to 2018. Since its peak in 2009, Indonesia's performance in Reading has dropped and reached its 2000 level in 2018 as opposed to its performance in Mathematics which has plateaued since 2009. Alarmingly, in 2012, the PISA results placed Indonesia 64 out of 65, second from the bottom of the list (OECD, 2014).

This 'PISA shock' became a stepping-stone for the Indonesian government to reform its educational system and improve the quality of education. As a result, the Indonesian government took action by reforming and revising the curriculum at all levels of education (primary, secondary and higher education) and establishing the 2013 Curriculum (Alhamuddin, 2014; Supriyono, 2013) to meet the demands of global development and progress as the rest of the world evolved. The aim of the 2013 Curriculum is as follows:

> To prepare Indonesia's young generation to have life skills as an individual person and citizen who are productive, creative, innovative, affective (religious and social attitudes) and competent to contribute to the betterment of social, national, and political lives, and humanity. (Kemendikbud/Permen No. 69/2013, 2013d)

Based on the above aim, Indonesian government formulated the 2013 Curriculum and, with it, the approach to learning and teaching was changed and focused on giving learners more exposure to activities that would train their interpersonal, analytical, and problem-solving skills

in the hope that in the future they could take part in advancing the country's development in science, technology, and other necessary aspects while preserving the country's cultural heritage (Kemendikbud/Permen No. 81A/2013, 2013e). Alongside the curriculum objectives, changes have been made to several elements in the curriculum including the theoretical model of the curriculum, content design and the process dimension of the curriculum. In addition, strategies for implementation and curriculum evaluation have also become the focus of the curriculum. The followings are some changes to the 2013 Curriculum elements:

1. Theoretical Model of the 2013 Curriculum

While its concept was derived from the competency-based curriculum, as proposed by the 2003 Indonesian Education Law, original basic principles and points of view were also formulated for the 2013 Curriculum. This newest curriculum emphasises the roles of courses to support students in achieving the expected competencies (see Quillen, 2001) through learning experiences that encourage students' active participation. Its contents and competencies are centred on students' attitudes, effective thinking skills, use of general knowledge, and learning skills. The 2013 Curriculum specifically views competencies as the ability of students to look at a problem from different perspectives and make use of this skill to answer real-life questions and challenges.

2. Content Design of the 2013 Curriculum

The 2013 Curriculum content was adapted from the competency-based curriculum which comprised of facts, concepts, theories, and procedures with new additional emphasis on attitudes, thinking, and social and cultural skills derived not only from the subject area but also society, culture, and students as the content sources. The content design includes the syllabi which is

arranged based on the National Education System Law, developed into *Standar Kompetensi Lulusan* (competency outcome standard), *Kompetensi Inti* (core competencies: religious attitudes, social attitudes, knowledge, and knowledge utilisation) and *Kompetensi Dasar* (basic competencies) as illustrated in Figure 5:

Figure 5

The Content Design of the 2013 Curriculum
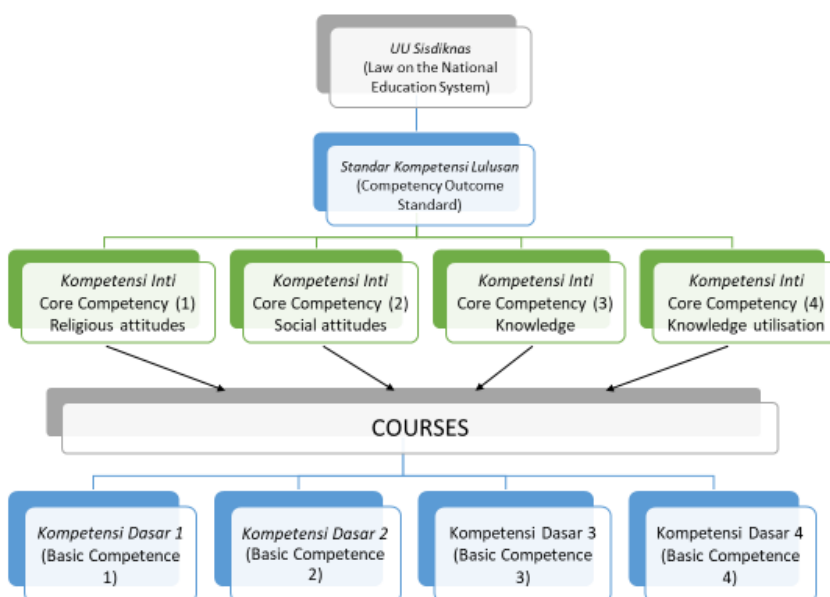
Note. Adapted from BIMTEK/Bimbingan Teknis Kurikulum 2013 [Technical Guidance of the 2013 Curriculum] by Endarta, 2017.

As per the 2013 Curriculum*, kompetensi dasar* are developed and arranged according to *kompetensi inti* and course-specific contents. *Kompetensi inti* is the level of ability to achieve *standar kompetensi lulusan* (competency outcome standard) that must be possessed by students at each level of class or programme (Kemendikbud/Permen No. 54/2013, 2013a).

3. Process Dimension of the 2013 Curriculum

The process dimension in a curriculum is a term used to describe the learning process design. In the 2013 Curriculum, the SA is selected and modified to provide student-centred learning activities that promote students' active participation, knowledge exploration, and attitude development as explained in the 2013 Curriculum document. In this respect, the SA model is redesigned to fit the nature of the other courses as much as it does in relation to natural science courses. This model provides five learning activities consisting of *observing, questioning, exploring/ experimenting, analysing,* and *communicating* results. Each activity is to be developed, planned, implemented, and assessed by teachers since they all count as competencies required in the 2013 Curriculum.

These three elements underlie changes in each course or subject, including EFL, at all levels of school from elementary to secondary levels in terms of model, content design, and learning-teaching processes. The position and changes in the EFL subject are described in the following section.

2.2 The Position of English as a Foreign Language (EFL) as a Subject in the Indonesian Curriculum

English in Indonesia is taught as a foreign language. As mentioned before, in the realm of teaching, a foreign language is a language that is not used as a normative communication tool in the country in which the language is taught (Gunderson, 2009). The Indonesian population overall represents approximately 707 different languages (The Language Development and Fostering Agency, 2018; Simons & Fennig, 2017). The people of Indonesia consist of many

different ethnic groups with their individual customs and native languages. English is not spoken

outside the classroom or as a medium of instruction in EFL classes. Research indicates that

teachers have a lack of confidence in using the English language during the learning and

teaching process, and thus still use Indonesian as the medium of instruction in teaching EFL in

the classroom (Artini, 2013). Accordingly, exposure to English is insufficient both in the

educational setting or in direct communication contexts in the surrounding environment of

students. Thus, there is no urgency that conditions the students to be able to communicate in

English, and for this reason, lessons taught in the EFL classroom become impractical and

unreliable. According to the results of the Education First English Proficiency Index for Students

(EF EPI-s) in 2019, the acquisition of English skills (English reading and listening proficiency)

of secondary and tertiary students ranks Indonesia as 61 out of 100 countries with a

categorisation of low proficiency level (Education First, 2018).

Factors that adversely influence prolonged unsuccessful English language teaching in countries

with myriad sociocultural structures like Indonesia are complex (Komaria, 1998). However, it is

observable that the limited use of English from both students and teachers, as well as

monotonous teaching strategies that are left unevaluated and undeveloped, become the main

contributors to such unsatisfying results (Astika, 2016; Cahyono & Widiati, 2011; Nurhanifah,

2012). Moreover, the use of L2 (Indonesian language or other local languages), which could

actually bridge the communication gap in EFL classes, has not been maximised. In the other

words, the failure in supporting the students to attain expected competencies happens mostly at

the implementation level and is secondary to the ability of teachers to carry out effective,

engaging, and memorable English teaching (Astika, 2016; Megawati, 2016; Nurhanifah, 2012).

Consequently, the EFL curriculum in Indonesia has experienced several changes. In the era of colonization, the changes were mostly aligned with the establishment of schools in Indonesia starting in the early 19th century. Like the development of the general curriculum in Indonesia, the teaching policy of English as a foreign language has evolved over time and changes in policy have been greatly influenced by economics and politics. The changes to the EFL curriculum can be divided into three eras of Indonesian government, as highlighted below:

1. *Dutch Era (1600s-1942)*

During the Dutch colonial period (1930s), English was taught at the MULO or Meer Uitgebreid Lager Onderwijs (equivalent to junior high school level) and AMS or Algemeene Middlebare School (equivalent to senior high school). At that time, only Dutch children and certain indigenous people (the Indonesians who belonged to the Royal family) were allowed to attend MULO and AMS. However, most indigenous people could only attend elementary school, which hampered the development of English language skills in indigenous children during that period (Rizka, 2013).

2. *Japanese Era (1942-1945)*

The English learning system changed enormously when Japan began to take over Indonesia in 1942. During Japanese occupation, it was forbidden to study English at any school level, and the English language was not to be used in daily life. Moreover, English books were burned to reduce the exoticism of the Western language and cultural influence in the country. All sources of information, including books, were required to be in Indonesian; English books were, according to Rizka (2013), no longer used.

These two eras highlight that changes to English teaching were influenced by colonial powers with different political and social agendas that reflected their influence and position of authority in Indonesia.

3. Independence Era (1945-Present)

In 1967, the Minister of Education and Culture in Indonesia decided that English would officially be taught as a foreign language in Indonesian schools. After the colonisation eras, language curriculum development (specifically EFL) can be mapped into seven periods, namely: (1) 1967 Curriculum; (2) 1975 Curriculum; (3) 1984 Curriculum; (4) 1994 Curriculum; (5) 2004 Curriculum; (6) 2006 Curriculum; and (7) 2013 Curriculum. Within the seven periods of curriculum development, the foundation or approach used in the English curriculum covers four approaches (as stated in the EFL Curriculum):

- the Audiolingual Approach implemented in the 1967 and 1975 curricula;
- the Communicative Approach as part of the 1984 and 1994 curricula;
- the combined approach of the Communicative Approach and the Genre-Based Approach as part of the 2004 and 2006 curricula; and
- the Scientific Approach in the 2013 Curriculum. The latter is the newest approach in the English curriculum.

The Audiolingual Approach was implemented in 1967 as the first approach to the teaching of English. The language theory underlying the audiolingual model is a structural linguistic theory that was successfully developed in the United States at that time (Sundayana, 2013). From the audiolingual perspective, foreign languages can be learned and taught more effectively if

presented in spoken form (Richards & Rodgers, 1987). Based on the principles of the Audiolingual Approach, speech is the main medium through which to learn a language. Since the purpose of the English curriculum in this period was to enable students to communicate using English language, the Audiolingual Approach was chosen and English teaching placed more emphasis on teaching speaking skills than other components of language acquisition (Sundayana, 2013).

In the 1984 Curriculum, the purpose of the English curriculum changed and English teaching was intended to focus on meaning and the communicative function of the English language (Huda, 1999). This curriculum emphasised that students should gain as many opportunities as possible in the classroom to learn the language in communicative settings. Thus, the Communicative Approach was selected as the teaching approach to teach English language in this period. Communicative language teaching was developed in opposition to the Audiolingual Approach which focused on drilling and memorization (Richards & Rodgers, 2001). Communicative language teaching focused on developing the ability of communication in learners in real-life situations. The focus of communicative language teaching lay in meaning rather than accuracy. Then in 1994, the government revised the 1984 Curriculum by implementing a new policy in which teachers were to develop their English syllabi based on clear national guidelines (Dit. PSMA, 2009). This revised curriculum was intended to highlight regional or local values (Nur & Madkur, 2014). Furthermore, the Genre-Based Approach[6] (GBA) became popular when the 2004 Competence Based Curriculum (CBC) was introduced in

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[6] GBA employs the use of different genres of texts, such as procedure text, descriptive text, report text, recount text, and narrative text (*Source: Introduction to Genre Based Approach. Ministry of National Education, Directorate General of Quality Improvement of Teachers and Educator Personal, Supplement Module MGMP. Bermutu: Jakarta).*

Indonesia in the English language curriculum for the senior high school level. The CBC focused more on developing the students' communicative competence (Agustien, 2003). The target of this approach was to master language competence, prepare students for university studies, and to also enable students to communicate in written and spoken English in their daily lives aligned with the purpose of the curriculum (Depdiknas, 2004 in Oematan, 2008).

In 2006, the curriculum was changed from CBC to School Based Curriculum (SBC). The English curriculum gained focus on students' communicative competence, utilizing Communicative Language Teaching (CLT). Before this time, English teaching and learning focused heavily on memorization, in which the students were drilled on memorizing basic words and phrases provided by the teacher. As a result, students could not communicate in everyday life using English. These conditions of learning and the resulting failure to achieve the curriculum goals led to the implementation of CLT. Finocchiaro & Brumfit (1983) state that CLT is a teaching approach in which language is taught in a communicative way, obtaining language skills through communication in real contexts. In CLT, classroom activities should be meaningful and involve real communication rather than simple memorization and recitation. As Littlewood (1981, in Hossen, 2008) points out, CLT involves activities that enable learners to use the language appropriately in each social context. Therefore, CLT was aligned with the 2006 Curriculum goal of successfully equipping students with oral and written skills that would allow them to communicate in English in daily life contexts.

The Indonesian government's decision to implement the Scientific Approach (SA), replacing CLT in the 2006 Curriculum, undoubtedly represented a major change in terms of learning

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approach. While both the 2006 and 2013 approaches place learners as the focus of learning and teaching activities, the structures of the instruction of each approach are distinct.

It is important to distinguish the Communicative Approach (CA) from the Scientific Approach (SA). One of the differences lies in the aim of each approach. The CA, as applied to EFL classes, focused on enabling students to communicate in English fluently. Meanwhile, the SA focuses more on enabling learners to self-direct and think more critically about their language acquisition experiences in the classroom (Zaim, 2017). Additionally, the SA is designed to prepare students for future challenges, including those related to globalisation, the advancement of technology and information, environmental issues, the creative and cultural industries, and the development of education at the international level. These demands of globalisation require that students gain competencies that are provided by the SA curriculum such as the ability to effectively communicate (as also the purpose of CA), critical thinking skills, and the ability to live in a globalised society (Kemendikbud/Permen No. 81A/2013, 2013e; Machali, 2014). The SA is therefore considered "the answer" to facing these challenges, but further study is needed to validate this assertion. Table 2 below offers a comparison of Communicative Language Teaching (Nunan, 1991), the Scientific Approach (Garland, 2015) and the Scientific Approach in English Language Teaching (ELT) based on the 2013 Curriculum in relation to theories of language and learning, objectives, syllabi, classroom activities, the roles of the teacher, the learner, and materials.

Table 2

A Comparison of Communicative Language Teaching, the Scientific Approach, and the Scientific Approach in ELT Based on

Indonesian Senior High School Curriculum

No	Approach	Communicative Language Teaching Approach (CLT)	Scientific Approach (SA)	Scientific Approach in ELT (based on 2013 Curriculum for Senior High School Level)
1.	Theory of Language	Language functions as a tool that enables its users to interact and convey meaning	Language is used to demonstrate critical thinking and ideas	Language is a device used in a more advanced way (compared to its usage in Junior High School level) to cope with different situations that require both spoken and written communication skills
2.	Theory of Learning	Promoting authentic and contextual materials as well as active classroom interactions that stimulate students to use the four	Engage in self-acquiring knowledge facilitated through activities of observing, questioning, data collecting, experimenting,	Interact with provided textual information presented in the target language to acquire comprehension and imperative knowledge on certain matters relevant to studied phenomenon through classroom interactions that involve the

No	Approach	Communicative Language Teaching Approach (CLT)	Scientific Approach (SA)	Scientific Approach in ELT (based on 2013 Curriculum for Senior High School Level)
		language skills (reading, writing, speaking, and listening) fluently	analysing, and decision making	use of the four language skills (reading, writing, speaking, and listening)
3.	Objectives	To develop students' skills in performing effective communication that is relevant to and can be implemented in real-life communication contexts	To find evidence that supports or invalidates assumptions	To enhance learners' ability in using English in various activities in real-life contexts and in facing the globalisation era; to develop learners' abilities to have communicative competence in interpersonal, transactional, and functional texts to help learners expand their scientific insights about other subject matter through self-direction and more critical thinking
4.	Syllabi	Includes some or all the	Includes procedure of conducting experiments; ordering is based	Includes the basic competencies, learning materials and learning activities

No	Approach	Communicative Language Teaching Approach (CLT)	Scientific Approach (SA)	Scientific Approach in ELT (based on 2013 Curriculum for Senior High School Level)
		following: structure, functions, notions, themes and tasks; ordering is guided by learners' needs	on the learners' needs	
5.	Activities	Encourage learners to actively participate in classroom interaction, stimulating students' communication skills such as classroom discussion	Engage learners in formulating hypotheses, making observations, experimenting, and reporting the results	Facilitate learners to actively engage with the lesson materials from which they gain understanding and thinking abilities through a structured activity comprising of observation, hypothesis or questions formulation, experiment, making correlation, and information sharing
6.	Role of Learner	Negotiator, interactor - giving as well as taking	Observer, experimenter, researcher, decision maker, as well as critical	Subject who also observes, questions, experiments, associates, and communicates

No	Approach	Communicative Language Teaching Approach (CLT)	Scientific Approach (SA)	Scientific Approach in ELT (based on 2013 Curriculum for Senior High School Level)
			thinker	
7.	Role of Teacher	Facilitator of communication process, needs analyst, counsellor, and process manager	Facilitator and research Collaborator	Facilitator of class activities and process manager
8.	Role of Material	To advance effective communication skills through lesson materials and activities relevant to real-life communication contexts	Facilitate learners to conduct experiments through task-based discovery, problem solving, and critical thinking	Facilitate learners' activities in the class through problem-based and project-based discovery

Note. Source: Nunan, 1991; Garland, 2015; the Indonesian 2013 Curriculum.

Based on the elucidation above, it is apparent that the SA in the 2013 Curriculum for ELT is similar to CLT, but the learning steps or activities are adapted from the SA. This is aligned with the 2013 Curriculum aim to enhance students' critical thinking abilities and self-direction through the activities of learning: problem-based learning, project-based learning, and discovery learning based on the SA.

2.3 The Implementation of the Scientific Approach (SA) in Indonesian 2013 Curriculum

Implementation is carried out with an intention of making a change by instilling a new concept into an existing system (Zaim, 2013; Fullan, 1991). In the context of curriculum, implementation is considered as a phenomenon in which a new set of ideas relating to the policy, content, and process of learning and teaching are applied, and, as a consequence, change the structure of current practices (Print, 1993). In terms of the 2013 Curriculum, changes were introduced to many aspects including learning and teaching processes in which the SA should be applied to achieve new curriculum goals that include increasing students' competences and critical thinking.

The history of the scientific method is a fascinating and long one, covering thousands of years of ancient history. The development of the scientific method involved some of the most enlightened cultures in history, as well as some great scientists, philosophers and theologians that developed much technical knowledge and many crafts and mathematics (Pedersen, 1993). Although the scientific method has been applied since the ancient times, Roger Bacon (1214 - 1294) was one of the earliest European scholars to refine it. He developed the idea of making observations, hypothesising and then experimenting to test the hypothesis. In addition, he

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documented his experiments meticulously so that other scientists could repeat his experiments and verify his results. Later, Francis Bacon (1561 - 1626) became one of the greatest movers behind the development of the scientific method. He reiterated the importance of induction as part of the scientific method, believing that "all scientific discovery should proceed through a process of observation, experimentation, analysis and inductive reasoning to apply the findings to the universe as a whole" (Shuttleworth & Wilson, 2009).

Since that time, scientists have used the method to explain different phenomena through reasoning, observing, and experimenting and they named it as the *Scientific Method* (Shuttleworth, 2009). The method is associated with some famous figures in science, such as Aristotle, Ibn al-Haytham, and Galileo, the latter given the credit for being the creator of the Scientific Method (Shuttleworth, 2009). Meanwhile British, Italian, French, and German scholars contributed to the methodology during the 17th, 18th, and 19th centuries. Among them are James Bacon, René Descartes, and Isaac Newton. The method gained familiarity in the US between the 19th and 20th centuries when scientists such as John Dewey and Morris R. Cohen spoke about and utilized the scientific method (Aaboe, 1974; Shuttleworth, 2009).

The scientific method typically refers to "a body of techniques or methodical steps that are shared by all science domains for investigating phenomenon and acquiring new knowledge" (Tang *et al*., 2009, p. 29). While the term is called scientific method, the Indonesian 2013 Curriculum prefers to use the term of Scientific Approach or SA to specifically denote the accounts of scientific process steps that are implemented in the process of learning and teaching of all subjects, curriculum and instruction. In other words, the terms of scientific method and the

scientific approach refer to the same entity, as such both are used interchangeably in this dissertation.

Research on the implementation of the scientific method has been conducted by scholars such as Steel *et al.* (2004) who conducted research and data analysis in an ecology context in the US. Their research shows that middle school students are successful in applying difficult and abstract mathematical concepts to their own research projects by applying each step of the scientific inquiry process. Furthermore, in the Japanese context, research by Nakamura *et al.* (2015) reports that the scientific method is a foundation of Science and Mathematics classes to train students to set problems and conduct research for themselves, to cultivate strong abilities in science, to enter university courses, and to lead Japan in the future.

By looking at the success of the SA in other countries, especially in developed countries, the SA was recommended as a teaching approach for Indonesian 2013 Curriculum. According to the curriculum, SA allows students to become involved in acquiring new knowledge through activities that stimulate them to use their questioning, observing, analysing, and decision-making skills by also making use of available resources and their prior knowledge (Kemendikbud/ Permen No. 81A/2013, 2013e). While the SA can make learning and teaching activities more structured, attention to detail and clear instruction that teachers give for each activity are paramount (Kemendikbud/Permen No. 81A/2013, 2013e).

The scientific method can be applied in almost all fields of study as a logical and rational problem-solving method (McLelland, 2006). In other countries (such as Japan, the US, the UK

and Australia) the use of the scientific method is mostly applied in natural sciences (such as

Biology, Chemistry and Physics) and social sciences (such as Geography, Economics and

History) (Rudolf, 2005). No research in such countries has found the SA used in any language

classroom. This is most likely because the scientific method was first introduced as a practical

guide for laboratory work in American schools (Rudolf, 2005). The scientific method attempts to

deconstruct a proposal about how people (in this case, those who work in the laboratory) think

and gain knowledge (Dewey, 1910). This decontextualized deconstruction of the more

philosophical ideas about how humans come to know something has created a uniform and safe

method for young learners to conduct their scientific experiments in the laboratory (Hodson,

1996). The researcher argues this is the reason why the SA is not popular for application in

language classes since the scientific method, as explained by Rudolf (2005), Dewey (1910) and

Hodson (1996), has often been limited to subjects that involve experiments and laboratories.

More specific to the Indonesian 2013 Curriculum, the use of the SA became a controversial issue

when the Indonesian government decided to implement the approach in all subjects including

EFL classes. In fact, Indonesia is the first country to implement the SA to language teaching and

learning, including EFL (Estuarso, 2015). Over the years, various methods have been used to

teach language from the 1780s to the 1980s such as The Grammar Translation Method (GMT),

the Direct Method (DM), the Audiolingual Method (ALM), Total Physical Response (TPR), the

Silent Way (SW), Suggestopedia, Community Language Learning (CLL), and Communicative

Language Teaching (CLT) (Richards & Rodgers, 2001). Detailed analysis and evaluation on

each method are presented in Table 3:

Table 3

Analysis and Evaluation on Language Teaching Methods from the 1780s to the 1980s

Period	Method	Analysis and Evaluation
1780s	The Grammar-Translation Method (GMT)	This method focused on the literature and grammar of the target language. The main activity was translating passages into and from the mother tongue. This was popular for teaching Latin and Greek throughout Europe in the 18th and 19th centuries. While it promotes accuracy in linguistic rules, studies found that GMT played a role only in improving learners' reading and writing, while listening and speaking were left unexplored (Abdullah, 2013). For this reason, GMT is considered ineffective in accommodating students' needs for skills necessary in real life. Students learning through this method mostly experience difficulties to hold even a simple conversation in the target language since the instruction is usually derived in a lecture style with limited use of the target language which makes the students think in L1 instead (Abdullah, 2013).

Period	Method	Analysis and Evaluation
1890s	The Direct Method (DM)	In the DM, there is no translation activity. The use of the mother tongue is expressly forbidden, and all communication is in the target language. It was first created and applied in German private language schools. While exposure to the target language is highly facilitated, the DM requires teachers to have native-life target language skills. In this regard, challenges appear as the result of teachers' and/or students' poor command of the English language, making learning less meaningful and effective (Richard and Rodgers, 2007).
1950s	The Audiolingual Method (ALM)	Developed by Charles Fries in 1958, ALM was largely used within the USA military during World War II to train large numbers of personnel in disparate languages. Although it is designed for automated communication, activities such as drilling, repetition, and memorisation have an adverse influence which inhibits students' ability to develop their communication skill which is important in real-life communication outside the classroom. In addition, the ALM is based on mechanical learning which leaves limited space for students to produce errors. Such a condition contributes to students being

Period	Method	Analysis and Evaluation
		demotivated as, in this case, students' own experiences are considered insignificant (Richard and Rodgers, 2007).
1970s	Total Physical Response (TPR)	TPR is rooted in the belief that when action is combined with language, learning is boosted. TPR is a comprehension approach, stressing the importance of input in the initial phase and modelled on the stress-free way that children learn their mother tongue. This was first developed by James Asher, a Professor of Psychology at San Jose State University in California. Although it promotes multimodality which enhances the chance for long-term potentiation, TPR is mostly popular and effective only for teaching beginner level and young learners. In addition, while it can trigger students to be more motivated and confident, students who are less social can have a different response towards the implementation of the TPR. For instance, quiet students tend to be demotivated and their attitude towards learning decreases since they feel threatened from being forced to do things that they would not usually do (Richard and Rodgers, 2007).
1970s	The Silent Way (SW)	This method is based on the idea that language learning can be enhanced in three main ways: discovery rather than teaching;

Period	Method	Analysis and Evaluation
		problem-solving in the target language; and through the use of physical tools. Implementing the SW can be challenging as it requires students' autonomy. While it is important for the students to gain problem-solving skills, students who are not equipped with sufficient linguistic skills can experience barriers during the learning process. For this reason, this method is mostly effective when used to teach students with a good command of the target language, showing high motivation and a growth mindset (Richard and Rodgers, 2007).
1970s	Suggestopedia	The name combines the terms "suggestion" and "pedagogy", the main idea being that accelerated learning can take place when accompanied by the de-suggestion of psychological barriers and positive suggestion. This method was developed by the Bulgarian psychotherapist Georgi Lozanov to learn foreign languages.
		Researchers argue on the scientific bases of Suggestopedia and consider them as pseudoscience. While it will still be useful, its effectiveness relies solely on learners' beliefs and perceptions. It is also important to note that learners can respond to the use of music in the classroom differently; some would find it

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Period	Method	Analysis and Evaluation
		enjoyable and helpful, while others might consider it a distraction.
		Furthermore, exposure to the target language is limited to listening and reading that is accompanied by soothing background music. Other important aspects that facilitate language acquisition such as direct use of the target language are neglected (Richard and Rodgers, 2007).
		In addition, implementing Suggestopedia in countries like Indonesia can be challenging for several reasons such as limited facilities and the number of students in a classroom, which are considered too large for it to work.
1970s	Community Language Learning (CLL)	CLL emphasizes the importance of the learners themselves by calling them "clients" and letting them design lesson content. The teacher plays the part of "counsellor", while the learners are encouraged to work together, interacting and helping each other personally in a supportive community. This method, which aims to alleviate the anxiety and threat so often felt by language learners, is sometimes described as "counselling learning". Critics of CLL mostly reference its imbalanced focus between fluency and accuracy which could lead to students having insufficient control of the grammatical rules of the target

Period	Method	Analysis and Evaluation
		language. Moreover, language teachers' expertise in providing counselling is questioned as their educational background and experience might not cover specific training required for effective processes of psychological counselling which, according to the proponent of CLL, parallels with language learning in classrooms (Richard and Rodgers, 2007).
1980s	Communicative Language Teaching (CLT)	CLT proponents believe that language learning should be designed to enhance students' ability in using the target language in real-life communication contexts. For this reason, CLT demands authenticity in its lesson materials and classroom activities from which students can implement acquired language skills in daily communication. Language components like grammar, however, are not CLT's concern since the approach sees the skill to perform effective communication as the main goal of language instruction. While it promotes authenticity and instructional design that is aimed to provide learning experiences that reflect real-life communication, studies opposed such notions as they found that CLT was unable to meet the need of providing students with the ability to communicate and develop their communication skills in various contexts (Bax, 2003; Nunan, 1987). In addition, the authenticity

Period	Method	Analysis and Evaluation
		of designed classroom interactions created a major debate as the question arose regarding whether or not genuine communication could really take place in the classroom. Moreover, it was also reported that there was prevalent dissatisfaction resulting from the incompatibility of the CLT with certain attributes of local contexts (Kumaravadivelu, 2006). As such, Stelma (2010, p.55) explains that to comprehend CLT methodology, there are two important things that should be taken into considerations: first, "the models of the communication process that implicitly held position of learning to use language through communicating" and second, "understanding what is involved in the process of communication".

In the Indonesian context, before the introduction of the SA, the commonly used methods in teaching foreign languages including EFL were Total Physical Response (TPR) and Communicative Language Teaching (CLT) (Yamin, 2017). TPR was used to teach foreign languages at the primary level since the method was considered in accordance with the concept of language learning (learning by doing) and the level of knowledge development of elementary school children (Yamin, 2017). Meanwhile, CLT was implemented at secondary level (in junior and senior high school levels) (Febriyanti, 2017). CLT was selected because it combines the mastery of language structure and communication, assuming that these two aspects are

interrelated and cannot be separated when mastering a language, especially in learning EFL (Febriyanti, 2017). By implementing CLT, the aim of language teaching was to enhance the students' communicative competence (Febriyanti, 2017). However, Stelma (2010) argues that communicative competence is not something fixed as "in reality, societies and technologies constantly change, and ways of communicating therefore keep changing. Hence, the aim of language teaching is something that may constantly change" (Stelma, 2010, p. 54).

Changes occurring in society have become one of the major reasons why school curricula and teaching methods need updating. Schools need to adjust their curricula and prepare their students with skills that are relevant to a developing society (Oliva and Gordon, 2013). Taking this into account, the 2013 Curriculum was implemented in response to world demand and government expectations to prepare learners for the 21st century through developing students' thinking skills (Kemendikbud/Permen No. 81A/2013, 2013e).

In facing the 21st century, Voke (2018) points out that teaching is becoming more complex and challenging. Teachers need to equip the learners with skills required to face modern-age competition such as creativity and innovation, media and Information and Communication Technology (ICT), literacy, critical thinking, research skills, global awareness and multicultural literacy (Hosnan, 2014). Báez (2004) further argues that the role of language educators should not be limited to the teaching of language features exclusively but they should also become agents of change. Teachers should be able to encourage learners to actively reflect on current concerns and enable them to have the awareness that they are not passive recipients so that they can, eventually, become active members of their society who can contribute to ameliorate the

needs of their nations. In addition, Watanabe-Crockett (2018) states that in the 21st century,

students need to have abilities to survive and succeed in a time that is rapidly changing and

developing. Students also need challenges to encourage greater learning. According to

Watanabe-Crockett (2018, p.17):

> No pupil in the history of education is like today's modern learner. This is a complex,
>
> energetic, and tech-savvy individual. They want to be challenged and inspired in their
>
> learning. They want to collaborate and work with their peers. They want to incorporate
>
> the technology they love into their classroom experiences as much as they can. In short,
>
> they have just as high a set of expectations of their educators as their educators have of
>
> them.

Taking this into account, the Indonesian government wants to integrate non-academic skills

(spiritual, social and knowledge) with the subjects taught in schools. One of the ways to enhance

students' knowledge and skills is by enhancing students' critical thinking skills, creativity,

communication skills and collaboration, as displayed in Figure 6:

Figure 6

The 21st Century Skills Integrated into Subjects Taught in Indonesia
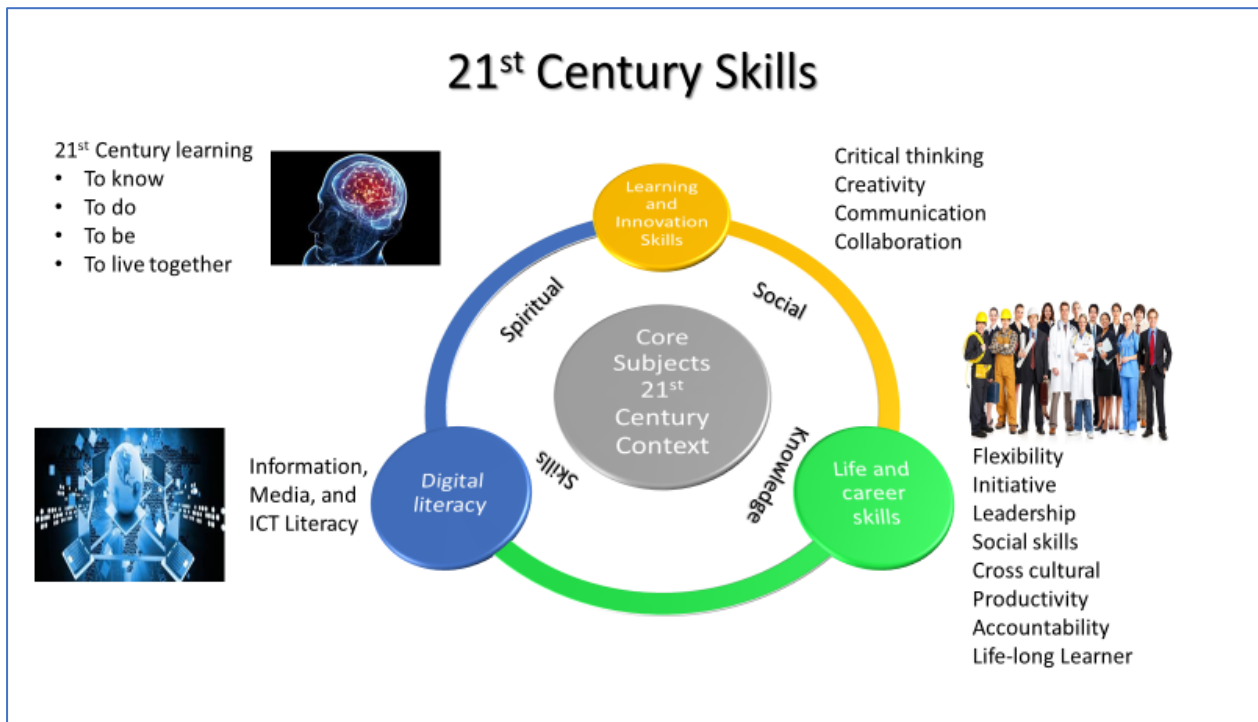
Note. Adapted from Nizam, Puspendik/Evaluation Board of Ministry of Education and Culture of the Republic of Indonesia, 2016**.**

As mentioned in Figure 6 of the 21st century skills integrated into subjects taught in Indonesia, one focus of the Indonesian government has been to enhance students' critical thinking skills through their launch of the 2013 Curriculum. Moreover, in accordance with 21st century challenges, the government requires teachers to stimulate the students to not only know 'what' but also 'why' and 'how', as seen in Figure 7 below:

Figure 7

Driving 21st Century Competency
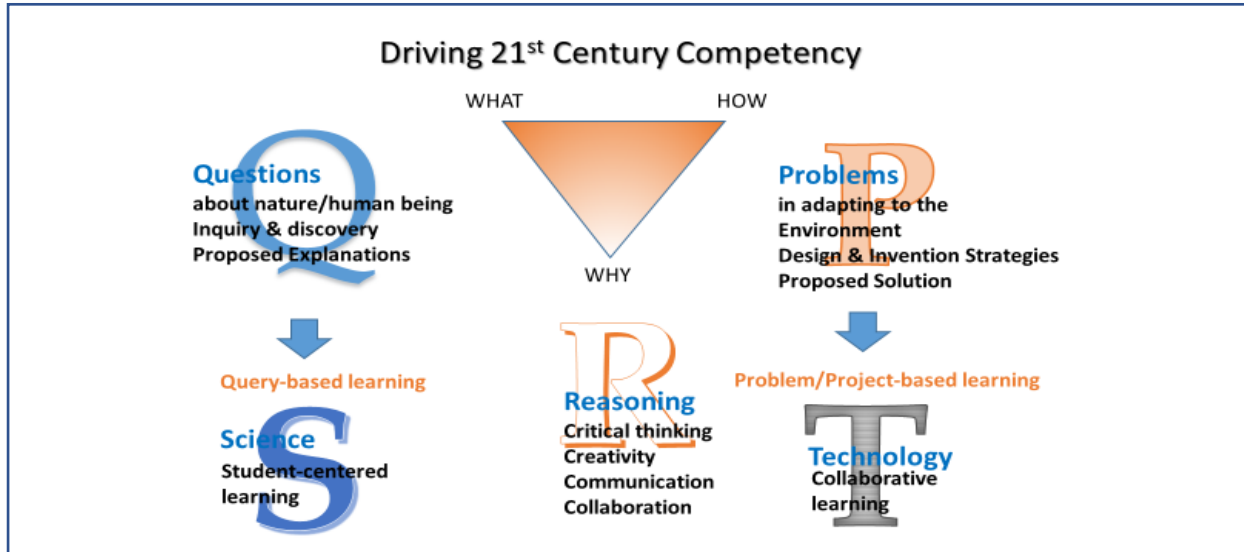
Note. Adapted from Nizam, Puspendik/Evaluation Board of Ministry of Education and Culture of the Republic of Indonesia, 2016.

