THE EFFECTS OF GENRE-BASED TEACHING ON ENHANCEMENT OF THAI ENGINEERS' TECHNICAL WRITING ABILITY: A STUDY OF THAI IN AN INTERNATIONAL COMPANY

BY

MISS TANAPORN UEASIRIPHAN

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS IN ENGLISH LANGUAGE TEACHING
LANGUAGE INSTITUTE
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ENTITLED

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was approved as partial fulfillment of the requirements for
the degree of Master of Arts in English Language Teaching

on July 31, 2018

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Degree	Master of Arts
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Thesis Advisor	Associate Professor Supong Tangkiengsirisin, Ph.D.
Academic Years	2017

ABSTRACT

This paper aims at investigating the effects of a genre-based approach to teaching technical writing to Thai engineers with a focus on writing work instructions, and the attitudes of Thai engineers toward this genre-based writing. The lesson plan was evaluated for the appropriateness of teaching technical writing to Thai engineers. It was assessed by three experts to check its suitability for teaching. Learning achievements have been examined using a comparison of a pre and post-tests for ten engineers who are in the same discipline, yet have different backgrounds of English proficiency.

The learning outcomes were measured by the difference in scores between pre-test and post-test, and revealed that there was a significant difference between after teaching at p-value < .05 (p= 0.002) as indicated by their paired t-test analysis. Lastly, a satisfaction interview of the overall course has been conducted for four participants and showed that the engineers' attitudes were positive about the teaching method.

Keywords: Genre-based approach, Technical writing, Work Instructions, Thai engineers, Writing ability, Attitude

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to Assoc.Prof. Dr. Supong Tangkiengsirisin, my advisor, for his exemplary guidance, valuable feedback, and constant encouragement throughout this challenging thesis. His perceptive criticism kept me working to make this project in a much better way. Working under him was an extremely rewarding experience for me.

I would like to express my deepest appreciation Asst. Prof. Dr. Ketvalee Porkaew and Asst. Prof. Dr. Rosukhon Swatevacharkul, for serving as my committee members and for comments that greatly improved the manuscript.

I am also immensely grateful to Dr.Maneenun Rhurakvit at University of the Thai Chamber of Commerce, John Harry Pugh from the UK, Ian Stewart Briggs also from the UK who are Native English teachers, for their extraordinary support and their comments on my version of the evaluation form (Items Objective Congruence Index, IOC) the manuscript in this thesis process.

My gratitude also goes to all faculty members and staff, for the cooperation and given throughout my academic pursuits; in particular, including I would like to thank the Language Institute, Thammasat University, for financial support during this study.

This study would not have been possible without the cooperation of Fabrinet Co., Limited. I would also like to thank the engineers and colleagues who willingly were participants for providing me with useful information in this thesis, without which this research would be incomplete.

I would also like to give my sincere thanks to my colleagues who are Ms. Tirada Iamudom, Ms. Siriluck Pukdeyotin, Mr.Phongthep Kumarin, Ms.Pitchaya Sayan, Ms. Pimrat PhongChamnan, Ms. Sukanda Tongton and Mr. Punjapol Boonma

for their wonderful collaboration, they supported me greatly and were always willing to help me.

Special thanks also go to Dr. Dmitri Davidov who inspired me in my ability to study on ELT curriculum.

Lastly, I would like to thank my family who supported me throughout my MA study and inspired my strong determination to pursue my study at ELT, Language Institute, Thammasat University.

Miss Tanaporn Ueasiriphan

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LIST OF ABBREVIATIONS

Symbols/Abbreviations	Terms
ESP	English For Specific Purposes
GBA	Genre-Based Approach
SFL	Systemic Functional Linguistics
TLC	Teaching-Learning Cycle

CHAPTER 1
INTRODUCTION

In general, English language has influenced education in Thailand because the educational system of engineering institutes or university departments worldwide often use English as the common mode of learning and communication. Most of the engineering students focus on technical subject matter and they successfully carry on their technical subject studies without extra writing courses. When English language is taught to engineering students, it is considered as a field of English for Specific Purposes (ESP). This is one strategy to learn English, as it is employed with reference to specific vocabulary and skills to meet the needs of the learners and is centered not only on the language but also on discourse skill. English writing in engineering is often referred to as technical writing, which is any written form of writing including a variety of documents in technical field, engineering and science field, and related occupational field.

Technical writing deals with special knowledge of scientific and technological subject matter. Technical writing is important not only in the Engineering syllabus in the universities but also in real working life. Insufficient technical writing practice is given to the engineers who study engineering and technology in Thailand.

Technical writing skills are highly valuable. According to Silyn-Roberts (1998), writing English is one of the most required skills for engineers. In addition, Silyn-Roberts (1997 cited in Silyn Roberts, 1998) stated that on average engineers spend between 30% and 95% of their time on writing. For this reason, many experienced engineers reflected that when they were undergraduate engineering students, they did not spend enough time learning professional writing. Likewise, Beer (2005), stated that engineers spent over 40% of the working time on writing, and said the ability to write was one of the most crucial skills in an engineer's success. The engineering students need the knowledge of ESP to equip them well with the skills they need for their future careers. These days, undergraduate students of engineering colleges or universities are taught the technical subjects in English, using English text books, but are not taught English as a language. The lack of English communication abilities in English is the greatest struggle for newly graduated engineering students at the start of their working

life. In an increasingly technical world, the number of engineers is increasing correspondingly; the information technology revolution and globalization have brought technical communication to the fore. A government policy to promote better English training in academic institutes and industry is needed to support the expansion of international business which is facing large challenges in communication today. In this highly competitive environment, success depends not just on acquiring specialized analytical skills, problem solving skills and subject specific knowledge, but also on developing effective technical communication skills.

Therefore, engineers need to increase their English skills in order to be able to convey their message in English at an understandable level; this is one of the skills that will accelerate their career success, increase the chance of promotion or getting a good job, and subsequent promotions and therefore allow them to make more money.

Technical writers should create sentences that readers can easily comprehend, and they should place those sentences in context and in paragraphs. So individuals in technical fields should study significant amounts of both oral and written work and learn how to impart their ideas using a variety of structures, particularly shorter structures utilizing technical terms for the technical and more or extended structures for the non-technical. They can likewise help the non-technical people understand effectively the technical terms. If the writers being familiar with the terms can make the terms understandable, the work then becomes accessible to everyone. The correct interpretation of the term relies upon a reader's background knowledge of the subject being discussed; the non-specialists would be able to guess the meaning of a term from its context in the sentence. From this point of view, communication skills are not simply helpful, they are basic instruments for success, even survival, in real world situations.

The genre-based approach has been broadly adopted in language teaching and learning. In the 1980s, the genre approach gave increased attention to the notion that student writers could benefit from studying different types of written texts. Hyland (2004), stated that the concept of genre enables teachers to look beyond content, composing processes, and textual forms in order to better understand the ways that language patterns are used to accomplish coherent prose. Genre-based approaches emphasize that this higher order must be studied for effective language use. The rationale for applying a genre-based framework is that it facilitates clear links to

engineers' ability in specific writing beyond the writing classroom. Thus, the primary goal is to enable engineers to perform a broad range of specific purposes for technical writing in English, and to select specific genres based on the engineers' most immediate occupational needs.

1.1 STATEMENT OF PROBLEM

The system and characteristics of industry in Thailand are divided into two major categories. First, the brand owners produce the products on their own, under the label of their firm. Second, the contract manufacturer or CM, makes products under contract for other brand owner companies. These other brand owners do not produce on their own; instead, they pay a contract manufacturer to make their product, under the label or brand of the brand owner. The company where the author works is a contract manufacturer specializing in low or high volume production of a high mix of precision optical and electro-optical products. The brand owner's product designers provide the contract manufacturer with the product information, operating manuals, test specification and assembly knowhow in the form of work instructions. With the spread of globalization, Thailand plays an important role in Southeast Asia as a manufacturing hub, with the advantages of low labor cost, highly skilled labor and a convenient and modern land-, water- and air-transportation system. With these advantages, developed countries with advanced technology often choose to hire a company in Thailand to produce their products. In the current economic situation, the business environment has changed in a way that has become seriously competitive. Countries in the same region as Thailand in Southeast Asia are rapidly developing and becoming formidable competitors. Therefore, a company that is a contract manufacturer (CM) in Thailand must build trust with the Original Equipment Manufacturer (OEM) in order to win their business to carry out production. The contract manufacturer production companies must develop their competency in terms of both product quality and management. To be able to compete with other companies, the manufacturing company must find a strategy or system to develop their business. One of these strategies is mastering English. The increasing use of English language in an international organizations and businesses company has made the learning of English an essential activity to enable

effective communication within global companies. English is the official language of many countries. It is also widely used as the language of science and technology, international business and trading and, increasingly, even education.

The aim of this research is to evaluate the effectiveness of a particular pedagogic method to teach some engineers the principles of good scientific writing and to encourage them to apply these principles in their daily work. The engineers all work at a contract manufacturer in the field of high-precision optical manufacturing. With increasing job competition from English-speaking engineers from the Philippines and India, Thai engineers have to quickly improve their technical writing ability which is the main language feature in dealing with writing assignments. Specifically, they do not know the pattern of language use and how to write work instructions.

The researcher observed that process engineers, whose job description includes writing work instructions, spent excessive time struggling with the task. If production starts before the engineer has written the work instructions, the operators then have to decide for themselves how to assemble a product. Each operator has a different work experience, different knowledge and a different level of skill; therefore, when an operator is given freedom to interpret the assembly process individually, product variation is the result. This variation affects the quality and reliability of the product, leading to rework and scrap and an increased risk of field failures. As a result, the company will lose money and reputation and possibly even lose their customer. The larger the manufacturing company, the more assembly operators there are and the more variation that can work its way into the production line. Having work instructions is the key to minimizing variation, allowing manufacturers to improve product and process quality. The key purpose of the work instructions is to eliminate confusion and ambiguity during specific assembly operations.

Many new engineers do not know how to write effectively, nor do they have the knowledge of the components and tools and equipment. Furthermore, they do not know the characteristics of good work instructions, including the appropriate language to use; vocabulary, sentence structure etc. When new engineers start work, they often find that the actual production process does not match the description in the existing work instructions. This makes training new engineers very difficult –and often their first job is to re-write the work instructions, something they are not yet qualified to do. A product

comprises many single parts, and these parts are added to the semi-finished product as it moves from workstation to workstation in a fixed sequence until it comes to the end of the production line as a finished product. Each step of the assembly process needs to be described in a work instruction for the operator to follow, using words and pictures to specify work steps, images, key points, tools required, parts required and other necessary information. All work instructions must contain up-to-date visuals for every model and option configuration. After having been written initially, work instructions are often updated by integrating feedback from people on the shop floor actually doing the work in the spirit of continuous improvement.

The importance of having good work instructions, and the inability of many Thai process engineers to write good work instructions, makes this an ideal topic for a study into how to teach engineers this skill. The researcher decided to use the genre-based approach to teach the engineers this technical writing skill, and to evaluate its effectiveness by comparing documents written before and after training. Furthermore, the researcher investigated the attitudes of Thai engineers towards using the genre-based teaching approach to writing work instructions.

The genre-based approach is able to encourage engineers to comprehend writing as a tool that they can utilize, and to realize how to manage the content in order to promote logical hierarchy. This genre has its own structural quality complying with communicative purposes. M Rahman (2011) mentioned that the genre approach is a very useful tool, for the reason that it combines the two properties of functional language and formal language in writing instructions, and it acknowledges that there are influential connections between them.

1.2 OBJECTIVES OF THE STUDY

To this end, the study aims to investigate the two following points:

1.2.1 The effects of the genre-based writing approach on technical writing ability with a focus on work instructions writing among Thai engineers

1.2.2 The attitudes of Thai engineers toward genre-based writing approach to write works instruction.

1.3 RESEARCH QUESTIONS AND HYPOTHESIS

Based on the above objective the following research questions are suggested:

1.3.1 What effects does the genre-based writing approach have on Thai-engineers' work instructions writing?

1.3.2 What are Thai engineers' attitudes towards the genre-based approach to learning to write work instructions?

Based on the above questions the following hypotheses are suggested:

1.3.3 There is no significant effect on Thai engineers' ability to write good work instructions after undergoing a genre-based instruction approach
(Null hypothesis H_0: $\mu 1-\mu 2 \leq 0$).

1.3.4 There is a significant effect on Thai engineers' ability to write good work instructions after undergoing a genre-based instruction approach (Alternative hypothesis (Alternative hypothesis H_A: $\mu 1-\mu 2 > 0$).

1.4 DEFINITION OF TERMS

Definitions of the terms of this research are the following:

1.4.1 Technical writing: "specialized genres of writing that occur in technical fields, such as computer science, engineering or mechanics". (Richards & Schmidts, 2010, p.590). In this study, technical writing refers to writing work instruction documents.

1.4.2 Work Instructions: documents that describe in sufficient detail how exactly to perform each step of the production of a particular product, including descriptions of the tools and methods to be used and the measurement pass/fail limits.

1.4.3 Thai engineers: the process engineers who work in an international company in Thailand.

1.4.4 Genre-based approach: an approach to the teaching of the English language as a framework for language instruction based totally on examples of a particular genre (Richards & Schmidts, 2010, p.245)

1.4.5 Writing ability: a skill, talent, or proficiency in writing area to perform writing tasks for a given purpose, satisfy a given discourse community with regard to the structure and content of the discourse, and communicate functionally.

1.4.6 Attitude: an expression of person's reaction (positive or negative feelings) to reflect impressions towards the genre-based writing approach.

1.5 SCOPE OF THE STUDY

The researcher conducted a pre-test on how to write work instructions with 10 Thai engineers who are responsible for product assembly and product testing. The pre-test was scored using a Technical Instruction Writing Rubric. In this study, the researcher designed and taught the course on how to write work instructions following a genre-based approach method. The teaching materials were prepared in a way to conform to the procedures carried out during class instruction. After 8 weeks training, a post-test was administered using the same rubric, to investigate the improvement of technical writing. After collecting the data, the post-test scores was compared to the pre-test scores and the results was analyzed. Interviews of the attitude of those engineers towards a genre-based approach was conducted after the course. The independent variable was the genre-based approach. The dependent variables were writing ability and attitudes.

1.6 SIGNIFICANCE OF THE STUDY

This study is primarily aimed at knowing what effects the genre-based writing approach have on Thai-engineers' work instructions writing ability, as well as finding the attitudes of Thai engineers' towards the genre-based writing approach. The potential value of the findings will greatly benefit a large group of engineers as follows:

1.6.1 Training of new engineers. Work instructions that are well written by experienced engineers can serve as a training tool for new employees.

1.6.2 This new employee training will be beneficial for engineers to use the knowledge after training to develop a great work instruction competence.

1.6.3 The training will help engineers to understand the basic elements relative to an effective work instruction and how to write a work instruction to give maximum transfer of information.

1.6.4 The training will reflect impressions or attitudes towards the designed teaching approach

1.7 ORGANIZATION OF THE STUDY

Five chapters have formed this research.

Five chapters have formed this research.

Chapter one begins with an Introduction which consists of background and a statement of the problems. It also provides the objectives of this research, how the research questions comply with the objectives, definition of terms of this research, scope of the study, and the significance of the study.

Chapter two or the Review of Literature provides assumptions of genre theory, followed by a description of a set of genre studies relevant to the current study.

Chapter three explains the methods that have been used for conducting the research and the analysis of the data used in this study. It also demonstrates how the data are collected.

Chapter four or Data Analysis provides the results and detailed discussion of the findings of the study.

Chapter five is conclusions and recommendations, and summarizes the research findings and indicates the pedagogical implications of the findings. Limitations and recommendations for further research are included and conclusions are also considered in the last chapter.

CHAPTER 2
REVIEW OF LITERATURE

The researcher studied the theoretical underpinnings of the genre-based theory and reviewed the relevant published studies in order to define the background and scope of this research. The chapter begins with an overview of the different concepts of three genre theories in order to create a theoretical framework for the existing research. These theories are essentially three different perspectives; namely, the systemic functional linguistics (SFL) genre which focuses on the function and structure of a language; the new rhetoric (NR) genre which focuses on the outcomes in social contexts; and the English for Specific Purposes (ESP) genre studies which focuses on the communicative needs of a particular professional discipline. These theoretical perspectives are analyzed as complementary rather than contradictory in terms of analyzing the genre theories in this research. Sample genres include various texts, and follow the concept of genre-based approach and the Teaching-Learning Cycle. Moreover, the three perspectives cover the general concept of Technical writing, the importance of writing, its components, the steps in writing and the characteristics of good technical instruction writing.

2.1 Genre

In the 20th century, genre began to be used notably in academic discourse and discourse linked to professional and commercial life, not only in non-literary discourse (Nunan 1993; Derewianka 2003; Christie 2008). Genres refer to more specific classes of texts. Genre is a particular type used to explain spoken or written text types on the basis of external criteria; for example, the text that is produced by particular person for a specific reason and target audience, and in a particular context. Examples of genres are newspaper articles, research reports, essays, lectures and personal letters.

Swales (1990) and Martin (1984), as cited in Kay and Dudley-Evans 1998 state that “some genres control a set of communicative purposes within certain discourse community and that each genre has its own structural quality according to those communicative purposes.” Hence, writing should be identified as communicative

purposes and structural knowledge when used in the classroom writing. In genre analysis, genre becomes disengaged from art and refers to any type of communication. In addition, Swales (1990) investigated academic genres (primarily research articles), for example, and described genre meaning as follows:

"A genre comprises a class of communicative events, the members of which share some set of communicative purposes. These purposes are recognized by the expert members of the parent discourse community and thereby constitute the rationale for the genre. This rationale shapes the schematic structure of the discourse and influences and constrains choice of content and style. Communicative purpose is both a privileged criterion and one that operates to keep the scope of a genre as here conceived narrowly focused on comparable rhetorical action. In addition to purpose, exemplars of a genre exhibit various patterns of similarity in terms of structure, style, content and intended audience. If all high probability expectations are realized, the exemplar will be viewed as prototypical by the parent discourse community. The genre names inherited and produced by discourse communities and imported by others constitute valuable ethnographic communication, but typically need further validation".

Bhatia (1993), more interested in business and legal genre, in additional summarized a number of the common ground of genre definition as below.

"Genre is a recognizable communicative events characterized by a set of communicative purposes identified and mutually understood by members of the professional or academic community in which they regularly occur."

"Genres are highly structured and conventionalized communicative event. Specialist members of a particular professional community will have a much greater knowledge and understanding of the use and exploitation of genres than those who are apprentices, new members or outsiders."

"Various genres display with constraints on allowable contributions not only in terms of the intentions, positioning to give expression to and the form they often take, but also in terms of the lexico-grammatical resources one can employ to give discoursal values to such formal features."

"Although genres are viewed as conventionalized constructs, expert members of the disciplinary and professional communities often exploit generic resources to

express not only ‘private’ intentions but also organizational intentions within the constructs of ‘socially recognized communicative purposes’.”

Genre is a particular communicative purpose using structural knowledge of linguistic and discourse in disciplinary and organizational cultures, and it apparently focuses on social situations embedded within disciplinary, professional and other institutional practices. All disciplinary- professional genres have certain standardized practices within the boundaries of a particular genre and have an integrity of their own, which are frequently recognized with regards to a combination of textual, discursive and contextual elements

In accordance with this, Dudley-Evans and John (1998) stated that the knowledge of genre is an important factor in the sort of communication found in texts of academic writing. They believed that knowledge of genre imposes an understanding of the expectations of the discourse community that reads the text due to the conventions that have been gradually generated about the schematic structure, the language use, and the rhetoric of genre.

Henry and Roseberry (2001:154) described “genre as a series of movements”. To extend the definition of movements is that "a move can be thought of as part of a text, written or spoken, which achieves a particular communicative purpose within the text. The move contributes in some way to fulfilling the overall purpose of the genre".

2.2 Genre-based approach

In the 1980s the genre approach became popular along with the notion that student writers could benefit from studying different types of written texts. The perspective of genre has been interesting in both first and second language education in many areas of the world and in different sectors of education, including the teaching of English for Specific Purposes (ESP) in North American colleges and universities, primary and secondary school teaching and learning in Australia, and teaching English in the school; Gibbons 2002; Hyland 2003a; Cheng, A 2006). It is considered to help English writing to develop through insights into the context where the text is embedded and functioning. However, the success of the genre approach is to show learners how different disciplines need different structures. Furthermore, introducing authentic

textbooks or materials enhances learner engagement and relevance to the writing process.

2.2.1 Genre based writing teaching: three traditions of genre theories

The goal of the genre approach to teach writing, is to make the writer aware of the context and the readers. Factors of location, purposes of study and different perspectives on genre, however, divide genre theories into three traditions comprising the Australian work of Systemic Functional Linguistics (SFL, genre as social purpose), the New Rhetoric (NR, genre as situates action), and English for Specific Purposes (ESP, genre as professional competence). Definitions and implications of genre vary across these traditions.

2.2.1.1 Systemic Functional Linguistics

Systemic functional Linguistics is one of genre-based approach which is known in the United States as the ‘‘Sydney School,’’ of genre studies. Hyon (1996) called it this because linguists and instructors from the University of Sydney in Australia implemented it in courses for adult immigrants and pre-university learners and it originated from Michael Halliday’s SFL (Hyland, 2007). This theory implies that genre is text-type or textual orientation which has consistent pattern and certain social purposes. Halliday (1994); Halliday & Hasan (1989), the linguists, developed this model of genre in order to create a genre-based pedagogy based on the work of systemic functional linguists. Halliday’s notion of Systemic functional linguistics is “ a set of systems which offers the writer/speaker choices in creating meanings in social context is wider than most linguistic theories as it is considered language primarily as a resource for making meaning rather than as a set of rules for ordering grammatical forms.” (Hyland, 2004:25). As cited in Hyland, (2004:25), genre is defined as “a stage, goal oriented social process” (Martin, 1992, p. 505) in spoken and written language. Genre in SFL can be described as “a staged, goal-orientated, and purposeful social activity that people engage in as members of their culture” and emphasizes the purpose and character order of different types of links between language and context in a systematic way (Martin, 1992, p.505). The SFL approach to the genre concept arose from observations of how language is used in different situations. For example, there are

observable differences in the rhetorical patterns in recounts, procedures, narratives, descriptions, reports, explanations, and expositions. These are sometimes called ‘elements of genres’, and two or more elements can combine to form a 'macro' (Martin, 1992). In this way, an element of genre (a procedure, for example) might be used in an essay, lab report, instruction manual or recipe, whereas a macro genre (such as an editorial in a newspaper), could employ more than one genre element (exposition, discussion and rebuttal, for instance).

	A procedure	**A Report**
Purpose	Tells how to do something	Informs reader about something
Structure	Goal-materials required-steps needed	Identifying statement--description
Grammar	imperatives, action verbs, describing words, adverbials to express details of time, place,& manner, connectives and sequencers	general nouns, relating verbs, action verbs, timeless present tense, topic sentences to organize bundles of information

Table 2.1. Identification of features for procedures and reports at elementary level (As cited in K. Hyland (2007), *Journal of Second Language Writing 16*, pp.148–164)

As shown in Table 2.1, learners need to be aware of how, within a genre, certain linguistic features are used to achieve a given purpose in social communication. Once teachers understand a genre's elements, they can give explicit writing rules to their students to make their writing appear authentic and suitable for their readership

Halliday (1978) addresses how his notion of context of situation is used to explain what we expect to find in a text, and why certain things are said or written the way they are on a particular occasion. This includes the option for creating meanings and contributes to what we perceive as coherence. A particular context and text are connected by two levels: register and genre. The connection of text and context to determine the choice of register is influenced by three contextual variables: the field (topic of language) of discourse, which defines the kind of social activity taking place, which people are involved and what the text is about; the tenor (community

relationship) of discourse, the relationships of the participants' interaction in a social situation which refers to who are taking part in the activity, people's status-role relationship, how often they contact and the speech roles they assume in the negotiations; and the mode (the organization of text) of discourse, the role of language which refers to the channel of communication, and the symbolic organization of the text in terms of status and functions in the context. A functional model uses the concepts of field, tenor and mode to describe how a text makes meaning within the context of a particular situation in social contexts. These are the three features of the situation which influence the way language is used in the text.

This concept of genre indicates that texts are culturally understood as purposeful, social processes. Genres provide opportunities for choices in language use which serve social communicative purposes. As a result, language users select one genre among various perspectives in a particular context in response to particular social purposes in regard to field, tenor and mode, which motivate particular language choices within the language system at the level of grammar and lexis. For analysis, SFL scholars use a Hallidayan scheme of linguistic analysis (Hyon 1996). The SFL model of language in context is shown in Figure 2.1.

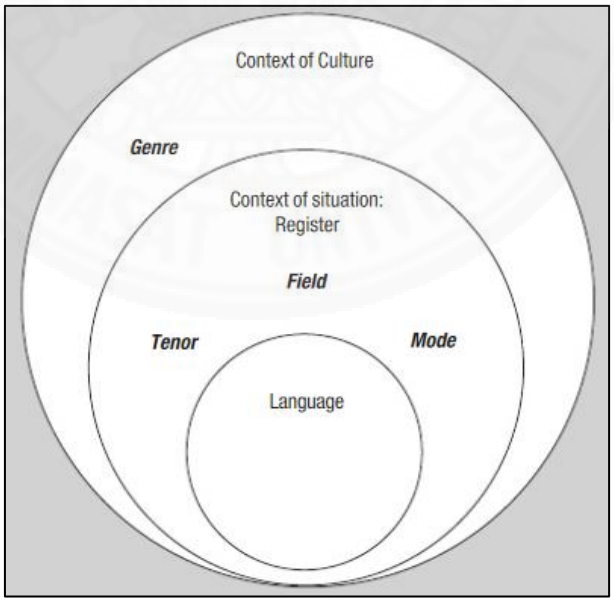

Figure 2.1. A functional model of language (Halliday M.A.K. & Martin 1993)

According to Halliday, the context of situation, however, is only a part of the functional model of language in which texts are constructed. There is a broader context that is the context of culture, in which the texts are to be interpreted. Genres are considered not only patterns of texts, but also the situational and cultural contexts where a particular genre occurs.

2.2.1.2 The New Rhetoric

The second main point about genre differs from SFL. Not only of what a genre is and how it should be studied, but also the value of genre in the writing class. Genre studies in the new rhetoric focus less on features of the text and more on relations between text and context often by employing ethnographic research or case study methods. New rhetoric view is influenced by post structuralism and first language composition theories rather than second language acquisition theories, and is based on ethnographic, rather than linguistic perspectives (Hyland, 2004; Hyon, 1996). The definition and concept of genre in the "new rhetoric school" (NR), a specific group of North American theorists (e.g., Freedman & Medway, 1994; Miller, 1984), were implemented to examine language convention and regularities which are much more "flexible, plastic, and free" (Bakhtin, 1986, p. 79), because they focus on the dynamic quality of genres and the periodic and accurate communication which one converses with in the forms and patterns used within a community. The Genre-based studies are open to individual interpretation, as the language is much less rigid than in the other two perspectives, and the researcher has to 'freeze' the language in order to study it by using a "stabilized-for-now" form of action. This means that the textual orientation is an element in a discourse study, whereas a social action that is "centered not on the substance or the form of the discourse but on the action it is used to accomplish" (Miller, 1994, p. 24) (Hyland, 2004, p.35).

Studies of genre applied Bakhtin's recognition theory (1986) of dialogue with postmodern social and literary scheme in the L1 context (e.g. Freeman & Medway, 1994). Therefore, scholars in NR focus on the outcomes of the genre in social contexts and consider why people produce language differently in related situations (Hyland, 2004; Johns, 2002; Swales, 1990).

Many researchers in the field of new rhetoric have adopted ethnographic rather than linguistic methods for providing descriptions of the contexts surrounding genres and the actions they perform within these contexts. These studies include Myers' (1990) study of the writing of scientific articles. The New rhetoric sees genres as only guiding frameworks or rhetorical strategies rather than as recurring linguistic structures. Freedman and Adam (2000) argue that genres in the classroom are mere artifacts for the purpose of study in an inauthentic context and classroom genres are different from those in real world contexts in term of goals, roles, learning method, and types of evaluation they engender. NR assumes that genres can only be taught if they are static, as it would make no sense to teach flexible entities that are inconstantly subject to change and reshaping by individual users. Thus, genres cannot be transferred to the writing classroom because this seeks to make solid what is actually shifting and variable (as cited in Hyland, 2004, p.39). In consequence of this concept, NR studies have less influence on teaching and learning in the classroom (Hammond & Derewianka 2001, p.191). Likewise, the New Rhetoric approach emphasizes a consideration of what kinds of social contexts produce a particular genre in order to increase the efficacy of the genre approach.

2.2.1.3 English for Specific Purposes

Genre is interesting for many researchers in English for specific Purposes (ESP) as a tool for understanding and teaching the kinds of writing required of non-native English speakers in academic and professional contexts. The competence to function in a range of written genres is a central concern for additional language learners, as it influences their access to career opportunities, positive identities, and life choices. In consequence of this concept, ESP investigates how a text's structure is influenced by the constraints imposed on the writer by the rules of academic or scientific writing or business communication conventions, and how these structures can be taught (Hyland 2004:43). ESP research is interested in the communicative needs of particular academic and professional groups and what it is those groups use writing to do. Genres are the purposive social action routinely used and recognized by community to achieve a particular purpose, written for particular audience and employed in particular context (Hyland 2004:45).

The relations between communities and genres are described in 'English for Specific Purposes (ESP)' proposed by Swales. Swales (1990) proposes genre as a class of communicative events with some shared set of communicative purposes. These purposes are recognized by members of the professional or academic community in which the genre occurs, and thereby constitute the rationale for the genre. This definition is extremely influential in ESP work on genre analysis. SFL and ESP traditions of genre studies put much emphasis on identifying structural elements in texts and make statements about the patterning of these elements.

Following Swale's study on genre analysis (1990), the notion of the ESP genre approach has often been identified and explored by researchers who are interested in genre as a tool for teaching discipline-specific writing to L2 learners (Cheng, 2006; Johns, 2003; Kay & Dudley-Evans, 1998; Swales, 1990). According to Paltridge (2007, p. 932), Swales accepts that a genre may have multiple purposes and its characteristics can vary owing to participant involvement. In addition, like the NR proponents, ESP scholars assert that genres are not static, but change over time in response to particular community needs.

ESP theorists have shown their commitment to developing research-based language education through the analysis of the constraints of social contexts on language use in academic and professional settings, and the ways learners gain control over these. ESP focuses on identifying the key features of genres employed in both academic settings written genres (e.g., research articles, conference abstracts, book reviews, grant proposals, undergraduate essays, PhD dissertations, text book and reprint requests), and professional settings written genres (e.g., direct mail letters, business faxes, engineering reports, legal cases and briefs, e-mail memos, company annual reports, charity donation requests and letters of recommendation). The importance of genre knowledge in helping language learners to understand and master academic, professional or educational discourse has widely been acknowledged for over two decades (Swales, 2004). Swales was primarily interested in written texts such as research articles, academic essays and the like, all of which were important especially for ESL students (Christie 2008, p. 30).

ESP considers genre as a tool for analyzing and teaching language. The genre analysis framework developed by Swales (1990) divides a text into elements or stages

called “moves” which are geared towards a particular communicative purpose. In ESP genre analysis, discourse structures are described as a series of moves. Each move is a distinctive communicative act designed to achieve one main communicative function and can be further subdivided into several “steps”. Drawing on Swales move-analysis framework, ESP proponents have identified various discipline-specific genres and analyses which also shed light on the discipline and associated pedagogies (Cheng, An 2007)

Genre analysis in ESP is often associated with the kind of move analysis by John Swales (1990). When it comes to genre analysis, much of this work focuses on textual or structural analysis. This approach describes communicative purposes expressed in stages or sequenced manner, a text being built up systematically through a series of what are called moves and steps. The kinds of analyses of text structures have proved useful in L2 writing teaching by encouraging awareness of students to express certain purposes. Moreover, ESP studies have identified the main features of particular genres. McKenna (1997) show that engineering reports are dominated by sentence subjects that refer to real world entities and processes as analytical concepts:

The alarm sensors operate on …

Composting may be an appropriate…

Bracing systems allow us to…

These approaches to the analysis of genres have much in common, with considerable overlap, even though they deal with different issues and sometimes have different theoretical concerns.

2.2.2 Advantage of GBA writing teaching

Genre pedagogies pull together language, content and contexts which offer real benefits for learners. Hyland (2004, p.10-11) summarized some of the main advantages of Genre-Based Writing Instruction as follows. Genre teaching is:

Explicit: Makes clear what is to be learnt to facilitate the acquisition of writing skills.

Systematic: Provides a coherent framework for focusing on both language and contexts.

Needs-based: Ensures that course objectives and content are derived from

students' needs.

Supportive: Gives teachers a central role in scaffolding students' learning and creativity.

Empowering: Provides access to the patterns and possibilities of variation in valued texts.

Critical: Provides the resources for students to understand and challenge valued discourses.

Consciousness-raising: Increases teachers' awareness of texts to confidently advise students on writing.

2.2.3 Genre and writing instruction

For writing, teachers need to concentrate carefully on the role of genres in L2 writing instruction carefully both during the course and during the course. There are a number of principles supporting a genre-based approach which address syllabus target and teaching methodologies (Hyland, 2004, p.87). These key principles are:

2.2.3.1. Writing is a social activity

This is a key to genre-based writing teaching. Communication has a purpose, a social context, and a targeted audience, and these perspectives form the basis of both writing tasks and syllabuses. Engineers need different writing experiences in order to describe texts, analyze texts and examine the objectives of writing to meet the needs of their readers.

2.2.3.2. Learning to write is needs-oriented

Good teachers recognize not only the wants, prior learning, and current proficiencies of their students, but also their aspirations. In a genre-based course, teachers show the students how to identify the context, and show them the appropriate style of writing for that context.

2.2.3.3. Learning to write requires explicit outcomes and expectations

Learning will happen effectively if the teacher is clear about why the students are studying and what to expect the students to be able to do at the end of the course. The knowledge and skills should be listed, in what Bernstein (1990, p. 73) calls a ''visible pedagogy''. Teachers have to work with the students to define what should

be taught, how the students should be assessed and then provide the knowledge to achieve the outcomes.

2.2.3.4. Learning to write is a social activity

The learner is seen as a social constructor of knowledge. Learning to write needs to be supported within familiar routines and by linking new ideas to what students already know. Teaching is, therefore, a series of scaffolded developmental steps in which teachers and peers play major roles.

2.2.3.5. Learning to write involves learning to use language

Genre based teaching involves being explicit about how texts are grammatically patterned, but grammar is integrated into the exploration of texts and contexts rather than taught as a discrete component. This helps students not only understand how grammar and vocabulary choices create meanings, but also develop an understanding how language works, acquiring a vocabulary about language in context.

2.2.4 Approach to genre analysis

Approaching unfamiliar genres in any discipline may be a problem for those who do not have relevant background experience. One first needs to consider the purpose of the analysis, the aspect of the genre intended to be emphasized and the basic knowledge of the characteristics of the genre to be investigated. Bhatia (1993) suggested to analyze unfamiliar genres by considering the framework with seven steps as follows (1) placing the given genre-text in a situational context, (2) surveying existing literature, (3) refining the situational / contextual analysis, (4) selecting corpus, (5) Studying the Institutional Context, (6) Levels of Linguistic Analysis and (7) Specialist Information in Genre Analysis.

2.2.4.1. Placing the given genre-text in a situational context

Intuition is the key concept for investigating any genre. The genre-text needs to be placed first. The reader should try to determine the contextual situation without any input other than the text itself. Bhatia (1993) discusses three aspects according to their previous experience: analysis; the internal clues in the text; and the encyclopedic knowledge of the world. People who are part of the discourse community have more ability to do this initial analysis and produce the genre-text than people who do not, because they have more background knowledge.

In this study, the researcher's background and previous knowledge of engineering provided the situational context for genre-text analysis. The genre belongs to the community of professional engineers and production operators. The common understanding of the genre within this specific group allows the writers to communicate easily with their readers. Hence, basically, genre is a part of the professional community that people who work within a specific discipline will be enabled to acknowledge better, compared to people who don't work within a specific discipline. Bhatia (1993:22) supported that "this will accommodate the understanding of why the genre is conventionally written the way it is, and why it is used in the specific area of activity to which the genre belongs". He further stated, "This kind of knowledge is greater in those people who professionally belong to the community which habitually makes use of the specific genre". However, surveying existing literature is required for those who do not possess the knowledge.

2.2.4.2. Surveying existing literature

Many studies have used specific genre-texts from different professional settings, thus creating an accumulation of literature. According to Bhatia (1993), the reviewed literature includes: linguistics analyses of a specific or related genre; a description of the relevant tools, methods and theories used in genre analysis; and guidelines for authors relevant to the speech community being addressed. The description of each genre includes the social structure, interactions, history, beliefs, goals, etc. of the community which uses it.

For this study, the literature reviewed included studies by Bhatia (1993) conducted on work instructions writing. The study applied the approaches of Bhatia and Lassen (2012), who analyzed the moves and steps of work instructions.

2.2.4.3. Refining the situational /contextual analysis

Basically, explaining what is known about the text can be part of the analysis. According to Bhatia, complying with the basics of steps 1 and 2, above, needs a slightly more technical level of analysis. After the genre-text has been placed into a situational and contextual boundary, Bhatia stated four theme discussions which are needed to further improve understanding of the interrelated professional community. These four themes are: defining the author of the text, and their audience's targets;

defining the historical, socio-cultural, philosophical and/or occupational placement of the community in which the discourse takes place; identifying the genre's background network of surrounding texts and linguistic traditions; identifying the topic/subject/extra-textual reality which the text is trying to represent, change or use and the relationship of the text to that reality." (Bhatia, 1993: 23)

For the purpose of this analysis, the text authors are defined as process engineers. These engineers are employed by a manufacturing company whose concern is to encourage safe and repeatable working practices. The engineers are involved directly in writing the work instructions. The discourse takes place around the instructions which the operators have to read, understand and follow precisely. Consequently, the relationship of the text to reality is in the form of correctly assembled products.

2.2.4.4. Selecting Corpus

Bhatia stressed the importance of selecting the right kind and size of corpus and to consider the following three criteria when making the selection. Firstly, the researcher has to identify the relevant genre or sub-genre, define it and characterize it thoroughly so as to distinguish it from similar genres. The genre should be chosen for its communicative purpose within the situational context. The intention is to avoid any confusion which might arise from choosing the wrong genre. Unless the genre is well defined from the beginning, the analyst may confront a problem while analyzing the selected text such as the text corpus being too narrow or too broad (Bhatia, 1993: 23). Secondly, Bhatia clearly stated the criteria for selecting a corpus in order to decide which corpus a text belongs to. Following his guidelines, the genre used in the present analysis was found to belong to the written communicative events corpus, specifically, within the engineering discourse. Thirdly, on the selection of corpus, Bhatia (1993:24) argued that the researcher should "decide one's criteria for an adequate selection of the corpus for one's specific purpose(s)". Typically, the selection of corpus will depend on the aim of the analysis. Bhatia advises selecting different types of text randomly, or texts based on the level of analysis, which may be more detailed.

2.2.4.5. Studying institutional context

Bhatia suggests studying the institutional context, i.e. the linguistic, social, cultural, academic and professional rules and conventions in which the genre is

being used. He states that it may be relevant to study certain institutional contexts, since some particular organizations may have unique genre conventions. Evidently, every social, professional or organizational context will have a degree of influence on the text-genres they use. People follow these conventions often without being aware that they are communicating in a specific way. The genre analyst needs to define these conventions in order to make a thorough investigation. (Bhatia, 1993: 24) Knowledge of the specific context and environment in question will always help the analyst to understand the genre and its conventions.

2.2.4.6. Levels of linguistic analysis

In order to carry out an appropriate analysis, the genre analyst has to decide at which level(s) of linguistic analysis significant features of language occur. The linguistic analysis can be focused by analyzing such as grammatical features, or textualisation, or structural interpretation of the text-genre. The following section describes these three levels in more detail.

Level 1 is an analysis of Lexico-grammatical Features.

This analysis focuses on specific features of language that are predominantly used in the genre that the texts belong to. It involves a corpus-based sample of texts and is quantitative in nature. Bhatia makes two essential observations. Firstly, the analysis of lexico grammatical features is very useful in determining whether and how a given particular genre includes the expected features. Secondly, and on the other hand, the analysis of a lexico-grammatical feature does not cover all aspects of a given genre. Hence, to respond to all questions about a given particular genre-text, it must be analyzed at different levels.

Level 2: Analysis of Text-patterning or Textualisation

Bhatia explains the linguistic analysis of a genre should focus on how various tactical aspects of language are assigned and restricted by the way members of a particular discourse community use the language. Swales (1974) studied the function of past-participles in the pre- and post- modifying noun phrase positions in chemistry textbooks. The conclusion is that pre-modifying –en participles (e.g. given) had two different uses depending on whether they occur in contexts where the author of the text is generalizing or exemplifying. It is an example of how a specific linguistic feature is an aspect of a given particular genre. Another example is noun phrases used

in technology and scientific writing. The noun phrase that appears at the beginning of the article may not be as concise as the noun phrases that appear at the end. The reason is that writers use an uncomplicated "introductory" language at the beginning to help the reader. These kinds of differences which appear in a genre are what Bhatia refers to as pattern of text, and this "'adds interesting explanations to the analysis of lexico-grammar of a genre'" (Bhatia, 1993: 29).