By knowing the 'why' and 'how', students will have a deeper understanding that allows them to better analyse the circumstances surrounding an occurrence and consider differing viewpoints about it (Tsai *et al.*, 2013). To accomplish this, the government set the learning steps in the curricula of all subjects to correspond to the learning steps in the SA with the aim of developing and improving students' critical thinking skills.

The steps used in implementing the scientific method in each country are also remarkably diverse. For example, a study by Steel *et al*. (2004) reported that in the science class that they observed, students undertake the following steps: ask testable research questions, design unbiased experiments, collect their own data, analyse the data via graphical representations and

statistical summaries, and communicate their research results as both poster and oral

presentations. Meanwhile, research conducted by Lim (2012) in a Chemistry class in Australia

found that students often learn that science is practised according to the scientific method, a

model of scientific discovery with these steps: the collection of information about a phenomenon;

the development of a hypothesis to explain those observations; an experiment to test a prediction

that arises from the hypothesis (including more observations and collection of more information);

and improvement of the hypothesis.

Table 4 below offers a comparison of different adaptations of the scientific method from the

original form—called Traditional Scientific Method which was published by scientists such as

John Dewey and Morris R. Cohen in the 19th – 20th centuries (Aaboe, 1974; Shuttleworth, 2009)

– to that which is adopted in Indonesia (Kemendikbud/Permen No. 81A/2013, 2013e) and in

other countries such as the US (Steel *et al*., 2004), the UK (The Science Teacher, 2018),

Australia (Lim, 2012), Norway (Knain, 2018), and Japan (Kunifuji, 2013).

Table 4

The Steps of the Scientific Method in Indonesia, the US, the UK, Australia, Norway and Japan as

compared to the Traditional Scientific Method (TSM)

STEP	Traditional Scientific Method	Indonesia	US	UK	Australia	Norway	Japan
1	Identifying a problem	Observing	Asking testable research questions	Having new experiences/ question	Collecting the information about a phenomenon	Observing	Exploring the situation surrounding the problem
2	Researching the topic	Questioning	Designing unbiased experiments	Creating possible explanations: - Alternative ideas - Existing ideas - Bigger ideas	Developing a hypothesis to explain the observations	Formulating a hypothesis	Collecting all relevant and accurate data through observation
3	Formulating a hypothesis	Experimenting	Collecting the data	Making a prediction	Doing an experiment to test a prediction that arises from the hypothesis (including more observations and collection of more information)	Experimenting	Formulating or developing many hypotheses and deciding one of those hypotheses to adopt

S T E P	Traditional Scientific Method	Indonesia	US	UK	Australia	Norway	Japan
4	Performing the experiment	Associating	Analysing the data (via graphical representations and statistical summaries)	Planning and conducting investigations	Improving the hypothesis	Making a theory	Revising the adopted hypothesis through deductive reasoning
5	Recording and analysing the data	Communicating	Communicating their research results as both poster and oral presentations	Interpreting the data			Planning an experiment for testing the adopted hypothesis
6				Making conclusions			Observing the experiment
7							Giving the results of the experiments
8							Verifying the hypothesis
9							Acquiring a conclusion

Note. Source: Kemendikbud/Permen No. 81A/2013, 2013e; Steel *et al.*, 2004; The Science Teacher, 2018; Lim, 2012; Knain, 2018; and Kunifuji, 2013.

The comparison identifies that the steps of the scientific method used in some developed countries refer closely to the steps of the TSM, but with some development and additional steps added. For example, in the UK and Japan, the steps closely follow the five steps of the TSM and then include additional steps such as making a conclusion (UK) and revising the adopted hypothesis (Japan). Another finding is that although they give different labels to each step, the basic activities are largely similar. For example, step 1 of the Scientific Method refers to the same type of activity focused on identifying the problem (as named by the TSM), but different descriptions are given for this step depending on the country: observing (Indonesia), asking testable research questions (US), and collecting the information about a phenomenon (Australia). In other words, though there are different steps and names for the scientific method available, in general, there is similarity in the procedural steps that are adapted from the original or TSM model.

In the Indonesian context, the Ministry of Education and Culture through Kemendikbud/Permen No. 81A/2013 (2013e, p. 6-7) depicts the five steps of implementing the SA in the teaching and learning processes as being: "observing, questioning, experimenting, associating, and communicating". They are described as follows:

a. **Observing**

Observing is the first activity teachers need to engage the students with when implementing the SA. This step includes two major foci for teachers to carry out. The first is the actual process of observing given stimuli relevant to the expected competencies in the forms of audio, visual, audio-visual, or realia. The other responsibility during this activity is to guide

students on how to conduct an effective observation so that they could gather information according to what is instructed. There are seven activities teachers can use to lead students to observe learning sources in the first step (observing): (1) determining the quality and characteristics of the observed objects; (2) finding the purpose; (3) explaining the observing process; (4) setting the limitation or scope of the observed objects; (5) conducting the observation process carefully; (6) reporting the observing result; and (7) comprehending/understanding the result of the observation (Kemendikbud/Permen No. 81A/2013, 2013e).

b. **Questioning**

Questioning is the second step of the SA where students are encouraged to be cognitively active and to communicate their opinions from which students' questioning and speaking abilities can be improved. They further lead students to engage in discussion and encourage them to think and conclude while training students to be open-minded and tolerant, as well as to support students to develop their critical thinking skills (Kemendikbud/Permen No. 81A/2013, 2013e).

c. **Experimenting**

This is the core activity of the learning where students directly interact with the lesson materials in order to acquire new knowledge in a set structured procedure comprising of planning, action, and follow-up activities. The five further activities teachers can do in this step are as follows: (1) divide students into small groups; (2) have students start discussions; (3) record the process of the discussions; (4) supervise students during the teaching and

learning process; and (5) support groups that need help (Kemendikbud/Permen No. 81A/2013, 2013e).

d. Associating

This step requires teachers to facilitate students with activities requiring analytical skills to build, connect, and elaborate what they did and discovered in the previous steps to enable them to draw a conclusion so the instruction can be relatable and meaningful (Kemendikbud/ Permen No. 81A/2013, 2013e).

e. Communicating

In this step, students are expected to be able to share the information they have observed and experimented with the class. There are four further activities teachers can do in this step: (1) have students read their work to their classmates; (2) ask other students to focus on the performing student and give some feedback; (3) provide further explanation needed based on the discussion; and (4) provide further tasks which might help students to improve their ability to perform positive attitudes, skills, and comprehension on the discussed topics (Kemendikbud/Permen No. 81A/2013, 2013e).

The steps of the SA that are proposed by the government in the 2013 Curriculum serve as a guideline for observing the implementation of the SA in EFL classes.

2.4 Critical Thinking and Bloom's Taxonomy in the Indonesian 2013 Curriculum

Some historians have recorded that the intellectual roots of critical thinking are as ancient as the

teaching practices and vision of Socrates (5th century BCE) who discovered a method of probing

questioning. This method emphasises that people could not rationally justify their confident

claims to knowledge. As such, Socrates established the importance of asking deep questions that

profoundly probe one's thinking before accepting ideas as worthy of belief. His method of

questioning is now known as "Socratic Questioning" (Paul *et al*, 1997). Later, Socrates' practice

was followed by Plato, Aristotle and other scholars and continued to be developed in the Middle

Ages, Renaissance and post-Renaissance periods, and it is still implemented and further

developed to the present day.

Resources on critical thinking have been sufficiently developed by experts (e.g. Bissell and

Lemons, 2006; Black, 2006). Socrates established the fact that to have sound knowledge and

insight, one cannot depend upon those in "authority". Socrates further explained that "persons

may have power and high position and yet be deeply confused and irrational" and it is important

to ask, "deep questions that probe profoundly into thinking before ideas are accepted as worthy

of belief" (Paul *et al.,* 1997, p.37). He also established that it is important to seek evidence,

closely examine reasoning and assumptions, analyse basic concepts, and trace out implications,

not only of what is said but of what is done as well (Paul *et al*., 1997).

In accordance with critical thinking, the term "critical thinking" itself is open to different

interpretations. Paul (1994 in Walters, 1994) defines critical thinking as a movement of 'critical

analysis' or clear, rational thinking involving critique. A similar viewpoint is also expressed by

Beyer (1995 in Elkins, 1995) who states that critical thinking means making clear, reasoned judgments. Based on those definitions, *clarity* and *rationality* become two important points that characterise critical thinking. Furthermore, in a broader sense, the U.S. National Council for Excellence in Critical Thinking defines critical thinking as the "intellectually disciplined process of actively and skilfully conceptualizing, applying, analysing, synthesizing, or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action" (The Foundation for Critical Thinking, 2017, p.766). As such, critical thinking is more than just thinking in a clear or rational way, but it is also about thinking independently (Watanabe-Crockett, 2018). In other words, during the process of critical thinking, ideas should be reasoned, well thought out, and judged by the individual before presenting them to others.

In relation to students' competencies, for students one of the most important skills they need to learn is the ability to think critically about an issue so that they can present a well-constructed argument both in spoken and written form (Judge *et al*., 2009). Thus, it is also important for teachers to assist students in developing their critical thinking skills. By utilizing activities that enhance critical thinking, students can better understand why something has occurred rather than simply understanding what has occurred (Tsai *et al*., 2013).

Additionally, critical thinking is essential to most aspects of study, whether the students are listening to lectures, contributing to seminars or reading about a subject (Judge *et al*., 2009). In other words, utilising in-depth questioning and evaluation to assist students' critical thinking is applicable to all educational sectors (Kawalkar & Vijapurkar, 2013). In activities, for example,

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the teacher can ask the students to track the patterns available in information that can help them

to develop the skills of recognition and prediction and ask the students to evaluate the

information or sources they view so that they can learn appropriate procedures to find and utilise

credible information in acceptable and appropriate ways (McCollister & Sayler, 2010). As Choy

and Chaeah (2009) point out, critical thinking enables learners to think and evaluate their

behaviours and attitudes in learning, to be decisive on all issues related to their own selves and

surroundings, and to understand their roles and contributions to their surroundings in their daily

lives.

In relation to the Indonesian 2013 Curriculum, critical thinking became one of the students'

competences to improve (Kemendikbud/Permen No. 81A/2013, 2013e). Even though this

emphasis on critical thinking is now a clearly stated component of the educational system in

Indonesia, it is unlikely to be widely implemented in the processes of teaching and learning at all

levels of education (Ilyas, 2017). The researcher contends that such a situation occurs because

the previous 2006 Curriculum did not emphasise the skill of critical thinking for students, while

the current curriculum prescribes a focus on students' critical thinking skills development. This

constitutes an incredibly complex change for teachers to implement with their students. Indeed,

the development of Indonesian English Language Teaching (ELT) from the colonial era to the

present has not facilitated students' critical thinking skills.

Nevertheless, in line with the goals of the 2013 Curriculum, EFL classes, along with their role to

increase students' language competencies, are expected to also conduct the teaching of critical

thinking (Kemendikbud/Permen No. 81A/2013, 2013e). Based on the standard competence of

the 2013 Curriculum, learning and teaching should be designed to develop students' cognitive abilities and communication skills, also stimulating students to not only memorise but also to critically respond to lesson material. On that account, critical thinking is the foundation for learners to develop other skills as also expected in the 2013 Curriculum. The Indonesian government views that integrating the teaching of critical thinking skills with English language teaching through the implementation of the SA can effectively improve students' thinking and communication abilities. In addition, to categorise the levels of thinking abilities of students, there is an extension and deepening of taxonomy in the process of achieving competence in the 2013 Curriculum compared to the previous 2006 Curriculum, as follows:

Figure 8

Formulation of the Process of Achieving Competences in the 2013 Curriculum
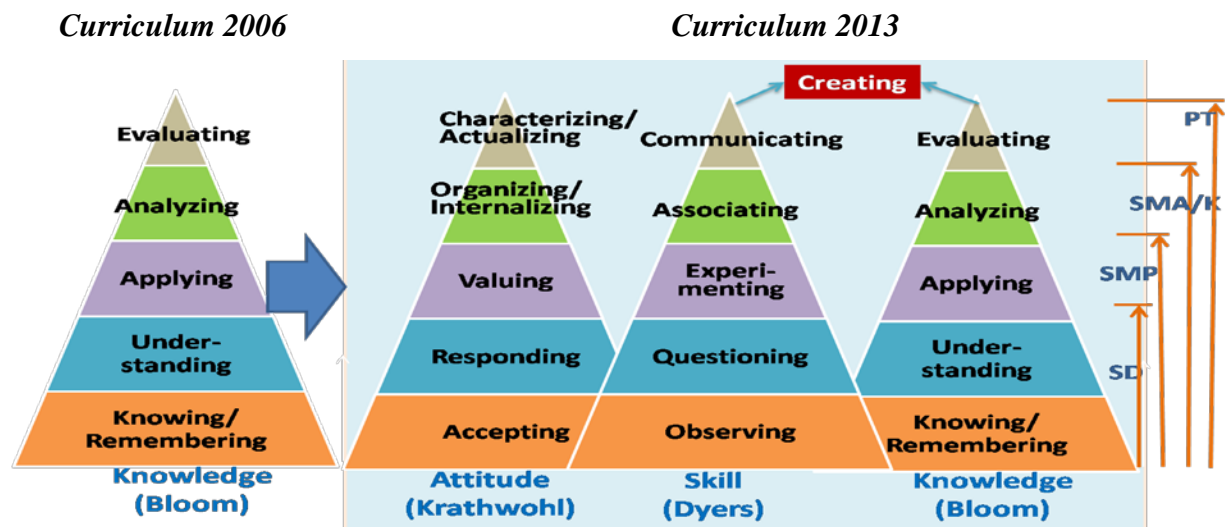
Note. The meaning of the abbreviations on the right-hand side of this figure: SD (Sekolah Dasar) = elementary school; SMP (Sekolah Menengah Umum) = junior high school; SMA/K (Sekolah Menengah Umum/Kejuruan = senior high school/vocational high school; and PT (Perguruan Tinggi) = higher education/university. Source: Teacher's Development Centre, Kemendikbud, 2014.

The difference of taxonomy in the 2006 Curriculum and 2013 Curriculum lies in the addition of competencies that should be reached by each school level (from the elementary to higher education levels). In the 2013 Curriculum, competence is not only assessed from knowledge competency, but also from attitude and skill competencies.

In the 2013 Curriculum, knowledge competence is based on the revised Bloom's Taxonomy by Anderson and Krathwohl (2001). The notion was originally designed by Benjamin Bloom (1956) as a way to categorise the levels of thinking abilities needed by students to learn effectively (Gaitan, 2017). Each one of its categories is purposed to construct one level of abstraction more complex than the previous. This updated version points to a more dynamic conception of classification (Gaitan, 2017), as presented below:

Figure 9

The Revised Bloom's Taxonomy by Anderson and Krathwohl (2001)
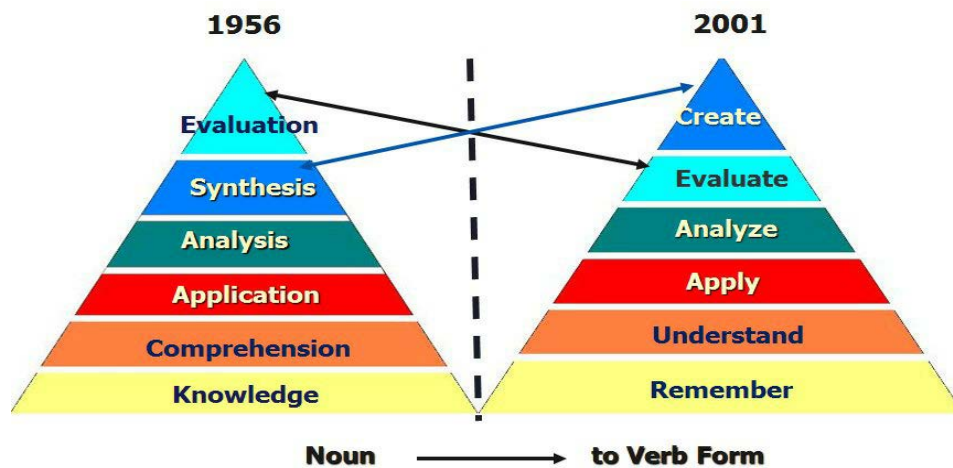
As defined by Bloom and his taxonomy, critical thinking skills are an integral part of both higher- and lower-order thinking. Levels 1-3 (commonly referred to as C1, C2, and C3, where C refers to Cognitive) are considered lower-order thinking skills (LOTS) in which the students can

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only reach the level of remembering, understanding, and applying, while levels 4-6 or C4, C5, and C6 are called higher-order thinking skills (HOTS) and include analysis, evaluation, and creating. As set out by Indonesian 2013 Curriculum for the senior high school level, it is required that students can critically think about a set of facts or other information to make an informed decision through the six levels of cognitive thinking defined by Bloom: *remembering, understanding, applying, analysing, synthesising,* and *evaluating* (Kemendikbud/Permen No. 81A/2013, 2013e)Furthermore, the revised Bloom's Taxonomy by Anderson and Krathwohl (2001) was used to analyse how the students' critical thinking skills are built throughout the SA implementation as required by the 2013 Curriculum.

2.5 Teaching Critical Thinking Skills in EFL Classes

In the past, critical thinking was taught to students through memorization and controlled teaching (Lim, 2016). Critical thinking skills were also taught as a set of discreet knowledge in an isolated fashion, and thus, this kind of isolated teaching method hampered students' critical thinking development (Scheurman *et al*., 1995). However, along with the changing era and the developments in education, there were some strategies for teaching critical thinking in the classroom. Abrami *et al*. (2008) proposed an argument that teaching strategies for critical thinking can be categorised as mixed immersion as well as infusion. These methods are used when the critical thinking skills are specific and attached to subjects or disciplines (Abrami *et al*., 2008). The general method is used when critical thinking is delivered in the classroom in a distinct educational unit along with the idea or concept that the skills being taught are transferable across disciplines as well as contexts. In immersion and infusion methods, it is more essential to focus on the content of the disciplines or subjects.

In the Indonesian 2013 Curriculum that uses the SA, critical thinking is not a subject that is taught separately from other subjects and instead is integrated into the subjects delivered. Thus, the researcher argues that students' critical thinking skills are developed by using the immersion method since it is rooted in the related subject, in this case EFL.

Critical thinking has become one of the popular skills to integrate in EFL/ESL classes alongside language production (speaking and writing) and receptive skills (listening and reading). This trend emerged as studies related to critical thinking showed the connection between students' critical thinking and their abilities to communicate using the target language. For instance, Harizaj and Hajrulla (2017) argue that developing students' critical thinking helps them enhance their vocabulary mastery and the ability to sense the context affecting the language use. They further imply that the teaching of critical thinking in foreign language classes could trigger the students to communicate more, from which they acquire more vocabulary.

This notion also resonates with the claim given by Clark & Starr (1991) that inquiry learning, which includes second and foreign language learning, can take place if only its basic requirement is fulfilled: the ability to think. Therefore, they note that it is necessary for the students to first acquire the skill to think critically so that they can employ this skill to learn a second language more effectively. To facilitate such a need, these scholars suggest students must have a language classroom environment that conditions them through involvement in collaboration, from which they can learn to interact and use the language they learn. Furthermore, through this interaction, students can each gain more awareness of their individual role as a group member, which further adds to their understanding of the learning process and their own potential to improve their

language skills. It is also believed that through activities that trigger the students to use their critical thinking skill, they will develop independence and decision-making skills which further lead to the development of their autonomous learning skills. In other words, promoting critical thinking skills in language learning could facilitate the students learning the language in a more sustained way.

In accordance with the Indonesian 2013 Curriculum, the purpose of including critical thinking in all subjects is to facilitate active learning that enables students to develop knowledge independently through the process of interacting with their surroundings (Kemendikbud/Permen No. 65/2013, 2013c). The researcher's argument related to this is that teaching critical thinking using the immersion method provides a good opportunity for the students to develop their critical thinking abilities through the subject being learned. Other research also indicates that to improve students' critical thinking, the students should interact with and be actively involved in the learning and teaching processes in the classroom (Maryani *et al*., 2018). However, the learning process does not only happen through the process of interaction; right after that, students will develop learning methods themselves through the process of exploring or manipulating as well as performing "experiments" (Nelson and Crow, 2014). As such, the researcher argues that teaching critical thinking is not only purposed to create active learners, but also to train students to explore their skills in searching, exploring, processing, and evaluating critical information they received, as also expected by the 2013 Curriculum.

Furthermore, in relation to the implementation of critical thinking to subjects in the class, Jones (2007) investigated the cultural epistemological concept of Economics and History subjects

which are also taught in the Indonesian curriculum. Her findings revealed that diverse perceptions of the two disciplines affected the conceptualisation of critical thinking. She explained that History, as a certain discipline, allows debate and varied views. Meanwhile, Economics gives constancy and is likened to Science. In the History subject, her research findings reported that critical thinking is rooted more smoothly in lectures and tutorials, as well as in every task and essay given in the classroom. Nonetheless, critical thinking is seen to be more of an implementation of logic in Economics, and the learning and teaching processes of critical thinking is "grounded around the process of understanding the concept of economic theory, tools, and models" (Jones, 2007, p.92).

These findings in the implementation of critical thinking in History and Economics have led the researcher to investigate similar research on the implementation of critical thinking in the area of language, and more specifically in EFL, exploring whether it will have the same results or create new findings. In this research, the researcher intends to examine how EFL teachers implement and integrate the SA in EFL classes and how this implementation assists students in developing their critical thinking skills. This has become integral to the purpose of this study.

2.6 Summary of Review of Related Literature Chapter

This *Review of Related Literature* has offered an overview of the launch of the Indonesian 2013 Curriculum and highlighted the reasons behind the publication of the curriculum as well as specific changes in the EFL curriculum in Indonesia. Changes in the curriculum related to the Scientific Approach, critical thinking and Bloom's Taxonomy had been discussed in the chapter as they are the main topics of the study. The explanation of how the SA and critical thinking are

applied in various countries has also been an important point of reference in supporting the development of this research.

Furthermore, literature and research within the researcher's field and from similar fields have been examined in this chapter. The results of the presentation of literature and previous research have provided information on the current situation on the implementation of the 2013 Curriculum in Indonesia and how the SA is implemented in various subjects, particularly in EFL, which is the focus of this study. Several issues related to the implementation of this current curriculum and its complexity have led the researcher to explore similarly related issues more deeply, specifically on the implementation of the SA in EFL and its influence on the development of students' critical thinking processes. Having identified and presented key literature relevant to this research, the dissertation will now move on to explain the methodological decisions which underpin the empirical research that was conducted as part of this study.

Chapter 3

Research Methodology

It has been established that this research aimed to investigate the implementation of the Scientific Approach (SA) in English as a Foreign Language (EFL) classes and its influence on the students' critical thinking development in Indonesia. Challenges faced by the school population (e.g. the principal, the vice principal for curriculum affairs, the teachers and the students) and the way they overcome these challenges is also of concern in this study. This chapter opens with a discussion about the research design and the sample of the study. After that, data collection methods and methods of data analysis are discussed in detail. Figure 10 shows the steps that were carried out when undertaking this research, beginning with an acknowledgement of the broad assumption and interpretive lens used in this study.

Figure 10

Phases in the Qualitative Research Process
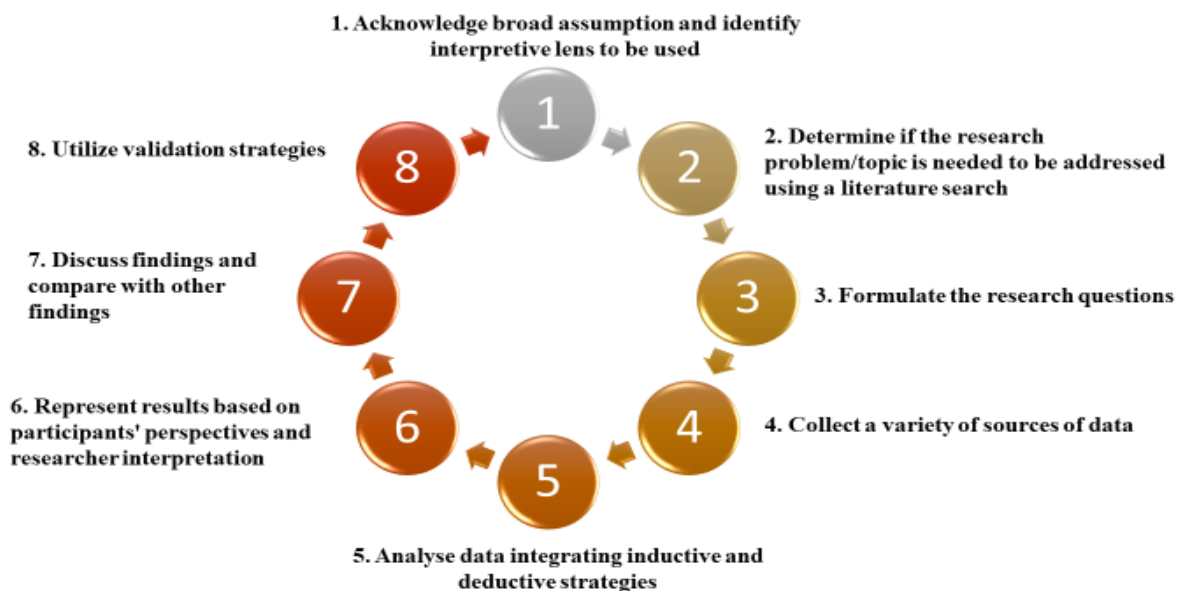
Note. Adapted from Creswell & Poth, 2018, p.51.

3.1 Philosophical Background

Clarification of the research philosophy and paradigm location of this study is important since these two aspects orient and provide a perspective for undertaking the study, as mentioned by Mertens (2010). Prior to clarifying the type of ontology subscribed to in this study, Crotty (2003, p.10) defines that ontology is "the study of being" that is concerned with "what kind of world we are investigating, with the nature of existence, [and] with the structure of reality as such". Having embraced this definition of ontology, this study was conducted by considering the principles and procedures drawn by the constructionist paradigm that stands on the notion that knowledge is acquired through the process of constructing the world from the point of view of the people in that world (society) (Crotty, 1998; Gray, 2014; Scott & Usher, 1996). On this account, this study focused on discovering thorough explanations of the implementation of the SA in EFL classes and how it affects students' critical thinking according to the perspectives of those involved directly in the process (the teachers, the principal, the vice principal for curriculum affairs, and the students). The constructionist's view on knowledge drives the understanding that the research results drawn from the data obtained from the above parties could represent the actual phenomenon (Goodson, 2010; Gray, 2014). Moreover, establishing what was right or wrong in terms of how the SA was implemented was not the intention of the study. It was focused more on looking at the process and, from there, finding its potency and room for improvement (Crotty, 1998; Gray, 2014).

Furthermore, epistemologically, this study applied the view of interpretivism which considers culture and history in interpreting the world. It is also aligned with the aim of searching for a "culturally derived and historically situated interpretation" of the SA implementation in EFL

classes (Crotty, 1998, p. 67). Moreover, using case study as a methodological approach for this research allowed the researcher to focus on the participants' (teachers', students', school principal's, and vice principal's) opinions, feelings, experiences and inner thoughts.

3.2 Research Design

A qualitative case study approach was used for this research because it focused on the following: (a) describing how the process of the SA implementation occurred specifically for EFL classes in the context of Indonesian 2013 Curriculum, and (b) explaining how the process of the SA implementation contributed to the development of students' critical thinking skills. The contextual conditions of the case study were also described (see section 3.3) since they were connected to the studied phenomenon, and it must be noted that there was an unclear boundary between the phenomenon being studied (the process of the SA implementation in EFL classes) and the contextual surroundings, such as the condition of the classrooms, the teachers, the students, and school (Baxter & Rideout, 2006).

Case studies come with what is called "methodological freedom" that allows space for the researcher to investigate multiple aspects and perspectives by applying multiple data types (Stake, 2000) as a form of data triangulation (in this case interviews, classroom observations, and document reviews – to be discussed in 3.4.

In addition to analysing how the SA was implemented during the learning and teaching process, its role in improving students' critical thinking skills also became of interest in this research. Through conducting a case study, this research was able to gather all the data needed to offer

detailed and comprehensive explanations on how the SA was carried out in EFL classes. Following this, evidence-based reflection and recommendations can be provided (Stake, 2000).

3.3 The Sample of the Study

The school where this research took place was chosen using the purposeful sampling strategy which allowed the researcher to find the school with the characteristics needed to achieve the aims of this study, so the 2013 Curriculum implementation could be explained with sufficient detail as access to teachers, principal, vice principal, and students involved could easily be obtained (Glesne, 1999; Creswell & Poth, 2018). The rationale behind choosing one school was the constraint of time for one researcher (the researcher herself) to conduct an in-depth case study aimed at providing profound insights into the SA implementation. Due to this constraint, the results of this study cannot offer generalisations about all schools in Indonesia. The chosen school is an A-accredited school and the school has been set by the government of Indonesia as a model school for the implementation of the 2013 Curriculum in the region. It has implemented the SA from the first time this approach and related curriculum were introduced to the public in 2013. The school is also a nationally standardised school, which is considered to be representative of the quality of Indonesian education in general.

Furthermore, the research participants chosen were four EFL teachers in the school who were teaching at different grade levels (grades 10th, 11th, 12th), students from their four classes (n=152 in total), the principal, and the vice principal for curriculum affairs. By this sampling, the researcher intended to gain in-depth information from different perspectives that come from the EFL teachers who are required to teach using the SA, from the students who are instructed to

learn through the SA, and from the school principal and the vice principal who are responsible for ensuring the SA is used throughout the school. Moreover, Ross (2005) suggests that in selecting research participants, one of the following conditions should be fulfilled: (a) research participants have direct and first-hand experience in the phenomenon being studied, in this case the SA implementation which involved teachers, the principal, the vice principal for curriculum affairs, and students; or (b) they actively engage with the school's situation and activities. It was important for this research to obtain thorough information and comprehension about the studied phenomenon (Creswell & Poth, 2018); therefore, the researcher opted to gather research data from the parties directly involved in the SA implementation since they had sufficient and reliable knowledge.

The school principal involved in this study had served as the principal since 2011. He oversaw one of the pilot/cluster schools when the 2013 Curriculum was established. He had attended six training sessions on changing the previous curriculum to the new 2013 Curriculum. Furthermore, the vice principal for curriculum affairs had 16 years of experience as a teacher and six years of experience as a vice principal for curriculum affairs. She had completed six training sessions on the 2013 Curriculum. Meanwhile, the EFL teachers (three female and one male) were highly experienced teachers. They reported that they had between 28 to 33 years of teaching experience. Two of them held Master's degrees in English Education and the other two were Bachelor's degree holders in English Education. All were classified as certified teachers and had undergone three training sessions on the 2013 Curriculum and the SA implementation.

Furthermore, this study also involved 152 students in total consisting 68 males and 84 females with age range between 16 and 18 years old and were in grade 10th (n=76), 11th (n=38), and 12th (n=38). In terms of their range of ability, students with low, medium, and high attainment were involved and classified by the teachers based on the score students got for EFL subject. With 70 as minimum band score, students who scored below were classified into low achievers, while those who obtained 70 – 80 and 81 – 100 were classified into medium and high achievers respectively.

The researcher believes that the chosen participants sufficiently met the criteria that she needed for the research purposes. By involving these participants, the researcher aimed to collect meaningful data on the implementation of the SA and its influence, whether positive, negative, or neutral, on students' critical thinking development.

3.4 Data Collection Methods

The data of this research were collected from interviews (with school managers, EFL teachers and students), classroom observations and documents (syllabi and EFL teachers' lesson plans). The details relating to the data collection methods are presented in the following sections.

3.4.1 Interviews

The method of interview is a proven useful method for data collection in social science studies. Schostak (2006) mentions that the interview allows the researcher and research participants to engage in extended conversations in order to obtain sufficient data needed for the research. In the context of this research, the semi-structured interview was opted for, owing to its flexibility and

tendency to create more open discussion and investigation from which comprehensive data, explanation, and understanding about phenomenon being researched – in this case the implementation of the SA in EFL classrooms – could be gathered from the research participants (Fontana & Prokos, 2007; Galletta, 2013; Rubin & Rubin, 2005). Taking this into account, as conversations through this type of interview could be extended, interview guidelines in the form of a checklist were prepared in advance to ensure that all the information needed for the research was obtained. Indeed, as Berg (2007, p.39) explains, "…the checklist allows in-depth probing while providing chances for the interviewer to manage the interview under the parameters which are derived from the aim of the research".

The interviews were organised in three groups: the first group was comprised of EFL teacher interviews (n=4); the second group included interviews with the students (n=4); the third group was the interview with the senior management members that involved the school principal and the vice principal for curriculum affairs (n=2). Each interview lasted in 30 - 60 minutes. The time and venue for each interview were at the discretion of the participants.

Prior to the interviews, the participants were informed that all interviews were audio-recorded on a digital recorder. To gain comprehensive and detailed information from the participants, the interviews were conducted in the Indonesian language because English proficiency varied among the participants and it was easier for the participants to explain the issues in their mother tongue. Moreover, it was preferable and helpful for the participants to provide deep and thorough answers in Indonesian and to avoid misunderstandings that might result from conducting the interviews in English.

The first group was the interviews with EFL teachers. Each teacher was interviewed individually prior to the classroom observations in his/her class. The purpose of this was to find out what the teachers knew and understood about the SA (see Appendix C for details of the questions).

The second group was the interviews with the 24 students selected from the four observed EFL classes. There were six students selected from each class that included one male and one female from each grade of students' attainment: high category, middle category, and low category. The researcher's rationale for choosing these students was to obtain plurality in their answers and to gain different perspectives about the implementation of the SA in the class that would be gained through this data collection. By employing variation in sampling, in this case the students from different grades (high, middle and low), multiple perspectives could be described about the cases being researched (Van Hout & Bingham, 2013 in Creswell & Poth, 2018). For this study, the teachers selected the students for the interviews. These selected students were then contacted by the teachers and asked whether they wanted to take part in the interviews or not. Those who refused to be interviewed (n=2) were replaced by the other two students from the same category. The student interviews obtained feedback related to students' experiences in the observed class activities. There were six questions directed to the selected students (see Appendix D). The questions were intended to gain more information about the participants' perceptions, thoughts and feelings regarding the implementation of the SA and how it influenced their performances in the class as well as their critical thinking development.

For students, the interviews were in the form of combining a Focus Group Discussion (FGD) and a Focus Group Interview (FGI), which the researcher named Focus Group Discussion and Interview (FGDI). Some researchers argue that FGD and FGI are two names that refer to the same phenomenon since both are forms of interviewing in which the data comes from a group discussion (Morgan, 2013). It is further argued that both are used for data collection (Krueger & Casey, 2015), both function to provide "…a rich and detailed set of data about perceptions, thoughts, feelings and impressions of people in their own words" (Stewart & Shamdasani, 1990, p.140), and both are "…predominantly beneficial when a researcher intends to find out the people's understanding and experiences about the issue and reasons behind their particular pattern of thinking." (Kitzinger, 1995 in Dilshad & Latif, 2013, p.192).

However, in the process of interviews, FGI and FGD are two different methods. Patton (1987 in Clark, 2016, p.2) explains that "a focus group interview is an interview with a small group of people on a specific topic [and] the focus group interview is indeed an interview…not a discussion [or] a problem-solving session [or] a decision-making group [but rather] an interview". Nevertheless, Anderson (1990, p. 241) argues that a focus group discussion is defined as "a group comprised of individuals with certain characteristics who focus discussion on a given topic". Additionally, there is a difference in the roles of the researcher in FGDs and FGIs as explained below.

In an FGI, the researcher adopts the role of an *investigator*. As an investigator, the

researcher asks questions, controls the dynamics of the discussion, or engages in dialogue

with a specific individual at a time. In contrast, in an FGD, the researcher adopts the role

of a *facilitator* or a *moderator* where the researcher thereby takes a peripheral, rather than

a centre-stage role in a focus group discussion. (Bloor *et al*., 2001 in Nyumba *et al*.,

2017, p.21)

Based on the explanation of two different types of focus group (FGD and FGI), the researcher

tried to combine the two types to cover the gap that she found during the piloting. The FGDI

method was used because of constraints found during the pilot study interviews that used FGI

with the students. The researcher found it difficult to elicit the information that she needed from

the students' point of views since they tended to give short answers and sometimes repeated their

friend's answers despite the use of probing questions to retrieve richer answers. A similar

situation was also explained by Patton (1987 in Clark, 2016) that in FGI, participants get to hear

each other's response and they can give responses based on what they heard from others or

directly repeat others' answers. Thus, the researcher found that the FGI did not work well to

obtain the data she needed in the pilot study. In addition to this, due to time constraint and

limited access to conduct individual interviews with the students, the researcher decided to

combine the FGD for thought showering and then continue to conduct the FGI to tease out in-

depth answers from the students. The researcher played two roles during the FGDIs: *facilitator*

and *investigator*. Figure 11 below shows the steps and activities that the researcher conducted

when interviewing the students using the FGDI method.

Figure 11

Diagram to Show the Steps and Activities in Conducting the FGDIs
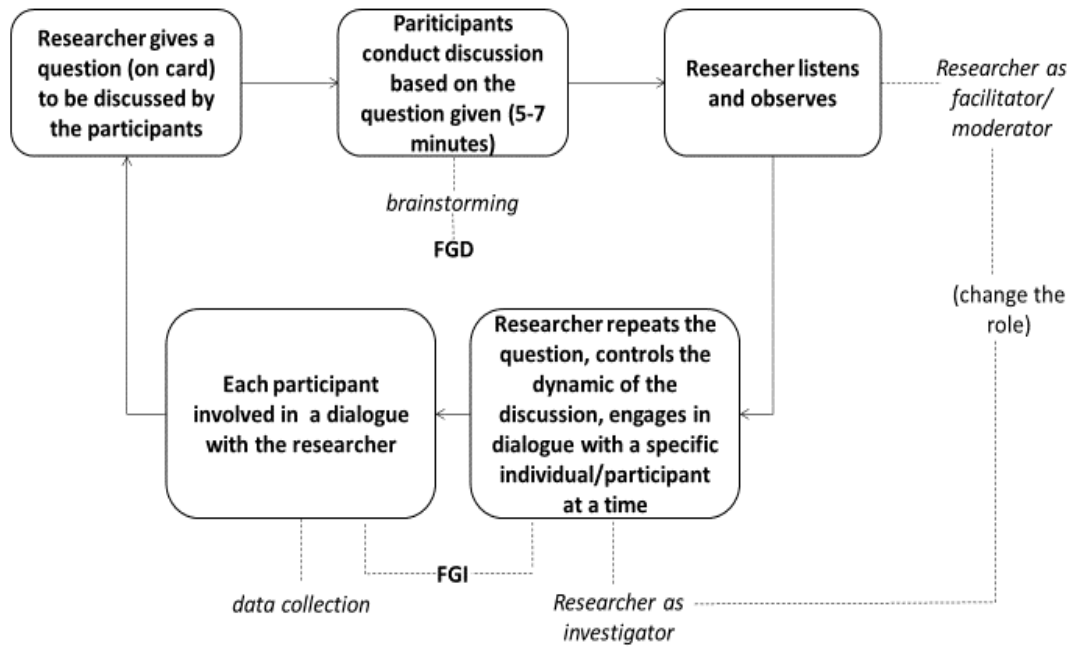
There were four FGDIs which involved 24 students from the four observed EFL classes. Each

FGDI lasted about 60 minutes. The FGDIs were administered at school and scheduled based on

the students' availability. As FGDI was conducted as a group (in this case group of 6), each

group was given a set of time option to be opted and agreed upon. No interruption was made to

students' learning time as the FGDIs were held after school and with their consents signed and

informed to parents.

The third group was the interviews with senior management members. The interviews involved

the school principal and the vice principal for curriculum affairs. The intention of their

interviews was to gain other perspectives on the implementation of the SA and its effects on the

students' critical thinking processes from the position of the highest administrators (see

Appendix E). The principal and the vice principal for curriculum affairs were interviewed individually.

After the interviews were audio-recorded on a digital recorder, the recorded interview data were promptly transferred to a protected data storage device. The interviews were all audio recorded after receiving signed consent forms from each participant (see Appendix F). Afterwards, the interviews were transcribed into digital Microsoft Word files. The recorded interviews allowed the researcher to re-play and listen to the contents to help refine the transcripts. The process of translation was performed by a professional translator to obtain the results as accurately as possible (see Appendices G, H, and I for the extracts of the interviews with the participants).

3.4.2 Classroom Observations

Classroom observation was chosen as one of the data collection methods in this research, from which authentic and valid data about the process of the SA implementation from the beginning to end could be obtained directly and within the relevant context (Cohen *et al*., 2011). In this case, the data were gained from learning and teaching activities held in the classrooms and the approaches and strategies that teachers used in teaching activities. In addition, conducting classroom observations allowed the researcher to triangulate the findings to confirm if teachers' beliefs and perceptions about the SA stated in the interviews were reflected in the teaching and learning process they facilitated in the classroom (Cohen *et al.*, 2011; Robson, 2002), so assumptions could be avoided (Cooper and Schindler, 2014; Cohen *et al*., 2011).

Classroom observations were conducted in four EFL classes (two classes of 10th grade, one class of 11th grade and one class of 12th grade). Each of the four classes was observed on two occasions in class periods lasting 90 minutes (since one topic is conducted over two lessons). The number of classes and class majors in which the observations were conducted were determined by the EFL teachers who participated in this study. Each class had a relatively large number of students (38 students). Thus, there were 152 students involved in this study along with the four EFL teachers. The teachers' educational backgrounds and their years of experience were important to reflect adequate teaching skills, sufficient knowledge of the subject matter and pedagogy which influenced this study that intended to observe the teachers' teaching practice in implementing the SA.

Furthermore, a semi-structured observation was used as the type of classroom observation in this study. This type of observation was chosen because the main focus of the research was the implementation of the SA without limiting the possibility of other issues arising during the classroom observations (Cohen *et al*., 2011; Creswell & Poth, 2018). The researcher went to each class as a non-participant observer in which she observed activities that happened in the class without interacting with the participants (the students and the teachers) being observed. As Williams (2008, p.561) notes, "non-participant observers [can] take a position within a setting and record what they observe without interacting directly with participants." It is also important to note that the researcher's presence as an observer could affect the nature of the learning and teaching process (Richards & Farrell, 2011). For example, a teacher might feel tense knowing that an observer is observing his/her teaching performance; students might also be affected in a similar or different way. To try and prevent such situations, the researcher had a clear discussion

on the purpose of her being there with the teachers and students both before and after the observations so that they would hopefully feel comfortable with her presence.

The main focus of the observation was on *how* the EFL teachers taught. More specifically, the focus was on how they carried out the steps of the SA in their teaching practices, on the strategies and procedures they used to set up class activities, on the ways they gave instructions and explanations, and how they provided feedback to students in relation to the development of the students' critical thinking processes. At the same time, the observations also focused on how students responded to each class activity and how that impacted on the students' critical thinking in the classroom. There were two rubrics personally developed as guidance in conducting the observations. The first rubric was related to the steps of teaching in implementing the SA (see Appendix A). The second rubric was the rubric for observing students' critical thinking in the classroom based on the revised Bloom's Taxonomy by Anderson and Krathwohl (2001) (see Appendix B). A checklist and field notes were completed to help fill in the rubrics for observation data gathering. By this, observation means that it provided an "agenda of issues to observe but the data [were] gathered to illuminate the issues in a far less predetermined or systematic manner" (Cohen *et al*., 2011, p.457).

In addition, this study was guided by the ethical considerations proposed by the British Educational Research Association (BERA) 2018 and approval had been given by the Ethics Research Board at School of Education, University of Bristol (see Appendices N and O). Ethical approval from the students and teachers were also needed here. Before observing the classroom activities, consent forms were distributed and explained to the teachers and the students in

addition to first gaining ethical approval from the university prior to conducting any research. All

data and all participants' identities were kept anonymous and under strict confidentiality.

Furthermore, all data recorded from the observations were thematically analysed (as adapted

from Braun & Clarke, 2006), which is elaborated upon in the data analysis section (see 3.4).

3.4.3 Documents

Documentation relating to Indonesian 2013 Curriculum contains necessary data that could

complete the explanation on how the SA is implemented in EFL classrooms. For this reason,

these documents were considered as another data source in this research. The data came in the

form of syllabi and EFL teachers' lesson plans, with the syllabi provided by the government, and

the lesson plans developed by the teachers. The lesson plans were analysed to determine whether

they were aligned with Indonesian 2013 Curriculum principles, the syllabi, and the actual

activities in the classrooms. Lesson plans analysis was focused on looking at the indicators,

objectives, teaching procedures (the SA steps), teaching models, and learning assessment

components (Kemendikbud/Permen No. 65, 2013c).

The rationale for using documents in this research was that it was still necessary to assess

whether evidence of congruence between the observations, the interviews and the curriculum

documents could be ascertained. In addition, the curriculum documents provided guidelines for

learning and teaching practices in the classrooms.

3.5 Data Analysis

After all the required data was obtained, they were systematically analysed to produce comprehensive explanations and answers to the research questions formulated in this research (see 1.2). In line with Creswell, (2007, p.148) the following processes were undertaken: "…data analysis in qualitative research consists of preparing and organising the data (i.e. text data as in transcripts, or image data as in photographs) for analysis, then reducing the data into themes through a process of coding and condensing the codes, and finally representing the data in figures, tables, or a discussion".

Thematic analysis, as described by Braun & Clarke (2006), document analysis by Bowen (2009) and qualitative conventional content analysis (Hsieh & Shannon, 2005) were used for the analysis of data in this study. Thematic analysis was used to analyse the data from the classroom observations. Meanwhile, qualitative conventional content analysis was used to analyse the interview data from the participants (the EFL teachers, the students, the principal and the vice principal for curriculum affairs). In addition, document analysis was used to analyse the curriculum documents (syllabi and lesson plans).

The rationale for choosing three different methods to analyse the data was the purpose obtained from each data collection method, their relevance to the research questions and the purpose of the study, as well as their scope for presenting accurate and reliable data. The decision to use different data analysis methods is supported by Knafl & Howard (1984, in Hsieh and Shannon, 2005). In addition, Richmond (2006) also argues that different types of data collection can require different analysis. Furthermore, Kawulich (2004, p. 96) states that "the decision to

choose the analysis methods should stem from a combination of factors, which include the research questions being asked, the theoretical foundation of the study, and the appropriateness of the technique for making sense of the data". As such, since this study has three different research purposes (see 1.2) and three types of data collection, the use of different type of data analysis method is considered appropriate to present accurate and reliable data regarding the SA implementation and its influence on students' critical thinking development processes.

The process of data analysis was done manually (pen and hardcopy papers) and electronically (via Excel to copy and paste transcribed text into a spreadsheet for coding analysis and to create a digital folder for easy storage and retrieval of the data). The researcher did not use any software programmes to analyse the data since she felt more comfortable and confident conducting the analysis manually and electronically. As Basit (2003) confirms, the decision to undertake the data analysis manually or electronically really depends on the researcher herself. As long as the researcher becomes more confident and more consistent as categories are elucidated, with ambiguities resolved and fewer surprises and anomalies within the data encountered, neither manual nor electronic analyses are an issue.

3.5.1 Data Analysis from the Interviews

In order to analyse the interview data, it was necessary to select a content analysis approach. According to Hsieh and Shannon (2005), three different approaches can be taken – conventional, directed and summative content analysis – which are summarized below in Table 5. In short, the main way in which the three approaches can be distinguished lies in how the initial codes are developed during data analysis.

Table 5

Major Coding Differences of Three Content Analysis Approaches

Type of Content Analysis	Analysis starts with	Timing of Defining Codes or Keywords	Source of Codes or Keywords
Conventional Content Analysis	Observation	Codes are defined during data analysis	Codes are derived from data
Directed Content Analysis	Theory	Codes are defined before and during data analysis	Codes are derived from theory or relevant research findings
Summative Content Analysis	Keywords	Keywords are identified before and during data analysis	Keywords are derived from interest of researchers or review of literature

Note. Source: Hsieh and Shannon, 2005, p.1286**.**

Conventional content analysis was selected as the most appropriate approach. As shown in Table 6, through this approach categories are obtained from data during data analysis. Consequently, preconceived categories can be avoided by the researcher since they flow from the data (Kondracki and Wellman, 2002). Another key reason for choosing conventional content analysis was due to the fact that "conventional content analysis is generally used with a study design whose aim is to describe a phenomenon" (Hsieh & Shannon, 2005, p.1279). In this case, the implementation of the SA in EFL classes and its influence on students' critical thinking processes was the phenomenon. Additionally, the aim of the analysis is "to provide knowledge

and understanding of the phenomenon under study" (Downe-Wamboldt, 1992, p.314) by interpreting the content of the text data through the systematic process of identification, classification, and coding in respect to the patterns and themes of the text (Hsieh & Shannon, 2005). In relation to this research, the categories were derived from the text data as a result of the interviews with the participants (the EFL teachers, the students, the principal, and the vice principal for curriculum affairs). Below are some steps in analysing the data using conventional content analysis approach (Adapted from Hsieh and Shannon, 2005, p.1279):

1. All data was read for an immersive sense of the whole data

    The researcher began by reading each transcript from beginning to end. This was done repeatedly to achieve immersion and obtain a sense of the full answers given by the participants since their answers were provided in three different languages, namely English, Indonesia and Sundanese. Furthermore, at this stage, the researcher also had to be aware that most of the answers given by the participants were not given directly and explicitly (as influenced by Sundanese culture in which speech tends to be indirect and circular). As such, the researcher only took the participants' main answers that fulfilled the data needed. For this purpose, the researcher read and re-read the transcripts over and over again to understand the core answers given by the participants. After that, the researcher transcribed all the main data and it was then translated into English. The translation process was supported by a professional translator in order to improve the accuracy of results and to increase the researcher's confidence in presenting and analysing the data. The researcher then double-checked the results of the translation to make sure they were in line with the data received by the researcher.

2. Data was read word-for-word to derive codes

At this stage, the researcher read each transcript carefully, highlighting text that appeared to describe an opinion or ideas related to the research questions. Each participant's core answer was then written on a small card to make it easier for the researcher to categorise.

3. Codes were sorted into categories

After gathering all the answers, the researcher classified them into similar groups and created codes. Each code contained similar thoughts or keywords. As the researcher worked through grouping the codes, she attempted to limit these developing codes as much as possible. After coding three to four transcripts, the researcher decided on preliminary codes. She then coded the remaining transcripts and recoded them using these codes and added new codes when data were encountered that did not fit with an existing code.

4. Emergent categories were formulated as clusters/subcategories

Once all of the transcripts were coded, the researcher examined all of the data within a particular code. Some codes were combined during this process, whereas others were split into subcategories.

5. Larger subcategories were combined or organised into a smaller number of categories

Finally, the researcher examined the final codes to organise them into a hierarchical structure. A tree diagram was developed to help the researcher organise the categories into this hierarchical structure (as recommended by Morse & Field, 1995). Next, definitions for each category, subcategory, and code were developed. To prepare for reporting the findings, exemplars for each code and category were identified from the data.

3.5.2 Data Analysis from the Classroom Observations

In relation to this study, thematic analysis was chosen to analyse the data drawn from the classroom observations in order to help identify, interpret and understand the themes retrieved from each step of the SA. This is in line with the purpose of thematic analysis which is used to identify themes such as patterns found in the data that are important to address the research question, to interpret the data and to make sense of it (Clarke & Braun, 2013). Moreover, thematic analysis provides clear organization and a comprehensive description of the data, supporting "an accessible and theoretically flexible approach to analyse qualitative data" (Braun & Clarke, 2006, p.3).

Therefore, by applying this kind of data analysis, the researcher could gather in-depth and detailed data from the classroom observations regarding the implementation of the SA in the EFL classes. For the analysis, the researcher adapted the steps of thematic analysis proposed by Braun & Clarke (2006, p.87), which are "data familiarisation, generating initial codes, searching for themes, reviewing themes, defining or naming themes, and producing the reports". Table 6 shows the data analysis process along with descriptions of each phase.

Table 6

Phases of Thematic Analysis

Phase	Description of the process
1. Familiarizing yourself with your data	At this stage, the first action was checking the observation results available in the observation rubrics. Next, the data were translated. Since notetaking was untaken in the Indonesian language, translation from Indonesian into English was done before

Phase	Description of the process
	transcribing. This was followed by reading and re-reading the data and finally noting down the initial ideas.
2. Generating initial codes	At this stage, coding interesting features of the data in a systematic fashion across the entire data set was undertaken, collating data relevant to each code.
3. Searching for themes	At this stage, collating codes into potential themes was undertaken, gathering all data relevant to each potential theme.
4. Reviewing themes	At this stage, checking if the themes worked in relation to the coded extracts and the entire data set was undertaken, generating a thematic 'map' of the analysis.
5. Defining and naming themes	At this stage, ongoing analysis to refine the specifics of each theme, and the overall story the analysis told was undertaken, generating clear definitions and names for each theme.
6. Producing the report	At this stage, this was seen as the final opportunity for analysis – this was undertaken using the following steps: • selection of vivid, compelling extract examples, • final analysis of selected extracts, relating the analysis back to the research question[s] and literature, • producing a scholarly report of the analysis.

Note. Adapted from Braun & Clarke, 2006, p.87)

The six-phase guide above became the framework for conducting the analysis derived from

classroom observations in the observed EFL classes.

3.5.3 Data Analysis from the Documents

In addition, document analysis was used for analysing the data from the curriculum documents (syllabi and lesson plans) because this provided rich descriptions about the phenomenon being discussed (Bowen, 2009) – in this case, the SA implementation in the classrooms along with guidelines. According to Bowen (2009), document analysis involves three steps:

(1) skimming (superficial examination),

(2) reading (thorough examination), and

(3) interpretation.

Bowen (2009) further explains that the iterative process of document analysis combines elements of content analysis and thematic analysis. Thus, the syllabi and the lesson plans, as the two main document types for each class, were analysed using document analysis to locate the information for the data needed in the research. Table 7 displays an overall summary of the data collection methods and data analysis approaches utilised in the research to answer the research questions.

Table 7

Data Collection and Analyses of the Research Data

Research Questions	Data Collection	Data Analysis
1. How do EFL teachers implement the SA in their classes?	- Semi structured interviews - Classroom Observations - Document reviews	- Qualitative Conventional Content Analysis (Hsieh & Shannon, 2005) for semi-structured interview data - Thematic Analysis (Braun & Clarke, 2006) for classroom observation data - Document Analysis (Bowen, 2009) for document reviews

Research Questions	Data Collection	Data Analysis
2. What challenges do EFL teachers experience when implementing the SA in their classes and how do they overcome the challenges?	- Semi-structured interviews - Classroom Observations	- Qualitative Conventional Content Analysis (Hsieh & Shannon, 2005) for semi-structured interviews data - Thematic Analysis (Braun & Clarke, 2006) for classroom observations data
3. How does the SA in EFL classes contribute to students' critical thinking development processes?	- Semi-structured interviews - Classroom Observations	- Qualitative Conventional Content Analysis (Hsieh & Shannon, 2005) for semi-structured interview data - Thematic Analysis (Braun & Clarke, 2006) for classroom observations

3.6 Summary of the Research Methodology Chapter

This chapter has justified constructionism as the philosophical background of the study and the choice of a qualitative case study as the research design. It also has explained the types of data collections methods – classroom observations, interviews, focus groups, and document analysis – which were considered to be the most appropriate methods to obtain the data needed to answer the research questions. Furthermore, the reasons for choosing the approaches to data analysis have been explained to provide a basis for obtaining accurate and reliable data. Details regarding the process of actual data collection, how the data were gathered and the research findings are subsequently offered in Chapter 4.

Chapter 4

Research Findings

This chapter offers a comprehensive presentation of the findings of research. The presentation of the findings is based on the results gathered from the following data sources: the researcher's observations in EFL classes, semi-structured interviews, and the study of related documents (syllabi and EFL teachers' lesson plans). Data description and interview excerpts will be presented to support the emergence of themes and ideas from the information gained. Critical discussion on the data analysis and how the analysis connects to the research questions are not included in this chapter as they are discussed and analysed in Chapter 5.

This chapter also presents the results gathered from the data collection which examined the implementation of the Scientific Approach (SA) in the English as a Foreign Language (EFL) classrooms in relation to Indonesian 2013 Curriculum and its influence on students' critical thinking development. Specifically, the aims of this study are presented as follows:

Figure 12

The Aims of the Study
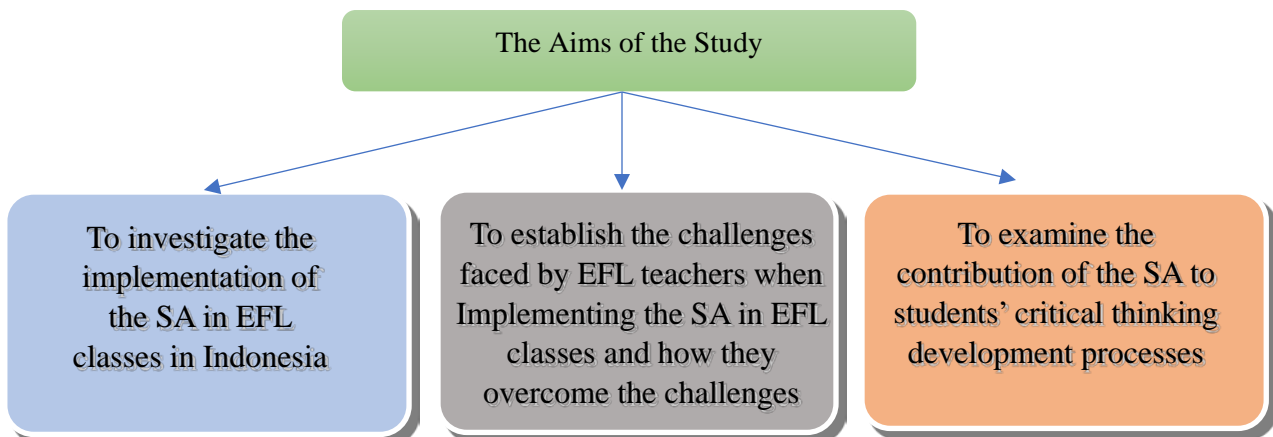
4.1 Finding Drawn from the Interviews Data

During the in-depth interviews, participants reflected on their perceptions of and experiences with the implementation of the SA in EFL classes and how it influenced the development of students' critical thinking processes. Some efforts to improve the quality of students' critical thinking were also discussed as part of the interview questions directed to all interview participants (see Appendices C, D and E). As explained in Chapter 3, interview data was analysed using conventional content analysis adapted from Hsieh and Shannon (2005).

The data obtained from the interviews and FGDIs covered: *the implementation of the SA in EFL classes*, *the challenges faced by EFL teachers when implementing the SA in EFL classes and how they overcome those challenges*, and *the contribution of the SA in EFL classes to students' critical thinking development.*

4.1.1. Data Analysis and Findings Regarding the Implementation of the SA in EFL Classes

The first set of data that was analysed was *the implementation of the SA in EFL classes (Research Question 1)*. The analysis proceeded by creating codes established from the data. Table 8 below illustrates the process on how the data was identified, how the codes were assigned, and how the categories were constructed based on the data from interviewing the school managers.

Table 8

The Coding and Categorisation from the School Managers' Interviews Data

Interview Text	Codes	Categories
School principal (SP): The teachers apply the SA starting with the lesson plan arrangement that they made	The lesson plan arrangement	The implementation of the SA in terms of planning
Vice principal (VP): The SA is applied in the learning process through instructions designed in accordance with learners' needs and expected basic competencies, as also stated in the lesson plan	The design of a lesson plan	
SP: Teachers have applied the five steps of the SA in the teaching process. The five steps are related to the implementation of the SA. In terms of the teaching process, they have practically implemented the SA in the classroom	The implementation of five steps of the SA in the teaching process	The implementation of the SA in terms of teaching
VP: The steps of the SA have already been implemented in the teaching processes	The implementation of the SA in the teaching process	

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Interview Text	Codes	Categories
SP: The scientific approach is indeed useful to track how far students can think at HOTS levels both orally and in writing	To assess the students' critical thinking abilities	The implementation of the SA in terms of assessment
SP: In the SA implementation, the teacher is not the only source of teaching	The teacher is not the only source learning	Role of teacher
VP: In the SA implementation, there is a shift, from teacher-centred to learner-centred	The teacher is not the centre of the learning process	

Based on the results of the interviews with the school managers, the SA has been applied in terms of planning, teaching and assessment. Moreover, the roles of the EFL teachers were also highlighted in implementing the SA in the classroom activities. In addition, to enrich the data related to the implementation of the SA, data from the EFL teachers were also obtained. Table 9 below provides the illustration of data analysis derived from the EFL teachers' interviews.

Table 9

The Coding and Categorisation from the EFL Teachers' Interviews Data

Interview Text	Codes	Categories
Teacher 1 (T1), T2, T3, T4: The lesson plans were designed in accordance with the steps of the SA,	The EFL teachers design lesson plans based on the SA steps	The implementation of the SA in terms of planning

Interview Text	Codes	Categories
as required in the curriculum. But there are some difficulties in designing the curriculum		
T1, T2, T3, T4: I apply the five steps of SA in teaching four skills of English - they are reading, writing, speaking and listening	The implementation of five steps of the SA in the teaching process	The implementation of the SA in terms of teaching
T3: By implementing the SA, I can measure the levels of students' HOTS	The SA implementation to measure the students' higher-order thinking levels	The implementation of the SA in terms of assessment
T1, T2, T3, T4: In the SA implementation, teachers are no longer the only source of teaching. Students are expected to find other sources to help them gain information. The method of teaching focuses on the students	The EFL teacher is not the only source of learning	Roles of the teachers

In addition, data from the FGDIs also provided information related to the implementation of the SA based on the students' perspectives in terms of teaching, assessment and the roles of the teachers. The results are presented in Table 10.

Table 10

The Coding and Categorisation from the FGDIs with the Students

Interview Text	Codes	Categories
Student 1 (S1), S2, S3, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14, S15, S17, S18, S19, S20, S21, S22, S23, S24: Yes, the class activities involve *observing, questioning, experimenting, associating,* and *communicating*	The class activities involved the five SA steps	
S4: The activities always involve *observing, questioning, associating,* and *communicating. Experimenting?* Not always	The class activities involved the SA steps, except the step of experimenting	The implementation of the SA in terms of teaching
S16: There are *observing, questioning, experimenting, associating,* and *communicating activities.* But I think *experimenting* is rarely done in the class activity	The class activities involved the SA steps, except *experimenting*	
S1, S2, S3, S4: Understand the materials taught, implement them by successfully answering all questions given by the teacher and be able to	The implementation of the SA has trained the students to the processes of	The implementation of the SA in terms of assessment

Interview Text	Codes	Categories
put the materials in a dialogue with various situations and expressions by myself	understanding, implementing and applying	
S1 – S24: The teacher's method has not brought us to the higher level of thinking skills yet	The SA implementation has not brought the students to the HOTS level	
S1, S2, S3, S6, S12, S13, S14, S15, S17, S18, S19, S20, S21, S22, S23, S24: As usual, when the teacher comes to the class, he/she talks about the homework (if any), explains the materials, asks questions related to the topics, and then ultimately gives us homework	The role of the teacher is still considered dominant	Roles of the teacher
S4, S11, S16: She (the teacher) enters the class, explains the materials, then gives us some exercises	The teacher is the primary source of the material	
S5, S7, S8, S9, S10: The teacher comes and immediately explains the materials from the books or internet or from the teacher himself/herself.	The sources of learning: book, internet, teacher	

Interview Text	Codes	Categories
At the end, she/he gives us some exercises.		

The results of the FGDIs were used as additional supporting data for the findings derived from the interview results of school managers and EFL teachers. The first category that was created from the interview data derived from school managers, EFL teachers and students related to the implementation of the SA in EFL classes and is demonstrated diagrammatically in Figure 13.

Figure 13

Diagrammatical Summary of the Category "The SA Implementation in EFL Classes"
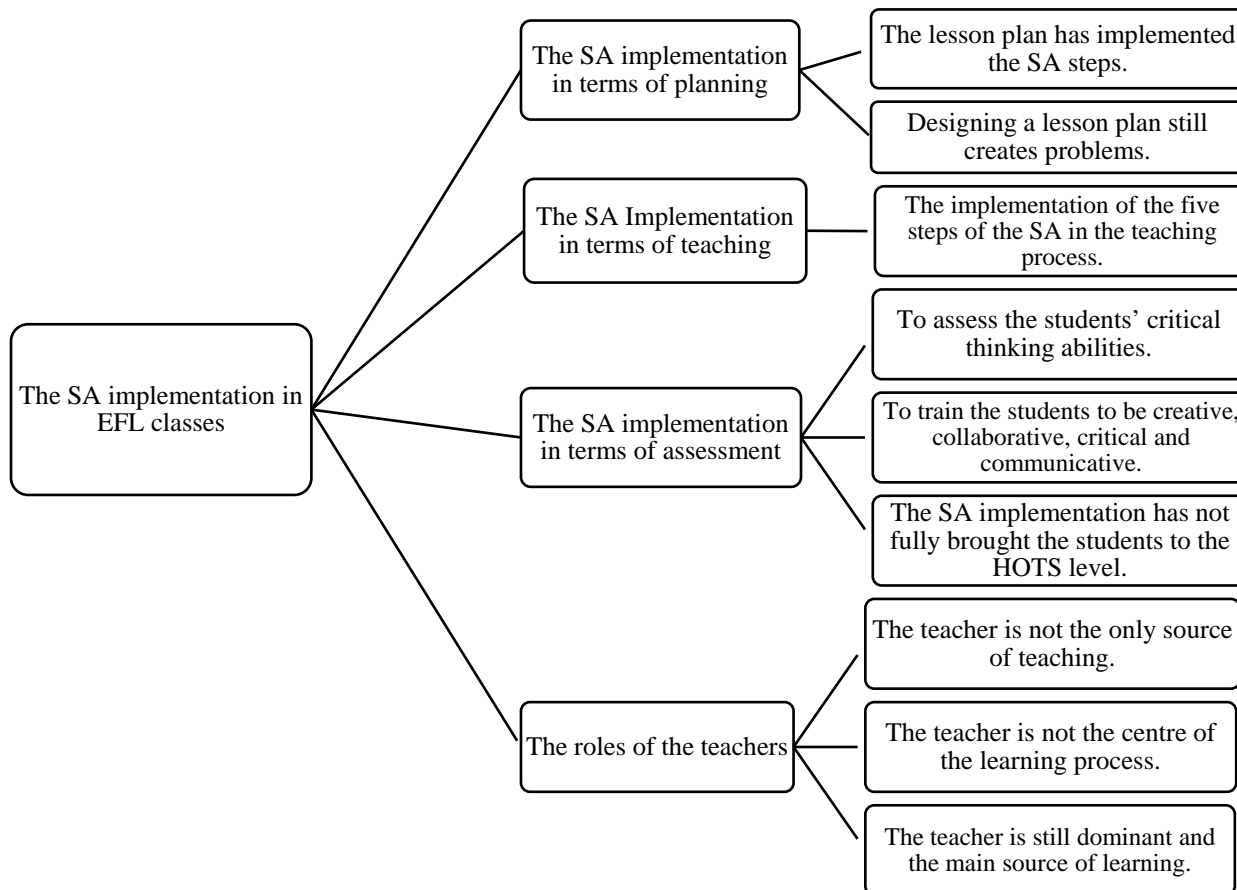
Based on the study findings from interview data for the SA implementation in EFL classes, the data are discussed in four parts: (1) The Implementation of the SA in terms of Planning, (2) The Implementation of the SA in terms of Teaching, (3) The Implementation of the SA in terms of Assessment, and (4) The Roles of the Teachers. Each part was further divided into sections based on participants' perceptions and experiences which were collected and analysed from the interview data.

4.1.1.1 The Implementation of the SA in Terms of Planning

This section discusses the five steps of the SA, as required by the 2013 Curriculum, that were incorporated by the teachers to be applied in the classroom activities. When asked about lesson plans and how the teachers designed them, all the observed teachers described that the lesson plans were designed based on the SA steps. Teacher 1 (T1) emphasized how the lesson plans had to meet the students' needs, and T2 and T3 talked about the design of the lesson plans that should meet the expected basic competencies as required in the syllabi. In general, the teachers and also the school managers reported that the teachers implemented the SA in terms of planning by including three components in their lessons plans: the steps of the SA, the purpose of teaching, and the expected basic competencies as required in the syllabi.

All four EFL teachers indicated that they designed their lesson plans following the SA (i.e. inserting the five steps of the SA) for classroom activities. T1 summed up the consensus among participants as follows:

In the planning step, I design the instructions using the five steps of the scientific approach which I develop according to the syllabi, and they must also meet the students' needs and basic competencies that are required in the syllabi. (Teacher 1, interview)

The statement from this participant showed that they already understood the purpose of designing the lesson plans, as Cox indicates (2015, p. 1) – "a lesson plan is a detailed step-by-step guide that outlines the teacher's objectives for what the students will accomplish during the lesson and how they will learn it". In accordance with the 2013 Curriculum revision 2017, the lesson plans which are made by teachers should also incorporate the following four points:

- PPK (*Penguatan Pendidikan Karakter*) or character building,

- 4C (Creative, Critical Thinking, Collaborative and Communicative),

- Literacy, and

- HOTS (Higher-Order Thinking Levels) (Datadikdasmen, 2019).

Since there are five steps of the SA, the teachers needed to consider how to develop each step of the SA and put the PPK, 4C, Literacy and HOTS into their lesson plans. As explained by T1:

In planning, the challenge includes the demand to be able to design lesson plans that teachers need to have, from analysing the syllabi to determining main competencies. This matter often creates obstacles for me and for other teachers since we must think about the detail of a step-by-step plan for teaching activities. (Teacher 1, interview)

T1's statement clearly outlined that the teachers faced some challenges and difficulties in designing and developing the lesson plans. Similar statements were also admitted by T2, T3, and

T4. As for creating and implementing solutions, all teachers said that they often had discussions with other colleagues and attended the teacher organization (MGMP) or teacher training.

The importance of attending teacher training was mentioned by the teachers as they could learn how to better plan and develop their teaching activities as required in the curriculum and syllabi. The school principal and the vice principal stated that to train the teachers to implement the new approach in teaching, there must be sufficient training. They must be informed on what steps should be included and what activities should be accomplished at every stage of teaching.

The vice principal added that, so far, the school had provided some support to enhance the teachers' abilities and competencies in dealing with the new curriculum and the SA implementation. This support included conducting mentoring such as IHT (in-house training), dissemination, and joining the English Teacher Organization. Most teachers said that continuous teacher training is needed more than just stand-alone training sessions carried out sporadically.

4.1.1.2 The Implementation of the SA in terms of Teaching

EFL teachers reported a wide range of experiences in implementing the SA. Their responses can be divided into two parts: (a) how they implement the SA in classroom activities and (b) how the students responded to the activities. T3, for example, stated that,

> I use the five steps of the SA [observing, questioning, experimenting, associating, and communicating] in teaching four skills of English [listening, speaking, reading and writing]. (Teacher 3, interview)

This statement showed that she had started to implement the SA in her classes by applying the steps of the SA in the teaching activities. Despite the implementation of the SA steps, T3 expressed concern that using each step of the SA was sometimes too rigid for teaching EFL. She reflected on this by saying,

> Well, teaching a language is not like teaching science that is doing some experiments in the lab[oratory] where the experiments are done by stage. For language classes, it is usually more communicative [and] mostly constructed from a variety of activities and student responses in the classroom. So, sometimes, I find it difficult to develop and implement the approach in the EFL classroom. (Teacher 3, interview)

T3's comments not only describe that she had problems in developing the activities at each step of the SA, but also considered that the SA may not be compatible when implemented in communicative EFL classes because it is designed for more science-specific subjects. On this issue, the teacher's choice in EFL instructional approaches becomes limited and contrasts with more historical approaches to teaching English as a foreign language (EFL) implemented in Indonesia as presented in the *Review of Related Literature* chapter.

Furthermore, in relation to the implementation of the SA in the EFL classroom, the researcher discovered evidence that at the beginning of the SA implementation, students were not clearly aware of whether the teachers used the SA or any other specific approaches in teaching English. The students simply described their teachers' approaches following a common, basic pattern in which the teachers came to class, explained the materials and gave students some exercises. However, when the researcher probed the students further with some more detailed

questions, the students recalled and reflected more on the learning process they experienced and could acknowledge that the teachers in general applied the SA steps. Furthermore, most of the students (n=22) mentioned that the teachers implemented steps 1-5 (*observing, questioning, experimenting, associating,* and *communicating*) in almost every teaching and learning process, while two students (S4 and S16) mentioned that step 3 (*experimenting*) was rarely included in the class, as explained below:

> Yes, I think that the activities [in the EFL class] involved the observing, questioning, experimenting, associating and communicating. But experimenting was not done too often. (Student 4, FGDI)

From the results of the interviews with the teachers, the researcher was provided with data explaining why the teachers did not implement the complete steps of the SA. The teachers who spoke of this reported that the absence of step 3 was due to limited time allotment, materials, and students' understanding of the materials/topics being taught and their abilities to apply steps 1-3 to the topics covered (further explanation and analysis can be found in Chapter 5).