Level 3: Structural Interpretation of the Text-genre

The third level deals with the cognitive aspects of language organization by analyzing the structural interpretation of the text-genre. Bhatia placed it under the psycholinguistic orientation as it reveals the cognitive structuring of the texts. Writers concentrate on the tactical aspects, making individual choices to achieve their intentions. Bhatia explains it like this:

"Specialist writers seem to be fairly consistent in the way they organize their overall message in a particular genre …" (Bhatia, 1993: 29)

To illustrate this idea, Bhatia discusses an investigation carried out by Swales into the structure of rhetorical "moves" used to achieve a communicative purpose in the introductions to articles. Swales described the typical cognitive structure for the research introduction genre in articles. This analysis adds relevant insights to the preceding two levels. Firstly, by focusing on the structure of information in any genre (it is relevant because this structure may represent some of the key features in the genre's convention). Secondly, by focusing on the communicative purpose, which is a significant feature of any genre. Hence, determining the communication structure in the genre-text helps analysts to summarize their findings. As Bhatia's statement emphasized, consistent writers will be able to define more clearly their genre. Therefore, it is common for the analyst to try to find the particular structure or organization of the genre-text in question.

2.2.4.7. Specialist informant in genre analysis

This last section is a practical step in genre analysis. Bhatia suggested that the genre analyst or the user of specialist information should confirm with a practicing member of the disciplinary culture where the genre is being used on a regular basis of the text-genre. According to Bhatia (1993: 34), "the information

provided by specialist informants tends to bring validity to the insights gained and adds psychological reality to the analysis".

Bhatia (1993:36) annotated a number of factors which are important to keep in mind when consulting a specialist informant in order to exploit the expertise adequately. A significant factor is that the analysts who are motivated to contribute to the investigation must have a good idea of what they are looking for in terms of initial analyses of the genre. Moreover, the specialist should be prepared to refine and reframe questions. After conducting the analysis itself, it is necessary to consult a reviewer to validate the assertions and to give a second opinion. This probably, however, is the most intricate task of the entire analysis. The need for such coordination should be determined by the size and purpose of the analysis

2.2.5 The Teaching-Learning Cycle: Genre and Systemic Functional Linguistics (SFL)

The teaching and learning cycle is a systematic Functional Linguistics approach to the process of teaching to engage with and create texts which is a teaching pattern used in GBA writing instruction. The teaching-learning cycle used in this study is represented in the notion of scaffolding, especially since it has been developed into a clear methodological model in Systematic Functional Linguistics (SFL) (Hyland, 2004).

The role of the teaching and learning cycle is the concept of scaffolding, which is based on the theory of social constructivism language acquisition theory (Freeze, 1998; Hammond, 1992). Although the teaching and learning cycle was designed specifically for the SFL, it was possible to apply it for these lessons which were based on the ESP genre. This was because both the SFL and ESP genres rely on the concept of scaffolding. The core of the ESP genre theory is a part of the second stage of the teaching cycle although details relating to genre analysis in the SFL and ESP genres may be different. One of the most well-known pedagogy representations of this cycle of SFL perspectives on genre is given by Feeze (1998), as Figure 2.2.

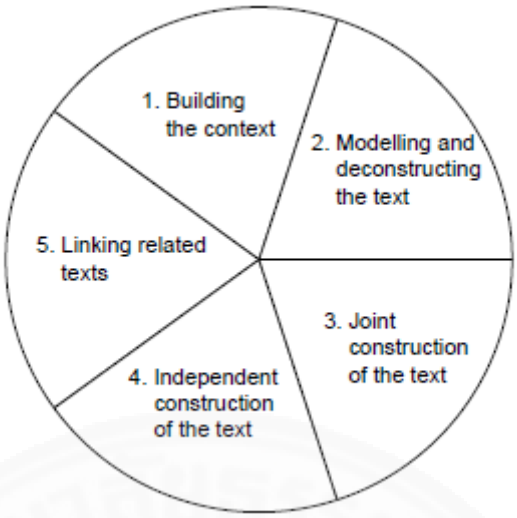

Figure 2.2. The teaching-learning cycle (Feeze, 1998, p.28)
(As cited in K. Hyland (2007), *Journal of Second Language Writing 16*, pp.148–164)

The main objective of the teaching-learning cycle is follow a process of learning a genre as a series of linked stages. The teacher provides the instructional planning of classroom activities, the initial explicit knowledge and guided practice by developing understanding of texts (Hyland, 2004), and the encouragement to the learners; finally, the teacher gradually withdraws their help until the learner is able to work alone. The cycle is designed for flexible use. Learners are allowed to step into the process at any stage, depending on their existing knowledge of the genre, and teachers can return to previous stages of the cycle if their students need it. Hyland (2007) emphasized a main key objective of the teaching-learning cycle is that learners are able to participate in various activities to ensure that opportunities are repeated. Students should reflect on what they've learned and be self-critical about their own learning about the meaning of contexts/texts, and improve their performance through writing or speaking, reappraising and using feedback. Therefore, the model and vocabulary are reused and, in this way, the student builds on literacy skills from the previous stages in order to be develop them further by working through a new cycle at a higher level of the genre's expression. The theory of each stage is given below (Feeze, 1998; Hyland, 2004). Each of these stages achieves a different objective, and as a result, is related to different types of classroom activities and different teacher–learner roles (Hyland, 2004, pp. 130–140).

2.2.5.1 Building the context

This stage demonstrates the purpose of a particular genre, and the setting where it is commonly used. This stage also emphasizes the functional linguistic tools and method an author uses to impart meaning in a certain context. Therefore, teachers elicit from the learners many responses to questions such ‘what is the text about’, ‘who is the writer’, ‘for whom was it written’, ‘what purposes does it serve’, ‘what relationships exist between the writer and reader’, ‘what format choices does the writer have’, ‘why did the writer select specific vocabulary’, ‘in what social activity does the genre normally occur (e.g., job hunting, customer relations, academic essay writing)’, ‘what does the channel (e.g., diary, letter, newspaper, website) tell us about the text’, etc...

2.2.5.2 Modeling and deconstructing the text

This stage helps learners to thoroughly understand the model text. The purpose is to analyze model samples of the genre to identify the purpose, structure and grammar and the variations which are possible. These samples are then compared and manipulated together with the learners in order to understand the generic structure. This step involves the teachers and leaners discussing and exploring the stages of the genre (sentences and expressions), and the core grammatical features used to express how the text achieved its functions.

2.2.5.3 Joint construction of the text

This step involves the teacher and students working together to construct whole examples of the genre. The teacher gradually withdraws contribution as the learners gain more control over their own writing. The learners are in a better situation to start writing texts, but they still rely on the assistance and guidance of the teacher. However, the teacher focuses less on input and modeling and starts to act more like a facilitator for shared writing activities. This helps the students to become familiar with the genre-based approach to writing and to develop writing confidence. Class activity can be organized to work in groups or pairs. Learners create the outline of a writing situation and write a first draft with the teacher’s support. Finally, students revise their work based on an editing and revising checklist before re-submitting it to the teacher for feedback. This stage is teacher-supported practice in the genre, and is accomplished through tasks focusing on particular functions of the text. The teacher

and the students publish the text by displaying or communicating among other students. The other students then give comments.

2.2.5.4 Independent construction of the text

The purpose of this step is independent writing by learners and monitored by the teacher. Learners apply what they had learned from the GBA in class to write a text independently, while the teacher monitors and supervises them. They may choose any different topic. If the result is unsatisfactory, they may go back to the previous stage.

2.2.5.5 Linking related texts

The purpose of this step is to relate what has been learnt to other genres and contexts to understand how genres are designed to achieve particular social purposes such as preventive maintenance, Material Safety Data Sheets (MSDS) documents, assembly products, testing products, packing products, machine software installations, facility process and so on. The step gives students the opportunity to explore how the text is related to other texts that appeared in the same or similar context or how the text transforms across social context. This could only be successfully conducted after students had learned and understood the target genres provided in the classroom as that provided them with a basis to make comparisons.

2.3 Technical writing

The first step in learning how to produce good technical writing is to determine the type, because each type has certain more or less standard elements. Every well-planned technical writing has a specific purpose and audience. Once the purpose and the audience are determined, the writing task is simplified because the form is chosen in which material is presented. Technical writing is writing that helps users resolve problems with technology. Kenneth (2001) stated that “Technical Writing is a broad term that encompasses a wide variety of documents in science, engineering, and the skilled trades. The major types of documents in technical writing can be grouped into four major categories” as Figure 2.3.

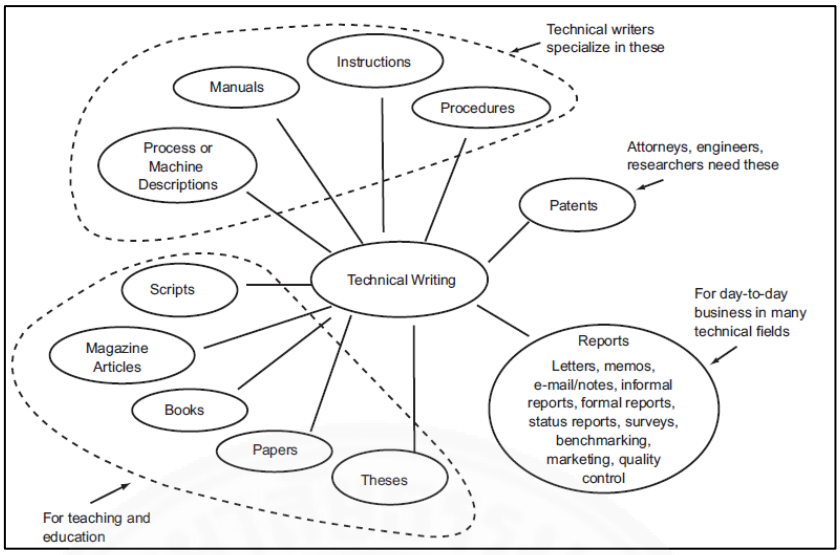

Figure 2.3. Spectrum of technical writing
(As cited in Kenneth G. Budinski (2001).*Engineers' Guide to Technical Writing*. ASM International: USA)

The first category of technical writing is reports and communications in workaday business in many technical fields. This category generally requires a written technical document in particular accompanied by related engineering drawings and detailed specifications. A second category of technical writing is papers, magazine articles, publication or books, and also documents for education, teaching, and information sharing. A third category of technical writing is Patents which require engineers to work together with professional lawyers who specialize in the legal side of intellectual property protection. The last category is operational manuals, instructions, or procedures; these kinds of documents frequently have liability implications for technical writers. The careers of engineers and scientists are often build on the written documentation that they produce, so learning the skills of good writing bring career benefits in various fields.

Technical writing is generally the term used to describe technical subjects, such as engine/ machinery, computers, or equipment/devices. This is the type of writing one sees in procedures, instruction manuals, product specifications and reference materials. This is a rather narrow technical definition. A broader definition of technical writing is any writing that focuses on communicating useful, accurate and precise information of practical value such as information presented for guidance, instruction or training. These broader definitions include books, textbooks, submissions, records, plans, and

other documents that are not necessarily about technology. Another broader definition of technical writing reflects the ability to work in a variety of writing styles from writing in the workplace to the highest level in academic writing. Almost all writing that appears about daily life, at home and at work, is technical writing (with the exceptions of fiction and magazines). The instructions that tell us how to assemble things, a resumé from a prospective employee, or a professional journal submission are all considered to be technical documents.

Schneider S (2005) defines technical writing as technical communication, discipline, and practice. It always deals to a certain extent with what it means to communicate within the technical context and technical development (as cited in O. V. Lubianova, 2015). Furthermore, I. Orlova (2012) distinguishes technical writing as a specific type of writing, which is above all subject to strict formats and mechanics and field-specific terminology. The purpose of technical writing is to convey scientific and technical information clearly and without ambiguity (as cited in O. V. Lubianova, 2015). Procedural texts are a generic type of factual genres that provide sequence directions on how to perform something in appropriate and more efficient ways. Recipes, ingredients and apparatus in home economics, experiments or demonstrations in science and technology, operations or assembly instructions, Health and Safety procedures, operations manuals, business protocols in school or workplace are all example of procedural texts. These are included in the main body of the text, separate from reference material. The procedure outlines the tasks required for using the product. These are included in the main content, along with the reasons why to take on tasks or jobs and what will take place as a consequence. It may also be necessary to use specific examples. Illustrations may be included to provide a visual aid.

To write procedures effectively when compiling content it is often necessary to use illustrations or diagrams. Examples of these are standard process flow charts, workflow, process mapping, symbols, illustrations, graphics, and flow diagrams; they can present the information of tasks or operations in a meaningful format that sheds light on the process, product, and/or information flow. So when starting to write any project, including writing work instructions, the first thing you have to do is to understand and know what you will be going to write. Then map out what you are going to write in a draft version. Document creation should come naturally from what you

learned from the planning process. Skipping this draft version will almost certainly make the writing project unsuccessful. Process instructions relate events step-by-step, and instructions are geared specially for persons who need to follow the procedure on their own.

2.4 Characteristics of good technical instruction writing

Work instructions are the major means of communication between process builders and their audiences. It describes a product, system, or process in detail in a linear format. The instructions walk the audience through the process. Not only can they understand it but also they can do it. This guideline applies to complete operating procedures/manuals document type that many technical professionals will help to write during their careers. When writing operating instructions, try to include enough theory and principles of operation to give the operator a fundamental understanding of how to use the equipment intelligently. A technical manual frequently contains many internal divisions. Since the users of operation manuals often do not have much technical training, careful writing is a must. The work instructions should show good illustrations as well as numerous illustrations and data displays which is as important as good text in every operation manual.

Technical writing is very important when one needs to write professionally. Having knowledge and learning good composition characteristics of technical writing is mandatory when the writers begin to write. There are several different types of writing, and each type is important. Technical writing differs from other writing in the way it conveys more information. The purpose of this writing is to provide an explanation of a variety of topics to other audiences. Technical writing is generally found in manuals and other documents that provide direction. Engineers are required to communicate to the audience accurately.

Kenneth G. Budinski (2001), mentioned that technical writing is an important part of an engineer’s or scientist’s career path. Writing is one of the essential occupations of engineers, from preparing price quotations to publishing research papers. The expectations for good technical writing are introduced the basic terms and attributes that are imperative in composing a decent report and understand that the

technical document will be proofread by other reviewers. The significant attributes employed in most categories of all technical documentation are as follows:

2.4.1 Technical Content (As cited in Kenneth G. Budinski (2001))

2.4.1.1 Appropriate Word Usage for Readership.

Technical content in documentation depends upon the kind of report and the proposed readership. Appropriate technical writing describes any document that is written for a specific readership and for those who are looking for particular content on a particular topic. Word order needs to be considered carefully to avoid using too many pronouns such as “it” and “this”. A patent, proposal, or technical report writer must select the appropriate wording and the right content.

2.4.1.2 Useful Information for Selected Readers.

The readers require the useful information of technical documentation to be easy to access. The author needs to determine what the reader needs, and provide that information in a way that is easy to find and understand. The writers likewise have a chance to consider to whom to send information. Documents should be sent to readers who would find it useful to read the report. In case a reader asked that, “Why was this paper sent to me?” you have sent the paper to the wrong reader. This can regularly negatively affect what you were endeavoring to accomplish with your report.

2.4.1.3 No Plagiarism.

Plagiarism is imitating the language and thoughts of another author without authorization or permission. In general, the writer will not be able to use any copyrighted material in a document. The consequences can be severe if plagiarism is caught, leading legal action or loss of position.

2.4.1.4 Factual Information/Supporting Data.

Most technical writers need information that is factual and helpful to induce readers to pay attention to the documentation. For example, saying that, “The products have a problem,” will get less attention from readers than saying that, “High temperature and high humidity cause a problem when testing”.

2.4.1.5 Clear Purpose.

Providing a concise and clear description and objective in documentation is essential, and in the document there should also be a description of why this information is important and how this information can benefit the reader.

2.4.1.6 Timely Documentation.

The rule is to make all documents timely. Good timing is an attribute that can be said to be very important for writing technical documentation. Some documentation takes time to write; nevertheless, the documentation must be completed in a timely manner. Documents should be finished in order or meet any submission deadline or to meet any required action; punctuality is very important for problem reporting or validation. Most engineers spend a large proportion of their career solving problems. The solutions to the problem should be identified, and the process documentation should be updated to avoid a recurrence of the same problem. Furthermore, the more useful reason for being timely is that you may lose information or overlook critical points in the event if you do not write your report quickly. After the engineers have finished the tasks or solved a problem, their manager might ask for a verbal report, but it is only when writing up the report that engineers think deeply enough to check their logic, and as they are writing the report they often discover new and better ideas that they might otherwise have missed. So verbal reports often don’t give the complete story, and key points can sometimes be lost in translation.

2.4.1.7 Give a Credit to Sources of Information.

When writing a technical document, the author must provide the appropriate attribution when referring to someone else's work. Using the words of others without attribution is plagiarism, as mentioned above. Ignoring references to related literature is neglectful. A small number of technical journals will publish articles without reference to similar or related work that should have been accurately cited. The important thing is that an information source should be referred to in technical documentation. The Information source is not necessarily in the form of journal articles that are already published.

2.4.1.8 Understandable or Clarity

Written documentation must convey a meaning that the reader can easily understand. It will waste the readers' time if the technical writing is unclear. Writers must consider that not everybody may know these particular terms. Writers who write a report should describe the statistical terminology in words that readers understand.

2.4.2 Presentation

2.4.2.1 Logical Sections.

Readers state that the logical structure is the most important part of a technical document. Many types of documents are considered technical. Each document varies from writer to writer and has totally different objectives. All documentation, however, should be divided into different parts, which will be in a logical sequence, making it easy for the reader to quickly find the information they seek.

2.4.2.2 No Personal Bias.

Personal bias is to impose the author's opinion or enthusiasm in the document, thus losing the objectivity that is an essential element of technical writing. Technical writing should report the facts and derive logical conclusions based on these facts. When the reader detects bias in the narrative, then the document loses its credibility. Writers might not realize that they are being biased, and it is often necessary to ask a colleague to proof-read the document to identify any logical fallacies coming from the author's bias.

2.4.2.3 Interesting.

Technical documentation is not for entertainment, but no one likes to read dense, convoluted text, including the readers who read technical documentation. "How can you make an interesting report on the seizing of an edge-guide roller?" Good technical documentation combines the facts in the following way: what?, so what?, now what?:

- "Are new to the reader"
- "Demonstrate the importance of the work"
- "Define the reader's stake in the results or conclusions"

2.4.2.4 Specific.

In general, a good presentation in any writing form will develop from the general to the specific. Nevertheless, a good technical documentation requires a more specific statement than a ruling and factual statement rather than a comment. Supporting information should be put in the appendix.

2.4.2.5 Report Mechanics.

Report mechanics affect the overall layout of a document and is an element of good presentation. This is a basic requirement for technical documentation and is a feature that makes documents clear and readable.

2.4.2.6 Hierarchical Headings

Generally, the technical documentation must include section headings. Simple structural elements can improve readability. Inserting bullets and subsections makes reading easier. A good report contains a logical sequence of sections, and each section is clearly titled. Hierarchical headings in a document should be well organized, but the font must not be larger than the font used in the text. Headings design should be clear in the hierarchy. Whichever design is used, the writer must be consistent throughout the entire the document.

2.4.2.7 Good Page Layout.

Good page layout is one key attribute and important part of good technical writing. The design and use of headings improves readability. The cover paper should be included with appropriate information, including the title name, original date, reference report number, author name, contributor, key words, and revised date.

2.4.3 Language Skills

2.4.3.1 No Jargon or Acronyms

Jargon, abbreviations or acronyms may make the document difficult to read. Using arcane words or words that are too complex may make the meaning unclear or ambiguous. Using jargon in technical communication sometimes complicates and obscures the meaning. Use meaningful words and specific definitions must be clearly given for uncommon words

2.4.3.2 No Misspelling.

The rule is not to allow any misspelled words in a final document. Spelling errors can disturb the readers' concentration, and lead the reader to question the validity of the conclusions: if the author is careless over spelling, was the author equally careless over the research method? A very simple spell-checker on the word processor can catch many errors, but best is to persuade a colleague to proof read the document to eliminate any misspelled words.

2.4.3.3 No Punctuation Errors.

Punctuation errors and misspelled words are in the same category. Careless punctuation makes it hard for the reader to follow, and creates doubt about the author's competence. There are a few simple, basic rules for commas, semicolons and colons. Punctuation in technical writing should generally follow these basic rules, and not be too creative. Wrong punctuation can also change the meaning of a sentence, causing the reader to misunderstand or waste time trying to make sense of what is written.

2.4.3.4 Mixed Sentence Length.

Appropriate technical writing requires many short sentences and not too many long sentences. Many long sentences are difficult to read, but a text with only short sentences are boring to read. A combination of sentences with different lengths should be used.

2.4.3.5 Written in the Active Voice.

Using the active voice in writing means to identify the actor of the action described by the verb. In recent years, there has been a trend to prefer the active voice in technical writing to the passive voice, on the grounds that it is more straightforward than the passive voice.