4.1.1.3 The Implementation of the SA in terms of Assessment

The data showed that in terms of assessment, the school managers believed that the implementation of the SA could help the teachers to assess the students' critical thinking abilities. As stated by the vice principal (VP) of curriculum affairs,

By implementing the SA, the teachers can measure the level of students' critical

thinking ability. By doing this, they can also evaluate and improve the ability of

critical thinking of the students. (Vice Principal, interview)

Alongside this view, one teacher (T4) and the school principal also believed that the SA

implementation could train students to be more creative, collaborative, critical, communicative

and independent. However, all students felt that the SA implementation that has been

conducted by their teachers had not brought the students to HOTS levels yet, as S8 explains,

I don't think that I can go through the analysing, evaluating, and creating levels

[be]cause sometimes I find difficulty in understanding the topic since I am not very

familiar with the terms or topic being discussed in the class. (Student 8, FGDI)

The statements from school managers, teachers and students showed that there were two

different perspectives between school managers and the teachers and the students. The data

showed that school managers and teachers believed that the SA could help the teachers to

improve students' critical thinking abilities; meanwhile, the students felt that so far they are

still unable to achieve HOTS due to difficulties such as the language barrier or a lack of topic

familiarity (discussed in more detail in Chapter 5).

4.1.1.4 The Roles of the Teachers

In relation to the teachers' role in implementing the SA, all EFL teachers admitted that the

method of teaching had shifted from teacher-centred to learner-centred. This should have

indicated that the teacher is not the only source of information and learning. However, the students still consider the teachers to be the dominant source of information in the class and the main source of learning. S17 and S16 stated that,

> As usual, the teacher comes to the class, talks about the homework (if any), explains the materials, gives some questions related to the topics, and then ultimately gives us homework. I think the teacher is still the one who controls all the class activities. (Student 17, FGDI)

> During the learning process, the teacher becomes the main source of learning, in which she is the one who delivers the information and theory of learning. (Student 16, FGDI)

These data showed that there was a difference in the data related to the role of teachers from the perspectives of teachers and students, which is elaborated more in Chapter 5.

4.1.2 Data Analysis and Findings Regarding the Challenges Faced by EFL Teachers when Implementing the SA in EFL Classes and How to Overcome the Challenges through the Implemented Solutions

The second set of data focused on challenges faced by the EFL teachers in implementing the SA and how they have overcome the challenges. The following table shows the process of how the data identification, codes and categories were constructed based on the data derived from interviews with the school managers, teachers, and students.

Table 11

The Coding and Categorisation from Interviews and FGDIs in relation to Challenges in

Implementing the SA and Solutions

Interview Text	Codes	Category
SP: One of the biggest challenges is that the teachers don't want to move out of their comfort zone. They don't want to change their teaching approach to implement the SA	The teachers do not want to change their teaching approach	Internal Challenge
VP: In fact, there are teachers who are practically still adopting conventional teaching approaches	Teachers still adopting conventional teaching approaches	
SP: Another challenge is maintaining consistency	Maintaining consistency	
VP: The teachers always go back to their comfort zone: the way they taught in the past	Go back to their comfort zone	
VP: Another challenge is how to encourage teachers to continue to improve their performance when teaching using the five steps of the SA	How to encourage the teachers	

Interview Text	Codes	Category
S6-S24: The biggest challenges are grammar and limited vocabulary	Students' lack of grammar and vocabulary	
VP: I can also mention that lack of infrastructure or facilities, especially for mediums of teaching. Teaching many students with diverse traits becomes another challenge for the implementation of the SA. Need enough time for the process of adaptation	Lack of infrastructure or facilities, of the number of students, time for the process of adaptation	
Teacher 1 (T1), T2, T3, T4: Time allocation is not reasonable	Insufficient time allocation	
T1, T2: The students are passive in their use of English	Passive students	
T1, T2, T3, T4: To implement SA in the classroom needs sufficient time allocation	Need sufficient time allocation	External Challenge
T3, T4: The students have no self-confidence	The students' lack of confidence	
T1: The steps in the scientific approach tend to be inflexible when applied in EFL teaching	The steps in the Scientific Approach are inflexible	

Interview Text	Codes	Category
which tends to be more communicative		
S9, S10, S11, S12, S13, S17, S18, S19, S20, S21, S22, S23, S24: There are too many materials and exercises	Too many materials and exercises	
T3, T4: Try to be patient and always try to encourage the students to enrich their vocabularies and ask them to keep on studying to write and speak using English	Be patient, encourage the students	
T2: Allow the students to mix their language, English and Indonesian	Mixing language	
VP: The solution is motivating teachers, as well as conducting mentoring such as IHT (in-house training), dissemination, and Teacher Organization (MGMP)	Conducting mentoring such as IHT (in house training), dissemination, and English Teacher Organization (MGMP)	Implemented Solution
SP: One way to overcome the problem is by continuing to strive to coordinate with the vice	Coordinating with the vice principal and teachers, conducting regular training	

Interview Text	Codes	Category
principal and teachers, as well as conducting regular trainings during briefing or in the internal school meetings		
S1- S24: I seek help from my teacher or friends, search Google or look up things in the dictionary	Help from teacher, friends, internet, and dictionary	

The second category that was generated from the data interviews derived from school managers, EFL teachers and students related to the challenges and some solutions incorporated into the implementation of the SA in EFL classes which is displayed diagrammatically in Figure 14.

Figure 14

Diagrammatical Summary of the Category "The Challenges in the Implementation of the SA in

EFL Classes and Implemented Solutions"
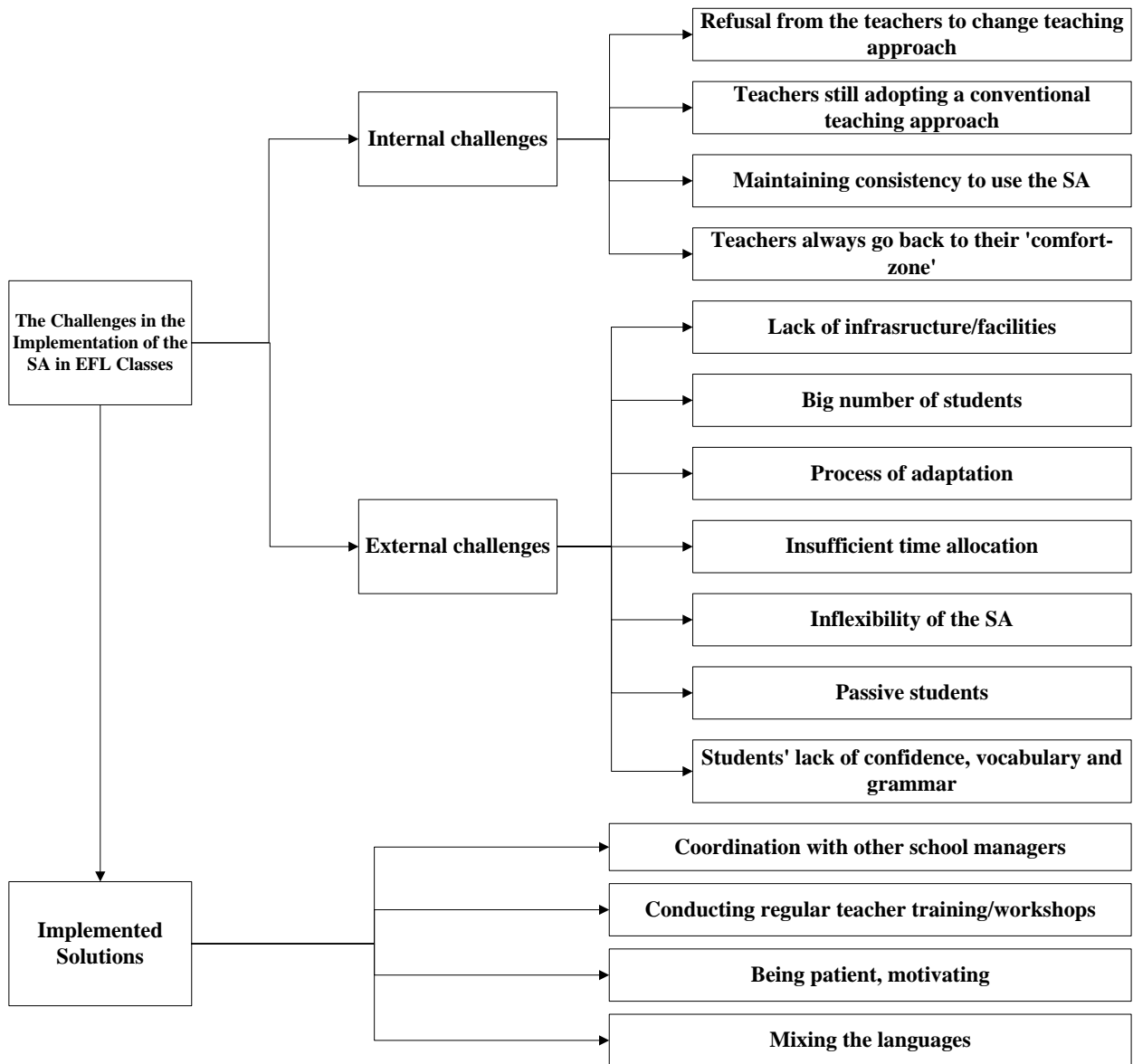
Based on the study findings from interview data for the challenges when implementing the SA in

EFL classes, school managers, teachers, and students said that they faced challenges due to the

implementation of the SA. As derived from the interview data, the school managers assumed that one of the most significant challenges in implementing the SA was the teachers' refusal to use the SA. However, the teachers conveyed other challenges in implementing the SA, such as the inflexibility of the SA, insufficient time allocation, students' lack of confidence, and the language barrier. In particular, all teachers found difficulties in implementing the SA due to insufficient time allocation. As T2 stated,

> Implementing the SA in the classroom needs sufficient time allocation [and] ninety minutes to implement the five steps of the SA is not enough. (Teacher 2, interview)

In addition, students' lack of confidence and the language barrier became other factors faced by the teachers. Similar factors were also admitted by almost all the students. As stated by S16,

> I do not have any confidence to speak in English because I am afraid of making mistakes [and] I also have difficulties following the teacher's instruction due to my limitations in vocabulary and grammar. (Student 16, FGDI)

To overcome such problems, the school managers and EFL teachers have implemented some solutions. The school principal explained that they have taken some steps to improve the implementation of the SA in their school through coordination with all faculty and staff involved and the provision of training opportunities. EFL teachers have consequently directed their efforts towards improving their performance in implementing the SA by attending workshops or teacher training sessions and constantly motivating the students in learning.

However, EFL teachers expressed concerns that more training is needed than has been provided thus far.

The implemented solutions were expected to improve the teachers' performance in implementing the SA and better enhance students' critical thinking abilities. The data related to the influence of the SA to students' thinking development is discussed in the following section.

4.1.3 Data Analysis and Findings Regarding the Influence of the SA Implementation on Students' Critical Thinking Development

The third research question focused on the contribution of the SA implementation to students' critical thinking development. The analysis proceeded by classifying the key points through coding and categorising as shown in Table 12.

Table 12

The Coding and Categorisation from the Interviews and FGDIs in relation to the Influence of the SA Implementation on Students' Critical Thinking Development

Interview text	Codes	Category
SP, VP and T2: As stated in the document of the 2013 Curriculum, one of the purposes of the SA implementation is to address the 21st century challenge	To address the challenge of the 21st century.	Purposes
SP: To enable the students to be independent and to be able to think critically	To enable the students to be independent and critical	

Interview text	Codes	Category
VP: To enable the students to not only receive what their teachers teach, but also to find another additional source by themselves to gain or add their understanding	To enable the students to find another additional source; to be independent learners	
SP: All through this period, the students are only spoon-fed by the teachers	The students are only spoon-fed by the teachers	Reasons
VP: So far, the students have not yet reached HOTS level	Students have not yet reached HOTS level	
T1, T2, T3, T4: The SA has not yet helped the teachers to train students' critical thinking due to some challenges	The teachers find difficulties to train the students to develop their critical thinking ability	
T1, T2, T3, T4: The SA has not yet helped the teacher direct students to think critically (HOTS), creatively, and have well-developed communication skills, mostly due to language barriers	Could not direct the students to think critically (HOTS), creative, communicative	Influences
T1, T2, T4: The SA provides various activities that trigger the students to be more active in the classroom	The students are triggered to be more active in the classroom	

Interview text	Codes	Category
S17, S18, S20, S22, S 23, S24: The teachers' teaching approach helps them to understand the topic in a step-by-step way	Helps the students to understand the topic in sequence	
S1, S2, S8, S9, S12, S18, S19: Helps [the students] to understand the topic in sequence and be engaged with the topic being discussed in the class	Helps the students to be engaged and active	
S1 – S24: I don't think that I have achieved the level of HOTS	The students have not achieved the HOTS	

Based on the data derived from the participants, two categories were found as follows: *The Purposes and Reasons for Implementing the SA in Relation to Students' Critical Thinking Development Processes* and *The Influences of the SA on Students' Critical Thinking Development Processes*. These share the following common theme: ***The Influence of the SA Implementation on Students' Critical Thinking Development***. This was the third category to emerge from the data and is depicted diagrammatically in Figure 15.

Figure 15

Diagrammatical Summary of the Category "The Contribution of the SA Implementation to Students' Critical Thinking Development"
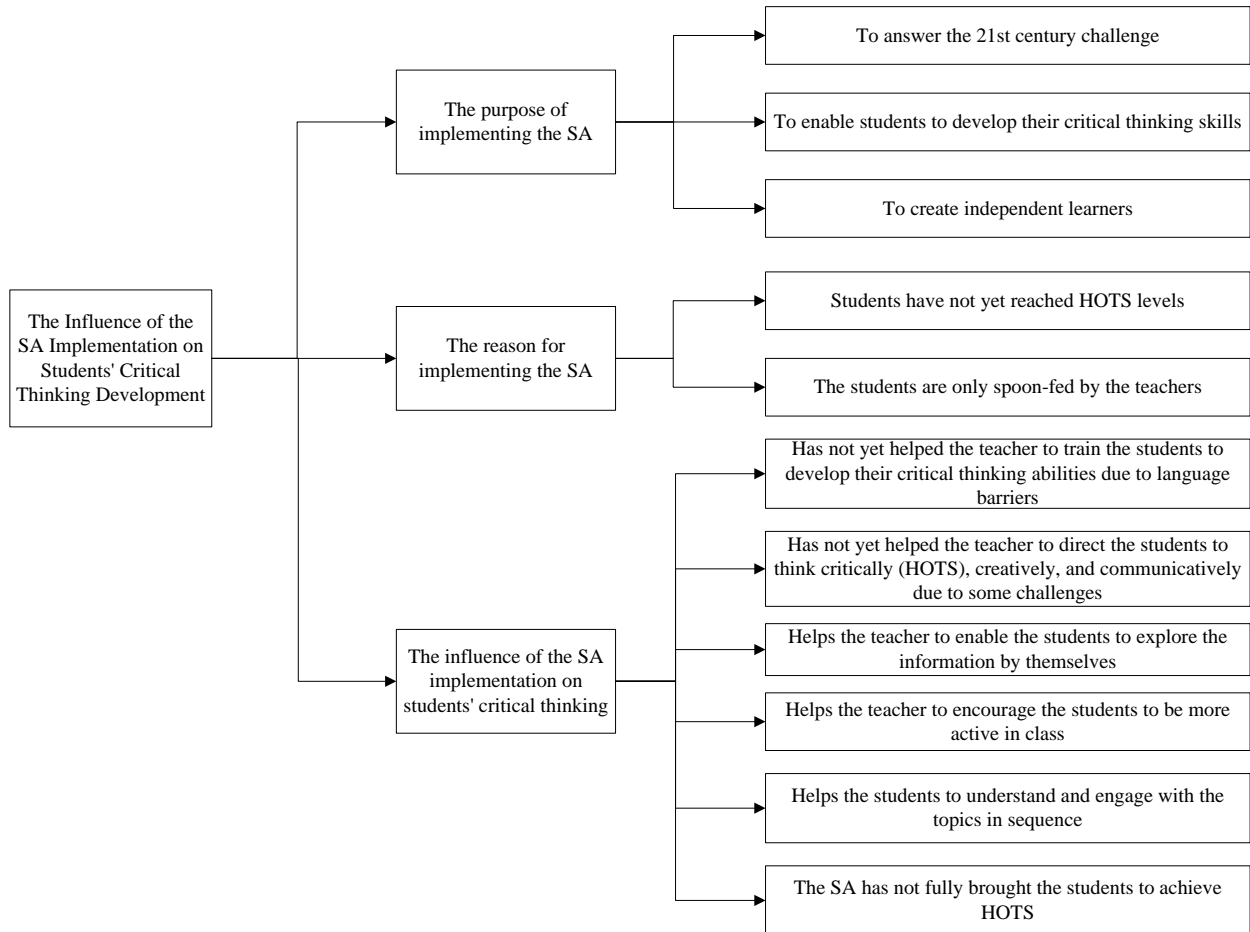
Study findings from interview data for the contribution of the SA implementation to students' critical thinking development were categorised into three main parts: *the purposes of implementing the SA*, *the reasons for implementing the SA* and *the influences of the SA implementation on students' critical thinking*. To examine how the SA influences students' critical thinking, some questions related to the topic were directed to all participants. Based on the results of the interviews with the school managers, the main reason for implementing the SA

was the claim that students have not yet reached HOTS. This situation was also recognized by the teachers. To explain the findings regarding the contribution of the SA to students' critical thinking, the data were derived from the perspectives of teachers and students.

For all EFL teachers, the SA implementation has contributed in some way to developing critical thinking, such as helping teachers train the students to develop their critical thinking skills by being more creative and exploring the information by themselves. T1 explains,

> The SA steps have helped me to train the students to dig other information or
> knowledge from various sources to enhance their criticality. (Teacher 1, interview)

Furthermore, the SA could also help the students to participate in more active learning, as stated by T4,

> The SA is capable of helping students to be *more active* in the classroom. (Teacher 4,
> interview)

Moreover, from the students' perspectives, the SA helped them to understand the topic(s) in sequence and helped them to become more involved with the classroom activities, as explained by S1 and S10,

> I think the way the teacher teaches me helps me to comprehend the topic gradually.
> (Student 1, FGDI)

She [the teacher] helps me to engage in the discussion or in the other activities in the class. (Student 10, FGDI)

However, on the whole, the students claimed that the teachers' approach in teaching EFL had been unsuccessful in improving the students' critical thinking skills due to the language barrier, as previously discussed in the SA implementation in terms of assessment. One of the students (S20) said that,

I feel that in EFL class, I'm still not able to do activities that involve a higher-order thinking level such as evaluating or analysing because there is a problem in understanding the language. (S20, FGDI result)

Overall, data derived from the results of the interviews with the school managers and the EFL teachers, as well as from the results of FGDIs with the students regarding the implementation of the SA in EFL classes were as follows: *The SA Implementation in EFL Classes*, *Challenges and Implemented Solutions*, and *The Contribution of the SA Implementation to Students' Critical Thinking Development* – these are displayed in Figure 16:

Figure 16

The Results of Interviews and FGDIs Data Analysis
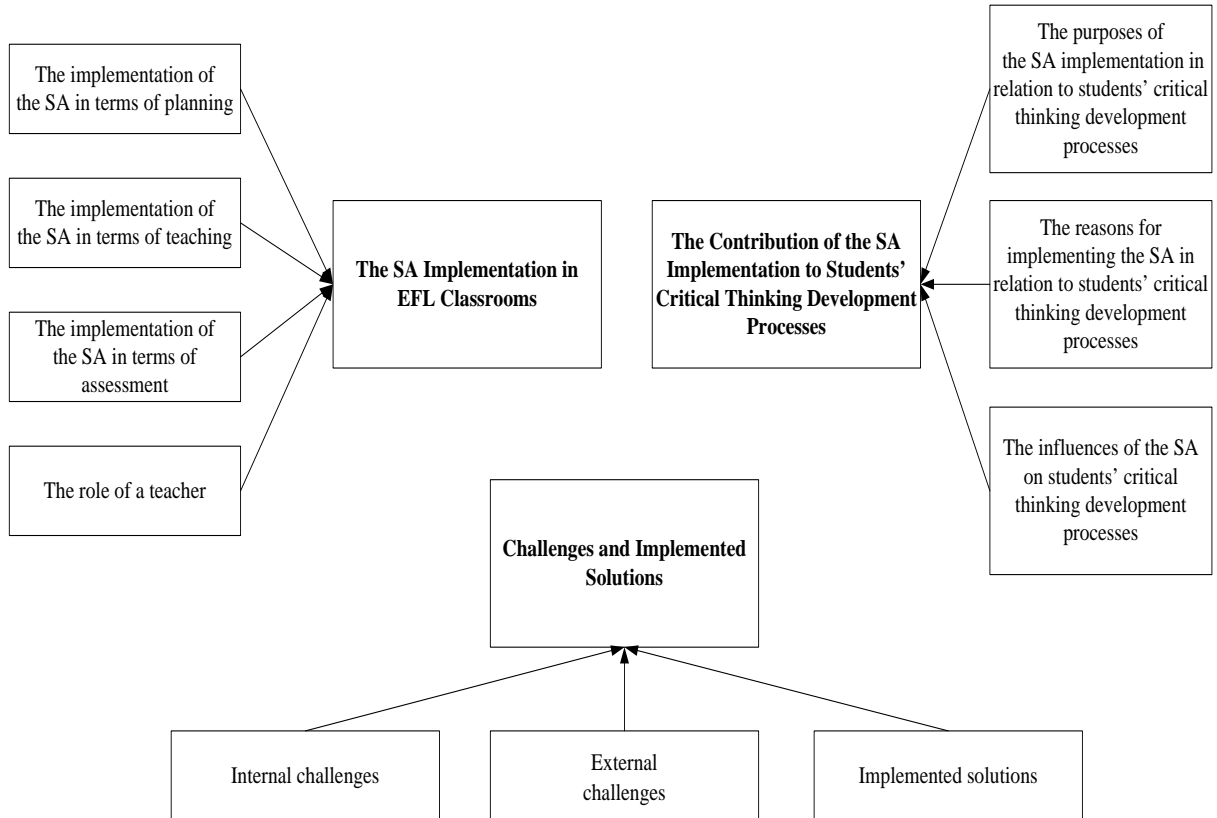
4.2 Findings Drawn from the Classroom Observations Data

Additional data were derived from classroom observations. In the EFL classroom observations, the researcher focused on the SA implementation process in a much wider framework, specifically on how the teachers implemented the SA which included interactions between the teachers and students, the students and other students, and the aspects of SA implementation enacted in the classrooms. Furthermore, to best capture the attributes of the classroom activities most relevant to the research questions, the researcher used two observation rubrics that focused on *teachers' instructions related to the SA implementation* and *the students' responses towards*

the instructions or activities in the classrooms. These two main findings became the main themes for this analysis.

4.2.1 Data Analysis and Findings Regarding the Teachers' Instructions Related to the SA Implementation and the Students' Responses towards the Instructions or Activities in the Classrooms

As mentioned before, thematic analysis (Braun & Clarke, 2006) was used to analyse the data collected from the observed classes. The analysis phases from the work of Braun and Clarke was adapted to uncover the features that were important and meaningful to the research questions revealed during the observations. The analysis below is intended to provide a general description of how thematic analysis was used in analysing the data for this study. The analysis covers the six-phase process for thematic analysis. Below are the phases that were followed in conducting the thematic analysis (Braun & Clarke, 2006):

Phase 1: Familiarisation with Collected Data

At this stage, the researcher familiarised herself with the data by transcribing the results of the observation rubric and reading the transcripts several times to familiarise herself with the data derived from the observations. As emphasized by Braun and Clarke (2006), the process of reading and re-reading is crucial to the initial phase of analysis – that of data familiarisation, both with the details of each data item and the 'bigger picture' of the data. At this phase, the researcher familiarised herself with the steps of the SA that were the focus of the classroom observations. Specifically, the researcher focused on the data derived from learning and teaching activities in each step of the SA, the targeted competencies, and specific activities that were

conducted by the teachers during classroom activities. The students' responses to the activities also became a point of focus as this determined the cognitive dimension processes (*remembering, understanding, applying, analysing, evaluating,* and *creating*) of the students in relation to critical thinking processes based on the categories of the revised Bloom's Taxonomy as described by Anderson and Krathwohl (2001).

Phase 2: Generating Initial Codes

To derive information related to this research questions, the researcher organised the data in a meaningful way (Miles & Huberman, 1994). The rubric of the class observation was adapted from the SA steps suggested by the Ministry of Education and Culture of the Republic of Indonesia that covered the following activities: 1) observing, 2) questioning, 3) experimenting, 4) associating, and 5) communicating (Kemdikbud/Permen No. 81A/2013, 2013e).

Furthermore, to collect the data needed, the potential activities and observed activities were also included in the rubrics to ease the process of coding and categorisation (see the Observation Rubrics in Appendices A and B). Coding and categorisation were done at each step of the SA: *observing, questioning, experimenting, associating,* and *communicating* to obtain the data from the classroom observations (see Appendix J). The example of coding and categorisation of the SA steps, as EFL teachers' activities in implementing the SA in their classes, is illustrated in the following table:

Table 13

Coding and Categorisation of the Teachers' Activities in Implementing the First Step of the SA

(the Observation Step)

Observed activities	Code	Category
T1 asked the students to look at pictures.	Instruct the students to see/ watch	Observing
T3 asked the students to see sentences shown to them.		
T4 asked the students to look at pictures.		
T4 asked the students to watch a short video, then she showed pictures of Indonesian heroes.		
T2 asked the students to read a script of dialogue.	Instruct the students to read	
T3 asked the students to listen to an audio-recorded dialogue related to the topic (If-clause type 2)	Instruct the students to listen	

Furthermore, the Cognitive Process Dimension Taxonomy, as suggested in the 2013 Indonesian Curriculum that was adapted from the analysis of the Anderson and Krathwohl (2001) revision of Bloom's original 1956 Taxonomy (see Appendix K), was used to classify the students' activities and their responses toward the teachers' instructions. The keywords were derived from the operative words in the observed activities, which then classified into each level of the Cognitive Process Dimension, in which C1(*remembering*), C2 (*understanding*), and C3 (*applying*) belong to Lower-Order Thinking Levels (LOTS), while C4 (*analysing*), C5

(*evaluating*), and C6 (*creating*) belong to Higher-Order Thinking Levels (HOTS). In addition, the observed activities related to the students' responses in certain categories (for example, *remembering*/C1) were determined not only from the operative words that resulted from the students' responses, but also from observations of the overall activities carried out by the students in every activity/response in the class. The process of coding and categorisation produced data on the students' critical thinking development as illustrates in Table14:

Table 14

Coding and Categorisation of Students' Critical Thinking Development

Classroom	Observed Activities	Code	Category	Level of Cognitive Dimension Process
Classroom 1	Students *read* a script of a dialogue that contained expressions of asking and giving opinions with responses	Read		
	Students *underlined* expressions that belonged to the topic they had learned	Underline		
	Students *identified* expressions they had learned	Identify		
Classroom 2	Students *read* a script of a dialogue containing the expressions of giving congratulations and responding to it	Read		
	Students *underlined* expressions of giving congratulations and compliments from the dialogue	Underline	Remembering	C1
	Students *identified* expressions of giving congratulations and compliments from the dialogue	Identify		

Classroom	Observed Activities	Code	Category	Level of Cognitive Dimension Process
Classroom 3	Students *recall*ed the structure of Conditional sentences type 1 and the meaning they had previously learned	Recall		
	Students *mentioned* the structure of Conditional sentences types 1, 2, and 3	Mention		
Classroom 4	Students *mentioned* the name/characters they saw in the pictures	Mention		
	Students *read* the historical recount text	Read		
	Students *mentioned* the generic structure of the recount text	Mention		
	Students *mentioned* the function of the recount text	Mention		

Classroom	Observed Activities	Code	Category	Level of Cognitive Dimension Process
Classroom 1	Students *gave responses* based on the pictures shown to them	Give a response	Understanding	C2
	Students *gave other examples* of giving and asking for an opinion	Give an example		
Classroom 2	Students *gave responses* of giving congratulations and compliments based on the pictures shown to them	Give a response		
	Students *gave other examples* of giving congratulations and compliments	Give an example		
Classroom 3	Students *differentiated* the structure of the sentences	Differentiate		
Classroom 4	Students *illustrated* the main idea of the story	Illustrate		
	Students *retold* the story using their own words	Retell		
	Students *described* the chronology of the events	Describe		
Classroom 1	Students *performed* the dialogue activity containing the expressions they had learned in front of the class	Role Play		

Classroom	Observed Activities	Code	Category	Level of Cognitive Dimension Process
Classroom 2	Students *performed a dialogue* using some expressions they had learned	Role Play	Applying	C3
Classroom 3	Students *completed* some sentences using Conditional Sentences – Conditional sentence types 2 and 3	Complete		
Classroom 3	Students *compared* sentences using Conditional sentence type 2 and 3	Comparing		
Classroom 4	Students *compared* recount texts of the personal, factual, historical and biographical types	Comparing	Analysing	C4
	Students presented a conclusion based on the analysis	Presenting		

For the process of data analysis, the researcher coded information from the classroom activities and then used these codes to generate categories. For example, a teacher displayed three pictures of Indonesian national heroes on the wall to students before she explained the topic of the recount text to students. Then she asked the students to look at the pictures. The researcher categorized this activity as the *observing* step (in the SA implementation) with the specific learning and teaching activity as *instruct students to see/watch.* Based on students' responses, which consisted of mentioning the names/characters they had seen in the pictures, the researcher categorised this activity into the cognitive process dimension taxonomy of *remembering* (C1).

Phase 3: Searching for Themes

As Braun & Clarke (2006) note, there are no fixed rules about what a theme is. They put forward that a theme is a pattern that captures something meaningful about the data which is usually related to a research question. In searching for themes, the researcher classified the results of coding and categorisation of each SA step. This included the teachers' activities in implementing the SA in EFL classes (Table 12) and coding and categorisation of the students' critical thinking development processes (Table 13).

Phase 4: Reviewing of Themes

In the stage of reviewing themes, the researcher confirmed that the categorisation of every activity carried out by teachers and the responses given by the students were in accordance with the categories created in the process of uncovering the themes. Therefore, the processes of coding and re-coding were carried out several times to ensure that the data analysed in the processes of coding and categorising were assigned accurately. For example, the researcher had

previously classified the 'peer-to-peer Question and Answer (Q and A)' activity – in which students were asked to *find* information from the written dialogues – into the *Remembering* (C1) activity. Nevertheless, the researcher found that the teachers' instructions were asking the students to *compare and classify* some expressions they found in the dialogues into categories (expression of asking for opinion, giving opinion and responses). The researcher then categorized this activity as the *Analysing* process (C4). Overall, the researcher endeavoured to be methodical in the process of coding and categorizing the activities.

Phase 5: Defining and Naming Themes

This was the final stage of the refinement of defining themes and the purpose was to "identify the essence of what each theme is about" (Braun & Clarke, 2006, p.92). In this analysis, the main themes were derived from the teachers' activities in implementing the SA in their classes and students' critical thinking development processes. The following figures (Figure 17 and 18) present the breakdown of the themes that were generated from the teachers' activities in implementing the SA in EFL classes (Theme 1) and the students' critical thinking development processes (Theme 2).

Figure 17

Breakdown of a Theme Derived from the Teachers' Activities in Implementing the SA in EFL

Classes (Theme 1)
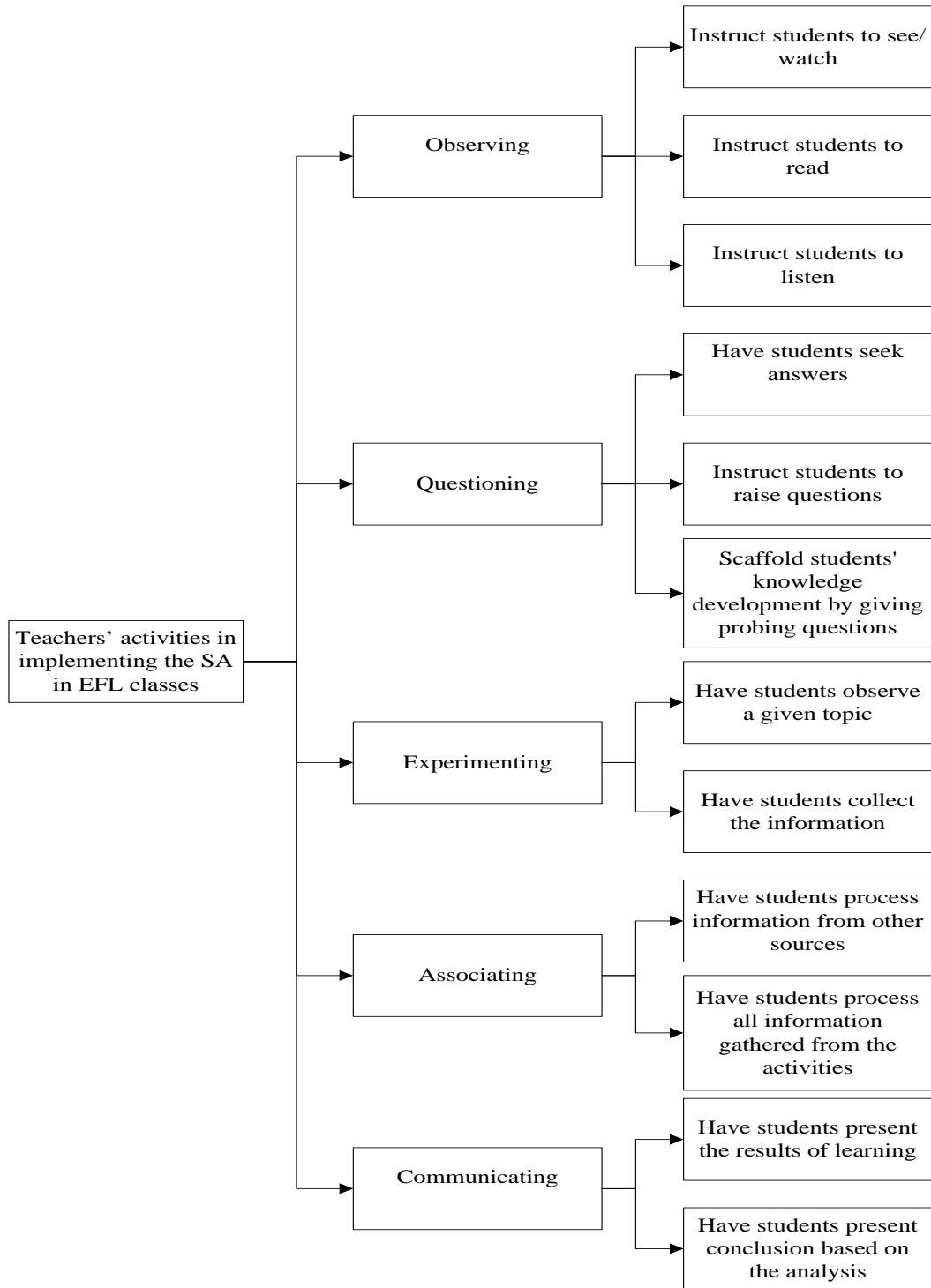
Figure 18

Breakdown of a Theme Derived from the Students' Critical Thinking Development (Theme 2)

Students *watched* a short video	Remembering	
Students *saw* some pictures	Remembering	C1
Students *listened* to a short dialogue	Remembering	
Students *answered* questions based on the text/dialogue	Understanding	
Students *raised questions* based on the text/dialogue	Understanding	C2
Students *answered* the teacher's questions	Understanding	
Students *observed* the text/script of dialogue	Understanding	
Students *collected* some information from the text	Understanding	C2
Students *looked for information* from the internet/handbook	Understanding	
Students *retold* the information they received from the video/text/script of a dialogue	Understanding	C2
Students *completed* the script of a dialogue, *classified* some expressions, *role-played*	Applying	C3
Students *compared* some sentences, *analysed* the type of some texts, *presented* a conclusion based on the analysis	Analysing	C4

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Phase 6: Presenting and Discussing Results

Based on the themes that were constructed from classroom observation data, two main themes were identified: *the EFL teachers' activities in implementing the SA in their classes* and *students' critical thinking development.* Figure 19 displays a thematic map derived from the classroom observations data:

Figure 19

A Thematic Map of Classroom Observations Data Analysis
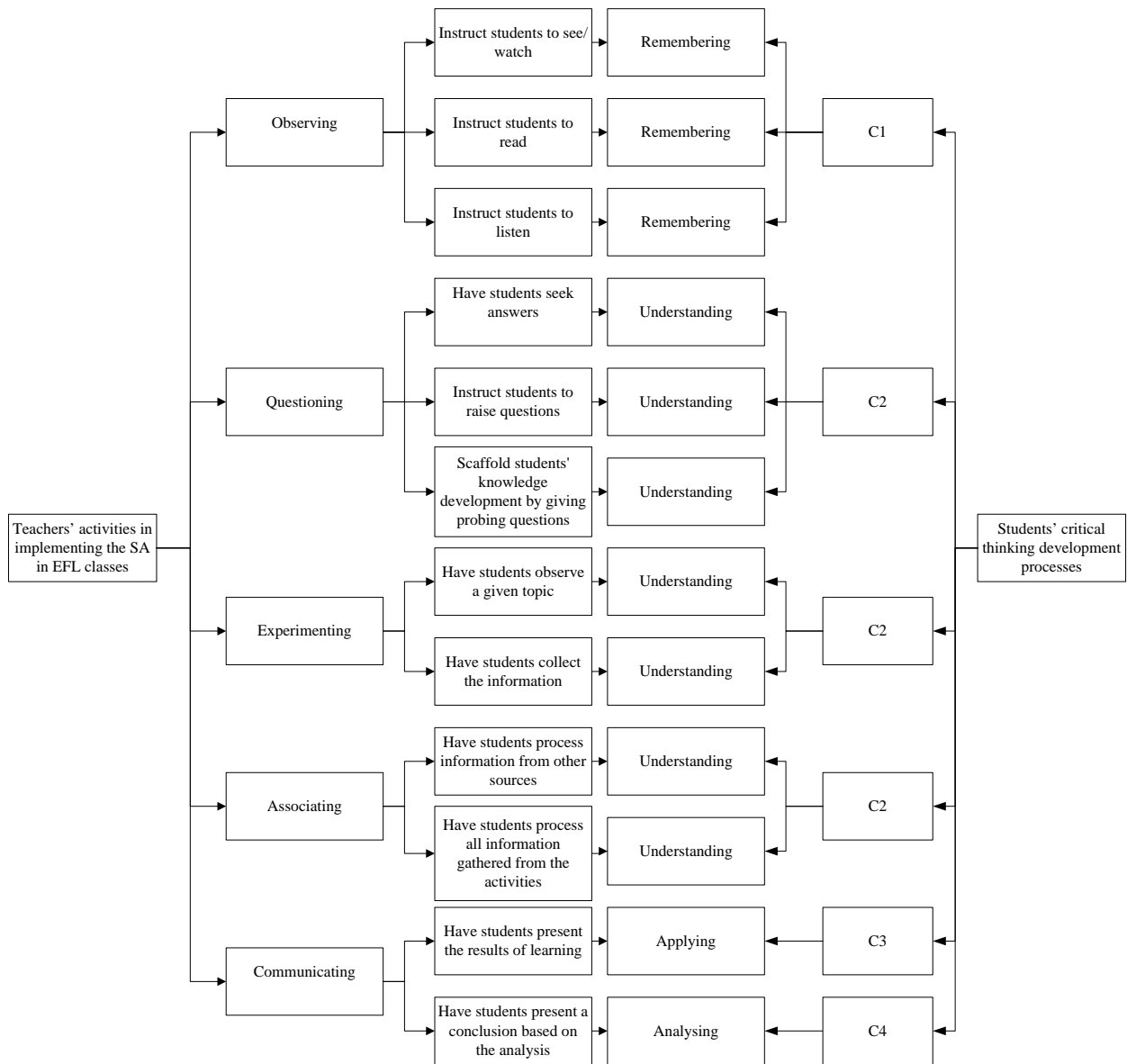
The data showed that the EFL teachers have implemented the five steps of the SA, as required by the 2013 Curriculum. However, by comparing the verbs offered in Bloom's revised Taxonomy, the activities related to the students' critical thinking development were still focused on lower-order thinking skills (LOTS)/C1-C3, while higher-order thinking skills (HOTS)/C4-C6 was only conducted by some teachers (T3 and T4) in a few activities. Details of the findings are discussed in the following section.