Example 1: "The feedthrough was composed of a sapphire optical fiber, which was pressed against the pyrotechnic that was used to confine the charge."

Example 2: "The feedthrough contained a sapphire optical fiber, which pressed against the pyrotechnic that contained the charge."

The two sentences are linguistically correct; in any case, English teachers or professional writers believe that readers comprehend written sentences in the active voice more easily than those written in the passive voice. The writer is seen

to be more trustworthy when writing in the active voice. In the present tense, therefore, writers should endeavor to utilize the active voice in order to suggest action.

2.4.3.6 Reasonable Grammar.

In technical documents, it is the technical content that readers are interested in. They are tolerant of small errors in language, so long as the technical information is interesting and important. However, the composition objective ought to be flawlessness. Punctuation and sentence structure are the fundamental standards of language, and a dismissal of these guidelines frequently prompts poor coherence or confusion. Poor language structure can influence your believability as a specialist individual. Readers may address why a writer did not have an archive edit before sending it out. Proofreading by a trusted companion is generally the most ideal approach to find and amend mistakes.

2.4.3.7 Concision.

The rule is to eliminate any unnecessary words, phrases, or sentences. Concision is one attribute of good technical writing. The readers want to get the most information with the minimum number of words. Brevity means not only being careful to use words compactly and efficiently, but also eliminate redundant words and paragraphs, or unnecessary visual aids. However, care must be taken to ensure that this is done without omitting key information and changing the meaning.

2.5 Review of previous research studies

Nagao, (2018) investigated genre awareness of discussion genre texts (particularly argumentative essays) during a 15-week functional linguistics course consisting of writing lessons assigned as part of a teaching and learning cycle. The participants consisted of 14 first-year university students (eight females and six males) in Japan. Their English competency was graded at the intermediate proficiency level (B1). The students were given pre- and post-learning surveys, and wrote down their self-reflections. The results showed a significant improvement in the students' understanding of the genre's structure and lexicogrammar. A correlation analysis illustrated that this increased understanding of lexicogrammatical features, such as textual meaning, interpersonal meaning, and experiential meaning, resulted in measurable improvements in their writing efficacy and confidence. The results

demonstrated that using a genre-based approach to teach the writing of argumentative essays has the potential to enhance EFL students' learning by making them more aware of the generic structures and interpersonal meanings.

Changpueng (2013) aimed at investigating the effect of using the genre-based approach on the writing achievement and attitudes of Thai engineering students. The participants consisted of 40 fourth-year engineering students enrolled in an English course. The participants needed to do a pre-test and the pre-test scores were divided into three groups as high, medium, and low level. The writing content related to engineering work; namely requesting e-mails, enquiry e-mails, and writing reports. The post-test, attitude questionnaire, and interview were administered at the end of the experiment. A one-way ANOVA was used for data analysis and the results revealed that the writing ability of students significantly improved in all three level groups after the experiment. The findings also showed that the students' attitudes were positive towards the teaching method, activities, and exercises. Moreover, students felt more confident in writing.

Ahn (2012) studied the influence of using a genre-based approach to improve the writing ability of L2 primary school students. The students went through 10 weeks instruction. Two types of genres were taught, namely: report writing and essay writing. The students were instructed through the course by using a three-staged teaching learning cycle (TLC). The students' writing sample from before they went through instruction were compared to their samples after the instruction. His study showed that "the teacher's active scaffolding processes at the early stage of the cycle benefited students by making them aware of the different ways texts are organized for different communicative purposes". Furthermore, students were more confident and responded with a positive attitude towards the writing teaching.

Hyland (2007) argues about the great advantages of genre-based methodology in teaching writing. He emphasizes that "an understanding of the ways language is used to create meanings in writing empowers teachers by offering them ways to analyze texts, to reflect on the workings of language, and to provide more robust and targeted support for learners" (Hyland, 2004, p. 162). Hyland (2007) regards genre-based approaches as a major response to learners' needs who were learning writing as a second language since, according to Hyland (2007) "a well-formulated theory of how

language works in human interaction has become an urgent necessity in the field of teaching second language writing".

Sabouri, Zohrabi, &Vafa (2014), studied the influence of using a genre-based approach to teaching writing in EFL contexts. To this end, the participants were 40 Iranian EFL learners, the experimental group was randomly divided into one group using a genre-based writing techniques and a control group using the traditional approach. Their study showed significant differences in outcome between the two groups, with the group instructed with the genre-based method doing better much better.

Arancon (2013) applied the SFL genre theory in analyzing the essays of 30 students who were randomly selected and have taken the ESP: Business course in the UNED (Universidad Nacional de Educación a Distancia), a distance-learning university in Spain. English competency level of the students tends to be between A2+ and B1. His study showed that there are particular lexical-grammatical errors based on three macro-functions. Hence, he argues that genre-based instruction with the perspective of SFL is influential in reducing the difficulties an L2 goes through in Business English writing. He particularly argues that with "better control of the canonical forms of the genre, they could start to be more unconventionally creative, but within the language system" (Arancon, 2013, p. 245).

Amogne (2013) made a study to improve writing skills of students using the genre approach. In his study, he also examined the extent to which 24 EFL students majoring in English at Bahir Dar University "improved their argumentative essay writing skills as they were exposed to a genre based writing practice with their writing teacher" (p. 242). These students were in their second year study. They had already taken a basic writing course before they were taught argumentative essay writing using a genre approach. The findings of his study showed that "students had serious problems of critiquing or rebutting opposition views and coming up with stronger refutations even after their exposure to genre based argumentative essay drafting" (Amogne, 2013, p. 242). His study also showed significant improvement in students' writing skills regarding "identifying the lexica-grammatical features and overall rhetorical (genre) structure of argumentative essays. The participants' reaction toward the approach was positive" (Amogne, 2013, p. 242).

Elashri (2013), investigated the influence of the genre-based approach on writing ability of second year EFL secondary stage students at AlAzhr schools as well as the students' attitudes towards writing ability. The experimental group used a genre-based approach and a control group used a traditional approach. To this end, the experimental design involved a writing test evaluated by an analytic scoring rubric using a holistic approach, and the attitude towards the teaching method. His study presented "evidence for the effectiveness of using the genre-based approach in developing the students' writing performance and attitudes towards writing" (Elashri, 2013, p. 2).

Rezvani, Aqdam, & Saeidi (2012), adapted a semi-experimental pre-test and post-test assessment to study the effect of a genre-based approach on writing ability of Iranian EFL students. To this end, 54 Iranian EFL students went under five weeks instruction which resulted in significant improvement from the genre-based instruction "on task-based writing achievement" (Rezvani, Aqdam, &Saeidi, 2012, p. 589).

Rahman (2011) numerates the benefits of the genre-based approach on the writing ability of EFL students. He argues that "the use of generic patterns can complement the dicta prescribed by the Process approach, and coordinating the approaches offers learners genuine opportunities to develop skills to reproduce coherent and cohesive texts" (Rahman, 2011, p. 8).

Chaisiri (2010) investigated how teachers perceive the effect in one writing classroom of alternative teaching approaches, namely their current approach and the genre-based pedagogy. 40 Thai students participated in this study and analyzed sample texts. The findings revealed that the teachers used an integration of approaches in the teaching, so the concept of genre and the genre-based writing instruction was utilized to improve the writing of students. He also stated that the teachers and students have positive attitudes towards the implemented writing pedagogy.

Dang (2002) conducted a classroom-based research in Vietnam to investigate the effectiveness of a GBA for teaching the English discussion genre. Twenty-three second-year undergraduate students participated in the research in a four-week writing course. Callaghan and Rothery (1988) suggested using the model of teaching and learning cycle (TLC) as the main teaching method. Dang revealed that students were able to write discussion texts successfully in that genre and gained control of the

structure and the language features. The results of attitudes also revealed that the students had positive responses towards the teaching method, although they suggested that more time was needed to adjust to the stages of teaching, especially towards the last stage in which students wrote independently. In addition, as suggested by the students, the teacher should encourage students to take part in finding relevant reading materials or sample texts of particular genres under study by themselves.

Another study conducted by Cheng (2006) reports on previous studies about second language (L2) genre-based writing classrooms and some theoretical debates. He contended that having learners understand the process of learning in an ESP genre-based writing classroom is significant in genre pedagogy. Two issues in a genre classroom that researchers should pay attention to are the complex roles of being a learner and a lack of genre-based theories of learning classrooms. He also claims that explicit genre instruction and genre analysis in L2 learners in writing instruction can improve reading ability of content materials and their recognition of discipline-specific features. This enhances discourse competence of the students' performance of accurate writing. His work confirms the importance of genre pedagogies in the ESP research tradition. (Chaisiri, 2011)

Swami (2008) investigated the effectiveness of GBA applications in writing courses with postgraduate learners in India. Genres such as sales promotion letters and job application letters (which are a non-academic genre) and essay writing (which is an academic genre) were taught as in-class GBA materials. The data collected were a mixture of qualitative and quantitative data. A pre-test and post-test was performed, five questionnaires were given, and a teaching journal was kept. Consequently, the findings of the study revealed that the learners' writing performance improved significantly through GBA tasks.

Similarly, Krisnachinda (2006) conducted a case study investigating a GBA in teaching writing in Rajabhat University in Thailand. Her study aimed to evaluate if the teaching approach helped three second-year students retain their ability in writing three sub-genres of recount (personal, biographical and historical). She taught the student participants the features of the sub-genres and, as well, explored the students' attitudes towards the teaching approach. The students' written texts were assessed by two other independent teachers of English as well as the researcher using a Systemic Functional

Grammar (SFG) framework. The findings revealed positive results in the students' command of the key features of the recount genre, and the students expressed positive attitudes towards the teaching approach. Krisnachinda suggested that the genre-based approach would be appropriate for pedagogical practices and investigation in the learning of English language writing.

Kongpetch (2003) examined the effect of a GBA on the teaching of factual English writing to third-year students at a Thai university. The main purposes of her study were to identify the effect of the genre-based approach on writing, and attitudes towards the genre-based writing class. The focus of teaching was on exposition genre writing, which was, according to Kongpetch, considered one of the most neglected in the Thai education system. She applied ethnographic case study research as the methodology of her investigation. The data collected included student diaries, audio-recordings of interviews with students, and three drafts of student writing. Content analysis and linguistic analysis were the methods used to evaluate the data. The findings showed that the students had positive attitudes towards the genre-based instruction, and it had a positive impact on student writing ability. Kongpetch also suggested that to effectively apply a GBA to a writing classroom in the Thai university context, some modifications in the approach had to be undertaken. She pointed out that students should have some choice in the selection of topics and genres; teachers have to ensure that students understand the language program objectives; both teachers and students have to accept changes in the teaching and learning processes which are culturally different in some aspects; teachers have to understand that both language and content are interrelated, and changes in curriculum development should be made in response to the notion of learning content by using the language and learning about the language (e.g. generic structures and language features) (Kongpetch 2006, pp. 24–25).

CHAPTER 3
RESEARCH METHODOLOGY

The aim of the research was to investigate the effect of using the genre-based teaching method on improving the technical instruction writing of Thai engineers in a work setting. In addition, the research investigated the attitudes of those same engineers towards the genre-based teaching approach. This chapter describes the methodology of this research. It begins with the reasons for choosing the setting and participants; it then describes the two instruments of this research; namely the research instrument and the pedagogical instrument. It goes on to describe the data collected for evaluating the lesson plan. This chapter also deals with the data analysis tools that were used in this study for content analysis. It explains how the genre-based principles were used to develop the lesson plans and shows how the theoretical concept of the SFL are embedded in the staged TLC and pilot study. It is then followed by the details of lesson plan implementation.

3.1 Participants

The participants of the study were ten Thai engineers of mixed English proficiency, all colleagues in the same electronics company. Five (three females and two males) are electrical engineers and five (three females and two males) are electronics engineers, forming a homogeneous group from one discipline or profession; namely, process/test engineers. Their ages ranged from 24-36 years. The researcher designed a course to use the genre-based teaching methodology to instruct the engineers in the specific skill of writing good work instructions. These engineers followed the course for two hours per week for 8 weeks.

3.2 Instruments

3.2.1 Research instrument

For research question 1: What effects do genre-based writing approach have on Thai-engineers' work instructions writing ability?

3.2.1.1 Pre-test and Post-test

The experiment was designed to measure the improvement in the students' ability to write good work instructions after following an intensive eight week training in the genre. Work instructions are essential tools in factories, describing exactly how to perform a series of manufacturing operations step-by-step. The students were given a pre-test and post-test, scored using a 32-point rubric, to evaluate the change in their writing ability. The difference between the two scores indicates how much the engineers' writing abilities improved, giving an indication of the effectiveness of the training..

The technical instruction writing score rubric and items checklist for scoring pre-test and post-test (see Appendix A) were validated for content by three experts judgment using the evaluation form (Items Objective Congruence Index, IOC). For each item, the experts were asked to determine the content validity score:

The score = 1, if the expert is sure that this item really measured the attribute.

The score = –1, if the expert is sure that this item does not measure the attribute.

The score = 0, if the expert is not sure that the item does measure or does not measure the expected attribute.

The IOC index ranges on a three-rating scale range from -1 to 1. The qualified items should have the IOC equal to or greater than 0.50. The IOC calculation results revealed that the three experts accepted this technical instruction writing rubric score criteria, with a content validity more than 0.5. Results indicated that they are acceptably congruent and could be implemented in the course. The experts, however, suggested improving the IOC score because the meaning of content was not in line with other content. The technical instruction writing score rubric was consequently re-written to align the purpose/aim item, mechanic item, and conciseness item with the others. Therefore, the researcher edited the technical instruction writing score rubric score for scoring pre-test and post-test (see Appendix B).

For research question 2: What are Thai engineers' attitudes toward genre-based approach to writing work instructions?

3.2.1.2 Interview questions

The researchers used an integrated type of interview which is a semi-structured interview, after the completion of the training in order to determine the attitude of engineers towards the genre-based approach method to teaching. The interviews were conducted with open-ended questions. The independent variable is genre-based syllabus. The dependent variable is writing ability improvement. The questions collected information about the following aspects:

- The first question asked their opinion about the difficulty of each element of work instruction writing; namely, understanding the objectives, being concise, being clear, being unambiguous, using visual aids, writing English.
- The second question was about whether the teaching method helped them understand how to write good work instructions.
- The third question was about how the course content, practicing with exercises, could improve their writing ability.
- The fourth question was about the strategies they learned to deal with situations when they cannot think of words or phrases to write.
- The fifth question was about whether after this course they will be able to use more appropriate language.

The researcher used Thai language to carry out the interviews which were recorded with note taking and then transcribed into English. Four Thai engineers were selected and interviewed. Content analysis was chosen as it focuses on how the content of oral and written data is analyzed. The content analysis helps the researcher to identify the common themes contained within the collected data. It also assisted with the interpretation of the spoken data. The themes or categories were derived directly from the text data.

The overall effectiveness of the intensive course has been evaluated through the interview questions in Appendix A. Interview questions in English to have complete and accurate information on how the engineers appreciated the teaching methodology and to evaluate their perception of usefulness of this course.

The IOC index ranges on a three-rating scale range from -1 to 1. The qualified items should have the IOC equal to or greater than 0.50. The IOC calculation results revealed that the three experts accepted this interview questions, with a content

validity more than 0.5. Results indicated that they are acceptably congruent. The experts, however, suggested adding some contents to easier understand when questions are asked to the participant. Therefore, the researcher edited the questions (see Appendix B) and implemented in the course.

3.2.2 Pedagogical instruments

3.2.2.1 Lesson plan

The lesson plan was designed in accordance with the identified learning objectives as Table 3.1. The approach was taught during 8 weeks at 3 hours per week to give engineers efficient strategies to improve their writing ability. Three experts of English language teaching were asked to assess the developed lesson plan, its quality and the appropriateness of the specific lesson plan genre-based approach teaching methods. The lesson plan in appendix A was validated using the evaluation form (Items Objective Congruence Index, IOC) to guarantee the appropriateness of the content as well as to ensure the validity of the overall lesson plans (objective, tasks, materials and timeline). The three experts evaluated the overall layout and design of the course, as well as the activities during the course, its content and teaching method.

The material used for this course was relevant authentic material in engineering procedural writing, and many writing examples were used.

	TLC method	Aim	Teacher activities
Week 1	**<u>1st stage</u> Building knowledge of the field**	1. hand in Pre-test	1.T accept the instruction writing from engineers
		2. To review how much Ss know about writing work instructions and their importance.	2.Warm up by talking about <u>Technical Instructions Planning Sheet</u> What are work instructions? And why are they important?
		3. To review how much Ss know about structure and linguistic features (active / passive voice; indicative vs imperative or subjunctive mood; use of articles.)	3.Warm up with an exercise <u>Model text 1</u>, hand out a Model text 1 to the class and ask what the purpose of this text is. Ask them to discuss their answers about the purpose of the model text as well as its structure and linguistic features
		4. To elicit engineers' background knowledge about the instruction/process text. Encourage engineer to brainstorm ideas on the purpose of the instruction/process genre. To draw engineers' attention to related vocabulary and content, which probably vary from people to people.	4.Good versus bad work instructions. Give examples of bad instructions - redundant, inacurate, unclear, ambiguous, long-winded.... Give examples of good instructions - concise, clear, well-organised, unambiguous
Week 2	**<u>2nd stage</u> Modeling**	1. To explain Structure of Instruction/Process and the genre analysis about movement	5.T explain the structure of Instruction/Process and the genre analysis about movement
			6.Give out <u>Model texts 2-6</u> to work in pairs. Ask engineers to find out about the schematic structure and the language features of the text. Use the following questions lead to discuss: - What is the text written for? – How complicated is it? - Who is the audience? - What is bad/good in the text? - What tense is mostly used in the text? - What other language features can be found in this kind of text? - What is the overall structure of the text?
			7.After engineers have deconstructed the model, ask each group to get prepared for a presentation of the findings. Have engineers nominate a representative to present their findings. Give feedback to the whole class and raise questions for engineers to discuss together. Help engineers to reach conclusions about the structure and the language features of the instruction/ process text type.

Week 3-4	**2nd stage Modeling**	2. To explain Instruction writing styles and criteria	8.. Explain good technical writing and criteria of how to write instructions - to understand the elements of style in technical writing and become familiar with the style that is most suitable for instruction writing - to understand when to use illustrations and understand what constitutes a helpful illustration
			9. Reuse Model text 2-6 and talk about what have we learned? What have we learned about instruction writing? Talk about structure all together: orientation, instruction, facilitation, validation or optioning
Week 5	**3rd stage** **Joint construction**	Have the class share ideas of planning to jointly construct a text.	10. Divide engineers to work in pairs and provide each group with a text (Model text 7). First part is to provide the pictures of step instruction of the product, then engineers write and describe the actions/processes. The second part, the paragraph order has been mixed up (Model text 8), and ask engineers in each group to look an event of technical sentence. The third part is to check language forms of technical instructions. Provide assistance if needed for each group and draw engineers' attention to the organized structures and the language features of the text (Model text 9). T takes the role of scribe whose responsibility is to write what engineers contribute appropriately as written form and explicitly instruct them how to deal with each stage of writing.
Week 6	**4th stage** **Independent construction**	Revising and editing their own writing.	12. Have engineers begin writing independently. Be available to them for their writing support. Remind engineers about revising and editing their own writing. Ask engineers to hand in their work.
Week 7	**5th stage** **Linking related texts**	To further know more other kinds of instruction writing	13.Let engineers think and discuss about other kinds of instruction writing such as preventive maintenance, MSDS document, assembly product, testing product, packing product, Machine software installation, facility process and so on.
		Post test- Instruction writing Peer-teacher review	14.Post-test , 1. Peer-teacher review, then ask engineers to re-edit their own writing and rewrite it. 2. Discuss with each engineer and their own writing.
Week 8	**Sharing instruction**	To share lessons learned and give feedback	15.T asks Ss to prepare for individual presentation with engineers. Provide an individual with final feedback of what they have learned and ask them to finalise their writing before submitting to the customer.

Table 3.1: Lesson plan

The IOC index used a three-rating scale range from -1 to 1. The qualified items should have the IOC equal to or greater than 0.50. The IOC calculation results revealed that the three experts accepted this lesson plan, with a content validity more than 0.5 except items 12,13,14 because one expert did not agree that one week was long enough for accomplishing the things that had been mentioned in this teaching instruction. Items that had an index lower than 0.5 were revised according to the suggestions of the experts by adding one hour to week 5 and week 6 (see Appendix B). With this change, the results became acceptably congruent.

3.3 Data collection

The procedures of this study have been divided into four phases.

The first phase is the development of the lesson plan. The second phase is running the pilot. The third phase consists of the assessment of the engineers' improvement after training. The last phase is to conduct an overall satisfaction interview.