4.2.1.1 The Teachers' Activities in Implementing the SA in EFL Classes

During the classroom observations, in general, the teachers had implemented all steps of the SA in teaching EFL. There were various activities in implementing each step of the SA.

For the step of observing, the researcher found that there were three main activities that the teachers had undertaken: a) instruct students to see/watch (T1, T4), b) instruct students to read (T2), and c) instruct students to listen (T3). These three activities were aimed at gaining students' attention and opening their minds to new knowledge before the teachers introduced the topics of the lessons (as also stated in the lesson plans and in the interviews).

At the second step of the SA, the questioning activity, there were two main activities that the teachers did: a) the teachers asked some questions related to the topic (T1, T2, T3) and b) the teachers instructed students to raise questions related to the topic (T1, T4). In addition, the researcher found that during the questioning activity, the questions that the teachers asked of the students were still in the lower-order categories belonging to C1 (sample keywords: *recognize*,

describe) and C2 (sample keywords: *compare*). For example, T1 offered select guiding questions as follows:

- *"What can you see in the pictures?"* (*recognise*, C1)

- *"Can you describe what situation they are in?"* (*describe*, C1)

- *"Please compare these two dialogues – which one contains the expression of congratulations and which one contains expressions of complimenting?" (compare,* C2)

However, the researcher also found some questions delivered by select teachers (T3 and T4) that can be classified into the higher-order categories of level 4 (such as *analyse*) and level 5 (such as *argue*). For example:

- *"Please look at these three sentences. Can you analyse the structures of the first, the second and the third sentence? What are the differences?"* (*analyse*, C4)

- *"What do you think the text* [historical recount text about Indonesian national heroes] *is about? Please give your opinion."* (*argue*, C5)

Thus, during the questioning activity, the teachers had encouraged the students to aim for a higher level of cognitive dimension.

In the third step of the SA, experimenting, the observed teachers (T1, T2, T3, and T4) applied three main activities: a) have students observe a given topic, b) have students collect information

related to the given topic, and c) instruct the students to read other sources related to the given topic.

The fourth step of the SA, the associating stage, was incorporated by having the students process information gathered from other sources and from previous activities. For example, T1 asked students to make a list of expressions related to *congratulating* and *complimenting* that the students identified in other sources.

The fifth step of the SA, the communicating stage, the teachers asked students to present the results of their learning in the form of various activities. T1, for example, asked students to perform a dialogue in front of the class.

However, the activities that related to the students' critical thinking processes were still conducted in the lower-level category (LOTS). For example, T1 gave a series of dialogues to the students, then asked the students to identify the expressions of 'congratulating and complimenting' in the dialogues by underlining the expressions. Comparing to Bloom's revised Taxonomy, this activity belongs to *remembering* (C1). A similar situation was also found in the fourth (*associating*) and fifth (*communicating*) steps of the SA, in which the activities continued to relate to the LOTS category.

Furthermore, in relation to teachers' activities in implementing the SA in EFL classes, in general, the teachers implemented all steps of the SA (1-5). However, it was found that the SA steps were not followed in order. For example, T3 incorporated the *observing*, *experimenting*, and *communicating* activities first, and then she returned to the *observing* and *questioning* activities.

A similar situation was also observed in the case of T4, in which she conducted the steps of the SA out of order and combined several activities – which belonged to separate stages – into one stage; for example, she incorporated three activities (*observing, experimenting,* and *communicating*) within the questioning stage.

Irregularity in implementing the SA steps in the classroom was found in all observed classes, especially when the teachers switched from one activity to the next task. For example, at the beginning of the learning and teaching activity, T4 asked the students to watch a short video (*observing* stage). Then he asked some questions of the students related to the video they watched (*questioning* stage). After this, he asked the students to look at the pictures (*observing*) and then answer questions related to the pictures (*questioning*). Then, he asked the students to write down information they identified about the pictures in the form of paragraphs (*experimenting*). Based on the observed activities, it can be noted that the classroom activities were conducted as follows: 1) *observing* stage, 2) *questioning* stage, 3) back to the *observing* stage, 4) *questioning* stage again, and 5) the *experimenting* stage. This shows that in the EFL classes, the activities tended to be more flexible with the necessity to convey and deepen the topic discussed in the class taking precedence over rigidly following the SA steps.

Another important observation was that the EFL teachers did not allow students much time to complete their tasks. For example, in classroom 1, there was a moment in which the students had to find expressions from other sources (e.g. the internet such as Google), and in the middle of doing that, the EFL teacher asked them to classify them into categories. A similar situation was also found in classroom 2 in which the students had not finished their original task, but the

teacher asked them to move to another activity and do another task. As a result, the students left the first task incomplete or simply looked at their peers' work. It seemed that the EFL teachers did not realise this situation and moved to another activity due to limited time allocation (as revealed from the interviews data).

The researcher also observed moments in which the EFL teachers did not elicit any response from the students. For example, in classroom 4, the students did not give any answer or opinion in response to the EFL teacher's questions/ instructions, even though the EFL teacher waited for a moment. In such a situation, the teacher applied the 'wait-time' to "allow students to complete 'on-task' thinking" (Stahl, 1990). The researcher noted that this occurred especially in responding to the questions that belonged to higher-order categories, for example when discussing the recount text of Indonesian national heroes: *"What is the video about?", "What do you imagine would have happened to our country if we never achieved independence?", "What do you think about colonizing and being colonized?"*. When faced with this situation, the teachers used the strategy of giving sample answers and changing the questions into a simpler form. For example:

T4	:	*What do you imagine would have happened to our country if we never achieved independence?*
Students	:	(*silence)*
T4	:	*Okay. Imagine that we were still colonized by the Dutch. Do you think that we would have a good life like what we have today? Do*

you think that you would have a good education like now? Do you

think that we would have freedom to rule our own nation?

In that situation, T4 tried to simplify the question by changing his question into a 'Yes-No question' to elicit the students' responses. As a result, some students gave their responses. When there was still no response from the students after a repeat and restructuring of the question in English, the teacher repeated the questions and the instructions using the Indonesian language. By using this strategy, some students gave their responses but they responded also using Indonesian. Furthermore, there was also a moment when the students answered the teachers' questions using Indonesian, and the teacher repeated the answer in English. For example:

T1	:	*What can you see from the pictures?*
Student	:	*Orang megang piala, Bu*. (Somebody is holding a trophy, Miss)
T1	:	*Okay good. But can you say it in English? Anyone?*

In this situation, T1 tried to encourage the students to use the English language when answering the questions. The researcher can see that T1 tried to encourage and train the students to speak in English. In terms of student learning, the researcher argues that the teachers applied different strategies for student learning: to stimulate the students' thinking, the teacher allowed the students the use of L1 (mother tongue), whilst encouraging a shift towards the target language. This indicates that in EFL classes, although teaching critical thinking was integrated in teaching English, they remained two different elements in the process which were undoubtedly challenging to successfully combine.

4.2.1.2 The Students' Critical Thinking Development Processes

In terms of providing support to students in the process of their critical thinking development, instructions or the tasks given by the teachers in the observed classes involved various activities which covered the students' cognitive levels ranging from C1 to C6 of Bloom's revised Taxonomy by Anderson and Krathwohl (2001).

Based on the results of the classroom observations, the researcher concludes that most of the support provided to the students focused on the levels of C1 to C3 (T1, T2, T3 and T4). Only limited support was given to students which focused on the levels of C4 to C6 (T3 and T4). Table 15 below presents more detailed information.

Table 15

The Results of Cognitive Development in the Observed Classes

Classroom	Remembering (C1)	Understanding (C2)	Applying (C3)	Analysing (C4)	Evaluating (C5)	Creating (C6)
1	✓	✓	✓	✓	✗	✗
2	✓	✓	✓	✗	✗	✗
3	✓	✓	✓	✓	✗	✓
4	✓	✓	✗	✓	✓	✓

☑ = Occurred in the observed EFL classes

☒ = Did not occur in the observed EFL classes

The results showed that the processes of C1-C3 mostly occurred in all observed classrooms, while C4-C6 only occurred in some classes (classroom 3 and 4). Instructions and tasks given by the teachers placed more emphasis on the processes of *remembering*, *understanding,* and *applying* (LOTS). However, there were some activities involving the students' thinking abilities at higher levels, namely *analysing*, *evaluating,* and *creating*. Based on the classroom

observations, the HOTS were either not observed or rarely incorporated into the class activities because of language barrier factors that hindered the teachers and the students to become involved in the discussion or activities involving the higher-order thinking levels, which the researcher found in all observed EFL classes.

4.3 Findings Drawn from the Documents Data

Other sources of data for this research were documents related to the 2013 Curriculum including the EFL syllabi and the teachers' lesson plans. In relation to this study, the syllabi and lesson plans were used as essential sources of data in addition to observations and interviews to triangulate all collected data. By triangulating data, the researcher can provide "a confluence of evidence that breeds credibility" (Eisner, 1991, in Bowen, 2009, p.28). The rationale for using documents in this research was to give detailed information regarding the EFL teachers' guidance in implementing the SA. As mentioned earlier, the curriculum documents provide guidelines for learning and teaching practices in the classroom. Therefore, document analysis taken from the curriculum documents (syllabi and EFL teachers' lesson plans) were included in the analysis to provide a rich description about the phenomenon being discussed - in this case, the SA implementation in EFL classes along with guidelines. Furthermore, since the documents were originally written in Indonesian, these two document sets were translated into English by a professional translator to have accurate results for the data sources and analysis (Ho *et al*., 2019).

The analysis of the syllabi focused on *Basic Competences* (it refers to certain/specific competences that should be achieved by the students) and *Indicators* (it refers to students' behaviour that can be measured and/or observed to indicate that certain basic competencies have

been performed or achieved by the students) (Kemendikbud/Permen No. 54/2013, 2013a). In addition, the analysis on the EFL teachers' lesson plans focused on teaching approaches, learning objectives, and learning procedures. These main points (Basic Competences, Indicators, teaching approaches, learning objectives, and learning procedures) contributed information to determine the level of cognitive achievement expected of the students and to examine the plan in terms of the SA implementation in the classrooms. Table 16 illustrates the data sources for the document analysis:

Table 16

Documents and Data Analysed

Documents Selected	Data Analysed
EFL syllabi for High School level (for Grade 10th, 11th and 12th) based on the 2013 Curriculum, Revised in 2018 (Kemendikbud/Permen No. 37/2018, 2018)	Basic Competences and Indicators
Four Lesson Plans of the EFL subject for Grade 10th (two lesson plans), 11th (one lesson plan) and 12th (one lesson plan) by the four EFL teachers (one teacher, one lesson plan)	Teaching approaches, learning objectives, and the learning procedures

As per Bowen (2009), document analysis involves three steps: (1) skimming (superficial examination), (2) reading (thorough examination), and (3) interpretation. To begin the process of data analysis, skimming and reading (superficial and thorough examination) were applied to

Basic Competences and *Indicators,* which both provide operative words displaying the level of cognitive thinking. The analysis was conducted as follows:

1. Identified operative words available in the *Basic Competences* and *Indicators*.

2. Classified the operative words into cognitive levels (Cognitive dimensions of Bloom's Revised Taxonomy by Anderson and Krathwohl, 2001, as available in Appendix K).

4.3.1 Data Analysis and Findings from the Syllabi

Table 17 offers the results of the analysis.

Table 17

Cognitive Level Analysis of the Basic Competencies and Indicators

Document analysed	Basic Competences & Indicators	Operative words	Cognitive Levels
EFL Syllabus for 10th Grade used by T1 (2013 Curriculum Revised 2018, p. X)	*Basic Competence*: "Applying the social functions, text structures, and linguistic features of interpersonal interaction texts which involve the expressions of congratulating and complimenting and how to respond per the contexts."	*Applying*	Applying (C3)
	Indicators: a. "Identifying text structure of expressions of congratulating and complimenting in a spoken and/or written activity."	*Identifying*	Remembering (C1)
	b. "Arranging simple texts that involve interpersonal interactions in giving congratulations and compliments and how to respond to them in spoken and written activities by paying attention to social functions, text structures, and correct linguistics features."	*Arranging*	Understanding (C2)
	c. "Arranging short dialogues using the correct sentence	*Arranging*	Understanding (C2)

Document analysed	Basic Competences & Indicators	Operative words	Cognitive Levels
	structure of giving congratulations and compliments, in spoken and/or written activities."		
	d. "Presenting a short dialogue *using* correct sentence structure of giving congratulations and compliments."	*Presenting,* *Using*	Applying (C3)
EFL Syllabus for 10th Grade used by T2 (2013 Curriculum Revised 2018, p. IX)	*Basic Competence*: "Applying the social functions, text structures, and linguistic features of interpersonal interaction texts which involve the expressions of giving and asking for opinions and how to respond to them per the contexts, in spoken and written activities. (Identify the linguistic features and use of: *I think, I suppose, In my opinion*)." (2013 Curriculum Revised 2018, p. IX)	*Applying*	Applying (C3)
	Indicator:		
	a. Identifying the text structures of expressions of giving and asking for opinions in spoken and/or written activities.	*Identifying*	Remembering (C1)
	b. "Arranging short and simple transactional texts that	*Arranging*	Understanding (C2)

Document analysed	Basic Competences & Indicators	Operative words	Cognitive Levels
	involve the expressions of giving and asking for opinions by paying attention to their social functions, text structures, and correct linguistics features."		
	c. "Arranging short dialogues using the correct sentence structures of giving and asking for opinions, in spoken and/or written activities."	*Arranging*	Understanding (C2)
	d. "Presenting a short dialogue using correct sentence structure of giving and asking for opinions."	*Presenting, Using*	Applying (C3)
EFL Syllabi for 11ᵗʰ Grade used by T3 (2013 Curriculum Revised 2018, p. XXV)	*Basic Competence*: "Applying the social functions, text structures, and linguistic features of transactional interaction texts which involve the expressions of giving and asking for information related to presupposition followed by commands/suggestions per the contexts, in spoken and written activities. (Identify the linguistic features of the use of conditional sentence '*If*' with	*Applying*	Applying (C3)

Document analysed	Basic Competences & Indicators	Operative words	Cognitive Levels
	imperative, *can*, *should*).		
	Indicators:		
	a. Identifying pictures based on the dialogue given.	*Identifying*	Remembering (C1)
	b. Identifying types, meanings, structures, and social functions of the conditional *If*.	*Identifying*	Remembering (C1)
	c. Reading texts that contain the conditional *If* with the correct pronunciation and intonation.	*Reading*	Remembering (C1)
	d. Identifying sentences and classifying them into 3 types of conditional *If*.	*Identifying*	Remembering (C1)
	e. Arranging transactional interaction texts which involve expressions of giving and asking for information related to presupposition followed by commands/suggestions, in spoken and written activities by paying attention to their social functions, test structures and correct linguistics features as per the contexts.	*Arranging*	Understanding (C2)
	f. Completing sentences or un-jumbling sentences of	*Completing*	Applying (C3)

Document analysed	Basic Competences & Indicators	Operative words	Cognitive Levels
	presupposition that use the conditional *If*.		
	g. Answering questions based on the text given.	*Answering*	Remembering (C1)
	Paraphrasing sentences using the conditional *If*.	*Paraphrasing*	Understanding (C2)
EFL Syllabus for 12th Grade used by T4 (2013 Curriculum Revised 2018, p. XXXV)	*Basic Competence:* "Differentiating social functions, text structures, and linguistic features of spoken and written transactional interpersonal texts which involve the expressions of giving and asking for information related to historical events and according to the contexts.	*Differentiating*	Understanding (C2)
	Indicators:		
	a. Identifying similarities and differences of social functions, text structures, and language features of a recount text.	*Identifying*	Remembering (C1)
	b. Understanding the text structures a recount text and asking and giving information related to historical events.	*Understanding*	Understanding (C2)
	c. Understanding the contextual meaning related to social functions, text structures, and linguistic features of a	*Understanding*	Understanding (C2)

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Document analysed	Basic Competences & Indicators	Operative words	Cognitive Levels
	recount text of historical events, in spoken and written activities.		
	d. Arranging short and simple historical recount texts, in spoken and written activity, while considering their social functions, text structures and linguistic features correctly and as per the context.	*Arranging*	Understanding (C2)
	e. Arranging text about historical events that happened in Indonesia.	*Arranging*	Understanding (C2)
	f. Displaying students' works on the classroom walls and then conducting a Question-and-Answer activity with others (teacher and classmates) who read the works.	*Displaying*	Applying (C3)

Based on the required *Basic Competencies* and *Indicators* taken from the 2013 Curriculum

Revised 2018 for EFL for High School levels (Grade 10th to 12th), the operative words

presented are as follow: *applying, identifying, arranging, presenting, reading, completing,*

answering, paraphrasing, differentiating, understanding, and *displaying.* In relation to the

categorisation of the operative words and activities in required basic competencies and

indicators, the levels of cognitive ability were in the range of C1 to C3, belonging to lower-order

thinking levels (LOTS). This shows that basic competencies and indicators set the students'

competency at the lower-order level which required students to master the stages of

Remembering, Understanding, and *Applying*. This is clearly not aligned with the expectation of

the government requiring that learning should involve high-level thinking skills

(Kemendikbud/Permen No. No. 36/2018, 2018).

Furthermore, if the objectives of senior high school level EFL are explored more closely, the

curriculum's objective is clear: "To develop the potential of students to have communicative

competence" (Kemendikbud/Permen No. No. 36/2018, 2018, p.iv). The curriculum further

explains that communicative competence refers to the competence of interpersonal, transactional,

and functional discourse, using various spoken and written English texts. This curriculum

objective for senior high school level EFL is aligned with the required competences and

indicators set in the curriculum indicating higher-order thinking skills (HOTS). Additionally, as

stated in the 2013 Curriculum, one of the basic curriculum improvements is to "face external

challenges, such as globalization, technological and information advancements, environmental

changes, and the rise of creative economy, culture, and education of the industrial era 4.0"

(Kemendikbud/Permen No. No. 36/2018, 2018, p. II). However, the results of the analysis show

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that there was a misalignment in setting up the objectives or basic competences and indicators with the purpose of the curriculum. As such, any improvements should aim to fulfil the 21st century competencies, which is achieved first and foremost by developing students' higher-order thinking skills, as required in the curriculum.

4.3.2 Data Analysis and Findings from the EFL Teachers' Lesson Plans

The second type of document analysed was the teacher lesson plan. The researcher's foci for analysing their lesson plans were teaching approaches, learning objectives, and learning procedures. These three parts of the lesson plans provided information on the following:

1) the teaching approaches used by the observed teachers;

2) the learning objectives which were used to determine the students' expected cognitive levels of achievement, and

3) teachers' learning procedures to see how the SA implementation was planned for the classes. The detailed analysis is as follows:

Table 18

Analysis of the Lesson Plans

Source	Topic	Learning and Teaching Method	Learning Outcomes	Operative Words of Learning Objectives	Cognitive Level	Learning Procedures
T1's lesson plan	Expressions of Congratulations and Compliments and Their Responses	Approach: Scientific Approach Learning Model: Not stated Method: Demonstrative and Assignments	After the learning process, students can *use* and *express* congratulations and compliments as a means of communication to *understand*, *implement*, and *analyse* verbal and written information.	● Use ● Express ● Understand ● Implement ● Analyse	● Applying (C3) ● Remembering (C1) ● Understanding (C2) ● Applying (C3) ● Analysing (C4)	- Ask students to *observe* pictures (C1) - Ask students to *write* expressions of greeting and compliment (C1) - Ask students to *make* dialogues using expressions of greeting and compliment (C3) - Ask students to *present* the dialogues (C3) - Ask students to *reflect* on the discussed topic (C4)
T2's lesson plan	Expressions of Giving and Asking for Opinions	Approach: Scientific Approach Learning Model: Not stated Method:	After the learning process, students can *use* and *express* giving and asking for opinions as a means of communication to *understand, implement*,	● Use ● Express	● Applying (C3) ● Remembering (C1)	- Ask students to *observe* expressions of asking for and giving opinions and their responses (C1)

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Source	Topic	Learning and Teaching Method	Learning Outcomes	Operative Words of Learning Objectives	Cognitive Level	Learning Procedures
		Demonstrative and Assignments	and *analyse* verbal and written information.	● Understand ● Implement ● Analyse	● Understanding (C3) ● Applying (C3) ● Analysing (C4)	- Ask students to *read* aloud texts containing expressions of asking for and giving opinions and their responses (C1) - Ask students to *classify* some samples of expressions of asking for and giving opinions and their responses (C2) - Ask students to *write* down examples of expressions of asking for and giving opinions and their responses (C1) - Ask students to *summarise* discussed topic (C4) - Ask students to *reflect* on the

Source	Topic	Learning and Teaching Method	Learning Outcomes	Operative Words of Learning Objectives	Cognitive Level	Learning Procedures
						discussed topic (C5)
T3's lesson plan	Conditional If: If Clause Type II	Approach: Not stated Learning Model: Not stated Method: Discussion and Q-A	Students can *implement* social functions, text structures, linguistic elements, and spoken and written transactional interactions, involving the expressions of giving and requesting information related to the occurrence of/doing something unreal now and in the past, in accordance with the context of its use.	● Implement	Applying (C3)	- Ask students to *listen* to audio recorded sources of teaching materials (C1) - Ask students to *identify* the social function of the Conditional If clause (C1) - Ask students to *match* statements containing the Conditional If clause (C1) - Ask students to *make* and practice dialogues using the Conditional If clause (C3)
T4's lesson plan	Recount Text: Historical Recount	Approach: Scientific Approach Learning Model: Discovery Learning Method: Question and Answer &	Using Discovery Learning and SA, students can *differentiate*, *understand* meaning, and *arrange* the recount texts related to their social functions,	● Differentiate ● Understand ● Arrange ● Ask	Understand (C2) Understand (C2) Remember (C1) Remember (C1)	- Ask students to *observe* photos/ pictures/video (C1) - Ask students to *read* a historical recount text (C1) - Ask students to *list* questions related to

Source	Topic	Learning and Teaching Method	Learning Outcomes	Operative Words of Learning Objectives	Cognitive Level	Learning Procedures
		Discussion	text structures, and linguistic features, in the form of spoken and written activities. Also, enable the students to *give* and *ask* for information related to historical events in contexts, by also expressing nationalism, discipline, confidence, honesty, responsibility, toughness, curiosity, and care for the environment.	• State	Remember (C1)	the topic being discussed (C2) - Elicit the students to *address* questions related to the topic to the teacher (C2) - Ask students to create *résumés summary* (C2) - Homework: Ask students to *make résumés* related to the conducted activities (C2)

For learning objectives, the researcher focused on operative words to determine the required cognitive levels that would become the learning objectives. Based on the findings, the operative words were classified into cognitive level categories as follows:

Table 19

Operative Words of Learning Objectives and Their Cognitive Levels based on Bloom's Revised Taxonomy (2001)

Operative words of Learning Objectives	Cognitive Level (Based on Bloom's Revised Taxonomy)
Use	Applying (C3)
Express	Remembering (C1)
Understand	Understanding (C2)
Implement	Applying (C3)
Analyse	Analysing (C4)
Differentiate	Understanding (C2)
Arrange	Remembering (C1)
Ask	Remembering (C1)
State	Remembering (C1)

Based on the categorisation of the operative words in the learning objectives, the levels of cognition were in the range of C1-C4, in which C1-C3 belong to lower-order thinking levels (LOTS) and C4 belongs to higher-order thinking levels (HOTS). Meanwhile C5 (*evaluating*) and C6 (*creating*), which also belong to HOTS, were not included in the objectives. As demonstrated in these learning objectives, students were required to achieve the stages of *remembering*,

understanding, applying, and *analysing*. However, in the actual learning procedures, C1-C5

cognitive level activities were observed. Although the learning objectives only required students

to achieve C1-C3 levels, the teachers incorporated activities that developed higher-level (C4 and

C5) cognitive abilities. There were no operative words or learning procedures classified at the C6

(*creating*) level of activity written in any of the documents. This showed inequality between the

learning activities and the objectives of the curriculum that aim to improve the students' critical

thinking ability, promoting the higher-order thinking levels (HOTS). It is also worth noting that

none of the observed teachers mentioned explicitly each step of the SA in their teaching

procedures. However, the researcher observed that the procedures followed the steps of the SA

even though the steps were not explicitly written. T1, for example, arranged the activities in the

classroom as follows:

Table 20

Example of Learning Procedures and the Implementation of the SA Steps

Observed Teacher	Learning Procedures	Classification of the SA steps
T1	Asks students to observe pictures (C1)	Observing (step 1)
	Asks students to discuss expressions of greeting and compliment (C1)	Questioning (step 2)
	Asks students to write expressions of greeting and compliment (C1)	Experimenting (step 3)
	Asks students to make a script of dialogues using expressions of greeting and compliment (C3)	Experimenting (step 3)
	Asks students to present the dialogues (C3)	Communicating (step 5)

Observed Teacher	Learning Procedures	Classification of the SA steps
	Asks students to reflect on the discussed topic (C4)	Associating (step 4)

It can be concluded from the learning procedures used by T1 that she had implemented the steps of the SA in her teaching plan. However, the activities that she planned to be implemented in the classroom did not follow the appropriate order of SA steps. The same phenomenon was also gathered from the lesson plans created by the other three observed teachers (T2, T3 and T4) (see Appendix L). In other words, in the preparation of learning procedures, the SA steps were not arranged sequentially and there was also no separation of activities grouped by the steps of the SA.

4.4 Summary of Research Findings Chapter

This chapter has provided a comprehensive presentation of the findings gathered from the researcher's observations in EFL classes, semi-structured interviews, and the study of documents (EFL teachers' syllabi and lesson plans). The data from interviews showed that the implementation of the SA in EFL classes still faces several obstacles, both internal and external. Further, the results of classroom observations have demonstrated that the teachers did not always implement the steps of the SA as required in the curriculum. In addition, document analysis showed that the operative words in the learning objectives stated in the syllabi and teachers' lesson plans were in the range of C1 to C4 of cognitive levels (based on Bloom's Revised Taxonomy). The analysis towards these findings is elaborated more in *Chapter 5: Analysis and Discussion*.

Chapter 5

Analysis and Discussion

This chapter analyses the results of the research on the implementation of the Scientific

Approach (SA) in the processes of learning and teaching English as a Foreign Language (EFL)

in an Indonesian senior high school and its influence on students' critical thinking development

processes. The findings of the research have been presented in detail in Chapter Four (p. 94). The

three main themes that were generated in response to the research questions from this study are

presented below:

Figure 20

Three Main Themes of the Study
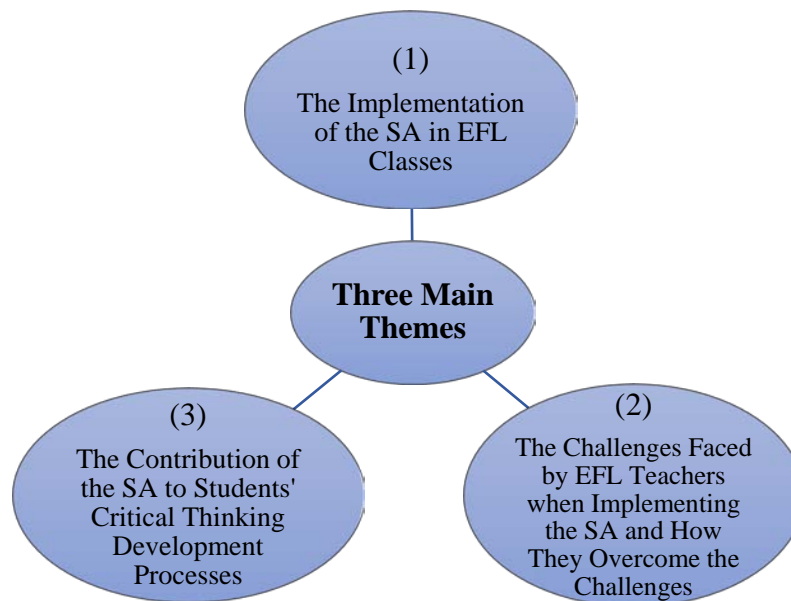
The results of the analysis are followed by a critical discussion of the findings and their linkage to the existing literature and research to uncover deeper understandings regarding the results of the research.

5.1   Theme 1: The Implementation of the SA in EFL Classes

To scrutinise the practice of EFL teachers implementing the SA in their classes, this research exemplified the following: how each step of the SA, as suggested by the 2013 Curriculum, was interpreted, implemented, and responded to by both teachers and students during the learning and teaching activities in EFL classes. The research findings showed that, in general, the EFL teachers implemented all steps of the SA in teaching EFL as suggested by the 2013 Curriculum. These steps were: *observing, questioning, experimenting, associating,* and *communicating*. Nevertheless, there were some important points in the implementation of each step of the SA in terms of planning, teaching, and assessment and also about the role of teachers that requires careful consideration as elaborated below.

5.1.1 The Implementation of the SA in terms of Planning

The planning stage analysis focused on investigating the EFL teachers' lesson plans as the guidelines for implementing the SA in their classes. The main foci analysed from the lesson plans were the teaching approaches, learning objectives, and learning procedures. The researcher focused on these three main components to gain detailed information regarding the EFL teachers' plans for implementing the SA and the level of cognitive achievement expected of the students in terms of planning.

The findings suggest, and teachers explained, that all the observed EFL teachers still faced difficulties in arranging their teaching approaches, learning objectives and procedures despite having received training sessions three times (2014, 2015 and 2018) regarding the implementation of the 2013 Curriculum. This included the implementation of the SA in the learning and teaching processes that was conducted by the EFL teachers. Despite following their training guidelines, they were still challenged by how to appropriately incorporate the steps of the SA in their teaching procedures, attributing this to limited expertise with the approach. For example, Teacher 3 stated, "I tried to insert the SA steps in arranging my lesson plan. However, I still found difficulties in developing the activities for each step of the SA because of the lack of my knowledge and training" (Teacher 3, interview).

A similar sentiment was also expressed by the other three selected EFL teachers who confided that they struggled to implement the SA when teaching EFL. The difficulties were confirmed by the results of the analysis of the teachers' lesson plans. The analysis found that none of the observed EFL teachers included every single step of the SA in their teaching procedures explicitly, although they mentioned the SA as their teaching approach. From this feedback and analysis, it was obvious that the EFL teachers were still challenged by the mandatory inclusion of the SA steps into the teaching models that they used in classes.

Furthermore, in terms of planning, all observed teachers also stated that they still faced difficulty in finding the appropriate teaching model for achieving the dual purpose of teaching EFL while at the same time enhancing the students' cognitive levels, as Teacher 1 stated:

In EFL, the main purpose of teaching is to enhance the students' ability to communicate using English in appropriate ways through both spoken and written activities, and yet; on the other hand, I also have to enhance the students' cognitive levels and make them be more critical. Therefore, I need to find suitable teaching procedures that can cover those two purposes of teaching and I also have to take into consideration the existence of language barriers faced by the students. (Teacher 1, interview)

In relation to the findings, in practice, the point of difficulty was the integration of the language learning objectives while simultaneously enhancing the students' cognitive levels. In the Indonesian context, teaching critical thinking in the EFL classroom is a significant challenge when it is expected to be integrated into teaching fundamental language skills.

In accordance to teaching critical thinking, Paul (2004) classified the type of approach in which teaching critical thinking is integrated into teaching a subject as a discipline-specific approach. Based on his classification, teaching critical thinking in Indonesia can be categorised into the discipline-specific approach since teaching critical thinking is not conducted as a separate subject. Paul (2004) further stated that the integration of both knowledge and thinking skills of related subjects can assist students to be critical thinkers in the classrooms. A similar thought is also proposed by Abrami e*t al.* (2008) who advocate mixed teaching strategies whereby critical thinking skills are specific and attached to the subjects or disciplines. It is argued that this two-pronged approach can motivate the students to develop their critical thinking skills and allow critical thinking skills to be learned and taught as independent entities within the distinct context of the unit or subject.

Furthermore, Tsai *et al*. (2013) emphasizes the importance of integrating critical thinking into the process of learning and teaching activities because then students can better understand why something has occurred rather than simply understanding what has occurred, and this deeper understanding allows the students to better analyse the circumstances surrounding the occurrence and to create different viewpoints about the occurrence. To EFL learners, critical thinking in EFL classes lends advantages, such as "to monitor and evaluate their ways of learning, to expand their learning experience, and to make the language more meaningful" (Rafi, 2009 p. 65).

Different studies have also corroborated the advantages of critical thinking to improve EFL writing ability (Shirkhani and Fahim, 2011), language proficiency (Liaw, 2007), and oral communication ability (Kusaka & Robertson, 2006). Furthermore, Voke (2018) points out that teachers' strategies in teaching EFL should integrate some of the most pertinent skills such as creativity and innovation, media and ICT literacy, critical thinking, research skills, global awareness, and multicultural literacy of the 21st century that they can integrate into their language lessons. Overall, the literature undoubtedly endorses the aspirations of the Indonesian government in promoting critical thinking skills through within the EFL classroom as also reflected in the practice that the researcher observed about.