Phase 1 - lesson plan development

At the beginning of the course, a pre-test was given to ten Thai engineers. This served as the baseline against which the effects of the genre-based approach as a teaching method could be compared. The pre-test used work instructions that engineers had written as part of their daily work. Before starting the training course, the engineers brought the work instructions they had written to the researcher. These were then used to determine their ability at writing work instructions.

The lesson plan for teaching writing in English in a genre-based method was prepared in a way to match the procedures mentioned above. The first session began with explaining what they would study, and what their roles would be during the process.

The first week focused on “building knowledge of the field”. The researcher talked about “What are Work Instructions?” and “Why are they important?” with Technical Instructions Planning Sheet questions (see appendix D). The warm-up exercise used Model Text 1 (see appendix E). This was handed out to the class and the engineers had to describe the purpose of the text. The researcher asked them to discuss their answers about the purpose of the model text and analyze its structure and linguistic features. Background knowledge was elicited from the engineers about the instruction/process text and the engineers were encouraged to brainstorm ideas about the purpose of the instruction/process genre. Some questions were put to the engineers, e.g. - In what kind of text can we find the instruction/process genre? - How is the text used? - Who is the reader? - What is the language and vocabulary like? What makes a good character? What makes a bad character? How can we describe them? At the end of the class, the engineers shared their ideas about the topic that had been written, and discussed the use of language, grammar and sentence structure that had been used, and how the engineers might use it in their own writing.

The second week focused on “Modeling and deconstructing the text”. The instructor explained the structure of Instruction/Process and the genre analysis about movement. This time the genre moves of the text had been underlined and marked. The lesson’s purpose was to explain each move, its functional orientation, and the linguistic forms used. To explain communicative moves and functions, each with a specific purpose, the terms of style and content were considered to be broadly representative of the technical procedures genre. Six moves were adapted from Sharpe M (2014) who examined the structural forms and the linguistic devices in two samples of technical instructional text. We studied how communicative moves in many types of technical instructional texts were used to achieve several communicative purposes. The texts shown in Table 3.2 were analyzed in terms of the communicative moves -- along with the teaching/learning cycle at the Modeling stage -- to help the engineers understand the genre and to identify its stages, key features and structural variations. This step involves the teachers and learners discussing and exploring the stages of the genre (clauses and expressions), and the key grammatical features used to express how the text achieved its functions. The functions of those moves are as follows:

Move Structure	Communicative step	Function/purpose
Move 1: Cover	Step 1: Provide revision history Step 2: Provide information and purpose	To tell what the document is built for and detail of changed revision
Move 2: Orientation	Step 1: Define Process Step 2: Define Sub-Process (if needed) Step 3: Tooling list Step 4: explain locate user in area of work and required general working of the system Step 5: Key and warning	To locate user in area of work and required general working of the system
Move 3: Instruction	Step 1: Define Process Step 2: Define Sub-Process (if needed) Step 3: Bill of material Step 4: Explain in linear steps the actions required to complete the procedure Step 5: Key and warning	To explain in linear steps the actions required to complete the procedure
Move 4: Facilitation	Step 1: Define Process Step 2: Define Sub-Process (if needed) Step 3: Bill of material Step 4: Introduce user to method/techniques that simplify the procedure Step 5: Key and warning	To introduce user to method/techniques that simplify the procedure
Move 5: Validation	Step 1: Define Process Step 2: Define Sub-Process (if needed) Step 3: Bill of material Step 4: explain consequences of completing the procedure Step 5: Key and warning	To explain consequences of completing the procedure
Move 6: Optioning	Step 1: Define Process Step 2: Define Sub-Process (if needed) Step 3: Bill of material Step 4: To add appendices of additional information Step 5: Key and warning	To add appendices of additional information

Table 3.2: Moves in instructional writing

In the class, Model texts 2-6 were given out to engineers to work in pairs. The engineers had to find out about the schematic structure and the language features of the text. Use the following questions as guidelines: - What is the text about? – How complicated is it? - Who is the audience? - What is bad/good in the text? - What tense is mostly used in the text? - What other language features can be found in this kind of text? - What is the overall structure of the text? After the engineers had deconstructed

the model, the researcher asked each group to prepare for a presentation on the findings. The engineers then gave feedback to the whole class and raised questions for them to discuss the results together. In this way, the engineers could learn the generic structure and the language features of the instruction/ process text type.

The third and fourth week focused on instruction writing styles and criteria. The class was conducted by explaining good technical writing and the criteria of how to write instructions. This included an explanation of the elements of style in technical writing and how to become familiar with the style that is most suitable for instruction writing. It also clarified when and how best to use illustrations. Model Text 2-6 (see appendix E) was reused. The class talked about what they have learned about instruction writing and talked about the structure, orientation and facilitation of the lessons. Furthermore, the engineers shared some experiences with the class.

The fifth week focused on "Joint construction". The class shared their ideas about the plan to jointly construct a text by dividing engineers to work in pairs and to provide each group with a text (Model Text 7 see appendix E). The first part provided the pictures of the step-by-step assembly instructions of the product, and then the engineers had to write and describe the actions and process. In the second part, the paragraph order had been mixed up (Model Text 8 see appendix E). The engineers were then asked in each group to put the given technical sentence in the right sequence. The third part was to check the language forms of rhetorical functions in technical instructions. The researcher provided assistance as needed for each group and drew the engineers' attention to the schematic structure and the language feature of the text (Model Text 9 see appendix E). The researcher took the role of scribe with the responsibility to record what the engineers contributed appropriately in written form and to explicitly instruct them how to deal with each stage of writing. At the end of the class Model Texts 7-9 were discussed.

The sixth week focused on "Independent construction". Engineers began writing independently using the same topic from the beginning. The researcher was available to them for their writing support and to remind the engineers to revise and edit their own writing. At the end of the class, the engineers handed in their work.

The seventh week focused on linking related texts and instruction writing with peer-teacher review. Engineers discussed the similarities with other kinds of instruction

writing such as assembly product, testing product, packing product and machine software installation. Finally, the engineers were asked to reedit their own writing after including peer feedback from the other engineers.

In the eighth week, the engineers shared their finished writing by presenting their work instructions to each other. The researcher then arranged for individual conferences, providing each engineer with final feedback and asking them to finalize their writing before submitting to the customer.

Phase 2 – Conduction of pilot study

The researcher conducted a pilot study with three Thai engineers from the same company but who were not part of the group of ten engineers used in the study a) to determine how the teaching method could improve work instructions writing within one month and b) to ensure that the initial version of the developed lesson plan is applicable to the study. The researcher checked the reflections by interview of those three Thai engineers. Based on this feedback, the course was adjusted by making a few required changes and revisions before implementing.

Phase 2 implemented (pilot run) with three engineers. The lesson was taught through until the joint construction stage. The conclusion of the pilot study was that the results obtained from the participants' feedback were positive. They liked the startup of teaching by asking engineers' background knowledge of how to write work instructions in their field. The researcher summarized three recommendations from three engineers after pilot run below:

Recommendation of engineer #1: She is an electrical engineer. She has nine years experience. She knows quite well how to write work instructions. She suggested modifying the fonts and the PowerPoint background. She had to recall the linguistic features. She knew more in detail, even if she never realized before how important it was. She was satisfied with the overall objects and design of this program.

Recommendation of engineer #2: She is an electrical engineer. She has six months experience. She said that the material was interesting. She liked the kind of brainstorming to think about teaching. This program can be used in working life especially to give some ideas to new engineers. She would like to get more practice in using the linguistic features. She liked it when the researcher taught quite slowly at the

beginning. During the class, when the researcher sped up, she asked to slow down for the benefit of the new engineers.

Recommendation of engineer #3: He is a mechanical engineer who works as a process engineer. He has five years experience. He said that “he got training with the training center in the company, but he never learnt in as much detail as in this program. He recommended offering the course to the training center of the company”

Phase 3 - Implementation of our intensive course and assessment of engineers’ by pre-test and post-test.

Two raters marked this test. The consistency between the two raters was assessed by correlating the marks. The sum of the two average ratings was used to provide a score for each of the engineer.

Phase 4 – Attitude interview

The results of their grading were then calculated using the Technical Instructions Rubric and The post-test, attitude and interviews were administered at the end of the experiment

3.4 Data analysis

The paired t- test was used to analyze the pre- test and post-test results by comparing one sample mean to a null hypothesis value. The paired t-test simply calculates the difference between paired observations (e.g., before and after) and then performs a 1-sample t-test on the differences. The compositions were rated using the technical writing rubric. An analytic rubric includes a more detailed analysis, based on content, presentation and language skills.

A semi-structured interview was conducted after the completion of training in order to determine the attitude of engineers towards the genre-based approach method. The interview spoken data was transcribed and categorized by theme, and the results analyzed by the researcher to calculate a percentage based on the frequency count of each category.

CHAPTER 4
RESULTS AND DISCUSSION

This chapter examines quantitative analyses of the processes and consequences of training intervention using a genre-based approach (GBA) to teach technical writing, based on pedagogical principles drawn from the systemic functional linguistics (SFL) tradition of genre pedagogy. This section also explains the influence of the genre-based training approach on Thai-engineers' ability to write good work instructions. The stages of the training were: building knowledge of the field, modeling, joint construction, independent construction, and linking related texts. Furthermore, this chapter includes s a brief description of the Thai engineers' attitudes towards the genre-based writing approach to writing work instructions. The data draw mainly on the researcher and researcher's notes and voice record.

The teaching was implemented in the engineers' workplace. The course conducted once a week after working hours, and lasted for 120 minutes. Phase 3 was implemented and the engineers' improvement was assessed from their Pre-test and post-test scores.

After teaching as lesson plan, the engineers were asked to edit a written work instruction document as a post-test. They added information to improve the content, presentation and language on the basis of what they had learnt from exercises in class.

4.1 Result of the study

4.1.1 Result of a genre-based writing approach

The results indicate that there was a significant improvement in the engineers' ability to write good work instructions after the training, as shown in the difference between the pre-test and post-test scores. Using the engineer's t-test to compare the two scores, a p value < .05 (p=0.002) was calculated (see Table 4.1 - paired t for total pre-test - total post-test). The results revealed that the null hypothesis was rejected (H_0: $\mu 1-\mu 2 \leq 0$) and the alternative hypothesis was accepted (H_1: $\mu 1-\mu 2 > 0$)

Engineer	Years' experience	Pre-test Score	Post-test score	% Improvement		
E1	1	19	27	42.11%		
E2	8	28	31	10.71%		
E3	0.5	19	25	31.58%		
E4	3	22	29	31.82%		
E5	5	30	31	3.33%		
E6	10	30	30	0.00%		
E7	8	26	32	23.08%		
E8	4	29	30	3.45%		
E9	4	26	29	11.54%		
E10	0.2	20	24	20.00%		
				Difference	**T-Value**	**P-Value**
	Mean	24.90	28.80	-3.900		
	StDev	4.51	2.66	2.767		
	SE Mean	1.43	0.84	0.875		
					-4.46	**0.002**

Table 4.1 Paired T for Total Pre-test - Total Post-test

A table 4.1 also shows a range of improvement from 0% to 42% among the engineers. Engineer E1 made the biggest improvement in writing ability, whereas engineer E6 made no improvement. See Figure 4.1.

The reason for the wide range in improvement can also be seen in Figure 4.1 – the engineers with a low pre-test score improved the most, whereas the engineers who already scored close to the maximum improved the least. The scatter plot in Figure 4.2 shows this very clearly; there is a moderately strong, negative, linear relationship between the pre-test score and the percent of improvement of the engineers who took the genre based teaching course. The diagram shows two distinct clusters of data, and these are highlighted in Table 4.2. Four engineers who had low pre-test scores (average 63%) had a high percent of improvement (H) at 31%. Meanwhile, the other 6 engineers who had high pre-test scores (average 88%) had a low percent of improvement (L) at 9%.

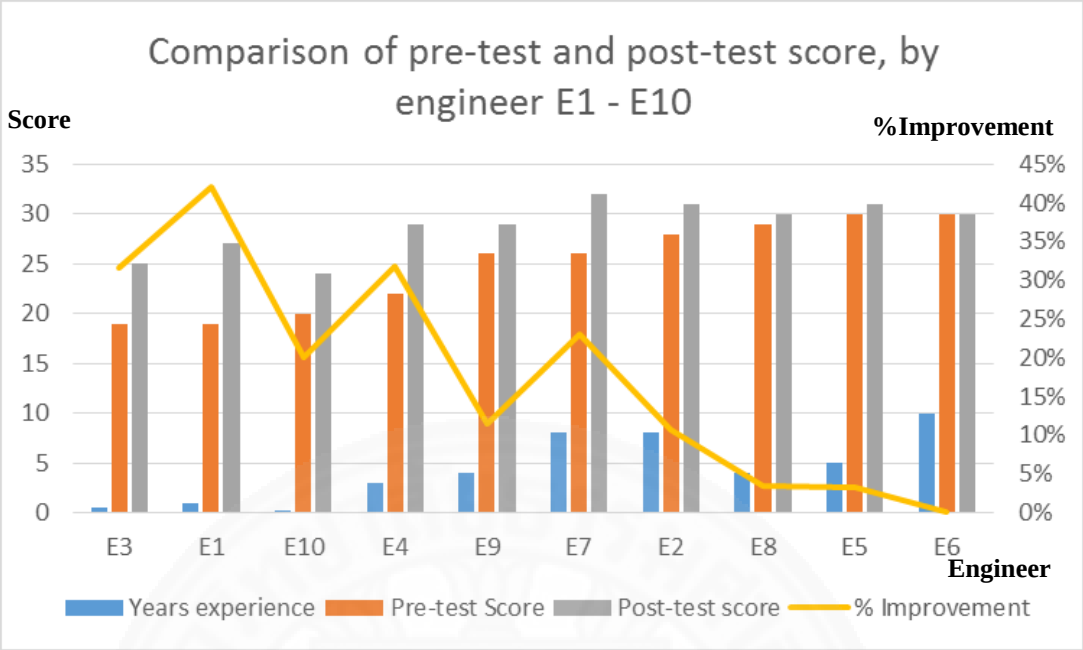

Figure 4.1 Pre-test and post-test comparison with years' experience

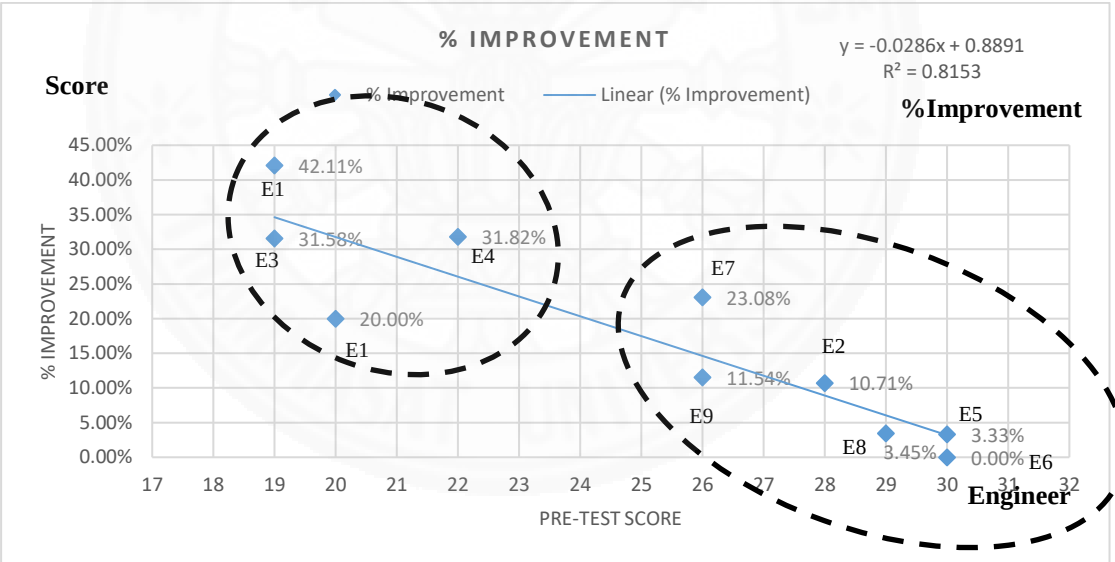

Figure 4.2 Scatter diagram-pre-test and post-test comparison

Engineer	Years' experience	Pre-test Score	Post-test score	% Improvement	Cluster
E1	1	19	27	42.11%	H
E2	8	28	31	10.71%	L
E3	0.5	19	25	31.58%	H
E4	3	22	29	31.82%	H
E5	5	30	31	3.33%	L
E6	10	30	30	0.00%	L
E7	8	26	32	23.08%	L
E8	4	29	30	3.45%	L
E9	4	26	29	11.54%	L
E10	0.2	20	24	20.00%	H

Table 4.2 Cluster -Paired t for total pre-test - total post-test

4.1.1.1 Breakdown of the improvement by skill: a) technical content and presentation

The improvement of technical content and presentation is shown in Table 4.3. It revealed that eight of ten engineers had a significantly high percent of improvement, ranging from 7% to 63%. Only two of the ten engineers failed to show any improvement after the genre-based teaching.

	% Improvement of technical content and presentation
E1	63%
E2	14%
E3	44%
E4	56%
E5	0%
E6	0%
E7	14%
E8	7%
E9	25%
E10	30%
Mean	**20%**

Table 4.3 Percent Improvement of technical content and presentation

All engineers clearly provided all the essential information in terms of author, purpose and objective after finishing revising the document. The objective could be both context and number in order to represent when users use the right

document to follow the process. Most engineers appeared to be aware how to write work instructions to make it easy for the user to follow.

For example:

Before editing: see figure 4.3. There are two instructions written in one step, but the picture does not refer to those instructions. The writer is familiar with the procedure; the reader is not. The writer should not assume that the reader will understand what the writer meant to say: the writer must identify it explicitly.

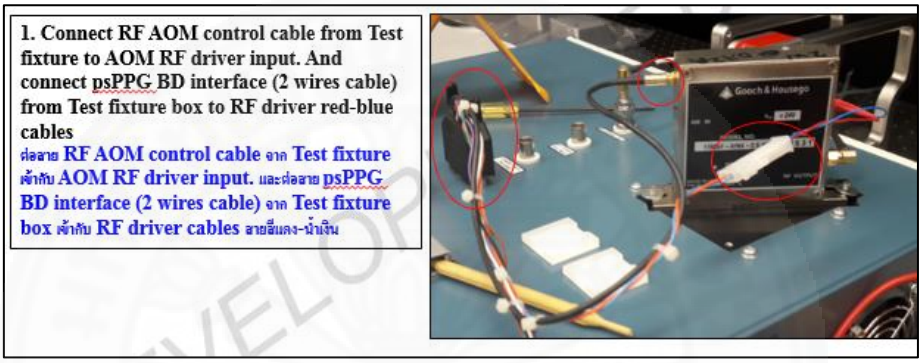

Figure 4.3. Example of before editing

After editing: as figure 4.4, the instructions are separated into two steps, and the picture is labeled to clearly show these steps.

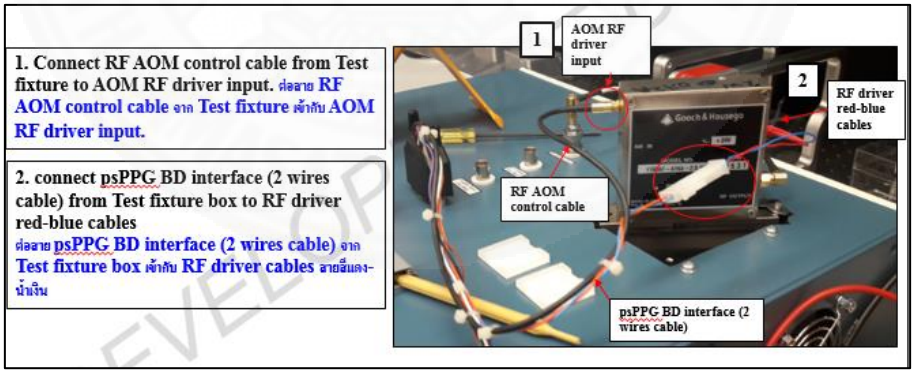

Figure 4.4. Example of after editing

Interestingly, all engineers gave useful pictures or diagrams after finishing revising the document. The main problems seen were that the step descriptions did not match with the picture or were unclear. The engineers replaced the unclear pictures or added an extra diagram in order to explain more clearly to the readers. Sometimes some texts could not make the instructions as clear as a well-labeled

diagram. This suggests that they fully understood the final stage. Most engineers also improved the composition of the page layout, fonts and hierarchical headings on each page after finishing revising the document.

For example:

Before edit: as figure 4.5, 3 steps are required, the layout, hierarchical headings are not organized with the pictures.

Figure 4.5. Example of before editing

After edit: as figure 4.6, adding the headings and re-organized the layout with more clearly.

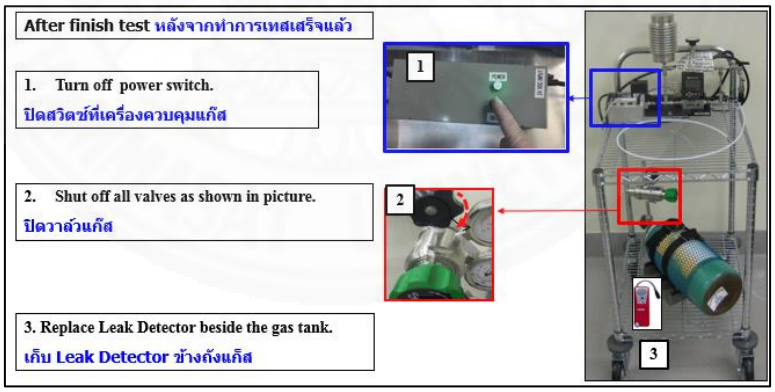

Figure 4.6. Example of before editing

4.1.1.2 Breakdown of the improvement by skill: b) language skills

The results of measuring the improvement of language skills are shown in Table 4.4. It revealed that seven of the ten engineers had a significantly high percent of improvement in the range from 7% to 27%. Meanwhile, the other three

engineers showed 0% change, which meant that there was no improvement after genre-based teaching.

	% Improvement of Language skills
E1	27%
E2	7%
E3	20%
E4	15%
E5	7%
E6	0%
E7	33%
E8	0%
E9	0%
E10	10%
Mean	**9%**

Table 4.4 Percent Improvement of Language skills

Only a few engineers appeared to improve their grammar and usage. The key point of grammar is the imperative mood, which most engineers can use correctly because they have some prior experience in using it. There were three main grammar points which were responsible for most of the mistakes, namely a) adverb; b) article a/an/the and countable noun/uncountable nouns; and c) verbs: using–ing or to+ infinitive.

For example:

'*Turn the knob quarter turn clockwise'* is edited to

'*Turn the knob a quarter turn clockwise*.'

'*Carefully tighten with 2 pc of screw to avoid Fan crack*' is edited to

'*Carefully tighten with 2 pc of screw to avoid cracking the Fan*.'

'Assembly PCB into Fan Back Wall' is edited to

'*Assemble PCB into Fan Back Wall'*

Most of the engineers had no problems to spell words correctly and got a high rated score. Only a few engineers improved slightly for misspelled words.

For example:

Adjust knop to measure Vdc. "knop" is edited to "knob" which is a rounded button for adjusting or controlling a machine.

"Were protective gloved" is edited to "*Wear protective gloves*".

Nearly all engineers used the right punctuation such as hyphen, capital letter, comma, colons, number etc. Only a few engineers improved their mistakes of punctuation.

For example:

"*Turn the knob a quarter turn clock-wise."* is edited to "*Turn the knob a quarter turn clockwise."*

"*Set RF power 2+/-0.1W."* is edited to *"Set RF power 2.0 +/- 0.1W."*

"If meter shows flow more than 1.0 scc/m Must be use the leak detector detect gas." is edited to

"If meter shows flow more than 1.0 scc/m, must use the leak detector to detect gas."

Most engineers appeared to be aware how to write work instructions concisely after finishing revising the document.

For example:

"Use tooling adjust trimpot inside of AOM RF driver for RF power setting to 2.0+/-0.1 W." is edited to *"Use trimmer to adjust trimpot to set AOM RF power 2.0+/-0.1 W."*

"Don't stem flowing air." is edited *to "Don't block the airflow."*

"Turn on the black valve control by turn valve in counter clockwise direction." is edited to

"Turn the black valve counter-clockwise."

4.1.2 Results of the interview

The first question the participants were asked was to score the difficulty of the following parts of work instruction writing by assigning them a score from 1 (very easy) to 5 (the most difficult). The results are shown in Table 4.5

Year experiences	**1**	**2**	**8**	**10**	**Years**
Difficulty parts/ Engineer	E1	E2	E3	E4	Mean
understanding	4	5	5	3	4.5
objectives	2	2	4	4	4
being concise	3	4	4	4	4
being clear	2	2	4	4	4
being ambiguous	3	3	3	5	3
using visual aids	1	2	3	1	2
writing English	4	5	5	3	4.5

Table 4.5: Summary of interview question 1

Opinion of the difficulty of each element of work instruction writing

The second question the participants were asked was to share their opinion about whether the teaching method can help them understand how to write work instructions. (Teaching method). All engineers stated that this teaching method was more understandable than other methods they had learned when it comes to how to write work instructions. The following notion from engineers illustrated what engineers had learnt:

E1 gave the answer that:

"This program helped me better understand and learn the right sequence of writing work instructions. I now understand the importance of each part, and can now write more clearly and without ambiguity. Furthermore, I am able to use the language better including the use of English grammar, which is now more accurate"

E2 gave the answer that:

"I can see a wider picture of how the sequence is, and how to layout the instructions. It gave a useful set of guidelines for using useful vocabulary and phrases. There are more words I can now use, and not just only one word one meaning."

E3 gave the answer that:

"It helps to understand more specifically the important examples in the various types of training and helps to better understand the language use.

E4 gave the answer that:

"I better understood how to write work instructions and the right sequence of writing work instructions. I now understand the purpose of writing clearly, and can write work instructions that are clear and not ambiguous. In addition, I can use the language and grammar in English better and more accurately.

The answers to the second question (whether the teaching method can help them understand how to write work instructions) were categorized into five themes, as shown in Table 4.6

Theme	Frequency	% Frequency
1 Learn the right sequence	IIII	100%
2 Use the language better (Grammar, vocabulary, phrases)	IIII	100%
3 Write more clearly and without ambiguity	II	50%
4 Understand the importance of each part	I	25%
5 Layout of the instructions	I	25%

Table 4.6 Theme of the second question

Participants were asked the third question to share an opinion about whether practicing with exercises can improve their writing ability (Teaching activities and achievements)

E1 gave the answer that:

"The training can improve our skills by learning from good and bad examples. I can now see clearly the errors in writing work instructions. I can also adapt and update my knowledge in the next work instructions I write. Work in pairs helps us to think. There is one exercise I didn't know the process and then must take time to understand."

E2 gave the answer that:

"Absolutely, the exercises can be used and adapted to improve the next work instructions, as I'm not good at grammar. Some exercises were quite difficult because I don't know vocabulary. "

E3 gave the answer that:

"Yes, it can be used as a model for writing future work instructions."

E4 gave the answer that:

"This program can be used in the future. If we have learnt to write good work instructions this will allow us to know the flaws in our WI writing, and we can take good examples from training to adapt and improve on our work instruction writing.

Their opinions about whether practicing with exercises can improve their writing ability (as asked in the third question) were categorized into three themes, as shown in Table 4.7

Theme	Frequency	% Frequency
1 Adapt and update the knowledge in the next work instructions	IIII	100%
2 Improve our skills by learning from good and bad examples	II	50%
3 Working in pairs helps us to think	I	25%

Table 4.7 Theme of the third question

Participants were asked the fourth question about what they will do if they cannot think of words or phrases to write.

E1 gave the answer that:

"I came up with words or phrases by looking them up in a dictionary and selecting the simple words or tried to elicit the words that people find easy to understand from their experience in order to make work instructions more friendly to the user. As a result, the user can follow the work instructions correctly even if the users are not good at English."

E2 gave the answer that:

"I usually use translation tool like Google translate. Sometimes, I get the right words and phrases but some technical terms cannot be translated via Google. I always use pictures instead of using words and phrases such as 'follow the picture' or

'see as the picture'. I know it's not good and get feedback from users. Then I ask my colleague or boss who knows.

E3 gave the answer that:

"When I cannot think about the English words or phrases, I ask or consult with colleagues who are native speakers or who have prior experience."

E4 gave the answer that:

"I search online dictionary or Google translate, and select the simplest words or words that provide the easiest means for everyone to read and that the readers can follow correctly. Although not in good English. We will use the image to illustrate the process to make easy understanding. Include directional symbols in the image to know the sequence of work such as the process requires movement.

The opinions about what they will do if they cannot think of words or phrases to write were categorized into four themes, as shown in Table 4.8

Theme	Frequency	% Frequency
1 Use a dictionary / online dictionary	III	75%
2 Use translation tool (Google translate)	III	50%
3 Use pictures instead of using words and phrases such as 'follow the picture' or 'see the picture'.	II	50%
4 Ask my colleague or boss who knows Ask or consult with colleagues who are native speakers or who have prior experience.	II	50%

Table 4.8 Theme of the fourth question

Participants were asked the last question to share an opinion after this course they will be able to use more appropriate language (Language use)

E1 gave the answer that:

"I think that I'm going to use the language more appropriate. Particularly, the verb is used various parts in the process."

E2 gave the answer that:

"I think that vocabulary and grammar are important. If I know more vocabulary, I can use English better. What I learned from training, imitate the phrases from other work instructions"

E3 gave the answer that:

"I will use easy words that are more easily attributed to work instruction writing in real work.

E4 gave the answer that:

"I think that I will use the language better including English grammar, especially the use of verbs and adverbs in the description of assembly work.

The opinion is that they will be able to use more appropriate language after this course, and their answers to the fifth question were categorized into five themes, as shown in Table 4.9

Theme	Frequency	% Frequency
1 Verb use has improved.	II	50%
2 Vocabulary has improved.	I	25%
3 Know how to copy phrases from other work instructions	I	25%
4 Use simple words that are easier to understand	I	25%
5 Adverbs has improved.	I	25%

Table 4.9 Theme of the fifth question

4.2 Discussion

This section discusses the effect of genre-based writing approach to work instructions writing on Thai-engineers and investigates their attitudes towards the genre-based writing approach to train them to write better works instructions.

4.2.1 The findings of the effect of a genre-based writing approach

The effect of a genre-based approach to teaching Thai-engineers to write work instructions is seen in the difference between the pre-test and post-test scores. It was found that the post-test score increased significantly, with a p value < .05 (p= 0.002). This suggests that an explicit understanding of how target texts are structured is an important advantage in genre-based teaching, as it makes clear the language pattern, and empowers both teacher and engineers. This is in line with the concept of visible pedagogy. It also suggests that the teacher plays a central role in scaffolding engineers' learning by using a variety of exercises and providing a coherent framework for both language and context. This method also increases the teachers' awareness of the genre, thereby enabling the teacher to give clear directions to the engineers. The improvement of writing ability shows two distinct clusters of data. The group of four

engineers who have a high percent of improvement, was observed to have less than three years working experience, ranging from 0.2 to 3 years. Three points above the trend line would suggest that engineers are more likely to improve, while one point below the trend line would suggest that an engineer has some difficulties that would be something to further investigate. One such finding from examining the specific work instructions of these four engineers was the difficulty and the complexity of the process that they had to describe. The greater the difficulty and complexity, the more writers must be aware of organization and language use. Furthermore, six of them who showed a low percent of improvement were found to have more than four years working experience, ranging from 4 to 10 years. The markedly small improvement or no improvement could be due to those engineers already mastering the genre, and with a high pre-test score there would be hardly room to improve. The experience would be one factor to improve writing ability. Moreover, the difficulty and the complexity would be another factor. As Van Laan and Julian (2001:55) stated that the structure or pattern of the document, the complexity of the language and the contents can be correctly written and writer could not design a usable document without knowing its purpose.

However, GBA teaching showed the improvement of work instructions writing on engineers as they had the chance to use the language in daily work. The result also shows the mean of technical content and presentation measurement was higher than the language skills measurement. Before the training, the engineers might not have been aware of the importance of a particular language feature or they lacked proficiency in language skill. It seems that grammatical features were adapted to be more focused for the next step. This is consistent with what Dare and Polias (2001) observed in ESL classrooms in Australia that students need to learn not only the cultural and situational context, but also the lexico-grammatical resources. A lesson plan and material were planned by the text book, but it can also be re-planned or the lesson plan adapted to make it suitable for the engineers.

As Hyon, (1996); Paltridge, (2001) supported that the TLC principles lessons should be clear, should be flexibly modified by scrutinizing the progress of students and their needs. GBA was started to implement with the TLC. GBA teaching required the cooperation of both teachers and learners.

With the concept of genre-based writing instructions in this study, GBA can be considered as a guide line teaching method, which may not only create standardized work instructions writing for both teachers and learners, but also produce a pattern and improve the language features of writers in ESL/EFL. Nevertheless, Myers (2000) argued that the genres are only models and not set patterns of form. Hence, the teacher should have a clear genre-based writing instruction through understanding the settings, functions and communicative purpose implications of particular genres within the context of recurring genre patterns as procedure genre.

4.2.2. The finding of the attitudes of Thai engineers toward genre-based writing approach.

The second objective was to investigate attitudes of Thai engineers toward a genre-based writing approach to write works instruction. Four engineers participated in individual interviews with five questions in a semi-structured interview after the training. Two engineers (E3, E4) have experience 1-2 years and the other two engineers have experience greater than 8 years (E2, E6). The genre-based approach encouraged a positive attitude response towards writing.

The first question asked the engineers to score the difficulty of the parts of work instruction writing. The answers showed that the two parts they apparently had most difficult coping with were a) understanding the process of writing work instructions and b) writing in English. If they use the language appropriately with knowing the technical content, they are able to write in a way that makes understanding easy for the users. Conversely, if they write without understanding the process, then they use the language inappropriately. It indicates that the lesson plan can be adjusted to compensate for any lack in the engineers' knowledge.

Engineers also gave positive responses to the second question about the teaching method. From the content analysis, the most frequent responses were for theme 1 (that the students felt that they learned in the right sequence) and theme 2 (that they better understand how to write work instructions). They said that the training provided a systematic way to understand how a text moves and the structure on writing work instruction. Engineers responded that the knowledge and techniques learnt from this training were very useful and they would be able to apply them to their processes.

Theme 3 (writing clearly and unambiguously), theme 4 (understanding the importance of each part), and theme 5 (the pattern or organization) were also mentioned to be very useful.

Engineers also gave positive responses to the third question, about the activities and exercises in this course which provided opportunities to practice written English (theme 1). Moreover, learning from good and bad examples of context was useful (theme 2). Most of the engineers expressed their appreciation for the chance to participate in paired work tasks (theme 3). They can help each other to share ideas for those engineers who have less experience than others. Some feedback was also stated by some engineers; for example, two engineers argued that the exercise was quite difficult because they did not know the vocabulary.

In answer to the fourth question, three strategies to be used when engineers cannot think of words or phrases to write were considered as follows; theme 1, by looking up a dictionary; theme 2, by using a translation tool; and theme 3, by asking more experienced engineers.

Most engineers gave positive responses that after this course they are able to use more appropriate language in the future (fifth question). From the content analysis, the most frequent response was that they could use verbs better was largely due to them being provided with a verb corpus list during the class to explain how to use the most common verbs in work instructions. Theme 2 was that they use more vocabulary. Theme 3 was that they imitate the phrases from other work instructions. Theme 4 was that using simple words is easier when writing, and theme 5 was that they could now better use adverbs in work instructions.

In this chapter, most engineers viewed this training as being very helpful, as it helped develop their writing ability organization and language use of work instruction. In addition, the training helps engineers to develop abilities of successful analysis both text and characteristic of technical writing through TLC stages in GBA teaching.

CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of the study with regard to research questions, limitations of this study, pedagogical implications, conclusions, and recommendations for further research.

5.1 Summary of the study

5.1.1 The effect of a genre-based teaching approach on Thai-engineers' work instructions writing.

A genre-based approach (GBA) to teaching enables engineers to manipulate how genres are constructed differently in terms of the technical content, presentation and use of language to achieve its purpose. In this study, the result revealed that the GBA afforded engineers an ability to draw on the knowledge they had acquired regarding the genre in order to improve their writing of work instructions with p-value < 0.05 ($p=0.002$). The teaching consisted of the following three items: a) technical content, which made engineers recognize what content they should include in their work instructions; b) presentation, which includes the use of visual aids (e.g. pictures), suitable page layout, fonts and hierarchical headings; and c) the appropriate use of language. Genre-based approach teaching is very helpful, as demonstrated in the results detailed in Chapter 4.

5.1.2 Engineers' attitudes toward a genre-based approach

The findings from this study about engineers' attitudes towards a genre-based teaching approach revealed very positive responses. A representative sample of the participants in the training were interviewed, and the majority found the two most difficult parts of writing work instructions were, firstly, understanding how to write to be understood, and secondly, writing in English. Both are related parts for writing work instructions because the main language use is English and they have to write to be understood. The engineers gave positive responses to the teaching method and also stated that the techniques learnt from this training were very useful and applicable to their processes. They improved their understanding of the right sequence of writing

work instructions. Learning through pair-work was also mentioned to be very useful. The activities and exercises in the course were provided to practice written English. Moreover, most of the participants appreciated the pair work strategy in the classroom, as it was easier for those engineers who have less experience than others to share ideas. Most of the engineers were able to use more appropriate language in the future such as verbs and adverbs which are the most frequently used parts of speech in work instructions. They also gained useful vocabulary and phrase lists to clearly explain the process of assembling the product.

5.2 Limitations of the study

First, the study involved Thai engineers from only one company, so it may not be safe to generalize the conclusions to the larger population. Second, only a small number of engineers participated in this study, so future studies with a larger class size might, as a consequence, need to allow more teaching time and provide more teaching support. A further consideration is that the classes were held during the engineers' working hours, disrupting their daily routines and possibly distracting the engineers from focusing on the lessons. If the study had been carried out as part of the compulsory orientation training for new employees, the engineers might have benefitted more. Finally, it is worth pointing out that the extent of the engineers' improvement had a strong negative correlation with their pre-existing writing skills and experience, an important factor to take into account by future researchers when selecting their sample group. These are the main limitations of the study; however, they don't significantly detract from the conclusion about the usefulness of a genre-based approach to teaching writing skills to Thai engineers.

5.3 Pedagogical implications

Where the focus is on a teaching approach, the teacher’s knowledge and skills, the engineers’ background, and the awareness of GBAs are probably considered as the first priority. Therefore, the key aspects on the adoption of a GBA are a) the linguistic knowledge regarding the move and structure of genres, and b) the teaching skills, including the selection of materials. The strategies of GBA and materials used need to

be prepared for engineers who have different backgrounds and different levels of proficiency. The TLC implementation in a GBA can be strongly recommended on the basis of this study, recognizing that the teaching and processes are flexible, and can be recycled at any time. Having said that, it is the teacher's responsibility to provide strategies for the engineers to analyze the technical content, presentation and language features to serve their process. Traditional grammar instruction is also necessary, but needs to be based on the particular language features essential to the genre. This has the added benefit of increasing the engineers' ability to use the language.

Where the focus is on varieties practice, writing work instructions for a process seems to be problematic if the engineers do not know about organization and language use. Teachers who are native speakers (NS) or non-native speakers (NNS) of English should prepare their linguistic knowledge, and not just focus on the technical content. However, a variety of exercises could be used to facilitate describing process and could be used to extend the lexicon.

Where the focus is on process writing, the teacher should be aware that comments are valued on the basis that they help to improve the engineers' writing.

To conclude, this study strongly supports the use of a GBA for teaching work instruction writing, which is a type of technical writing, in order to enhance the teacher's knowledge, experience and skills in teaching and improve the learning of Thai engineers. As the result of the study, this work has delivered useful material and engineers will use it to develop their writing, which is in line with the notion of appropriate pedagogy.

5.4 Conclusions

It is clear that there is no single approach or best method which is appropriate for all learning styles in teaching and learning English, and there is no one teaching method which is inherently superior to the others. However, the researcher selected the genre-based approach because the focus is specifically on the expected audience and the text is to be constructed to serve a particular communicative purpose. The GBA, to a large extent, also envisages an end product which resembles model texts of a

particular genre or text type. This can be perceived through the principle of explicit assessment, which is in line with the concept of visible pedagogy.

In conclusion, the study shows that the genre-based approach apparently provides a helpful method for Thai-engineers to learn how to write work instructions, a kind of technical writing. It enables engineers to better understand the move and structure of how to write work instructions with a) an accurate, concise and unambiguous technical content, b) an easy to follow presentation and c) an accurate use of English grammar, spelling and punctuation. It supports engineers to use written English language and results in promoting the engineers' writing ability. Engineers are able to manipulate the genre no matter what their background or English proficiency level. The result can support that a genre-based approach empowers engineers to perceive the purpose in professional settings written genres and move structure and, additionally, become aware of the necessary information required in a specific genre such as work instruction writing. With the specific content in an engineering field, this approach showed significant improvement in the part of technical content, presentation characteristics and language skills. In this sense, the study exposed that a genre-based approach could expand the ability to engage Thai engineers to help them to think positively about getting more involved in their field career. It was learnt from the interviews, additionally, that this approach provides engineers with a comprehensive way to approach content by doing some exercises and studying an example of work instructions from others in the classroom activities. They discussed and analyzed the context of work instruction writing in a concrete way in line with their experience.

5.5 Recommedations

According to the results and findings from the study, the recommendations should be considered and be suggested for further research in order to indicate how this approach could contribute to work instruction context.