Nevertheless, the SA, which the government expects to help improve students' critical thinking, has proven to be problematic on a practical level. The observed EFL teachers, on numerous occasions, indicated that the SA was excessively rigid when applied in all lessons, for example in the EFL class. The requirement to incorporate the SA into all teaching procedures has forced the teachers to use this approach even when they thought that it was not suitable for teaching certain

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topics in EFL classes. This was compounded with teachers' difficulties in arranging teaching procedures that could integrate language ability with critical thinking. The teaching activities compiled by all the observed teachers in their lesson plans largely failed to incorporate activities that could raise the level of students' critical thinking. The activities mostly involved simple steps that belong to lower-order thinking levels (LOTS). For example, based on the categorisation of the operative words in the learning objectives (as shown in Table 17 for the analysis of the lesson plans in Chapter 4, p. 146), the levels of cognition were in the range of lower-order thinking levels (LOTS).

The researcher argues that the prevalence of LOTS occurred because of the syllabi provided by the government, which was the primary source for lesson plan development. Upon closer analysis of this document, the researcher found that it set the competencies related to cognitive levels only in the lower-order levels which require students to master the stages of *remembering*, *understanding,* and *applying*. This is clearly not aligned with the expectation of the government requiring that the learning process should involve higher-order thinking skills (Kemendikbud/Permen No. 36/2018, 2018). The results of the analysis showed that there was a misalignment in setting up the objectives and indicators both in the government-mandated syllabi and the resulting lesson plans with the stated purpose of the 2013 Curriculum. There appears to be a mismatch between the actual curriculum that was formulated by the government and their aspirations.

In relation to the planning stage of teaching critical thinking in EFL through the implementation of the SA, the researcher argues that teachers must be able to design lessons that can enhance

students' language abilities while simultaneously improving students' critical thinking abilities to reach higher-order thinking levels (HOTS) by incorporating all steps of the SA. The researcher's argument regarding this expectation is that EFL teachers must not only be able to design an integrated classroom activity with critical thinking immersed throughout the subject, but they must also be able to create teaching procedures that actively involve the students in each of the activities. Furthermore, EFL teachers must create activities that can enhance the students' cognitive levels by implementing HOTS questions or instructions at the C4 to C6 levels. The following section discusses the way the teachers implemented the SA in their teaching activities.

5.1.2 The implementation of the SA in terms of Teaching

As reported in Chapter 4, all observed teachers implemented the five steps of the SA (*observing, questioning, experimenting, associating,* and *communicating*) in delivering one topic or one Basic Competence. There were some important points about the implementation of the SA as the researcher report below.

a. The Implementation of the Five Steps of the SA in teaching EFL

As mentioned earlier, all EFL teachers had implemented the five steps of the SA in teaching EFL. However, the five steps were not always conducted in a sequential manner, which differed from the lesson plans. Irregularity in implementing the SA steps in classes was found in all observed classes, especially when the teachers moved from one activity to the next or merged multiple steps into one. For example, Teacher 3 (T3) incorporated three activities (*observing, experimenting,* and *communicating*) within the *questioning* stage. Teacher 4 (T4) did something similar in that she conducted the steps of the SA out of order: *observing – questioning –*

observing – questioning – experimenting – communicating – associating. The flow of activities

carried out by T4 was as follows:

Figure 21

Diagram to Show the Flow of Activities Undertaken Teacher 4 (T4) in Implementing the SA in
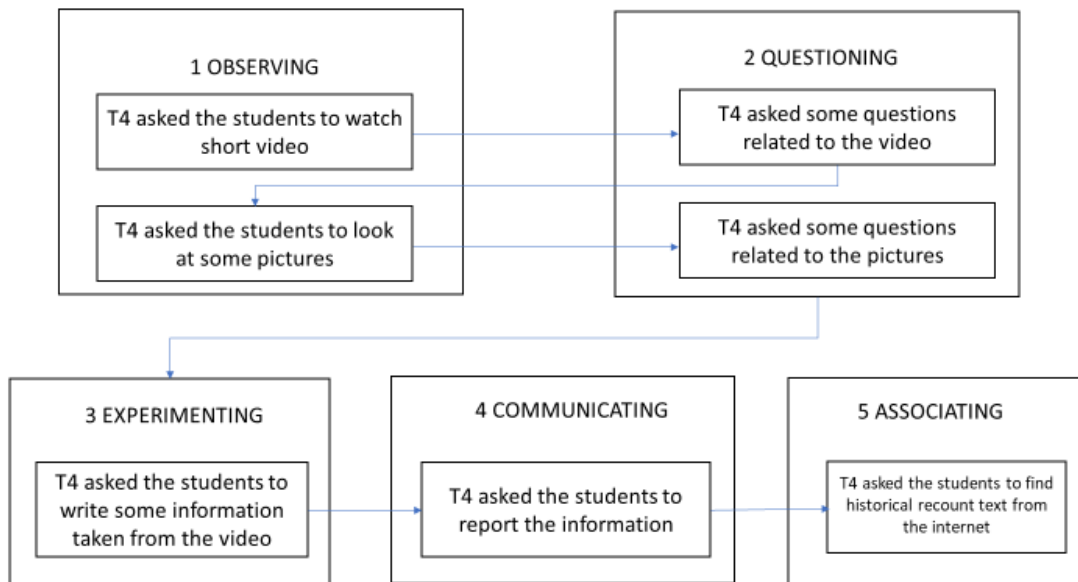
EFL Class

The way T4 implemented the SA provided evidence that the steps of the SA in EFL classes were

not carried out sequentially as explicitly stated in the 2013 Curriculum. Indeed, the 2013

curriculum emphasises that a series of activities must be done sequentially, systematically, and

must be structured and measurable (Kemendikbud/Permen No. 103, 2014). Furthermore, Cox

(2015) also claimed that the SA requires a systematic and orderly way of gaining information.

From these statements, it can be concluded that the SA is a fixed procedure that must be

conducted in an orderly manner.

On the contrary, Gauch (2013 in Ningrum, 2019, p. 11) argued that "the scientific [approach] is often misrepresented as a fixed sequence of steps, rather than being seen for what it truly is, a greatly variable and creative process." This statement was also reinforced by McLelland (2006) who adds that some steps can be stretched or omitted. Some descriptions list three to fourteen procedural steps (Sarwati, 2016) (see Appendix M). In most cases, "…the scientific method is an iterative process, it is a cycle rather than a straight line in which the result of one go-round becomes feedback that improves the next round of question asking." (Khan Academy, n.d. p.1).

In relation to the implementation of the SA in observed EFL classes, the jumbled order of the SA steps did not hinder the process of language learning in the classroom as the students were actively involved in learning and teaching activities of each SA step (as observed in Classroom 4). The findings showing irregularity in implementing the SA steps (carried out by Teacher 3 and Teacher 4) proved that the EFL teachers have their own intention in giving the tasks to the students. Teacher 4, for example, repeated the first two steps of the SA step (*observing - questioning – observing – questioning*) with the intention to introduce some forms of historical recount to the students before discussing them more deeply, meanwhile the government intended to create some tasks following the fixed steps of the SA. This shows that there is a difference between the intention of the government and the teachers in arranging the task and activities in the classroom. This finding mirrors the following reflections stated by Johnson *et al.* (2017, p.2):

It is reasonable to assume that the instructional use a teacher makes of a task will not necessarily align precisely with a task designer's intention. In fact, one can argue that teachers have a professional obligation to adjust "pre-fabricated" tasks to better match the local curriculum and the needs and capabilities of their students." (Johnson *et al.,* 2017, p.2)

Irregularity in implementing the SA steps clearly shows that the EFL teachers make their own decisions to create some tasks that fit the needs of the class. Indeed, it is important to emphasise that teaching a language is significantly different from conducting an experiment like in science classes. Language learning cannot unvaryingly encompass the SA – making hypotheses or predictions, conducting experiments, testing the hypothesis, and evaluating the experiment – taken as a set as the fixed procedures in the classroom. Rather, language learning is broadly defined as "developing the ability to communicate in a second/foreign language", and it focuses more on "the ability to use the target language(s) as a medium for understanding, expression, and communication" (LanQua, 2010, p.3). Such descriptions point to the assertion that the main tasks involved in language learning are most closely related to the SA steps of *experimenting* (step 3) and *communicating* (step 4). Therefore, learning activities must be set as flexibly as possible to support the students' ability in learning a language since how students learn science versus how they learn EFL and how the teachers teach science versus how they teach EFL are markedly different in nature.

b. The EFL teachers' instructions/questions

Another important point is related to the instructions and questions that the teachers gave to students during the class activities. In observations, all teachers' instructions/questions indicated levels one to three of Bloom's Taxonomy (*remembering, understanding,* and *applying).* Similarly, the findings regarding the use of lower-level questions by the teachers also resonated with other research conducted by Utami (2017) and Rosyida *et al.* (2015) which also found LOTS cognitive levels represented in instructions and questions. This further supports the observation in this research that the teachers' ability to provide higher level questions has not yet been fully realised in the classroom.

The researcher compared this finding with the teachers' lesson plans and curriculum document regarding the required Basic Competencies and Indicators for high school EFL (the 2013 Curriculum Revised 2018). The analysis revealed that the categorisation of the operative words and activities on required basic competencies and indicators were in the range of C1 to C3, or LOTS. This showed that even though what the teachers did was in accordance with the lesson plans they made and aligned with the required basic curriculum competencies and indicators, government expectations regarding the implementation of the SA had not been fully met. Therefore, it is strongly recommended that the basic competencies be revised, updating indicators so that operative words and activities belonging to HOTS levels feature more prominently.

5.1.3 The Implementation of the SA in terms of Assessment

The implementation of the SA in terms of assessment refers to how EFL teachers designed assessments of student achievement that were reflected in their lesson plans. At this stage of assessment analysis, the researcher did not analyse the results that students gained through the learning process using the SA, but instead focused only on how the assessment process was designed and conducted by the teachers in the EFL classes.

As written in the teachers' lesson plans, the researcher found that the students' cognitive achievements were evaluated in three types of assessment: performance-based assessment, project-based assessment, and written-based assessment as elaborated below.

5.1.3.1 Performance-based Assessment

According to the four EFL teachers' lesson plans, the performance-based assessment was presented in two forms:

1) written form: a student learning journal that contained a summary of learning topics the student had covered, items the student was still unsure of, a list of what the student needed to do to overcome these uncertainties, and topics the student had learned successfully that day (as written in T4's lesson plan), and

2) verbal form: the teacher directly asked for feedback on the learning process with questions such as: *How did you feel during the lesson? Is there anyone who wants to say something?* (as noted in T1, T2, and T3's lesson plans).

Based on the performance tests designed by the teachers (in written and verbal forms), the researcher argues that these types of tests were designed by the EFL teachers as a teaching

evaluation for the overall learning process rather than as an assessment of students' cognitive abilities because there were no specific criteria that indicated the cognitive level(s) that they wanted to measure. Thus, it would be difficult for them to measure the students' cognitive levels and truly evaluate their achievement of the learning process from these tests.

Chun (2010) explains that the purpose of a performance-based assessment is to measure students' ability to apply the skills and knowledge they learned from units of study. This explanation is in line with Indonesian 2013 Curriculum clause which indicates that performance-based assessment requires students to practice and apply the knowledge that has been studied in various contexts as per the desired criteria (Kemendikbud/Permen No.16/2019, 2019). However, the four EFL teachers tended to refer to traditional assessments that aimed at asking students about what they had learned, while in contrast, performance-based assessments require students to demonstrate what they have learned. The data collected in this study showed that there was a difference among the theory of project-based assessment, the curriculum, and practice.

Furthermore, by comparing the two forms of performance-based assessments designed by the EFL teachers, different results were found. The written form of assessment gave students more chances to evaluate themselves. In contrast, based on the researcher's observations in the three EFL classes, it was evident that not all students gave sufficient responses to the teachers' questions for verbal assessments. The students offered little or no feedback, and the teachers also had insufficient time to conduct this evaluation with only approximately five minutes allocated before the end of the lesson. The typically large numbers of students in one class (38 students) made it difficult for the teachers to assess all students verbally.

The finding was contrary to some researchers (e.g., Huxham *et al.*, 2012; Joughin, 2008 in Simper, 2010) who claim that verbal assessment works better than written because the written form is too tightly structured whilst verbal assessment seems more inclusive and challenging (Huxham *et al.*, 2012). The researcher's standpoint was not only derived from the observation results but also from her personal thirteen years of teaching experience and the dominant character of Indonesian people as being reserved and reluctant to speak openly in public, especially if they (in this case the students) were required to convey their inability in front of their peers which may make them feel uncomfortable and decrease their confidence (Sadikin, 2017).

5.1.3.2 Project-based Assessment

From the four observed classrooms, only one (Classroom 4) implemented project-based assessment, noting in the teacher's (T4's) lesson plan that she asked the students to do the following project tasks:

- Find a text or video about historical events (inventions or history).
- Write a factual recount of those events.
- Analyse the structure of the text.

Project-based assessment, as per the 2013 Curriculum (Kemendikbud/Permen No. 36/2018, 2018), is described as an assessment of tasks that must be completed by students within specific periods of time. The assessments include *planning*, *data collection*, *organizing, processing*, *analysis*, and *presentation of data*. It means that the assessment should cover lower and higher cognitive levels.

In relation to the project assessment designed by the one EFL teacher, the researcher found that the project assessment covered *understanding* (C2) as demonstrated by the task of finding a video of historical events, *applying* (C3) as the EFL teacher asked students to write a factual recount, and *analysing* (C4) as demonstrated by students analysing the structure of the factual recount text. HOTS tasks that involved *evaluating* (C5) and *creating* (C6) were not included in the assessment.

The researcher concluded that the absence of C5 and C6 in the assessment was related to the learning objectives set by the teacher. Based on data collected from the lesson plans, the objectives involved C1 to C4 (as explained in detail in Chapter 4), and the objectives themselves were derived from the standard competencies set out in the curriculum. Thus, the assessment was designed to achieve C1 to C4, but not designed for higher cognitive levels (C5 and C6) as expected by the government through the implementation of the SA. This finding provides further evidence, which concurs with what was found regarding the planning and teaching stages as well as performance-based assessment, highlighting a disconnection between the government expectations and the design of the curriculum. This disconnection adversely affected the teachers' design of learning objectives and assessments, with repercussions for students' access to higher cognitive levels.

5.1.3.3 Written-based Assessment

As per Kemendikbud/Permen No. 59 year 2014, revised 2018, "…written tests should require the students *to remember, understand, organize, implement, analyse, synthesise,* and *evaluate* subject matter learned by students" (Kemendikbud/Permen No. 36/2018, 2018, p.iv). In other

words, as with performance-based and project-based assessment, the questions should cover all cognitive levels (C1 to C6) of the revised Bloom's Taxonomy by Anderson and Krathwohl (2001), as specified in Indonesian 2013 Curriculum. Therefore, these kinds of assessments should provide teachers with opportunities to measure student learning outcomes at higher or complex cognitive levels. However, all questions (open ended and closed) in the written tests given by the four teachers were still in the range of C1 to C4 (as presented in Chapter 4) and did not include elements to test levels C5 and C6. This was evidenced by tasks written in the lesson plans that only required students to perform activities involving LOTS, as analysed from text-related questions (as noted in T1 and T2's lesson plans), as well as tasks such as arranging jumbled paragraphs, finding verbs in the text, and finding the main ideas of each paragraph (T4's lesson plan). However, none of the tasks required students to *analyse, evaluate,* and/or *create* as required by HOTS. This is unsurprising based on the aforementioned data analysis, which reveals that HOTS were side-lined throughout implementation.

Again, it is assumed that these findings reflect the basic competencies stated in the 2013 Curriculum which then influenced the teachers to set similar criteria for their written-based assessments. As such, the written-based assessments designed by the teachers were mostly categorised by LOTS levels which required the students to simply *memorise*, *understand*, and *apply*, while the only instance of HOTS reflected in some assessments was *analysis* as can be seen in T4's lesson plan that asked the students to analyse the structure of the historical recount text.

Regarding students' cognitive assessments in the forms of performance-based assessment, project-based assessment, and written-based assessment, the researcher reiteratively found that implementation of the SA in terms of assessment faced significant challenges since the EFL teachers were unable to incorporate HOTS or only incorporated few activities that involved HOTS. The study underlines that this finding represents a continuation of similar outcomes which were also found throughout the implementation of the SA whereby LOTS and in particular HOTS were not fully integrated. In response, the researcher sustains once again that the standard competencies design of the curriculum should be subject to careful review – in this case, it was the primary factor that influenced and created problems with the teachers' design of learning objectives and assessments.

There must be conformity in applying HOTS thoroughly at all levels – curriculum, planning, learning, teaching activities, and assessments – because they are inextricably linked with each informing the other (Wiliam, 2013). Indeed, Wiliam (2013) convincingly puts forward how assessment itself is a bridge between teaching and learning. Thus, HOTS assessments must be initiated or based on HOTS teaching and learning. An assessment should not be detached from the learning activities. Therefore, the type(s) of assessment, including tasks or questions that are used as tools to assess students' cognitive abilities during learning activities, should also contribute to students developing their thinking skills to the goal level aims of the SA implementation in learning. Furthermore, EFL teachers' understanding and their roles in designing appropriate assessments is important to manifest the learning goals. The roles of the teachers themselves are further explained in the following section.

5.1.4 The Roles of the Teachers

In accordance with the roles of teacher, Kemendikbud/Permen No. 69 Year 2013 (2013d) stated that there are three main points of change and refinement in the 2013 Curriculum. These are:

- a transformation of the role of teacher from teacher-centred to student-centred;

- a transformation from a one-way learning pattern (teacher to learners) to an interactive learning pattern (teacher to learners and learners to another learning resource/media/environment); and

- a transformation from the teacher as 'a resource' or 'controller' to 'facilitator' and 'motivator'.

The curriculum requires that the teacher does not assume a dominant role in the class as the only source of learning. However, based on classroom observations, the researcher found that the teachers still dominated classroom activities and gave students limited freedom to look for other sources of information when completing learning tasks. Moreover, from the result of the FGDIs with the students, all of them (n=24) confirmed this observation in their answers regarding the way their EFL teachers taught or delivered the EFL lessons. Student 1 (S1) explained a typical routine:

> The teacher enters the classroom and greets the students as usual. She would start the activities by reviewing previous materials, tasks, and homework. After that, she explains the materials and gives us some exercises in form of questions. (Student 1, FGDI)

This data, according to Harmer (1991), categorised the teachers as controllers, standing in front of the classes, talking to the students and giving instructions. Furthermore, the controller teachers "control not only what the students do, but also when they speak and what language they use"

(Harmer, 1991, p. 236). In relation to teaching EFL, a teacher as controller educates the students by introducing the target language, giving tasks, using repetitive drilling techniques and leading them through the content. This was evident in all EFL classes that the researcher observed. Suryadarma *et al*. (2004) states that, in Indonesia, teachers are commonly considered more authoritative with regards to knowledge since they provide the primary source of information. This was reiterated by one of the students who described the teacher as "the main source for explaining the topic, giving tasks and arranging the activities" (Student 11, FGDI). This student further added that they understand better receiving the information this way than if they read directly from English books, since they need some more explanation on grammar, diction, the structure of the texts, and other things related to the language from the teachers, highlighting why students preferred their teachers as the primary source and leader of the subject and activities.

Certainly, it is not always seen as a negative factor when the EFL teacher plays the role of controller. Harmer (2007 in Renandya, 2012, p.67) adds that "the teacher must act as a controller when introducing a new topic…when explaining a difficult grammatical concept or vocabulary meaning, when organizing structured group activities, when arranging for question-answer work, or when encouraging students to stay engaged or focused". This happened in all observed EFL classes. The teacher as controller is, nonetheless, often associated with a teacher-fronted mode of learning, which many experts (e.g. Lee *et al.*, 1998) believe is not conducive to learning. Notwithstanding, one can argue that there are many occasions during a lesson where the teacher must act as a controller, as previously explained by Harmer (2007), and as happened in the EFL classes that the researcher observed and described above.

Arguably, it is not appropriate for the government to limit the roles of a teacher as only 'a facilitator' and 'a motivator' in the classroom since the role of a teacher is determined by circumstances in the classroom and the needs of the learners. Harmer (2001, p.57) argues that the roles of a teacher are dependent on what students are expected to achieve and "may change from one activity to another, or from one stage of an activity to another" in the classroom. According to the researcher's observations, it appeared that the teachers mostly acted as 'controllers' who directed the process of learning and served as 'a resource' when describing the topic. Then they turned into 'a facilitator' when providing tasks for students to work on. The EFL teachers' roles were adjusted to the students' needs in each of EFL classes, including accommodating the more taciturn students who tended to have less understanding of English and/or lacked the currently expected proficiency in English.

All in all, whatever the roles chosen by the EFL teachers, the roles should facilitate the students in efficiently learning language in the classroom, which means that the teachers must be flexible and willing to utilise alternative roles depending not only on the teachers' desired methods for teaching the language but also on the students' needs. As a corollary to this point, another salient theme identified in the research revolved around the issue of how in carrying out their roles seeing as the teachers encountered several obstacles. This matter is subject to further explanation in the following section.

5.2 Theme 2: The Challenges Faced by EFL Teachers when Implementing the SA in EFL Classes and How They Overcome the Challenges

In practice, the implementation of the SA in improving students' critical thinking development at higher levels was clearly not easy for teachers to implement. There were still challenges in the process of implementation in terms of planning, teaching, and assessment. Based on the data from classroom observations, as well as the interviews with school managers and teachers and FGDIs with students, the challenges to implement the SA were identified as being both internal and external. Some implemented solutions are highlighted below to better understand the efforts taken by school managers, EFL teachers, and students to overcome the challenges they faced.

5.2.1 Internal Challenges

Internal challenges refer to the constraints and barriers that burden the individual, and in this case the individuals were represented by the school principal, the vice principal of curriculum affairs as the school managers, the EFL teachers, and the students. From the interviews with the school managers (school principal and school vice principal), it was revealed that the most important internal factors were the teachers' resistance to implementing the SA and maintaining consistency in implementing the SA during learning and teaching activities in the classroom.

5.2.1.1 The Teachers' Resistance to Implement the SA

The resistance from the EFL teachers in implementing the SA was noted by the vice principal for the curriculum affairs:

In fact, there are teachers who are practically still adopting conventional teaching approaches even though they have already been trained. These teachers don't change their teaching strategies since they believe that their teaching method is still valid and successful. (Vice principal, interview)

Meanwhile, to EFL teachers, reluctance to implement the SA is caused by other factors. These are illustrated by the following two quotations:

If there are some teachers, including me who don't implement SA, we possibly have other objectives in our teaching, such as emphasizing the practice like in teaching drama or practicing short dialogue without having to go through the steps of SA." (Teacher 1, interview)

For language classes, it is usually more communicative [and] mostly constructed from a variety of activities and student responses in the classroom. So, sometimes, I find it difficult to develop and implement the [SA] approach in the EFL classroom. (Teacher 3, interview)

Like the EFL teachers' comments above, many students from higher, middle and lower levels considered their teachers' ways of teaching were inappropriate for learning a language, as follows:

I found that the teacher's instructions were too rigid, complex, and segmented. The

activity always moves from one segment to another. Sometimes, it makes me feel like

I'm doing an experiment like in Biology or Physics classrooms…like hmm…observing

some pictures then asked to give the description, then make a report, then report the

findings in the class. (Student 8, high level, FGDI)

I think the way she teaches us is too segmented and it causes too many tasks to do since

in each segment we have to do tasks. (Student 16, middle level, FGDI)

I think there are too many activities in the [EFL] class that makes me have to move from

one activity to another, while I think it's better to learn the language more naturally, not

segmented like that. (Student 19, lower level, FGDI)

Regarding the resistance shown by the EFL teachers, "…resistance is as natural a phenomenon

as change itself." (Newton & Tarrant, 1992, p.191). Accordingly, Morrison (1998) and Nicolescu

& Lloyd-Reason (2016) agree that in the process of change, resistance can normally and, in fact,

inevitably occur. As such, implementation, as part of a change in process, "…is not just simply

bringing in and starting something new; it requires whole-system reform and leadership

development." (Fullan, 2009, p.30).

Therefore, the implementation of the SA as the new policy in curriculum reform needs an

appropriate system that will monitor and evaluate whether the implementation is achieved as

expected or not. Leaders, in this case the school managers, should also consider in that

evaluation why such a resistance occurs. As per the EFL teachers' comments, they not only had

difficulty in developing activities at each step of the SA, but also considered the SA too rigid to

be implemented in EFL classes because it is designed for more science-specific subjects (see also

4.1.1.2). Similar responses were also revealed from the students' points of view.

Another example of resistance shown by the EFL teachers related to when they tended to use

similar patterns of teaching (explaining the material, giving some questions/practice, then giving

some tasks/homework), as claimed by all students (n=24) during FGDIs. These students

considered the patterns of teaching were monotonous and unconducive to the development of

creative and innovative teaching patterns. For Kostoulas & Stelma (2017, p.9), the pattern that

the teachers conducted in the class "combined aspects of the Presentation – Practice - Production

sequence and local pedagogical traditions [and] perceived as a local methodological orthodoxy".

It seems that the directive to abandon long-established practices and "deviating from [this type of

pattern] seemed to generate unease [to the teachers]" (p. 9). As a result, curriculum development

as expected by the government through the SA implementation has not been fully realised.

5.2.1.2 Maintaining Consistency in SA Implementation inside the Classroom

Another issue related to the challenges of SA implementation was the need to maintain

consistency when implementing the approach during classroom activities. The school manager

pointed out:

It's quite challenging [to implement the SA], since they [teachers] always go back to their comfort zone: the way they taught in the past, while also it is difficult enough to change. Another challenge is maintaining consistency. This is more about maintaining how all the changes made by the new curriculum are continuously followed and implemented by all members of the academic community. The process of adaptation is also a challenge, where the change definitely takes time within the process of change itself. (School principal, interview)

On this issue, an EFL teacher's choice of EFL instructional approaches becomes limited and contrasts with more historical approaches to teaching a foreign language. Molina *et al*. (2015) argue that the teacher's personal and professional ideas of how to teach a foreign language influence not only teaching development but also its results. On this basis, the researcher argues that the EFL teachers' beliefs and choices in choosing their own approaches and strategies need to be considered by both stakeholders and the government as these were important factors in the process of teaching and the achievement of learning objectives.

5.2.2 External Challenges

The external challenges refer to obstacles coming from school elements and school circumstances. As revealed in the interviews, FGDIs and classroom observations, external challenges included: insufficient time allocation, limited training opportunities for teachers on the SA implementation, the language barrier and students' characteristics, as elaborated below.

5.2.2.1 Insufficient Time Allocation

The problem of insufficient time allocation was mentioned by all observed EFL teachers. As claimed by Teacher 1, "time allocation is not reasonable, given there are five steps to accomplish in SA. I am often overwhelmed because time rushes by and runs out. Consequently, there are many activities I skip because I run out of time" (Teacher 1, interview). As a result, time limitations affected the students in learning and their performance in finishing the tasks. Specifically, the EFL teachers complained about the quantity of tasks they were required to assign and noted how these often overlapped due to time constraints. This situation was also admitted by the students, as described by Student 12:

> For example, the teacher asked us to answer some questions based on the text, and then suddenly she asked us to classify some paragraphs based on the generic structures of the text; meanwhile, we have not finished working on the previous task. (Student 12, FGDI)

It is important for the teachers to consider the time available versus the number of tasks to accomplish. If they do not, then they may have poor student performance (Kayode, 2015) – this was also mentioned by students in the interviews when describing difficulties in completing tasks. Furthermore, poor academic performance is fundamentally linked to the application of ineffective classroom management strategies that impact the performance of the learners (Aliakbari & Bozorgmanesh, 2015). The effectiveness of teaching methods indicates the quality of teaching (Ganyaupfu, 2013). Thus, the EFL teachers need to consider the types of activities they use in each of the SA steps so that they can avoid overlapping or unfinished tasks performed by students.

5.2.2.2 Limited Training Opportunities for Teachers on SA Implementation

Since the 2013 Curriculum was established, all observed EFL teachers had similar training on the new curriculum and its changes and the implementation of the SA which were held three times (in 2014, 2015 and 2018). They justifiably expected that the training would be held annually so that they could optimize the implementation of SA in class. However, as one EFL teacher explained, "further training sessions that are deeper and more specific on the implementation of the SA in classes are needed, especially for those teaching language" (Teacher 1, interview).

Directly related to this situation, Boudersa (2016) found that the lack of professional training of teachers can be a key source for any dissatisfaction in the quality of their teaching. Indeed, limited training received by the EFL teachers on the implementation of the SA influenced their performance in implementing it as confirmed by interviews and observations. The teacher, as a professional agent, is considered the person most directly responsible for learning since s/he is the one in charge of facilitating students' learning, and the students benefit or suffer from the quality of their teaching (Boudersa, 2016). Given this, the teacher's competency is one of the most important factors in assuring the quality of their teaching. Therefore, comprehensive training programmes that focus on the SA implementation must include the implementation of the syllabi, lesson plans, teaching strategies, students' assessment criteria, and in-class learning process. EFL Teachers' comprehension and implementation of all these factors is essential to reach the optimum SA expectations in the classroom.

5.2.2.3 Language Barriers and Students' Characteristics

During the implementation of the SA, both EFL teachers and students admitted that the most

common problems were the language barrier and the students' characteristics. Students' lack of

vocabulary and understanding of the English language were the main challenges for the students

in learning English in the EFL classes, especially those from middle and low levels. The EFL

teachers said that it was sometimes difficult to engage students actively in each step of the SA

due to some barriers:

> Oftentimes, the activities in the class did not run well. The students kept silent. It is not
>
> because they did not have adequate knowledge about the topic discussed in the class or
>
> they did not have good critical thinking ability, but mostly because they had a lack of
>
> ability in using the English language. They were shy and afraid of making mistakes.
>
> But, when I delivered and repeated the questions in Indonesian, the students were
>
> actively involved in the activities. (Teacher 4, interview)

The above EFL teacher's view about the challenges in implementing the SA matched the

perspectives expressed by the students. For example, Student 9 said, "Sometimes, I know the

answer and I want to give my opinion or thought, but the problem is, I find it difficult to convey

it in English" (Student 9, FGDI).

From the data provided by the EFL teachers and students, it can be concluded that the students'

passive or silent responses were mostly caused by a language barrier, a lack of vocabulary and a

lack of confidence. This may also have been reinforced by the dominant characteristics and

expected behaviour of Indonesian people as Sadikin (2017, p.17) describes:

> Indonesian culture is centred on family and community, which manifests itself in a
> hierarchy based on age. Although nowhere as strict as Confucianism, the effect is still
> prevalent in everyday interaction. Children are taught to respect their parents and older
> siblings. Students are taught to listen to the teacher. Everyone is supposed to respect
> police, politicians, and any person wielding any form of authority, sit down obediently
> and listen to other people talking is a form of passivity. Reluctance, in essence, to express
> yourself due to a social fear of doing something 'improper'. (Sadikin, 2017, p.17)

This quote further shows that the implementation of the SA is challenged by various factors,

including cultural ones, that undermine learners' engagement with it.

5.2.3 Implemented Solutions

Some implemented solutions were attempted in order to overcome both the internal and external

challenges. Regarding the resistance of the EFL teachers in implementing the SA, the school

managers had made efforts to overcome the problem, such as: providing verbal/written

motivation, conducting monitoring programmes in the form of regular class visits by supervisors,

continuing to strive to coordinate with the vice principal and teachers, as well as conducting

regular teacher training sessions during briefings or in internal school meetings. However, as

comments from the teachers showed, they still need more thorough and continuous training on

the implementation of the SA as they still face difficulties in implementing the SA approach in

EFL classes. Regarding this situation, monitoring and evaluations are essential actions that should be conducted regularly and comprehensively by the school to help overcome the problems.

Furthermore, to increase the students' confidence, the teachers stated that they had tried to motivate them through strategies such as giving quizzes or singing songs. Concurrently, students themselves made some efforts to enhance their ability in learning EFL, as stated here:

> I memorise the vocabulary items as well as their meanings. However, I always forget what I memorise since I don't use them in my daily activities. If I encounter some difficulties, I usually ask a skilled friend or look it up the dictionary. (Student 17, FGDI)

In addition, other efforts such as discussions with friends for English practice and seeking out other sources such as a dictionary or internet applications were made by the students to enhance their English abilities. Overall, it is reasonable to point out that motivation techniques and approaches applied by the teachers significantly helped the students to improve their abilities in English as well as their critical thinking levels required by the curriculum. However, the extent to which implementing the SA in EFL classes contributed to the improvement of students' English and critical thinking abilities will be given further consideration and is elaborated upon in the following section.

5.3 Theme 3: The Contribution of the SA Implementation in EFL Classes to Students'

Critical Thinking Development Processes

In the Indonesian context, teaching critical thinking in the EFL classroom presents a considerable challenge since it is integrated into teaching the subject. The importance of integrating critical thinking into learning and teaching activities is dictated by the 2013 Curriculum. Implementing the SA in all subjects is expected to help students to improve their critical thinking to higher-order thinking skills (HOTS) levels.

In relation to the implementation of the SA, the researcher received various opinions from school managers, teachers and students as follows:

> It is really a time for the students to have good critical thinking abilities to face 21st century challenges. The steps [of the SA] are intended to help the students to improve their critical thinking level in learning the English language, in which the students are not only able to remember and understand the topics given to them, but they are also able to apply, analyse, evaluate, and then create their own ideas. (School principal, interview)

However, there were different opinions from the perspective of teachers and students regarding whether critical thinking development was available, as evidenced here:

> I think the SA could not yet help the students be more critical. The activities of each step of the SA could not help me to improve the students' critical thinking abilities due to some challenges such as language barriers and students' insufficient English proficiency. (Teacher 3, interview)

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The teacher does assist me in developing my critical thinking, but I am not yet reaching

the higher levels of thinking skill such as analysing. She has just introduced us to the

basic thinking skills such as answering questions in the handbook. (Student 3, FGDI)

Based on the data from the interviews, there were different points of view regarding the

implementation of the SA in EFL classes from three different perspectives: the leaders (school

managers), the EFL teachers and the students. The SA, which was considered the appropriate

approach to enhance the students' critical thinking by the school leaders, was considered

ineffective by the EFL teachers and the students who said that the SA had not brought the

students to reach HOTS levels yet. As a reason for this situation, research data consistently point

to a failure to optimally implement the SA in classes. The results of this research derived from

classroom observations and document analysis showed that the types of questions and the forms

of exercises given by the EFL teachers were still categorized as lower-order thinking skills

(LOTS) levels and only limited support was given to students to focus on HOTS (as explained in

section 4.2 and 4.3).

According to McCollister & Sayler (2010), critical thinking can be integrated into lessons for all

disciplines by utilising in-depth questioning and evaluation of both data and sources. However,

the use of in-depth questioning and evaluation and other activities that involve HOTS were not

observed as being applied in any of the observed classrooms. This showed that from the

perspective of the teachers, although critical thinking could be taught in an integrated way within

all subjects, critical thinking and the subjects were still largely two separate domains. This view

also comes from the classroom observations; to develop the students' cognitive processes, the

four observed teachers often changed the instructions or the questions into Indonesian. This code switching occurred in situations when the students did not give any response as expected and when the teacher tried to 'bring' the students into using HOTS, such as *analysing, synthesizing,* and *evaluating*. It was observed that when there was no response from the students, the teachers not only switched the instruction or the questions into Indonesian but also allowed the students to also respond in Indonesian. By using Indonesian, the students could give their analysis and evaluation as expected. This indicated that the problem was not about the low ability of students' critical thinking, but the students' difficulty of being able to communicate their conceptual knowledge in English.

Based on these observations, it can be inferred that in these EFL classes, teaching a language and teaching critical thinking were conducted through different processes. This finding is in line with Miraman & Tisman (1988) and Suhor (1984, as cited in Shirkhani & Fahim, 2011) who argue that in typical school settings, language learning and thinking skills are often treated as independent processes. As such, based on the findings, though teaching EFL and critical thinking could be conducted simultaneously, the two remain separate processes that cannot be mixed in one process or action. For example, in EFL classes, the process of teaching critical thinking was hindered by the language barriers which caused difficulty in training students to use HOTS, unless the teachers code switched from English to Indonesian. To address this situation, given that the purpose of implementing the SA in the 2013 Curriculum is to simultaneously improve students' abilities in English and improve their critical thinking abilities, the researcher argues that appropriate teaching strategies are urgently needed to achieve these two goals.