The implication of this training is expected to extend to providing opportunities to develop other skills. It is recommended that future research be conducted into the following considerations: employing a genre-based approach to teaching other kinds of genres; employing this approach in the official orientation compulsory course for new

employees and also employing this approach for teaching grammar and how to use a dictionary effectively.

1. Employing a genre-based approach to teach other type of genres

The findings from many studies have demonstrated this approach to be very beneficial. One goal of this approach is to help learners in the achievement of a particular communicative purpose. Therefore, it would be very useful to employ this approach in other types of technical writing genres such as a technical report, a failure analysis report, or a lab report. Such a course would consider the extent to which the engineers are able to apply structures to impart scientific/engineering thinking. It is envisaged that a genre-based approach would be beneficial and valuable for engineers, helping them to improve their communication competence and help their professional career development.

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2. Employing this approach in the compulsory orientation course for new employees

Work instruction writing is a responsibility for engineers who are in charge of assembling a product. Due to the international nature of the company, English language is mandatory for this task. There are extra-curricular classes provided by the company, but they do include English language use. It is recommended that this approach could be used as supporting the existing courses. This would imply making a class size larger than was used in this study, so the course might have to be adapted slightly in order to set an effective learning course.

3. Employing this approach to teach grammar and how to use a dictionary effectively.

As a result, it is recommended that teaching grammar could be considered as supporting existing courses. These could include teaching how to use a dictionary, both paper and online. Engineers should know how to use a dictionary to help them find out the grammatical details about a particular word, for example countable or uncountable, also helping them to check the part of speech, to check spelling and to find a useful synonym.

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APPENDICES

APPENDIX A

The index of item-objective Congruence: IOC

By expert _____

Profile

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THE EFFECTS OF GENRE-BASED TEACHING ON ENHANCEMENT OF THAI ENGINEERS' TECHNICAL WRITING ABILITY: A STUDY OF THAI IN AN INTERNATIONAL COMPANY

By

Tanaporn Ueasiriphan

Advisor Associate Professor Supong Tangkiengsirisin, Ph.D.

IOC 1. Course design (lesson plan)
IOC 2. Technical Instruction Writing Rubric score
IOC 3. Interview Question (English version)

OBJECTIVES OF THE STUDY

To this end, the study tried to answer the objectives of this research the two following questions:

1. To investigate effects of genre-based writing approach on technical writing ability with a focus on manual instruction writing among Thai engineers
2. To investigate attitudes of Thai engineers toward genre-based writing approach to manual instruction writing.

RESEARCH QUESTIONS

Based on the raised objective the following research questions are suggested:

1. What effects does genre-based writing approach have of Thai-engineers on manual instruction writing among Thai engineers?
2. What are Thai engineers' attitudes toward genre-based writing approach to manual instruction writing?

SCOPE OF THE STUDY

This research will conduct pre-test on how to write instruction manual as technical writing with 10 Thai engineers who are responsible for product assembly and product testing. In this study, the researcher designs the course and teaches how to write instruction manual in a genre-based approach method. The teaching material is prepared in a way to conform to the procedures carried out during class instruction. After 8-week treatment, post-test is administered to investigation the improvement on technical writing. After collecting the data and by analyzing the pre-test score comparing to post-tests score based on Technical Instruction Writing Rubric score as

instruction manual. The interview of the attitude those 10 engineers toward genre-based approach is conducted after the course. The independent variable is genre-based approach. The dependent variable is writing ability and attitudes.

IOC 1. Lesson plan

	TLC method	Aim	Teacher activities	Expert 1	Expert 2	Expert 3	Total	The IOC Index Mean of Expert Scores
Week 1	**1st stage Building knowledge of the field**	1. hand in Pre-test	1.T accept the instruction writing from engineers	1	1	1	3	IOC1 = 3/3 = 1
		2. To review how much Ss know about writing work instructions and their importance.	2.Warm up by talking about Technical Instructions Planning Sheet What are work instructions? And why are they important?	1	1	1	3	IOC1 = 3/3 = 1
		3. To review how much Ss know about structure and linguistic features (active / passive voice; indicative vs imperative or subjunctive mood; use of articles.)	3.Warm up with an exercise Model text 1, hand out a Model text 1 to the class and ask what the purpose of this text is. Ask them to discuss their answers about the purpose of the model text as well as its structure and linguistic features	1	1	1	3	IOC1 = 3/3 = 1
		4. To elicit engineers' background knowledge about the instruction/process text. Encourage engineer to brainstorm ideas on the purpose of the instruction/process genre. To draw engineers' attention to related vocabulary and content, which probably vary from people to people.	4.Good versus bad work instructions. Give examples of bad instructions - redundant, inacurate, unclear, ambiguous, long-winded.... Give examples of good instructions - concise, clear, well-organised, unambiguous	1	1	1	3	IOC1 = 3/3 = 1
Week 2	**2nd stage Modeling**	1. To explain Structure of Instruction/Process and the genre analysis about movement	5.T explain the structure of Instruction/Process and the genre analysis about movement	1	1	1	3	IOC1 = 3/3 = 1
			6.Give out Model texts 2-6 to work in pairs. Ask engineers to find out about the schematic structure and the language features of the text. Use the following questions lead to discuss: - What is the text written for? – How complicate it is? - Who is the audience? - What is bad/good in the text? - What tense is mostly used in the text? - What else of language features can be found in this kind of text? - What is the overall structure of the text?	1	1	1	3	IOC1 = 3/3 = 1
			7.After engineers have deconstructed the model, ask each group to get prepared for a presentation of the findings. Have engineers nominate a representative to present their findings. Give feedback to the whole class and raise questions for engineers to discuss together. Help engineers to reach conclusions about the structure and the language features of the instruction/ process text type.	1	1	1	3	IOC1 = 3/3 = 1

Week 3-4	**2nd stage Modeling**	2. To explain Instruction writing styles and criteria	8.. Explain good technical writing and criteria of how to write instructions - to understand the elements of style in technical writing and become familiar with the style that is most suitable for instruction writing - to understand when to use illustrations and understand what constitutes a helpful illustration	1	1	1	3	IOC1 = 3/3 = 1
			9. Reuse Model text 2-6 and talk about what have we learned? What have we learned about instruction writing? Talk about structure all together: orientation, instruction, facilitation, validation or optioning	1	1	1	3	IOC1 = 3/3 = 1
Week 5	**3rd stage Joint construction**	Have the class share ideas of planning to jointly construct a text.	10. Divide engineers to work in pairs and provide each group with a text (Model text 7). First part is to provide the pictures of step instruction of the product, then engineers write and describe the actions/processes. The second part, the paragraph order has been mixed up (Model text 8), and ask engineers in each group to look an event of technical sentence. The third part is to check language forms of technical instructions. Provide assistance if needed for each group and draw engineers' attention to the organized structures and the language features of the text (Model text 9). T takes the role of scribe whose responsibility is to write what engineers contribute appropriately as written form and explicitly instruct them how to deal with each stage of writing.	1	1	1	2	IOC1 = 3/3 = 1
Week 6	**4th stage Independent construction**	Revising and editing their own writing.	12. Have engineers begin writing independently. Be available to them for their writing support. Remind engineers about revising and editing their own writing. Ask engineers to hand in their work.	-1	1	1	1	IOC1 = 1/3 = 0.33
Week 7	**5th stage Linking related texts**	To further know more other kinds of instruction writing	13.Let engineers think and discuss about other kinds of instruction writing such as preventive maintenance, MSDS document, assembly product, testing product, packing product, Machine software installation, facility process and so on.	-1	1	1	1	IOC1 = 1/3 = 0.33
		Post test- Instruction writing Peer-teacher review	14.Post-test , 1. Peer-teacher review, then ask engineers to re-edit their own writing and rewrite it. 2. Discuss with each engineer and their own writing.	-1	1	1	1	IOC1 = 1/3 = 0.33
Week 8	**Sharing instruction**	To share lessons learned and give feedback	15.T asks Ss to prepare for individual presentation with engineers. Provide an individual with final feedback of what they have learned and ask them to finalise their writing before submitting to the customer.	1	1	1	3	IOC1 = 3/3 = 1

IOC 2. Technical Instruction Writing Rubric score

1 for expert judging “Yes”, 0 for expert judging “Questionable” และ -1 for expert judging “No”

Content	Teacher’s score	Peer reviewer’s score	Expert’s opinion (Valid?)
Are the purpose and objective clearly stated?			
Is this document easy to read and follow?			
Presentation			
Are the visual aids and picture helpful?			
Is the composition to your liking? (page layout, fonts heading, etc)			
Language skills			
Is the grammar acceptable?			
Are there any misspelled words?			
Is the punctuation acceptable?			
Is this document as concise as it can be?			

Adapted from G. Budinski, Kenneth. (2001). *Engineers’ Guide to Technical Writing*. ASM International: USA

	4	3	2	1	Expert's opinion (Valid?)
Content					
Purpose/Aim	Purpose/aim of instructions is very clear.	Purpose/aim is quite clear, but not outlined well for the audience.	Purpose/aim is not clear at all. Text just starts with instructions.	No attent to purpose/aim of instructions.	
Clarity	The instructions are easy to follow.	The instructions are quite easy to follow.	Parts of the instructions are easy to follow.	The instructions are difficult to follow.	
Presentation					
Use of Images and Labels (if necessary for these instructions)	Well-labeled pictures accompany the instructions. The images make the instructions clear and easy to follow.	Well-labeled pictures accompany the instructions.	Some pictures are included with the instructions, but they are not clear, well-labeled, or connected to the text.	No pictures are included in the instructions. The document includes text only.	
Organisation (eg bullet points, steps, headings, sub-headings)	Instructions are very well organized into major sections with clear labels.	Instructions are well organized into major sections that are labeled.	Instructions are poorly organized.	Instructions have no clear organization at all.	
Language skills					
Grammar and Sentences	Sentences are concise and use imperative verbs where appropriate.	Most of the sentences are concise and usually use imperative verbs where appropriate.	Some of the sentences are concise and sometimes use imperative verbs where appropriate.	Sentences are long and do not use imperative verbs.	
Mechanics	1 Correct punctuation 2 Correct spelling 3 Correct grammar & usage	1 Punctuation is usually correct 2 Spelling is usually correct 3 Grammar & usage somewhat flawed	1. Punctuation is sometimes incorrect 2.Spelling is sometimes incorrect 3. Grammar & usage often flawed	1 Punctuation often incorrect 2 Spelling often incorrect 3 Excessive grammar and usage errors distort the message	
Conciseness	The sentence effectively targets the intended audience both in the amount of information and the way in which it is presented	Most of the time the content is appropriate but not presented as concisely as it could be	Sentences contain a lot of extraneous information due largely to too much procedural detail	Sentences contain a lot of extraneous information and does not effectively utilize technical terms	

IOC 3. Interview Question (English version)

1 for expert judging “Yes”, 0 for expert judging “Questionable” และ -1 for expert judging “No”

No	Question	Expert’s opinion (Valid?)
1	What do you think about which part is difficult when you start to write instruction manual if there is scores 1(low) to 5(high) why?	
2	Do you think to teaching method can help to understand of how to write instruction manual? (teaching method)	
3	Do you think to practice with exercise can improve you to write instruction manual better? (teaching activities and achievement)	
4	What would you do if you cannot think of words or phrases to write?	
5	Do you think to write instruction after teaching can use more appropriate language? (Language use)	

APPENDIX B

IOC Adapted version

IOC 1. Lesson plan

	TLC method	Aim	Teacher activities	Expert 1	Expert 2	Expert 3	Total	The IOC Index Mean of Expert Scores
Week 1	**1st stage Building knowledge of the field**	1. hand in Pre-test	1.T accept the instruction writing from engineers	1	1	1	3	IOC1 = 3/3 = 1
		2. To review how much Ss know about writing work instructions and their importance.	2.Warm up by talking about Technical Instructions Planning Sheet What are work instructions? And why are they important?	1	1	1	3	IOC1 = 3/3 = 1
		3. To review how much Ss know about structure and linguistic features (active / passive voice; indicative vs imperative or subjunctive mood; use of articles.)	3.Warm up with an exercise Model text 1, hand out a Model text 1 to the class and ask what the purpose of this text is. Ask them to discuss their answers about the purpose of the model text as well as its structure and linguistic features	1	1	1	3	IOC1 = 3/3 = 1
		4. To elicit engineers' background knowledge about the instruction/process text. Encourage engineer to brainstorm ideas on the purpose of the instruction/process genre. To draw engineers' attention to related vocabulary and content, which probably vary from people to people.	4.Good versus bad work instructions. Give examples of bad instructions - redundant, inacurate, unclear, ambiguous, long-winded.... Give examples of good instructions - concise, clear, well-organised, unambiguous	1	1	1	3	IOC1 = 3/3 = 1
Week 2	**2nd stage Modeling**	1. To explain Structure of Instruction/Process and the genre analysis about movement	5.T explain the structure of Instruction/Process and the genre analysis about movement	1	1	1	3	IOC1 = 3/3 = 1
			6.Give out Model texts 2-6 to work in pairs. Ask engineers to find out about the schematic structure and the language features of the text. Use the following questions lead to discuss: - What is the text written for? – How complicated is it? - Who is the audience? - What is bad/good in the text? - What tense is mostly used in the text? - What other language features can be found in this kind of text? - What is the overall structure of the text?	1	1	1	3	IOC1 = 3/3 = 1
			7.After engineers have deconstructed the model, ask each group to get prepared for a presentation of the findings. Have engineers nominate a representative to present their findings. Give feedback to the whole class and raise questions for engineers to discuss together. Help engineers to reach conclusions about the structure and the language features of the instruction/ process text type.	1	1	1	3	IOC1 = 3/3 = 1

Week 3-4	**2nd stage Modeling**	2. To explain Instruction writing styles and criteria	8.. Explain good technical writing and criteria of how to write instructions - to understand the elements of style in technical writing and become familiar with the style that is most suitable for instruction writing - to understand when to use illustrations and understand what constitutes a helpful illustration	1	1	1	3	IOC1 = 3/3 = 1
			9. Reuse Model text 2-6 and talk about what have we learned? What have we learned about instruction writing? Talk about structure all together: orientation, instruction, facilitation, validation or optioning	1	1	1	3	IOC1 = 3/3 = 1
Week 5	**3rd stage Joint construction**	Have the class share ideas of planning to jointly construct a text.	10. Divide engineers to work in pairs and provide each group with a text (Model text 7). First part is to provide the pictures of step instruction of the product, then engineers write and describe the actions/processes. The second part, the paragraph order has been mixed up (Model text 8), and ask engineers in each group to look an event of technical sentence. The third part is to check language forms of technical instructions. Provide assistance if needed for each group and draw engineers' attention to the organized structures and the language features of the text (Model text 9). T takes the role of scribe whose responsibility is to write what engineers contribute appropriately as written form and explicitly instruct them how to deal with each stage of writing.	1	1	1	2	IOC1 = 3/3 = 1
Week 6	**4th stage Independent construction**	Revising and editing their own writing.	12. Have engineers begin writing independently. Be available to them for their writing support. Remind engineers about revising and editing their own writing. Ask engineers to hand in their work.	0	1	1	2	IOC1 = 2/3 = 0.67
Week 7	**5th stage Linking related texts**	To further know more other kinds of instruction writing	13.Let engineers think and discuss about other kinds of instruction writing such as preventive maintenance, MSDS document, assembly product, testing product, packing product, Machine software installation, facility process and so on.	0	1	1	2	IOC1 = 2/3 = 0.67
		Post test- Instruction writing Peer-teacher review	14.Post-test , 1. Peer-teacher review, then ask engineers to re-edit their own writing and rewrite it. 2. Discuss with each engineer and their own writing.	0	1	1	2	IOC1 = 2/3 = 0.67
Week 8	**Sharing instruction**	To share lessons learned and give feedback	15.T asks Ss to prepare for individual presentation with engineers. Provide an individual with final feedback of what they have learned and ask them to finalise their writing before submitting to the customer.	1	1	1	3	IOC1 = 3/3 = 1

Lesson plan

Time	minute	Aim	Teacher activities	Student activity	Interaction	Materials	Success indicator
2 hrs	3	1. hand in Pre-test	T accept the instruction writing from engineers	Ss hand in instruction writing	T <--> Ss	Instruction manual document	-
	40	2. To review how much Ss know about writing work instructions and their importance.	Warm up by talking about Technical Instructions Planning Sheet What are work instructions? And why are they important?	Ss share opinions of what they know about the instruction manual and how important it is.	T --> Ss	Powerpoint	Ss can answer what they understand from previous knowledge about how to write instruction manual.
	40	3. To review how much Ss know about structure and linguistic features (active / passive voice; indicative vs imperative or subjunctive mood; use of articles.)	Warm up with an exercise Model text 1, hand out a Model text 1 to the class and ask what the purpose of this text is. Ask them to discuss their answers about the purpose of the model text as well as its structure and linguistic features	Ss look at model text1 and discuss their answers about the purpose of the model text as well as its structure and linguistic features	T <--> Ss	Powerpoint	Ss can see the structure and linguistic features
	37	4. To elicit engineers' background knowledge about the instruction/process text. Encourage engineer to brainstorm ideas on the purpose of the instruction/process genre. To draw engineers' attention to related vocabulary and content, which probably vary from people to people.	Good versus bad work instructions. Give examples of bad instructions - redundant, inacurate, unclear, ambiguous, long-winded.... Give examples of good instructions - concise, clear, well-organised, unambiguous				
2 hrs	50	1. To explain Structure of Instruction/Process and the genre analysis about movement	T explain the structure of Instruction/Process and the genre analysis about movement	Ss look at the movement and pattern following the T's explanation	T --> Ss	Powerpoint	Ss learn about genre and movement of Instruction manual
	10		Give out Model texts 2-6 to work in pairs. Ask engineers to find out about the schematic structure and the language features of the text. Use the following questions as guidelines: - What is the text about? - Why did the writer write the text? - Who is the audience? - What tense is mostly used in the whole text? - What other language features can be found in this kind of text? - What is the overall structure of the text?	Ss work in pairs for Model texts 2-6 to discuss and exaplin as following questions by teacher	T <--> Ss	Course book	Ss can see the structure and linguistic features
	60		After engineers have deconstructed the model, ask each group to get prepared for a presentation of the findings. Have engineers nominate a representative to present their findings. Give feedback to the whole class and raise questions for engineers to discuss together. Help engineers to reach conclusions about the generic structure and the language features of the instruction/ process text type.	Ss present the findings of assigned model text in pairs.	T <--> Ss		Ss can explain the findings and explain an assigned model text in pairs.
2 hrs	120	2. To explain Instruction writing styles and criteria	1. Explain good technical writing and criteria of how to write instructions - to understand the elements of style in technical writing and become familiar with the style that is most suitable for instruction writing - to understand when to use illustrations and understand what constitutes a helpful illustration	Ss listen about good technical writing and criteria of how to writing instruction	T --> Ss	Course book, powerpoint	Ss can learn about good technical writing and criteria of how to writing instruction

	120		2. Reuse Model text 2-6 and talk about what have we learned? What have we learned about instruction writing? Talk about structure all together: orientation, instruction, facilitation, validation or optioning	Ss go back to discuss about model text 2-6 to compare with criteria	T <--> Ss		Ss are able to know and tell the problem of each model text of sample instruction manual
2 hrs	90	Have the class share ideas of planning to jointly construct a text.	1. Divide engineers to work in pairs and provide each group with a text (Model text 7). First part is to provide the pictures of step instruction of the product, then engineers write and describe the actions/processes. The second part, the paragraph order has been mixed up (Model text 8), and ask engineers in each group to rearrange the text into the right order. The third part is to check language forms of technical instructions. Provide assistance if needed for each group and draw engineers' attention to the schematic structure and the language features of the text (Model text 9). T takes the role of scribe whose responsibility is to write what engineers contribute appropriately as written form and explicitly instruct them how to deal with each stage of writing.	Ss work in pairs for Model texts 7-9 Ss get exercise in part of describing the process, next is paragraph order and correct language forms of technical instructions.	Ss< - - > Ss	Course book, powerpoint	Ss can understand more in part of the content, vocabulary and language structure
	30		2. Divide engineers work in pairs and play communication game	Ss reproduce the drawing without seeing	Ss< - - > Ss	Paper and pen	Open their mind to understand how difficult to communicate clearly
2 hrs	120	Revising and editing their own writing.	1. Have engineers begin writing independently. Be available to them for their writing support. 2. Remind engineers about revising and editing their own writing. 3. Ask engineers to hand in their work.	Ss begin revise and edit writing independently and hand in to T	Ss< - - > Ss	Instruction manual document	Ss can learn from GBA teaching to improve instruction manual writing ability
2 hrs	20	To further know more other kinds of instruction writing	Let engineers think and discuss about other kinds of instruction writing such as preventive maintenance, MSDS document, assembly product, testing product, packing product, Machine software installation, facility process and so on.	Ss look at the other kinds of instruction writing	T --> Ss	Instruction manual document	Ss can know more other kinds of instruction writing
	100	Post test- Instruction writing Peer-teacher review	Post-test , 1. Peer-teacher review, then ask engineers to re-edit their own writing and rewrite it. 2. Discuss with each engineer and their own writing.	Ss get feedback from Peer -teacher	T <--> Ss	Instruction manual document	Ss can get feedback and to improve their writing
2 hrs	120	To share lessons learned and give feedback	T asks Ss to prepare for individual presentation with engineers. Provide an individual with final feedback of what they have learned and ask them to finalize their writing before submitting to the customer.	Engineers present their work instructions to each other.	T <--> Ss	powerpoint , word document	Ss are able to write work instructions and understand how important it is including of using the content and language feature.