5.4 Summary of the Analysis and Discussion Chapter

In practice, the implementation of the SA in EFL classes still encountered some obstacles. The constraints are related to the implementation of the SA in terms of planning, teaching and assessment. The discrepancy between the objectives and indicators set by the government through the syllabi and the government expectation has resulted in a failure to achieve the curriculum goal of enhancing the students' cognitive and critical thinking ability to reach the higher levels (HOTS). As such, reviews and revisions of the syllabi and the curriculum are urgently required. Furthermore, some issues regarding the challenges, both internal and external, in implementing the SA also require careful consideration. Solutions to address EFL teachers' resistance to implementing the SA and other obstacles which arose during implementation should also take priority.

The final chapter will proceed to provide conclusions and recommendations. It will also present the limitations of this research study and offer guidance on future research needed to further address the issues pertinent to this study.

Chapter 6

Conclusions and Recommendations

This chapter presents an overview of the research, main conclusions drawn from the findings, and recommendations derived from the analysis and interpretation of the data. Some limitations regarding the study have also been identified. The contents of Chapter 6 are as follows.

Figure 22

The Contents of Chapter Six

6.1 Summary of the Research

This study set out to explain how the Scientific Approach (SA) is implemented in Indonesian English as a Foreign Language (EFL) classes. It was also conducted to enrich the research on this specific topic within the context of the Indonesian 2013 Curriculum and its role in supporting the process of students' critical thinking development. The following sections provide a summary of the findings in relation to the objectives set for this study.

6.2 Summary of the Findings

This study investigated how EFL teachers implemented the SA in their EFL classes. EFL

teachers', school managers', and students' perceptions and responses towards the SA steps were

also considered. Furthermore, this study explored the contribution of the SA to students' critical

thinking development. All of the above was conducted in the context of high school level EFL

classes in one Indonesian school. Through thorough observations and interviews, the aims were

addressed and elaborated as follows.

6.2.1 Aim 1: To Investigate the Implementation of the SA in EFL Classes in Indonesia

This study suggests that EFL teachers were aware of and had integrated five steps of the SA

(*observing, questioning, applying, associating, and communicating*) as reflected in the 2013

Curriculum currently being implemented in Indonesia. However, regarding the ways in which

the SA was implemented in their instruction, teachers sometimes challenged the guidelines of the

2013 Curriculum designed by the Indonesian government. More specifically, they were found to

diverge from the sequence of the SA steps as regulated by the Kemendikbud/Permen No. 103

year 2014. This is reinforced by the teachers' claims that the nature of language teaching requires

flexibility in how the SA steps are incorporated as opposed to science classes which must follow

them more rigidly. Therefore, it was commonly observed in this study that the EFL teachers

started their class with *questioning* activities, for instance, or even merged two steps like

applying and *communicating* activities into one to respond to students' individual differences or

group needs. Reflecting on this finding, this study suggests that there might be noticeable

distinctions between teaching a language and conducting a scientific experiment, and those

distinctions should be diligently considered when determining how to best use the SA in each type of subject.

With regard to discipline-specific features, a unique focus of EFL teaching as per the 2013 Curriculum is enabling students to use English as a means of communication in both spoken and written forms (Kemendikbud/Permen No. 54/2013, 2013a). In other words, learning English should not be limited only to activities like making hypotheses or predictions, experimenting, testing hypotheses, and evaluating as reflected in first three steps of the SA (*observing, questioning, applying*). For this reason, this study contends that rigid adherence to the SA is not always appropriate for EFL classes.

In terms of assessment, the EFL teachers administered three types: performance-based, project-based, and written-based. As this study found from reviewing their lesson plans, these forms of assessments were not designed with the aim of the SA (enhancing students' critical thinking) in mind. Overall, these assessments covered only activities categorised as lower-order thinking levels (LOTS) that assessed students' memory, understanding, and implementation. Although higher-level thinking did take place, it was limited to only *analysis* activities. In other words, integrating higher-order thinking skills (HOTS) into teaching and learning activities is still considerably challenging for the teachers in this study.

Having said that, this study also discovered some inconsistencies in the standard competencies set in the curriculum which might have affected the EFL teachers' assessment designs. While they were required to provide students with activities involving higher cognitive levels (C5 and

C6), the standard competencies devised in the curriculum cover only C1 - C4. In other words, C5 and C6 can be omitted from an assessment. It is therefore apparent why assessments designed by the teachers were detached from their learning and teaching activities in which C5 and C6 were included. At present, the SA aims rely on teachers' awareness and roles to create instructions that stimulate student engagement in higher-level cognitive activities. This indicates a need for change in the standard competencies so that HOTS are not only promoted and encouraged in the classroom activities, but so that C5 and C6 are also covered in the assessment. Therefore, consistency in curriculum, planning, learning and teaching activities, and assessment processes need to be addressed.

Observations conducted in this study found that the EFL teachers' roles in the classroom can be summarized as these three: *controller, resource, and facilitator*. As *controller*, the teachers are present to manage and direct the process of learning and teaching in the classroom in accordance with the designed lesson plan. Then, when it is time for them to describe the topic, for instance, they act as the source from which students gain knowledge. Moreover, they become facilitators as they provide tasks for the students to work on. This finding explains how the EFL teachers could respond to, cope with, and adjust their roles to diverse classroom situations. For instance, they adjusted their roles when dealing with students who showed reluctance to participate or lacked the expected understanding and proficiency in English. In summary, the EFL teachers demonstrated versatile abilities to cope with the heterogenous nature of the students. However, they still found it challenging to design, maximise, and develop learning activities that would allow the students to work on HOTS due to the inconsistency in standard competencies and learning goals.

6.2.2 Aim 2: To Establish the Challenges Faced by EFL Teachers when Implementing the SA in EFL Classes and How They Overcome the Challenges

This study discovered that the EFL teachers experienced obstacles in accomplishing their goals and in implementing the SA in their EFL classes. Interviews conducted in this study suggested that internal and external factors contributed to the obstacles. The major internal factors included:

- EFL teachers' resistance to implementing the SA, and

- inconsistency in the ways the SA is implemented in classroom activities.

Based on the EFL teachers' comments, such resistance and inconsistency mostly resulted from their personal attitudes towards the SA. They rightly concluded that the SA was too rigid to be implemented in EFL classes and, therefore, they felt the SA would work more effectively in subjects other than languages such as science.

In addition, EFL teachers also faced challenges in developing activities at each step of the SA in the teaching process and this seemed to be due to the following external factors:

- insufficient time allocation

- limited access to practical training on the implementation of the SA

- the language barrier, and

- student characteristics.

All EFL teachers who participated in the study mentioned that the regulated time allocation for one classroom meeting was insufficient, which is highly likely to be one of the factors that hampered students' performance in completing the given tasks. This explanation aligned with feedback in the student interviews. In addition, limited access to relevant training might have

also contributed to the teachers' performance in implementing the SA as confirmed by their statements in the interviews and data gained from observations. The study has noted that the teachers expected training to be held at least annually so they could gain more skills to create more effective SA implementation measures for their EFL classes.

Furthermore, whilst the SA was being integrated in learning and teaching activities, both teachers and students believed that the language barrier and student characteristics might also be factors hampering success. Students' limited lexical range, poor command of English, and low self-esteem were the major challenges to the success of the SA, as students dealing with such issues tended not to actively engage during activities involving more complicated SA steps.

In response, school managers designed practical measures to tackle the challenges. One solution was a monitoring programme in the form of regular classroom visits by supervisors, followed up by a meeting between the vice principal and EFL teachers. In addition, the teachers also attended regular training held by the school managers during briefings or in the internal school meetings. Furthermore, to work on students' confidence, the teachers were encouraged to motivate the students through strategies such as giving quizzes or singing songs. In addition, the students also admitted that they could try to enhance their ability to learn English by being more engaged in the learning process.

6.2.3 Aim 3: To Examine the Contribution of the SA to Students' Critical Thinking Development Processes

Opinions on whether or not the SA has contributed to students' critical thinking development varied among senior managers, EFL teachers, and students. The senior managers believed that the SA is a suitable approach for enhancing students' critical thinking. However, the EFL teachers and students believed that it was rather ineffective considering that students had not yet engaged in higher levels of thinking (HOTS). In addition, thorough *questioning*, *evaluation*, and other activities classified as HOTS were not utilised in the observed classrooms. More in-depth observations and interviews found that such problems might be associated with students' insufficient command of English that hampered effective communication during classes rather than an inability to think critically. In fact, students could do this using their L1 or mother tongue (Indonesian language). For this reason, this study suggests that as a language barrier occurs, integrating the teaching of critical thinking in an EFL subject is somewhat ambitious, even though the school managers believed otherwise.

6.3 Conclusions

Of note, this study suggests that the SA has not been well implemented in the observed EFL classes, and, therefore, its aim to enhance students' critical thinking and English skills is a little too ambitious considering the circumstances and barriers observed in this study. One of the barriers included teachers' inability to implement the SA steps appropriately or completely. Another was their inability to formulate ideas on how to minimise issues coming from students' difficulties in using English when engaging with activities involving critical thinking skills.

Furthermore, the EFL teachers' adverse perceptions of the SA, including the belief that the SA is too rigid to be implemented in EFL, further challenged the success of the SA implementation. The EFL teachers found that such rigidity distracted them from focusing on, fulfilling, and adjusting their roles since they believed that the principles of the SA were not in line with the nature of language learning and teaching which demand more flexibility. The other factor that hampered the SA was the students' negative response to it – they thought that it created an extremely segmented mode of instruction which was difficult to engage with. Crucially, they believed that more flexibility would provide more opportunities to actively participate in the EFL classroom.

It is important to note that the EFL teachers need more support to achieve the goals of EFL teaching simultaneously with the government's expectation to improve students' ability in using English in daily communication while enhancing their critical thinking. Creative ideas and skills development are essential so that each step of the SA can be designed, whilst considering the right proportion of English and students' first language (in this case Indonesian language) during the instruction. This was mirrored by the results of students' interviews (FGDIs) in Chapter 4. More specifically, the EFL teachers need to improve the integration of teaching English and critical thinking in classroom activities, tasks, worksheets, teaching materials, and assessments.

While school managers considered the SA as a robust approach for enhancing students' critical thinking, the EFL teachers and students found it to be the opposite, seeing as HOTS were not utilized or achieved by the students because they were not integrated into the activities designed by the teachers. This adverse circumstance might be associated with the inconsistent standard

competencies set in the curriculum that are classified only by lower-order thinking levels that require students to simply memorise, understand, and apply knowledge. HOTS are mostly neglected in the published competencies.

To sum up, two main conclusions can be drawn from this study. First, it is apparent that a discrepancy occurs between the government's expectation to enhance students' command of English and critical thinking and their insufficient capabilities in providing clear and consistent curriculum documentation and strategies to achieve said expectation. Second, another discrepancy also exists in the government's proposed teaching approaches versus the teachers' negative attitudes towards the SA. For this reason, it is important for the Indonesian government to firstly deal with the consistency in integrating HOTS thoroughly at all levels from the curriculum to planning, learning and teaching activities, and the assessment process.

6.4 Recommendations for the Implementation of the SA in EFL Classes in Indonesia

As this study found that the SA was not successfully implemented due to practical challenges, recommendations are provided for the parties involved in the form of measures to maximise the main goal of the SA as constructed in the curriculum – this is to support students' critical thinking development. These recommendations are offered especially for teachers, school managers, and the Indonesian government.

6.4.1 For the Teachers

The main objectives constructed in the Indonesian 2013 Curriculum are to enhance students' knowledge related to the subjects taught and to improve their critical thinking. In this regard, the

EFL teachers' responsibilities include designing effective instructions from which the students can gain better English skills and critical thinking abilities. To achieve these goals, not only do the EFL teachers need be aware of students' individual needs and the strategies needed to support their learning, but they are also strongly encouraged to embed higher-order thinking levels into every classroom activity, task, and assessment. In addition, it is also necessary for the EFL teachers to manage all these factors in accordance with the principles of the SA as required by the curriculum. For this reason, they might benefit from attending more training courses where they could gain deeper understanding on how to implement the SA more effectively and, more importantly, to develop their instruction so that every single step of the SA is used to support students in attaining their greatest potential – both in their command of English and in their critical thinking skills.

6.4.2 For the School Managers

School managers play a major role in providing the EFL teachers with guidance and encouragement to help them accomplish their roles. This guidance needs to be clear and delivered in a way that is well understood. For this reason, strategies for better communication need to be established so school managers, EFL teachers, and even students can assemble and be open about their thoughts on learning and teaching at the school. In addition, school managers need to provide more facilities like greater access to teaching resources and training through which EFL teachers could gain more ideas and insights. This would support the EFL teachers, on a pragmatic level, to design more strategies aimed at coping with curricular expectations and the practical challenges they experience during teaching.

Furthermore, school managers also have the important roles of observing and supervising the EFL teachers to maintain their motivation in providing students with quality learning activities. To make this effective, monitoring needs to be conducted in a more systematic, robust, and regular way. Based on this measure, school managers can conduct thorough evaluations to achieve the goals stated in the curriculum and provide evidence to highlight both strengths and areas to work on.

6.4.3 For the Indonesian Government

It is important for the government to ensure that school managers can address the problems unique to their own circumstances. Therefore, the school managers need to be given more independence to make their own decisions in term of what strategies should be employed to achieve the curriculum objectives given that each school experiences different challenges. Furthermore, more autonomy should be given to the teachers, especially to the EFL teachers since they are the ones who directly deal with students' individual differences and know what strategies can work to accommodate those differences.

Crucially, the government should consider reviewing certain aspects in the curriculum that are not congruent with the whole. In this case, references regarding the standard competencies, learning objectives, and assessment must be designed carefully as these directly influence how teachers formulate their teaching strategies from planning to evaluating. Given that these are the standard policies to which teachers must adhere (meaning these are what teachers use to assist pedagogical decision-making), improving the clarity and consistency in these policies and how

they relate to the competencies and objectives are paramount tasks for the government to undertake.

Equally important, to achieve successful implementation, the curriculum documentation as the main source of information for EFL teachers and school managers needs to be complete and comprehensive. The Indonesian government, in this case, could arrange more comprehensive dissemination accompanied by more intensive training for the EFL teachers and school managers about changes made in the curriculum, including how the SA should be implemented considering that this approach is newly introduced, especially in the EFL context. Reflecting on how the EFL teachers implemented and perceived the SA, the current training carried out by the government needs a better design. The EFL teachers not only needed to be introduced to the concept of the SA and how to design their lesson plans accordingly, but also to fully comprehend why the government proposed the SA in EFL classes in the first place. Effectively framing the underlying rationale is an important precursor to mitigating any negative attitudes towards the SA.

In addition, the EFL teachers would have implemented the SA better if the government also focused on improving teachers' abilities to use the right proportion of the L1 (Indonesian language) and English to eliminate the language barrier experienced by the students which hampered their engagement with activities involving HOTS. In this regard, the EFL teachers would certainly benefit from face-to-face training with experts where intensive and supervised teaching practice could be administered.

6.5 Recommendations for Further Research

As there are many variables that might influence whether the SA is the appropriate approach for EFL classes, research on this topic could be enriched by studying other objectives of the SA such as the influence of the SA on students' performance and achievement/attainment. Moreover, further research might look at how the SA is implemented at schools in different regions of Indonesia, especially considering how large the country is and given that educational quality is unequally distributed. In addition, it is worth studying how the SA is implemented in other social sciences or non-science classes (other than languages) to obtain more explanation as to whether the SA can be applied or adjusted to subjects demanding more flexible teaching approaches, for example in Physical Education (PE) or Religion Education (RE) classes in Indonesian contexts.

6.6 Limitations

The findings of this research are limited to explaining how the teachers implemented the SA and how the SA attempted to help improve students' critical thinking only from observations and shared perspectives and practices (teachers, students, and school managers). However, direct measurement of students' learning outcomes reflecting improved critical thinking as a result of the SA implementation was not included. In other words, this study could not explain the exact magnitude of the influence of implementing the SA on students' critical thinking. Therefore, future research might broaden this explanation by obtaining more forms of data and diverse methods of analysis. For instance, the relationship between the SA and students' critical thinking can be assessed by conducting experimental research with the objective of ascertaining whether there is a significant difference in students' critical thinking with or without use of the SA in EFL classes.

In addition, this study is also limited by its aim to focus only on deriving an in-depth understanding of the SA implementation process in selected EFL classes. For this reason, data obtained from this study are qualitative and are only relevant to the observed environment, which is why this study did not set out to discover findings that are ready for generalisation (Creswell & Poth, 2018). In other words, this research cannot reflect the general situation of the given interest, and, therefore, other EFL classes in other schools or areas in Indonesia are likely to provide different explanations related to this topic.

Furthermore, even though thorough interviews were conducted, some questions and answers could only provide limited knowledge about the situation and, therefore, in-depth questioning could have also been conducted to other parties such as curriculum developers and experts to have more comprehensive explanation regarding the implementation of the SA in EFL classes.

6.7 Summary of the Conclusions and Recommendations Chapter

The objectives of this research have been identified and the findings of the data collected have been also discussed. This study provides consistent findings that the SA was found to be ineffectively implemented in EFL classes due to EFL teachers' difficulties in developing each step of the SA and the language barriers which affected significant numbers of students. Therefore, it is imperative that a more effective approach is adopted that can enhance both students' language abilities and higher-order thinking abilities.

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APPENDIX A

Classroom Observation Rubric 1: For Observing EFL Teachers in Implementing the

Scientific Approach Implementation in EFL Classrooms

Appendix 1. Semi Structured Classroom Observation Rubric – Scientific Implementation

No	Scientific Approach Stages	Teaching and Learning Activities	Targeted Competency	Notes/ Additional Information
1	Observing ✓	☐ Elicit students to read ☐ Elicit students to listen ☑ Elicit students to look/watch	Students' focus, accuracy, and skill of finding information in learning	◦) Showing some pictures (contains various expression/activities. Pic. 1 : Someone's holding a trophy (congratulating someone) Pic 2 ; Two girls are dancing and wearing beautiful gowns. ◦)
2	Questioning ✓	☑ Elicit students to raise questions ☑ Have students seek answers	Students' creativity, curiosity, critical thinking	◦) Asking students to do Group Discussions Asking the students to discuss some questions given by the teachers.

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		☑ Scaffold students' knowledge development		*Guiding the Ss to find out some expressions from the dialogue given to them.* *Guide the Ss how to give response towards the expressions.*
3	Experimenting/ Collecting Information	☑ Elicit students to conduct experiments (1) divide student ✓ into small groups; (2) have students ✓ start discussion; (3) record the process; (4) supervise ✓ students during the teaching and learning process; (5) ✓ support groups that need helps	Students' attitudes/ behaviours/ skills: careful, honest, polite, respectful, communication, collecting information from various sources, lifelong learning	*Teacher's coming to each group* *Do monitoring* *Checking the Ss' work*
		☑ Elicit students to read other sources related to a given topic		*Teacher's asking the Ss to find similar expressions from other sources*

		☑ Have students observe a given object/ topic/ activity (in more detail)		
		☑ Have students collect information related to a given topic		*Asking the Ss to write down some expressions taken from the other sources (internet) on the board.*
4	Associating/ Processing Information	☑ Have students process all information gathered from previous activities	Students' attitudes/ behaviours/ skills: honest, careful, discipline, obedient, hard work, applying inductive and deductive ways of thinking in deriving conclusions	
		☑ Have students process information for other sources		
5	Communicating	☑ Present the result of the observation (spoken and/ written)	Students' attitudes/ behaviours/ skills: honest, careful,	

		☐ Present the conclusion based on the analysis (spoken and/ written)	tolerant, systematic way of thinking, expressing ideas, communicative language skills	

(Adapted from Kemendikbud, 2013, p. 31)

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APPENDIX B

Classroom Observation Rubric 2: For Observing Students' Critical Thinking in the Classroom Based on Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001)

Appendix 2. Rubric for Observing Students' Critical Thinking in the Classroom based on Bloom's revised Taxonomy by Anderson and Krathwohl (2001)

No	The Cognitive Dimension Process	Potential Activities	Observed Activities
1 ✓	Remembering	• Write a list of the important events of the discussed story • Describe the chronology of the events • Create a facts chart • Make a list of information related to the topic • Mention the participants of the story • Create a chart showing things related to the story/topic • Make a list of wordplay/acrostic • Re-read the story	o) Observing Some pictuRes o) Mentioning some expressions o)
2 ✓	Understanding	• Draw some pictures to describe the event/story • Illustrate the possible main idea of the story/topic • Describing the sequence of events • Write down and show a play based on the topic/story	o) Find some expressions of: - Congratulation - Complimenting - Responding from the dialogue given to the Ss.

No	The Cognitive Dimension Process	Potential Activities	Observed Activities
		• Retell the story in the students' own words • Write a summary of the story/event • Make a flow chart to describe the chronology of the story/events • Make an individual book based on the topic/story	
3	Applying ✓	• Make a scene to illustrate an event • Make a logbook about the topic/story • Make a role model to include information related to the story • Take some photos to display important points of the story • ✓ Create a game or a puzzle about the story • Write a text about the topic/story • Paint a picture/ mural about the topic/story	•) Students are asked to create their own dialogue ~~based on using~~ that contains some expressions they have learned. (in pairs)
4	Analysing	• Write/Address some questions to gather information related to the topic	•) Students find some expressions taken from other sources and analyze ~~from~~ the dialogues by categorizing some expressions of: congratulating, complimenting, The response

No	The Cognitive Dimension Process	Potential Activities	Observed Activities
		• Create a commercial advertisement to sell something related to the topic • Create a flow chart to display the critical events of the topic/story • Make a graph to demonstrate important information • Create a family tree/diagram to show relationships based on the story • Develop a biography of a person based on the story • Make a report about the topic • Gather some supporting data through investigation • Review the text/story being discussed	
5	Evaluating	• Make a list of points/criteria to assess the story • Conduct a discussion debate about a certain issue related to the topic	

No	The Cognitive Dimension Process	Potential Activities	Observed Activities
		• Create a notice/leaflet about five important rules related to the topic and then try to convince other students • Conduct a panel discussion — *in a Group discussion.* • Write or type a letter to someone confirming the needs of changes on certain issues • Make a monthly/annual report • Work on a case to present individual view about something related to the topics	
6	✓ Creating	• Make a similar text — *Make a similar dialogue* • Create a product based on the story. Name it and conduct a marketing activity • Express/write about individual feelings related to the story/ topic • Write a summary of a TV show/play a puppet show, prepare a role play, sing a song or pantomime about certain topics • Make a diary, report, book or magazine cover	

No	The Cognitive Dimension Process	Potential Activities	Observed Activities
		• Demonstrate and sell ideas • Devise something/a way to do something • Create new phrases/expressions and use them in sentences/ paragraphs	

APPENDIX C

Semi-Structured Interview Questions – Scientific Approach Implementation

for EFL Teachers

1. What training have you received related to the 2013 Curriculum, specifically about the Scientific Approach (SA)?

    a. How many times have you received the training?

    b. What have you learned from the training about the SA?

    c. Was the training helpful for you to understand the SA? How it was helpful/unhelpful?

    d. What have you put into practice from the training in relation to SA implementation in your EFL classroom?

2. Why do you think that your practice of using the SA in your EFL lessons has been successful/unsuccessful, in terms of

    a. Planning?

    b. Teaching?

    c. Assessment?

    How do you know that it has been successful/unsuccessful?

3. What are the challenges that you face when implementing the SA in your EFL classroom? How do you attempt to manage them?

4. In your professional opinion, in what ways does the SA contribute to or hinder the development of students' critical thinking processes in your EFL classroom?

5. Do you have any further opinion(s) or suggestion(s) you would like to give related to the implementation of the SA in your EFL classroom?

APPENDIX D

Focus Group Discussion & Interview (FGDI) Questions – Scientific   Approach

Implementation for Students

1. How does your teacher teach/deliver English lessons in your EFL classroom? Do you find it

    easy/difficult to follow the activities/instructions given by the teacher? Why do you find it

    easy/difficult?

2. Do the activities involve you doing any of the following: knowing/remembering,

    understanding, applying, analysing, evaluating, and/or creating?

    - If yes, could you give me an example of the activity?

    - If no, what kind of other activities than those mentioned do you engage in?

3. In what ways do your EFL teacher's lessons help/hinder you to master/understand the topics in

    the classroom?

4. In your opinion, do your EFL teacher's lessons help you to develop your critical thinking

    about the topics presented by your teacher?

    - If yes, in what ways do your EFL teacher's lessons help you to develop your critical

    thinking?

    - If no, why do the EFL teacher's lessons not help you to develop your critical thinking?

5. What challenges do you or have you faced in learning English in the EFL classroom (based on

    the topics given by your teacher)? How do you cope with these challenges?

6. Do you have any further opinion(s) or suggestion(s) you would like to make related to your

    teacher's practice in your EFL classroom?

APPENDIX E

Semi-Structured Interview Questions – Scientific Approach Implementation for the School

Principal and Vice Principal for Curriculum Affairs

1. In your capacity as a Principal/Vice Principal, what trainings have you received related to the 2013 Curriculum, specifically about the implementation of the Scientific Approach (SA)? What have you learned from the trainings?

2. Do you think that the EFL teachers have applied the SA as required by the 2013 Curriculum in their classroom activities? Why do you think this?

   - If yes, to what extent do the teachers apply the SA in their EFL classrooms?

   - If no, do you know why they do not implement the SA in their EFL classrooms? What approach do they implement in their EFL classrooms?

3. Do you do any monitoring of EFL classroom activities? If so, when and how do you do this?

4. What comments have you received (positive and/or negative comments) from the teachers and students related to the implementation of the SA in EFL classrooms?

5. What are the challenges that you face in supporting EFL teachers in implementing the SA in EFL classrooms? How do you overcome these challenges? What successes/failings you have had in supporting the teachers in implementing the SA in EFL classrooms?

6. In your professional opinion, how does the SA contribute to or hinder the development of students' critical thinking processes in EFL classrooms?

7. Do you have any further opinion(s) or suggestion(s) you would like to give related to the implementation of the SA in your school, especially in EFL classrooms?

Consent Form for Teachers, the School Principal and the Vice Principal for Curriculum

Affairs and Consent Form for Parents/Caregivers

35 Berkeley Square
Bristol
BS8 1 JA, UK

Consent Form

Researcher : Diah Restu Susanti

Institution : University of Bristol, UK

Title of Research : The Implementation of the Scientific Approach (SA) in Indonesian 2013 Curriculum for English as a Foreign Language (EFL) Classes and Its Influence on Students' Critical Thinking Development Processes: An In-Depth Case Study of An Indonesian State Senior High School

I consent to voluntarily participate in the study that Mrs. Diah Restu Susanti is carrying out.

- I am fully aware that my contribution of a 30-60-minute interview for this study will be audio-recorded.
- I am fully aware that my participation is voluntary, and I can withdraw my participation from the study at any time without reason or consequence. However, for the interview data, I can only withdraw within two weeks after the interview is conducted.
- I am fully aware that I will be given a chance to check the transcriptions of the interview data for accuracy purposes and if I decide not to do this then the data will be taken as it stands.
- I am fully aware that a pseudonym will be used in the process of the study being undertaken and in its reporting so that my identity will be concealed.

- I am fully aware that only Mrs. Diah Restu Susanti and her supervisor will be able to access the original data of this study.
- I am fully aware that Mrs. Diah Restu Susanti will provide clarification of any details provided in the Information Sheet covering the nature of this study and answer any questions at any time that I may have related to the research.
- I acknowledge that I have been given a copy of the Information Sheet and Consent Form.
- I am fully aware that this study is guided by the ethical considerations proposed by the British Educational Research Association (BERA) 2018 and approval has been given by the Ethics Research Board at School of Education, University of Bristol.

Participant details

Date : _____

Name :_____

Mobile number/email address: _____

_____

In order to contact the researcher, Mrs. Diah Restu Susanti, with any questions, please email ds6411@bristol.ac.uk.

For any complaints about the research, you may contact researcher's supervisor, Dr. Simon Brownhill: simon.brownhill@bristol.ac.uk. In the case of you needing any assistance in conveying the complaint in English, you may contact the English teacher(s) who may be also involved in this study as she/he can assist you to contact the researcher's supervisor.

I consent to participate in the research described above and understand that I have the right to withdraw from the research at any time by contacting the researcher.

Date	Name of Participant	Signature

University of BRISTOL

School of Education
35 Berkeley Square
Bristol
BS8 1 JA, UK

CONSENT FORM (for Parents/Caregivers)

Research Title: The Implementation of the Scientific Approach (SA) of Indonesian 2013 Curriculum in English as a Foreign Language (EFL) Classes and Its Influence on Students' Critical Thinking Development Processes: An In-depth Case Study of An Indonesian State Senior High School

Please answer the following questions to the best of your knowledge (delete as appropriate):

I confirm that I have read and understand the accompanying participant Information Sheet **Yes/No**

I allow my child to participate in this study **Yes/No**

I am fully aware that my child will be anonymous in any report **Yes/No**

I understand that the data collected in this research will be saved anonymously and securely **Yes/No**

I am fully aware that all personal data relating to my child will remain confidential **Yes/No**

I understand that the data collection tools for this study include audio-recordings made during observations and interviews that may involve my child **Yes/No**

I hereby give permission for my child to participate in this research.

I hereby agree to participate in this research.

☐ Parent/Caregiver

☐ Child

Note: ☑ for agree; ☒ for disagree

X for disagree

Name of the Parent/Caregiver _____

Parent/Caregiver Signature _____

Child Signature_____

Name of Child _____

Date _ _ / _ _ / _ _ _ _

The Results of Semi-Structured Interviews of EFL Teachers

(Extract interviews with Teacher 1)

Interview Question 1: What training have you received related to the 2013 Curriculum, specifically about the Scientific Approach (SA)?

Teacher #1

1. The 2013 Curriculum Training for Senior High School teachers (30 June – 4 July 2014)

2. The 2013 Curriculum Implementation for EFL teachers (23 – 28 June 2015)

3. Workshop on Designing lesson plans and materials based on the 2013 Curriculum (21 July 2018).

Interview Question 1A: How many times have you received the training?

Teacher #1   : 3 times

Interview Question 1B: What have you learned from the training about the SA?

Teacher #1

1. Teaching and learning design; assessment process.

1. The implementation of SA, models in teaching and learning strategies and approaches.

Interview Question 1C: Was the training helpful for you to understand the SA? How was it helpful/unhelpful?

Teacher #1

Yes, it was. The training helped me to be aware and to understand about the implementation of SA; it helped me design lesson plans and decide which learning model that agrees with the basic competencies to achieve.

Interview Question 1D: What have you put into practice from the training in relation to the SA implementation in your EFL classroom?

Teacher #1

I adjust learning activities following the steps of the scientific approach when teaching the English four skills. The scientific approach is applied through instructions designed in accordance with learners' needs and expected basic competencies. For instance, I implemented scientific approach by using discovery learning as learning model.

Interview Question 2: Why do you think that your practice of using the SA in your EFL lessons has been successful/unsuccessful, in terms of Planning?

Teacher #1

I managed to do it since, as a teacher, I am able to develop teaching materials that go in line with scientific approach and its steps and agree with the chosen learning model as well as the expected basic competencies. In the planning step, I design the instructions using the five steps of the scientific approach which I develop according to the syllabi, and they must also meet the students' needs and basic competencies that are required in the syllabi. In EFL, the main purpose of teaching is to enhance the students' ability to communicate using English in appropriate ways through both spoken and written activities, and yet; on the other hand, I also have to enhance the students' cognitive levels and make them be more critical. Therefore, I need to find suitable teaching procedures that can cover those two purposes of teaching and I also have to take into consideration the existence of language barriers faced by the students.

Interview Question 2B: in terms of Teaching?

Teacher #1

The success in implementing scientific approach happens when I am able to encourage students to think critically, from understanding to performing evaluation. However, this implementation of SA is often interrupted by time allocation (90 minutes) which is only enough to cover 3 out of 5 steps of the approach. In addition, (I find) steps in scientific approach inflexible, since language is communicative in nature, not segmented. Scientific approach is inflexible that it tends to be monotonous although various learning models are used.

Interview Question 2C: in terms of Assessment?

Teacher #1

In terms of assessment, scientific approach useful to enhance the students' critical thinking. There might be students who are able to think critically but are discouraged to show it in the classroom; this might be because they have language barrier or lack self-esteem as number of students is considerably big in one classroom. So, teachers had better give written assessment as well to accommodate this type of student.

Interview Question 2D: How do you know that it has been successful/unsuccessful?

Teacher #1

I know it from students' responses and their active participation in the classroom. The implementation of scientific approach helps encourage students to be actively involved in learning activities where teachers do not play the role as the centre of the instruction anymore; it is rather student-centred.

Interview Question 3: What are the challenges that you face when implementing the SA in your EFL classroom? How do you attempt to manage them?

Teacher #1

In planning, the challenge includes this demand to be able to design lesson plan that teachers need to have, from analysing syllabi, determining main competencies. This matter often creates obstacles for me and for other teachers since we must think about the detail of a step-by-step plan for teaching activities. In teaching and learning activity, the issue is that teachers have to show their abilities in implementing scientific approach and developing it into classroom activities. For instance, in questioning section, teachers need to have various questions that could encourage students to be more curious, interested, and active during the lesson; in addition, teachers have to be more particular in their classroom management such as in seating plan or grouping. Sometimes, the students are not active in the class. So that the SA implementation cannot be done maximally. When this happens, I motivate them to be active to increase their confidence. Another strategy is by giving quizzes or singing a song, to make them encouraged. Second of all, time allocation is not reasonable, given there are 5 steps to accomplish in SA. I am often overwhelmed because time rushes me out. Consequently, there are many activities I skip because I run out of time. This issue sometimes discourages us (teachers) to use the SA in certain classroom activities. However, if there are some teachers, including me who don't implement SA, we possibly have other objectives in our teaching, such as emphasizing the practice like in teaching drama or short dialogue without having to go through the steps of SA.

Interview Question 4: In your professional opinion, in what ways does the SA contribute to or hinder the development of students' critical thinking processes in your EFL classroom?

Teacher #1

The SA steps have helped me to direct the students to think critically and creatively, and to train the students to dig other information or knowledge from various sources to enhance their criticality. However, this steps in scientific approach tends to be inflexible when applied in EFL teaching which tends to be more communicative. Having said that, students are encouraged to learn from different resources such as those available online so they can actively engage and interact with the lesson material.

Interview Question 5: Do you have any further opinion(s) or suggestion(s) you would like to give related to the implementation of the SA in your EFL classroom?

Teacher #1

Further trainings that are deeper and more specific on the implementation of the SA in the classrooms are needed, especially for those teaching language. Teachers need to possess sufficient knowledge about learning models that are applicable in the classroom including its steps and assessment forms; so, students can learn the material and furthermore can face their future as expected in the objective of education which is to create knowledgeable individuals with decent personality.

The Results of Focus Group Discussion & Interviews (FGDIs) of Students

(Extract FGDI with Student 1 from High Level Category)

FGDI Question 1: How does your EFL teacher teach/deliver the lesson in your EFL classroom?

Student #1

The teacher enters the classroom and greets the students as usual. She would start the activities by reviewing previous materials, tasks, and homework. After that, she explains the materials and gives us some exercises in the form of questions.

Do you find it easy/difficult to follow the activities/instructions given by the teacher?

Student #1

Sometimes, it's easy or rather difficult depending on the materials.

Why do you find it easy/difficult?

Student #1

It depends on the materials and also the teacher's mood. The instructions/learning activities are easy to follow if the materials are familiar to me and if the way the teacher explains the material is entertaining.

FGDI Question 2: Do the activities involve you doing any of the following: observing, questioning, experimenting, associating and communicating? If YES, could you give me an example of the activity?

Student #1

I found that she [the teacher] has asked us [the students] to do the observing, questioning, experimenting, associating and communicating in the class. From the teacher's explanation, I can understand or at least know about the materials taught. Then, I can implement them by successfully answering all questions given by the teacher, such as giving opinion. More importantly, I am able to put the materials to a dialogue with various situations and expressions by myself.

FGDI Question 3: In what ways do your EFL teacher's lessons help/hinder you to master/understand the topics in the classroom?

Student #1

The teacher helps me understand the materials taught, implement them by successfully answering all questions given by the teacher and be able to put the materials in a dialogue with various situations and expressions by myself.

FGDI Question 4: In your opinion, do your EFL teacher's lessons help you develop your critical thinking about the topics presented by your teacher?

Student #1

Yes and No. It is true that the teacher's lessons have helped me, but not yet reach the higher level of critical thinking. However, it facilitates me to be more active in the classroom and I think the way the teacher teaches me helps me to comprehend the topic gradually.

If YES, in what ways do your EFL teacher's lessons help you to develop your critical thinking?

Through various exercises in the classroom

FGDI Question 5: What challenges do you or have you faced in learning English in the EFL classroom (based on the topics given by your teacher)?

Student #1

The topics are somehow unfamiliar to me, so that I find them difficult to understand. More importantly, the topics given don't really consider about my limited vocabularies and grammatical knowledge.

How do you cope with these challenges?

Student #1

I always search on Google or look up in the dictionary.

FGDI Questions 6: Do you have any further opinion(s) or suggestion(s) you would like to make related to your teacher's practice in your EFL classroom?

Student #1

According to my perspective, a teacher should be fun, creative, and should not give a lot of assignments or tasks.

The Results of Semi-Structured Interviews of the School Principal and Vice Principal for Curriculum Affairs

Interview Question 1: In your capacity as a Principal/Vice Principal, what trainings have you received related to the 2013 Curriculum, specifically about the implementation of the Scientific Approach (SA)? What have you learned from the trainings?

Principal's answers #1

-I have been becoming the principal since 2011. When the 2013 Curriculum appeared, I was in charge of one of the pilot schools/clusters fortuitously. To this extent, all cluster schools (only 5 cluster schools implemented the 2013 Curriculum in *Sumedang* District), all school principals got the training on changing the previous curriculum to the new curriculum – the 2013 Curriculum. As a consequence, there is always training every year. Thus, since 2013 to the present (2013 until 2018), there have been 6 training already.

-The first training focused on all the changes on the 2013 Curriculum. Then, schools appointed as models had to prepare a number of programmes. One of the programmes is to make the 2013 Curriculum implementation successful through the school's managerial system, such as creating a workshop for teachers about the programme of PPK(*Penguatan Pendidikan Karakter*) or character building, 4C (Creative, Critical Thinking, Collaborative and Communicative), Literacy, as well as HOTS. In this case, Hots denotes the 21st century qualification that must exist as [a result of] the demands of the 2013 Curriculum implementation.

- Monitoring programme to all modelled schools is undertaken by LPMP (Lembaga Penjamin Mutu Pendidikan or Quality Assurance in Education) that also conducts regular training once or twice a year.

Vice Principal's answer #1

- As vice principal of curriculum, I undertook around three training from 2015 to 2017.

- The trainings were about what changes were to be made in the 2013 Curriculum compared to the previous curriculum and the arrangements of teachers' training programmes regarding the 2013 Curriculum implementation. The training programmes focused on learning about the implementation of the syllabi, lesson plans, teaching strategy, students' assessment criteria, and in-class teaching and learning process.

Interview Questions 2: Do you think that the EFL (English as a Foreign Language) teachers have applied the SA as required by the 2013 Curriculum in their classroom activities? Why do you think this?

Principal's answers #2

-Yes, I think EFL teachers have been implementing the teaching learning process in accordance with the 2013 Curriculum. Moreover, it is not only the EFL teachers who implement the new curriculum, all teachers should implement it, since all teachers have obtained trainings related to the teaching learning process more than once.

Vice Principal's answer #2

Yes, EFL teachers have been implementing '5-M' (Mengamati or Observing, Menanya or Questioning, Mencoba or Applying, Mengasosiasi or Associating, and Mengkomunikasikan or Communicating) strategies related to the implementation of SA in the classroom. EFL teachers

have followed training about three times regarding the 2013 Curriculum as well as its implementation.

Interview Questions 2A: If yes, to what extent do the teachers apply the SA in their EFL classrooms?

Principal's answers #2A

The teachers apply the SA starting with the lesson plan arrangements that they made. Teachers have applied the 5M steps in the teaching process. The 5M steps are related to the implementation of the SA. In terms of the teaching process, they have practically implemented it in the classroom.

However, these teachers will still continue getting trainings to be able to implement it effectively in the classroom. It includes trainings about the way how to construct HOTS-based test items. This kind of training has just been held on August 2019, even though it was only one-day training. This has involved two teachers as their own schools' representatives. Thus, the process will take longer since not all teachers have received this information.

Vice Principal's answer #2A

The steps of the SA have already been implemented in the teaching learning process. The SA is applied in the learning process through instructions designed in accordance with learners' needs and expected basic competencies, as also stated in the lesson plan. This can be observed from the lesson plans they have compiled which have already demonstrated scientific procedures.

Interview Questions 2B: If no, do you know why they do not implement the SA in their EFL classrooms? What approach do they implement in their EFL classrooms?

Principal's answers #2B

One of the biggest challenges is that the teachers don't want to move out of their comfort zone. They don't want to change their teaching approach to implement the SA. They believe that their teaching methods have produced a number of outstanding students with excellent potentials. Yet, it was still in the past. Nevertheless, the characteristics of today's students have already changed. I continuously tell the teachers in every briefing that they shouldn't be proud of the past achievements as circumstances have changed. On this wise, we all also have to change, or worst, we will be left behind compared to the other countries – our education will always be left behind, in any case.

Vice Principal's answers #2B

The teachers always go back to their comfort zone: the way they taught in the past. In fact, there are teachers who are practically still adopting conventional teaching approaches even though they have already been trained. These teachers don't change their teaching strategies since they believe that their teaching method is still valid and successful. Henceforth, the only ways are the eagerness to learn as well as to change. However, if there are some teachers who don't implement SA, they possibly have other objectives in their teaching, such as emphasizing the practice (drama, dialogue, etc.) without having to go through steps of SA.

Another approach used for the language class could be a communicative approach which was used in the previous curriculum.

Interview Questions 3: Do you do any monitoring of EFL classroom activities? If so, when and how do you do this?

Principal's answers #3

Indeed, there must be a monitoring in a semester at least by visiting and observing (the teaching process) in the classroom. In conducting monitoring, I was cooperated by vice principal. Afterward, he will appoint teachers who are also working as supervisors to accomplish the monitoring in the classroom. Also, there are 7 teachers who become supervisors in this school. They previously achieved prior training regarding the teacher's performance assessment process and graduated as an appraiser/supervisor and have been certified as a supervisor.

After they have accomplished a monitoring, the results will be given to vice principal of curriculum. Afterward, it will be handed over me as a principal that will be discussed in the meeting as an evaluation data.

Vice Principal's answers #3

There are monitoring of course, such as regular class visitation by supervisors. These supervisors are certified teachers to do performance assessment on teachers. It is usually held once in a semester.

Interview Questions 4: What comments have you received (positive and/or negative comments) from the teachers and students related to the implementation of the SA in EFL classrooms?

Principal's answers #4

Data from the teachers, their comments are heterogeneous. However, the students don't question the way their teachers use its approach – while teaching. What I noticed that the students keep interested in learning.

Some teachers give many complaints. Since, even this SA is a conventional approach, yet it is a new approach for some subjects that must be applied in the class to make students be able to think more critically and communicate, according to the proficiency of the 21st century.

The situation is normal if there are no changes in the curriculum, lesson plan, or in the teaching approaches. Thus, any changes made on these aspects will definitely create uncomfortable situation in whole school elements, particularly senior teachers who find hard to accept the changes. However, the comments are positive as far. They respond properly to any changes in school or in the classroom.

Vice Principal's answers #4

At the beginning, there were pros and cons. There are always rejections appeared for any changes made in the curriculum. The most negative comments are because of more demands that teachers have to do. The changes are in teaching approach, drafting lesson plan, assessment indicator, etc. For the implementation of SA itself, it means that teachers have to learn again how to implement it in the classroom: what steps should be done, what activities should be accomplished in every step of teaching, etc.

Interview Questions 5: What are the challenges that you face in supporting EFL teachers in implementing the SA in EFL classrooms? How do you overcome these challenges? What successes/failings you have had in supporting the teachers in implementing the SA in EFL classrooms?

Principal's answers #5

- It's quite challenging [to implement the SA], since they [teachers] always go back to their comfort zone: the way they taught in the past, while also it is difficult enough to change. Another challenge is maintaining consistency. This is more about maintaining how all the changes made by the new curriculum are continuously followed and implemented by all members of the academic community. The process of adaptation is also a challenge, where the change definitely takes time within the process of change itself.

-One way to overcome the problem is by continuing to strive to coordinate with vice principal and teachers, as well as conducting regular trainings during briefing or in the internal school meetings.

-The level of success could be marked by observing the ability of the teachers to apply SA steps in the EFL class. It also can be seen through the outputs that have already been achieved teaching and learning objectives.

Vice Principal's answers #5

- Another challenge is how to encourage teachers to continue to improve their performance when teaching using the five steps of the SA.

-The solution is motivating teachers, as well as conducting mentoring such as IHT (in house training), dissemination, and English Teacher Organization (MGMP).

- The Success can be seen through the teaching performance by the teachers as well as the performance of students.

I can also mention that *lack of infrastructure* or facilities, esp. for mediums of teaching. Teaching many students with diverse traits becomes another challenge for the implementation of the SA. Need enough time for the process of adaptation.

Interview Questions 6: In your professional opinion, how does the SA contribute to or hinder the development of students' critical thinking processes in EFL classrooms?

Principal's answers #6

I think the scientific approach is indeed useful to track down how far students can think at HOTS levels both orally and in writing. It is one of the efforts to answer the challenge of the 21st century in which students are required to be independent and able to think critically as in the SA implementation, the teacher is not the only source of teaching. All along this period, the students are only spoon-fed by the teachers. It is really a time for the students to have good critical thinking abilities to face 21st century challenges. The steps of the [SA] are intended to help the students to improve their critical thinking level in learning the English language, in which the students are not only able to remember and understand the topics given to them, but they are also able to apply, analyse, evaluate and then create their own ideas.

Vice Principal's answers #6

By implementing the SA, the teachers can measure the level of students' critical thinking ability. By doing this, they can also evaluate and improve the ability of critical thinking of the students. The students will not only receive what their teachers teach, but also they are able to find another additional source by themselves to gain or add their understanding.

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In the SA implementation, there is a shift, from teacher-centred to learner-centred. Through SA, it is expected that students can dig and explore the information or knowledge by themselves as well as reach higher over thinking skills (HOTS). The students are trained to be creative, to collaborate, to think critically, and to communicate during class activities so they are equipped for the challenges of the 21st century. Having said that, so far, I think the students have not yet reached HOTS level.

APPENDIX J

Coding and Categorisation of Each Step of the SA

1. The teachers' activities in implementing the SA approach in EFL classrooms

   a. Observing

Observed activities	Code	Category
T1 asked the students to look at pictures	Instruct the students to see/ watch	Observing
T3 asked the students to see sentences shown to them		
T4 asked the students to look at pictures		
T4 asked the students to watch a short video, then she showed pictures of Indonesian heroes		
T2 asked the students to read a script of dialogue	Instruct the students to read	
T3 asked the students to listen to an audio-recorded dialogue related to the topic (If-clause type 2)	Instruct the students to listen	

   b. Questioning

Observed activities	Code	Category
T1 provided some questions to be discussed by the students (group work discussion)	Have students seek answers	Questioning
T1 gave pictures to the students and asked them whether they have questions related to the given pictures	Instruct students to raise questions	
T2 guided the students to identify expressions from the script of the dialogue	Scaffold students' knowledge development	
T2 asked the students to identify expressions of *asking and giving of an opinion* in the script of the dialogue	Have students seek answers	
T2 guided students in classifying the expressions of *asking and giving of an opinion*	Scaffold students' knowledge development	
T3 asked the students to identify the structure of sentences	Have students seek answers	

Observed activities	Code	Category
T3 guided the students in comparing the structure of sentences	Scaffold students' knowledge development	
T4 asked the students to provide questions related to the short video they watched	Instruct students to raise questions	

c. Experimenting

Observed activities	Code	Category
T1 asked the students to identify expressions of *congratulating and complimenting* from the script of the dialogue	Have students observe a given topic	
T1 asked the students to identify expressions of *congratulating and complimenting* from other sources, such as Google, and write them down on the board	- Have students collect information related to a given topic - Elicit students to read other sources related to a given topic	
T2 asked the students to read the dialogue then asked them to identify the expressions of *asking and giving for opinion* in the script of the dialogue	Have students observe a given topic	Experimenting
T3 wrote sentences and asked students to identify the structure of each sentence and write down the structures of each of the sentences	- Have students observe a given topic - Have students collect information related to a given topic	
T4 provided texts then asked students to identify the generic structure of the texts	- Have students observe a given topic - Have students collect information related to a given topic	

d. Associating

Observed activities	Code	Category
T1 asked the students to write down expressions related to *congratulating* and *complimenting* from other sources, make a summary, and then create short dialogues using those expressions	Have students process information from other sources	Associating
T2 showed pictures and asked the students to give their opinions related to the pictures	Have students process all information gathered from previous activities	
T3 asked the students to identify the structure of each sentence then summarize the structure of *Conditional If Clause type 2 and 3,* and asked them to make sentences using the clauses	Have students process all information gathered from previous activities	
T4 provided texts, and then asked the students to read the texts and classified them based on the category of *recount text* and identified the reason for classifying them	Have students process all information gathered from previous activities	

e. Communicating

Observed activities	Code	Category
T1 asked the students to present short dialogues containing expressions of *congratulating* and *complimenting* in front of the class	Have the students present the result of the learning	Communicating
T2 asked the students to make short dialogues containing expressions of *giving* and *responding to opinion*	Have the students present the result of the learning	
T3 asked the students to make a summary or conclusion of the structure of sentences that belong to *Conditional If clause type 2* and *3*, and make sentences using these types of sentences	Have the students present a conclusion based on the analysis	
T4 asked the students to create a summary relating to the generic structure of *recount text* and *types of the recount text (personal, factual, historical, and biography*)	Have the students present conclusions based on analysis	

Cognitive Dimension of Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001)

REVISED Bloom's Taxonomy Action Verbs

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	• Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why	• Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate	• Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize	• Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory

Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, and assessing, Abridged Edition. Boston, MA: Allyn and Bacon.

EFL Teachers' Lesson Plans (Original version of the lesson plans are written in

Indonesian. They have been translated from Indonesian into English)

Lesson Plan

Name of the teacher	:	**XXX**
School	:	**XXX**
Class/Semester	:	**X/1**
Subject	:	**English**
Theme/Topic	:	**Congratulating and Complimenting Others**

A. Core Competences

1. Appreciating and practicing the values of the embraced religious belief.
2. Appreciating and practicing honesty, discipline, responsibility, empathy (cooperative, collaborative, tolerant, pacifist), respect, responsiveness and proactiveness, and the roles as a problem solver for social and environmental issues and as the reflection of the nation as the global citizen.
3. Comprehending, applying, and analysing factual knowledge, concepts, procedures, and metacognition based on their curiosity on science, technology, art, culture, and humanities with the insights in humanity, nationality, and civilisation in reference to the causes of a phenomenon and event, and implementing procedural knowledge on a specific field based on students' potential and interests to solve problems.
4. Processing, reasoning, and presenting in a concrete and abstract domain the personal development learned (by students) at school independently, taking effective and creative measures, and showing capabilities in using methods according to the scientific principles.

B. Basic competences

1.1. Being grateful for the ability to learn English as the language used internationally which is shown in the eagerness to learn.
1.2. Showing respect and empathy when interacting with teachers and friends.
4.2. Determining the social functions, text structure, and language features related to the situation when practicing interpersonal interaction both orally and in writing which

involves congratulating and complimenting (extended) others as well as giving responses based on the given context.

4.3. Designing a simple text on spoken and written interpersonal interaction that involves congratulating and complimenting (extended) and responding to them by considering the social function, text structure, and language features appropriately based on the given context.

C. Indicators

1. Using English to communicate in the process of understanding, determining, and analysing spoken and written information through conversation scripts consisting of congratulation and complimenting others as well as how to respond to them.
2. Practicing honesty, discipline, responsibility, and proactiveness in using English to congratulate and compliment others.
3. Identify the text structure of congratulating and complimenting expressions both orally and in writing.
4. Creating a short dialogue using the sentence structure for congratulating and complimenting others appropriately both orally and in writing.
5. Presenting a short dialogue by considering the sentence structure of the expressions of congratulating and complimenting others appropriately.

D. Objectives

After the instruction, students can show gratitude for English (as God's gift) and for being able to use it to congratulate and compliment others and in the process of understanding, implementing, and analysing spoken and written information.

E. Materials

Congratulating expressions

- Congratulations on your success.
- Please accept my warmest congratulations.
- I'd like to congratulate you on…
- Etc.

Complimenting expressions

- "Excellent! You really did it well, Tina."   - "What a nice dress!"
- "That's nice, Anisa. I really like it."   - "Good job!"
- "It was great. I like it, thank you."   - Etc.

F. Model of instruction

- Scientific Approach
- Demonstration and Assignment Method

G. Learning Activities

Activity	Description	Time Allocation
Introduction	- Greetings, expressing gratitude to God, and praying before the lesson starts - Checking for students' attendance (reflecting discipline) - Asking questions on previous materials to start learning activities - Presenting pictures as a hook for the learning materials - Informing students of the objectives and expected competencies of the lesson	10 minutes
Core	**Observing, Questioning – COLLABORATION, CRITICAL THINKING, COMMUNICATION, AND CREATIVITY** - Students observe a model text (dialogue/ conversation) consisting of congratulating and complimenting expressions - Students read aloud a model dialogue consisting of congratulating and complimenting expressions - Students discuss the content of the model dialogue by answering questions as a group - Students, with teacher's guidance, answer the questions and identify the social functions, text structure, and language features of congratulating and complimenting expressions	65 minutes

Activity	Description	Time Allocation
	EXPLORATION – CRITICAL THINKING, COMMUNICATION AND CREATIVITY Students, with teacher's guidance, question other forms of congratulating and complimenting expressions in English. - Students discuss and work on incomplete dialogue consisting of congratulating and complimenting expressions - Students discuss and explore various expressions of congratulating and complimenting others that have been learned from various sources - Students write congratulating and complimenting expressions by also considering and practicing the expected attitudes or behaviours such as honesty, carefulness, tolerance, and respect - Students write a simple dialogue/ conversation consisting of congratulating and complimenting expressions in pairs - Students present a simple dialogue/ conversation consisting of congratulating and complimenting expressions they have created - Students state problems they have encountered if any	
Closing	1. Students and teacher conclude the lesson materials 2. Students reflect on the activities they have been involved in 3. Students and teacher plan a follow-up project for the next meeting 4. Teacher dismisses the class by greeting and giving the students compliments	15 minutes

H. Resources and Teaching Media

Resources:

1. Student's handbook
2. Functional Practice
3. Pathway to English

Media:

Texts consisting of the expressions of complimenting others and ways to respond to them.

I. Assessment

● Process assessment

No.	Assessed aspects	Assessing technique	Time of assessment	Instruments	Description
1.	Studiousness	Observation	Process	Observation Sheet	
2.	Respect	Observation	Process	Observation Sheet	
3.	Discipline	Observation	Process	Observation Sheet	
4.	Responsibility	Observation	Process	Observation Sheet	

● Result assessment

Indicators of Competence Achievement	Assessing technique	Form	Instruction
Write a dialogue using the expressions of congratulating and complimenting others and ways to respond to them	Written test	Essay	Write a dialogue using expressions of congratulations and complementing and their responses
Present a dialogue consisting of expressions of congratulating and complimenting others and ways to respond to them	Oral test	Role play	Role-play your dialogue in front of your class!

- Answer Key:

  No fixed answers

- Scoring Guidance

Scoring Aspects	Score
Expressing the expressions of giving compliments and ways to respond to them properly in a written dialogue	100
Using and perform proper intonation, pronunciation, and acting performance in practicing the dialogue	100
Maximum score	100
End result	

APPENDIX M

Fourteen Procedural Steps of Scientific Approach

The Scientific Approach may include some or all of the following "steps" in one form or another:

1) Observation

2) Defining a question or problem

3) Research

4) Planning

5) Evaluating current evidence

6) Forming a hypothesis

7) Prediction from the hypothesis (deductive reasoning)

8) Experimentation

9) Testing the hypothesis

10) Evaluation

11) Analysis

12) Peer review

13) Evaluation

14) Publication.

Source: McLelland, C. V. (2006). *The Nature of Science and the Scientific Method*. Boulder,

Colorado: Geological Society of America

SoE RESEARCH ETHICS FORM

Name:

Diah Restu Susanti

Proposed research project:

The Implementation of the Scientific Approach (SA) in Indonesian 2013 Curriculum for English as a Foreign Language (EFL) Classes and Its Influence on Students' Critical Thinking Development Processes: An In-Depth Case Study of An Indonesian State Senior High School

Proposed funder(s):

None

Discussant for ethics meeting:

Yuliati (PhD student at the research stage and also a practising teacher/lecturer)

Name of Supervisors:

Dr. Simon Brownhill and Prof. William Browne

Has your supervisor seen this submitted draft of your ethics application?

Yes

Please include an outline of the project or append a short (1 page) summary:

This research will investigate the implementation of the Scientific Approach (SA) in English as a Foreign Language (EFL) classrooms. This study is intended to contribute research on the implementation of the SA in the EFL context in relation to Indonesian 2013 Curriculum and its

influence on students' critical thinking development processes. The following research questions are proposed to drive the direction of the research:

1. How do EFL teachers implement the SA in their classes?
2. What challenges do EFL teacher experience when implementing the SA in EFL classes and how do they overcome the challenges?
3. How does the SA in EFL classes contribute to students' critical thinking development processes?

The research will be conducted in a state senior high school in Indonesia. The chosen research participants are as follows:

- All English teachers in the school (five in total) teaching at different grade levels (grades X, XI and XII),
- Students from the five classes (two classes of X grade, two classes of XI grade and one class of XII grade), and
- The school's Principal and Vice Principal for Curriculum Affairs.

With regard to the student participants, each class contains about 45 – 50 students with a range of ages (14-18 years old). Therefore, there will be up to 250 students potentially involved in the study. The number of classes and class majors in which the study will be conducted are determined by the five English teachers who will hopefully be the participants in my study.

The main data for this study will be gathered from classroom observations involving the five EFL teachers and their students. The purpose of conducting observations is to observe the implementation of the Scientific Approach (SA) in English as a Foreign Language (EFL) classrooms and its influence on students' critical thinking development processes. The observations will be conducted two or three times for each class, depending on the topic being discussed in the class and the amount of time needed to deliver and complete the lesson(s) related to that topic. One topic is usually discussed for two or three class meetings, with each class period lasting 90 minutes. I will use semi-structured observations as the type of classroom observation to be conducted in this study. Each observation will be audio-recorded, transcribed and analyzed against a predetermined rubric.

Additionally, semi-structured interviews will also be conducted in my study. The purpose of the semi-structured interviews is to investigate participants' understandings of the process of the SA implementation in teaching English based on the 2013 Curriculum. This means that the participants will have freedom to explore their answers based on the prepared questions they are asked. Individual, face-to-face interviews will be conducted with five EFL teachers, one Principal, and one Vice Principal. Furthermore, Focus Group Interviews (FGIs) will also be conducted with a total of 30 students from the five classes being observed. These 30 students will be comprised of two students (one male and one female) from each grade (A, B, and C) from each of the five classes. The 30 students will be selected by the help of their teachers. There will be five FGIs conducted in this research.

Furthermore, supporting documents (such as syllabi and EFL teachers' lesson plans) will be collected. The number of lesson plans collected will be based on the number of lessons observed in the different classrooms. These documents will be used as another essential source of data in addition to the observations and interviews to triangulate all of the collected data. The lesson plans will be analysed to determine whether they are in line with Indonesian 2013 Curriculum principles, which are written in the syllabi. The analysis of the lesson plans will cover the indicators, objectives, media and materials, teaching procedures (the SA's stages), teaching models, and learning assessment components (Kemendikbud/Permen No. 65/2013, 2013c). The use of the documents will be carried out with the consent and agreement of the teachers, and will be used for the purpose of the study.

Prior to the main data collection phase (classroom observations and interviews), a briefing will be undertaken for the participants (the teachers, the principal and the vice principal) in order to provide thorough information regarding the purpose of my study and the methods and procedures for how data will be collected. Since this study will involve a large number of students (about 250 students) and will require specific times and places to gather data from them, teachers in each of the five EFL classes will be asked to explain the information related to this study to the students. The participants (the teachers, the Principal and the Vice Principal) will also be asked to provide feedback on the results of the interview transcription, observation notes, and on the review of the report that will be undertaken during the process of collecting data (Mero-Jaffe, 2011). Based on this feedback, I will discuss this with my supervisor and explore

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how the data collection tools might need to be adapted if necessary to resolve any issues that may be identified during the process.

Furthermore, all participants will be given an Information Sheet, and if they agree to take part, they will be asked to sign the Consent Form. For any participant under the age of 17 (about 100-150 students), the parent/caregiver will sign the printed Consent Form after also receiving and reviewing the printed Information Sheet. They will be asked to sign the Consent Form if they agree to allow their child under the age of 17 to participate in this research.

Ethical issues discussed and decisions made:

In the discussion, the discussant and I went through some aspects provided in the ethical guidelines. The most relevant ethical issues are:

1. **Researcher Access/Exit:**

   To gain access to the chosen school, I will apply for formal permission with the education offices in the Province and in the Regency. The letter of permission will be sent to them on January 2019 or around a month before the piloting study, and one or two months before conducting the actual data collection for the dissertation which is planned to be conducted in July – September 2019. Once I get their permission to conduct research, I will contact the school principal and arrange a discussion/meeting with the Principal, the Vice Principal for Curriculum Affairs and the five English teachers as they will (hopefully) be the participants in my study. I will clearly explain the purpose of the study and what is expected from them verbally. I will also assure them that the meetings (times and venues) will work according to their availability. Immediately after these participants show a willingness to be involved in the study, a second briefing will be held in which they will receive the research Information Sheet and the informed Consent Form.

   After the data collection process is finished, I will thank the participants and remind them that they are free to contact me if they have any further questions or want to add anything to what they have said during the interviews. I will also conduct a verbal debriefing with

the participants (the English teachers, the principal and the vice principal for Curriculum Affairs). I will also make the written copy available if the participants want to see it.

Moreover, for the students who become the participants of my study, I will send them the debriefing sheet through electronic mail. The debriefing sheet will inform the participants about the purpose of my study and the results of the data collection. Debriefing will also done to thank the participants for their participation in my study, to increase the participants' understanding about the study in which they were involved, and to remove or protect the participants from any possible harmful effects that may have inadvertently come about due to their participation (https://www.wpi.edu/sites/default/files/docs/Departments-Programs/Social-Science-Policy-Studies/Debriefing.pdf). Furthermore, they will be given the opportunity to check the transcripts of their interviews once the transcripts have been completed. Finally, they will be asked if they want to receive a copy of the final report or the summary of the findings. I will send them copies of these documents through emails.

2. **Information Given to Participants**

First and foremost, it is essential to provide the participants with detailed information of the research, including the purpose, methods, and procedures, so that they have a clear understanding of the researcher's intentions and their own involvement in the study (Kirkby *et al*., 2012; Karbwang *et al*., 2018). The Information Sheet and Consent Form will further explain the ethical aspects of the research, and how the data collected in this study will be used.

All of this information will be conveyed during the meeting/briefing with the intended participants during my first visit to the school. The participants will also receive some of the following documents that will be used throughout the data collection phase. I anticipate that there might be some minor corrections or modifications to the data collection documents following the data collection pilot project and in the light of any significant points raised in the meeting/briefing. These documents are:

- Formal Permission Letter from the University
- Research Information Sheet
- Consent Form
- Observation Sheet
- Interview Sheet.

3. Participants Right of Withdrawal

Prior to the participants' involvement in the study, I will conduct an introductory meeting to explain the research objectives, the participants' role in the research, their rights as participants, and their right to withdraw at any point in the research without giving any reason and without consequence. To withdraw, a participant can directly inform me as the researcher about their withdrawal. Each participant also has the right to decline to answer any question, to take a break and/or to terminate the interview at any point he/she wishes. In the case of a participant withdrawal, I will not use the data taken from the withdrawn participant and will delete his/her data immediately.

4. Informed Consent

All participants who agree to take part in the research will be asked to sign the consent form. The consent forms will be also be given to the parents/caregivers of all students under the age of 17 who may be involved in this research. The parents/caregivers must provide written permission before their children are allowed to participate in the study. In the case of a parent/caregiver not granting permission for their child to participate, data will not be collected from their child nor will the child be included as a data source for the research. For further questions related to consent, parents/caregivers can contact the researcher and/or the designated contact for the school.

I will assure participants about the confidentiality of the data they provide and the protection of their identity through anonymity in all phases of the research. All identifying characteristics, such as the school's identity, participants' ethnic background, and gender will be changed (Sieber, 1992). For example, the names of participants will be replaced with pseudonyms (Teacher 1, Student 1 and so on). Addresses can be deleted

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from the files once they are no longer needed. This assurance of anonymity and confidentiality is intended to make participants feel comfortable in how they will be involved and portrayed in the research.

Participants who agree to participate in the research will be asked to sign the Consent Form to confirm in writing that they understand all information provided and related to the research.

5. **Complaint Procedure**

Any complaints or uncomfortable feelings which might be experienced by any participant during the research can be reported directly to the researcher and/or contact the researcher's supervisor. In the case of a participant being unable to use the English language to effectively convey their complaint, she/he can contact her/his English teacher who will hopefully be involved in the study to help her/him contact the researcher's supervisor. Below are the contact details of my research supervisor:

Dr. Simon Brownhill

simon.brownhill@bristol.ac.uk

Research Supervisor

University of Bristol - School of Education

35 Berkeley Square, Bristol, BS8 1 JA, UK.

6. **Safety and Well-being of Participants/Researchers**

This research involves interaction with the participants through classroom observations and data collection from interviews. Therefore, in each part of the process of data collection, all the participants involved in this study will decide on the timing and venue for their observations and interviews. However, for some interviews, the time of conducting the interviews will be suggested by the researcher because there is a certain need of when the interview will be conducted, time-wise. For example, for the teachers, the interviews will be conducted *before* the classroom observations with the reason that the teachers will be able to gain more knowledge about the purpose of the observation from the interview sessions. Meanwhile, for the students, the interview will be carried out

after the classroom observations so that they will not forget the points being discussed in the classrooms. However, if the schedule that the researcher suggests is not suitable/fits in with the participants' schedules, then the researcher will follow the participants' requests.

Before conducting the observations and interviews, I will clearly explain the purpose of the data collection (the observation and conducting the interviews) to the participants along with their role in the study and their right to skip any interview question or withdraw from the study at any point. I will also provide participants with the opportunity to ask any questions of me as the researcher and will ask them to communicate their feelings about their readiness to get involved in the research. Furthermore, during the interview, the participant can ask me to turn off the recorder, leave the interview, or not answer the question if she/he wishes. In addition, if a participant feels uncomfortable at any point, I will stop the interview with the person and arrange another time to continue the interview her/him or omit the question that led to the discomfort. I will continue the interview with the rest of the participants. In the case that all of the participants refuse to do the interview, then I will postpone the interview section and rearrange a time whenever they are ready to be interviewed. Furthermore, I will give a chance for the participants to check or edit the interview transcripts for accuracy purposes. If a participant does not want to do this, then the data will be used as the transcript stands.

7. **Anonymity and Confidentiality**

All information and responses gathered from this study will remain confidential. The name of the participants as well as the school's profile will be anonymised. At this point, I will make assurances of confidentiality, typically via consent form statements (see point 3) that states: "I am fully aware that a pseudonym will be used in the process of the study being undertaken and in its reporting so that my identity will be concealed". Moreover, all identifying characteristics, such as the school's identity, participants' ethnic background, and gender will be changed (Sieber, 1992). I will also present confidentiality agreements at the beginning of the data collection process. Conducting a discussion in a confidential way from the outset is also necessary to acquire informed consent and build

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trust with respondents (Crow *et al.*, 2006). In addition, confidentiality will be addressed during the data cleaning process. I will remove identifiers to create a "clean" data set. A clean data set will not contain information that identifies respondents, such as a name or grade (such identifying information might be stored elsewhere in separate, protected files). Some identifiers will be easily recognized and dealt with. For example, the names of participants will be replaced with pseudonyms. The chosen naming will be Teacher 1, Student 1 and so on. Addresses can be deleted from the file once they are no longer needed.

This procedure will be made very clear to all participants prior to obtaining written consent. All data collected, findings and results from this study will be kept confidential and password protected and will only be used for this study.

8. **Data Collection**

The main data of this research will be gathered from classroom observations. Classroom observation is chosen because it provides the opportunity to obtain real-life data from real educational settings. Other forms of data collection that will be done are interviews and document reviews. Data will be collected on observation sheets and via audio recordings. All data collected (taken from observations and interviews) for this research will be stored and analysed based on the principles set out in the Data Protection Act (2018) and in line with University regulations (see http://www.bristol.ac.uk/secretary/data-protection/). The observations and interviews will be audio-recorded and will be transcribed. The transcription is anticipated to take place one to two months after the observation and interview. The participants (the five English teachers and the 30 students who will be interviewed) will be given the opportunity to check their transcripts, and for the teachers they will also be given the opportunity to check the observation rubrics. Once the transcription is accepted, the audio recording will be deleted. Transcriptions will be saved on a computer drive which is secure and protected by a Password Protect facility for any files/documents saved in the drive. All the data will also be stored in the University's data storage server and on my personal computer – this will also be password protected.

9. **Data Analysis**

   In this research, the classroom observation data will be analysed using thematic analysis while data collected from the interviews will be analysed using content analysis. Furthermore, I will use document analysis to analyse any documents (syllabi and lesson plans) collected for this research, In analysing the classroom observation data and interview data, I will do the process of translation myself since most of the verbal language during the observation and interview will be in Bahasa Indonesia/Indonesian language. Certain unique linguistic phrases that might appear in Indonesian will be preserved and will be provided with the appropriate English translation. The result of the analysis will use pseudonyms in order to protect the participants' identity.

10. **Data Storage**

    All data will be saved in password-protected files on a personal computer. The names of participants will be kept anonymous. All data will be destroyed after the completion of this study so that the protection of participants can be maintained.

11. **Data Protection Act**

    The data gathered will be protected based on the Data Protection Act (2018). As such, participants will be informed that the data will only be used for the purpose of this research. They will also be informed that anonymised data from this research with also be used for academic activities related to this research such as seminars (proceedings) and publications. The results of this research will also be presented to the participants in the form of a dissertation report (soft files).

12. **Feedback**

    The participants will be given opportunities to provide feedback if they would like to. The first feedback from participants will come from their review of the transcriptions from their interviews. After seeing and reading the transcriptions of the interviews, the participants will be asked to provide feedback on the accuracy of the transcriptions. However, if they do not want to read and review the transcriptions, the data will be used as it stands. Another form of participant feedback is related to the results of the

observation rubrics and notes. In this case, the teachers will be allowed to see my rubrics and observation notes in order to check the relationship between the observed activities in the class and the rubrics report /notes. Furthermore, all participants involved in the study will be asked to review the report and provide their insights if necessary/appropriate.

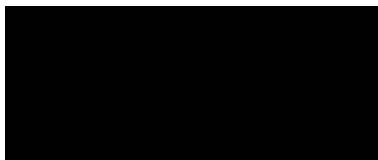## 13. Responsibilities to Colleagues/Academic Community

The University of Bristol's ethical regulations will be the guidelines for this research along with ethical rules in respect to professionalism and academic integrity for all stages of research. This research will be true and free of any bias or discrimination; it will also avoid any distortion. Furthermore, there will be no form of falsification, fabrication or plagiarism which violates ethics. This study will be conducted under the supervision with the researcher's supervisor, guided by the ethical considerations proposed by BERA (2018) and approved by the Ethics Research Board at UoB SoE.

14. Reporting of Research

Since this research is for my doctoral study at the University of Bristol, the results of this research will be presented to the University's Board of Examiners. I will work closely with my supervisor in completing this research. Dissemination of this study will be done through academic seminars and publications. In relation to these academic seminars and journal publications, the highest priority will be placed on the issue of respect and honesty in using the data from this research as well as maintaining the confidentiality and anonymity of the participants.
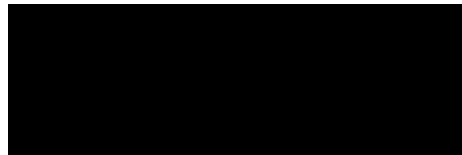
If you feel the need to discuss any further issues related to this research or to highlight difficulties, please contact the SoE's ethics coordinators who will suggest possible ways forward.

Signed: Diah Restu Susanti (researcher)   Signed: Yuliati Yuliati (discussant)

Date: 17 December 2018   Date: 17 December 2018

Approval Confirmation from RED

Email - Diah Restu Susanti - Outlook - Google Chrome

🔒 outlook.office.com/mail/deeplink?version=2020081704.10&popoutv2=1

↩ Reply all | ∨   🗑 Delete   ⊘ Junk   Block   ⋯

Ethics Online Tool: application signed off

R   Research Governance and Ethics Officer <Liam.McKervey@bri
stol.ac.uk>
Thu 03/01/2019 18:54
To: Diah Restu Susanti

Your online ethics application for your research project "The Implementation of the Scientific Approach (SA) in Indonesia's 2013 Curriculum for English as a Foreign Language (EFL) Classes and Its Influence on Students' Critical Thinking Development Processes: An In-Depth Case Study " has been granted ethical approval. Please ensure that any additional required approvals are in place before you undertake data collection, for example NHS R&D Trust approval, Research Governance Registration or Site Approval.

For your reference, details of your online ethics application can be found online here:

http://www.bristol.ac.uk/red/ethics-online-tool/applications/79989

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