IOC 2. Technical Instruction Writing Rubric score

1 for expert judging "Yes", 0 for expert judging "Questionable" and -1 for expert judging "No"

Content	Expert 1	Expert 2	Expert 3	Total Score	The IOC Index Mean of Expert Scores
1.Are the purpose and objective clearly stated?	1	1	1	3	IOC1 = 3/3 = 1
2.Is this document easy to read and follow?	1	1	1	3	IOC2 = 3/3 =1
Presentation					
3.Are the visual aids and picture helpful?	1	1	1	3	IOC3 = 3/3 =1
4.Is the composition to your liking? (page layout, fonts heading, etc)	0	1	1	3	IOC4 = 2/3 =0.67
Language skills					
5.Is the grammar acceptable?	1	1	1	3	IOC5 = 3/3 =1
6.Are there any misspelled words?	1	1	1	3	IOC6 = 3/3 =1
7.Is the punctuation acceptable?	1	1	1	3	IOC7 = 3/3 =1
8.Is this document as concise as it can be?	1	1	1	3	IOC8 = 3/3 =1

Adapted from G. Budinski, Kenneth. (2001). Engineers' Guide to Technical Writing. ASM International: USA

	4	3	2	1	Expert 1	Expert 2	Expert 3	Total Score	The IOC Index Mean of Expert Scores
Content									
Purpose/Aim	Purpose/aim of instructions is very clear.	Purpose/aim is quite clear, but not outlined well for the audience.	Purpose/aim is not clear at all. Text just starts with instructions.	No identification purpose/aim of instructions.	1	1	1	3	IOC1 = 3/3 = 1
Clarity	The instructions are easy to follow.	The instructions are quite easy to follow.	Parts of the instructions are easy to follow.	The instructions are difficult to follow.	1	1	1	3	IOC1 = 3/3 = 1
Presentation									
Use of Images and Labels (if necessary for these instructions)	Well-labeled pictures accompany the instructions. The images make the instructions clear and easy to follow.	Well-labeled pictures accompany the instructions.	Some pictures are included with the instructions, but they are not clear, well-labeled, or connected to the text.	No pictures are included in the instructions. The document includes text only.	1	1	1	3	IOC1 = 3/3 = 1
Organisation (eg bullet points, steps, headings, sub-headings)	Instructions are very well organized into major sections with clear labels.	Instructions are well organized into major sections that are labeled.	Instructions are poorly organized.	Instructions have no clear organization at all.	1	1	1	3	IOC1 = 3/3 = 1
Language skills									
Grammar & Sentences structure	Correct grammar & usage.	Grammar & usage somewhat flawed	Grammar & usage often flawed	Excessive grammar and usage errors distort the message.	1	1	1	3	IOC1 = 3/3 = 1
Mechanics	1 Correct punctuation 2 Correct spelling 3. Correct Capitalization	1 Punctuation is usually correct 2 Spelling is usually correct 3. Capitalization is usually correct	1. Punctuation is sometimes incorrect 2.Spelling is sometimes incorrect 3. Capitalization is sometimes incorrect	1 Punctuation is incorrect 2 Spelling is incorrect 3. Capitalization is incorrect	1	1	1	3	IOC1 = 3/3 = 1
Conciseness	The sentence effectively targets the intended audience both in the amount of information and the way in which it is presented	Most of the time the content is appropriate but not presented as concisely as it could be	Sentences contain a lot of extraneous information due largely to too much procedural detail	Sentences contain a lot of extraneous information , long and do not effectively concise as it could be	1	1	1	3	IOC1 = 3/3 = 1

IOC 3. Interview Question (English version)

1 for expert judging “Yes”, 0 for expert judging “Questionable” and -1 for expert judging “No”

No	Question	Expert 1	Expert 2	Expert 3	Total Score	The IOC Index Mean of Expert Scores
1	How would you score the difficulty of the following parts of work instruction writing? Parts: understanding objectives, being concise, being clear, being ambiguous, using visual aids, writing English.	1	1	1	3	IOC1 = 3/3 = 1
2	Do you think this teaching method can help to understand how to write work instructions? (teaching method)	1	1	1	3	IOC1 = 3/3 = 1
3	Do you think practicing with exercises can improve your writing ability? (teaching activities and achievements)	1	1	1	3	IOC1 = 3/3 = 1
4	What will you do if you cannot think of words or phrases to write?	1	1	1	3	IOC1 = 3/3 = 1
5	Do you think after this course you will be able to use more appropriate language? (Language use)	1	1	1	3	IOC1 = 3/3 = 1

APPENDIX C
Consent form

Participant Consent Form

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Project Title: THE EFFECTS OF GENRE-BASED TEACHING ON ENHANCEMENT OF THAI ENGINEERS' TECHNICAL WRITING ABILITY: A STUDY OF THAI IN AN INTERNATIONAL COMPANY

Thesis Adviser: Associate Professor Supong Tangkiengsirisin, Ph.D.

Researcher: Ms. Tanaporn Ueasiriphan

To this end, the study aims to study the two following:

1. To investigate the effects of a genre-based writing approach on the technical writing ability of Thai engineers with a focus on work instruction writing
2. To investigate attitudes of Thai engineers towards a genre-based writing approach to work instruction writing.

RESEARCH QUESTIONS

Based on the above objectives the following research questions are suggested:

1. What effects does a genre-based writing approach have on Thai-engineers on work instruction writing?
2. What are Thai engineers' attitudes towards a genre-based writing approach to manual instruction writing?

SCOPE OF THE STUDY

This research will conduct a pre-test on how to write work instruction as technical writing with 10 Thai engineers who are responsible for product assembly and product testing. The pre-test will be scored using Technical Instruction Writing Rubric. In this study, the researcher will design the course and teach how to write work instruction in a genre-based approach method. The teaching materials are prepared in a way to conform to the procedures carried out during class instruction. After 8 weeks training, a post-test will be administered using the same rubric, to investigate the

improvement of technical writing. After collecting the data, the post-test scores will be compared to the pre-test scores and the results are analyzed. The interview of the attitude of those 10 engineers towards a genre-based approach will be conducted after the course. The independent variable is the genre-based approach. The dependent variables are writing ability and attitudes.

Contact Details:

- **Email**: kiangkyole@gmail.com
- **Telephone**: 08-6364-6082

Thank you for your interest in taking part in this research. Before you agree to take part, the person organizing the research must explain the project to you.

If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you to decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

Participant's Statement

I agree that:

I have read the notes written above and the Information Sheet and/or listened to an explanation about the research, and understand what the study involves.

I voluntarily agree to participate in this research study.

I understand that if I decide at any time that I no longer wish to take part in this project, I can notify the researcher and withdraw immediately.

I understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.

I approve to be contacted in the future by the researcher who would like to invite me to participate in the follow-up studies.

I approve to my interview being audio-recorded and I consent to use of this material as part of the project.

Signature of research participant

_____ _____

(_____) Date

Signature of researcher

I believe the participant is giving informed consent to participate in this study

_____ _____

(Tanaporn Ueasiriphan) Date

APPENDIX D

Technical Instructions Planning Sheet

Before the class starts, engineers have to discuss the following questions on Technical Instructions Planning Sheet and write down your responses as you understand which you can use to get started on your instructions. Share your item and plans for writing instructions.

1. Why is it important to write work instructions?
2. Who will be the audience for your instructions?
3. What language and styles will you have to use?
4. How many different parts [e.g. tooling] will you have to explain for your audience? List the parts.
5. Will you need to include pictures or diagrams in your instructions?
6. Do you agree with this quote “A **picture** is **worth** a thousand words”?
7. What are difficult issues in writing work instructions?

PLEASE BRING WORK INSTRUCTIONS THAT YOU WROTE AND HAND IN DURING THE CLASS

APPENDIX E

Instructional Materials

1. Model Text 1: Inspection and Cleaning Procedures for Fiber-Optic Connections
2. Model Text 2: Overhead Projector pattern I
3. Model Text 3: Overhead Projector pattern II
4. Model Text 4: Pole Display pattern I
5. Model Text 5: Pole Display pattern II
6. Model Text 6: Dry mount photograph
7. Model Text 7: Cell phone dual rear camera replace guide
8. Model Text 8: Sentences of technical writing
9. Model Text 9: Pole Display pattern I and Overhead Projector pattern I

APPENDIX F

Examples of work instructions

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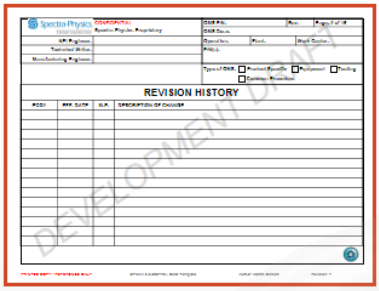

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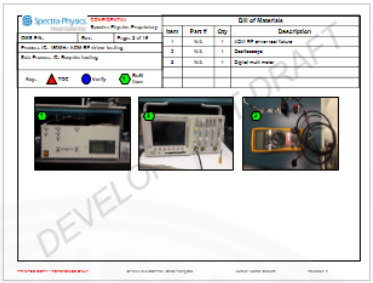
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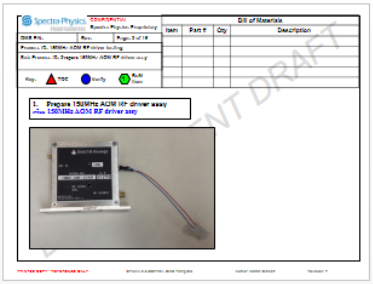
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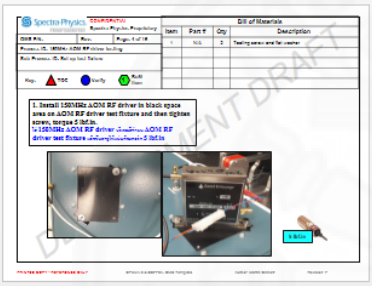
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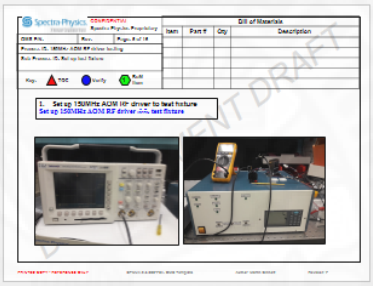
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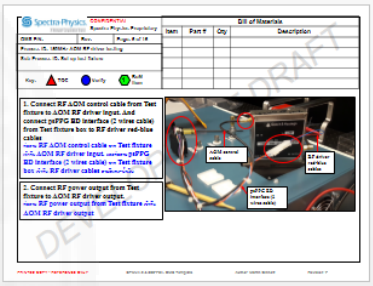
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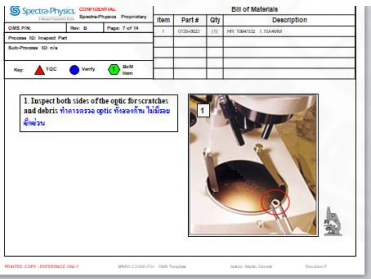
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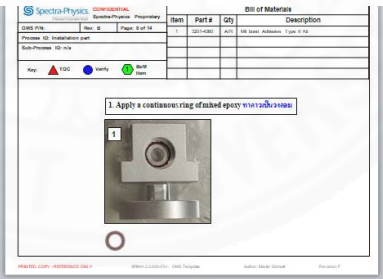
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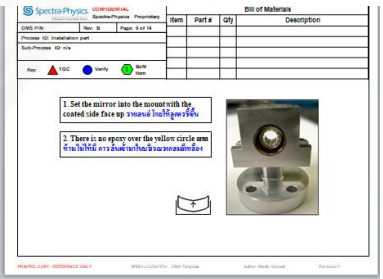
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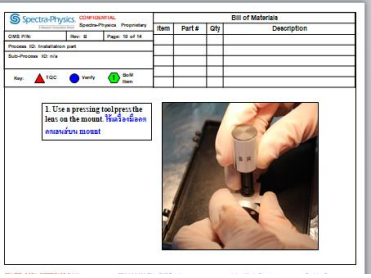

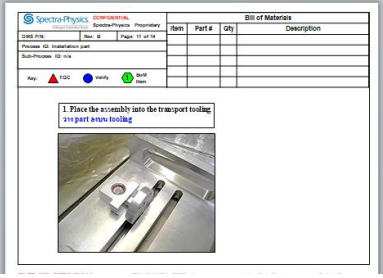

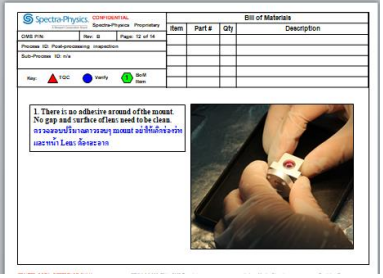

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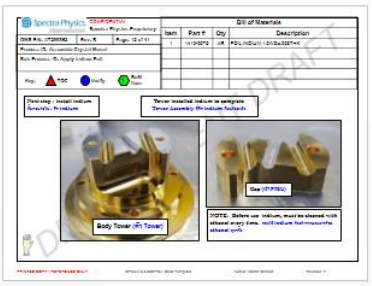

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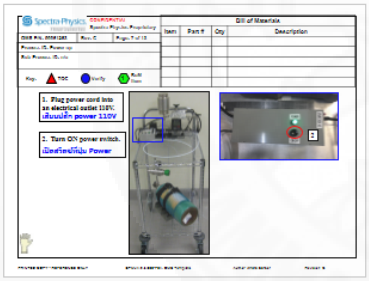

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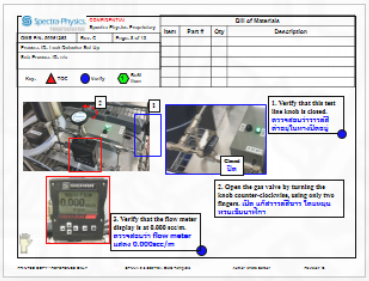

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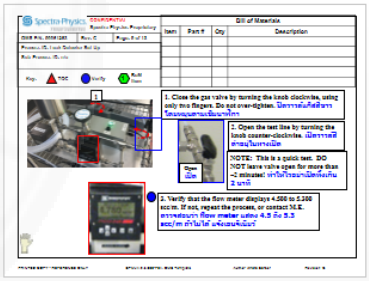

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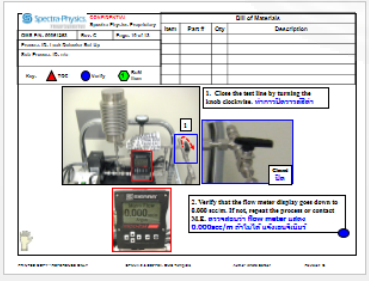

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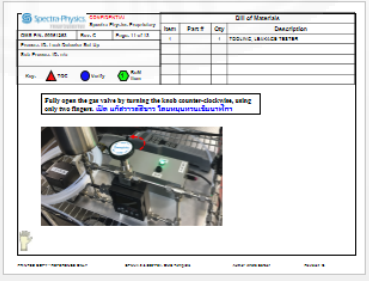

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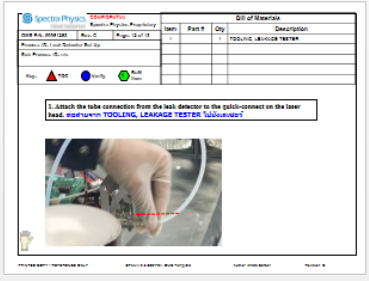

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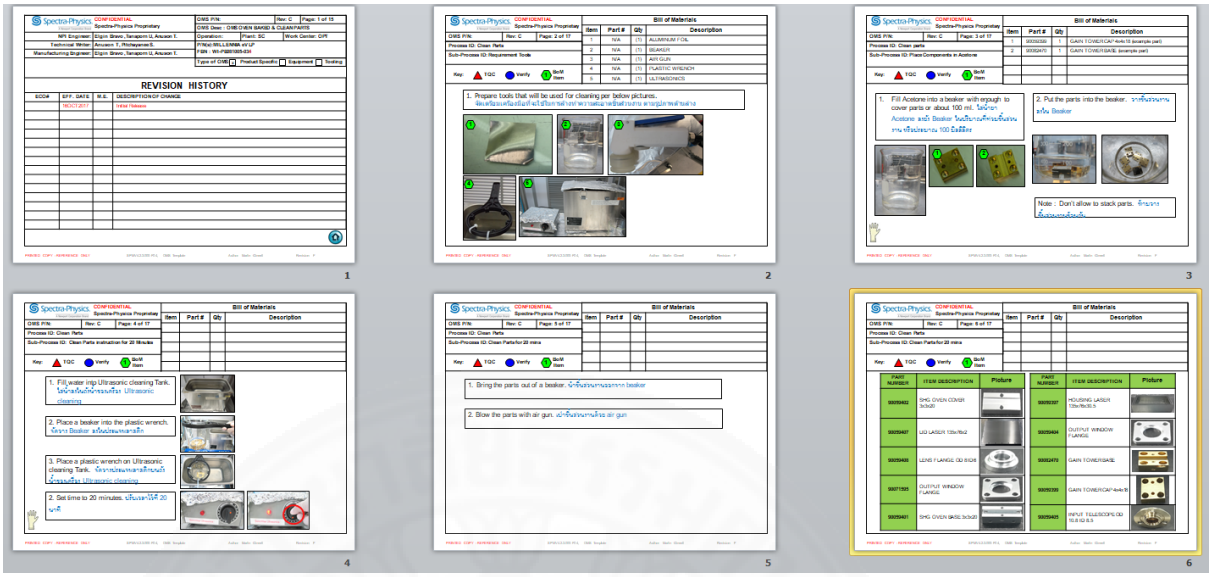

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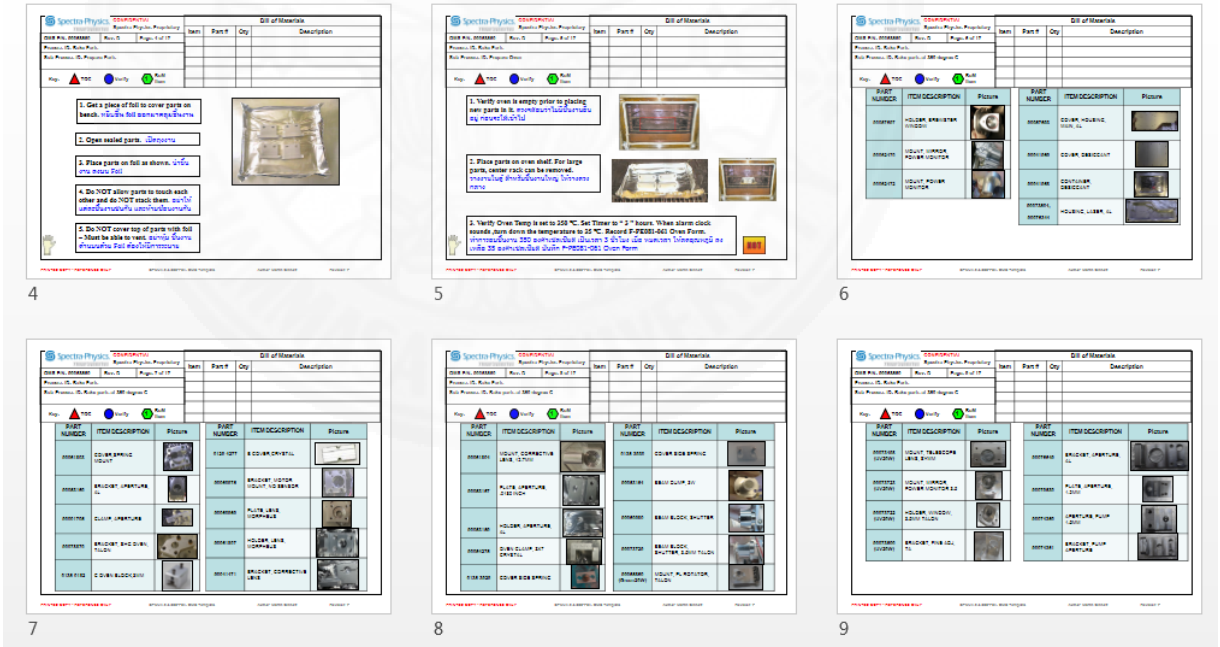

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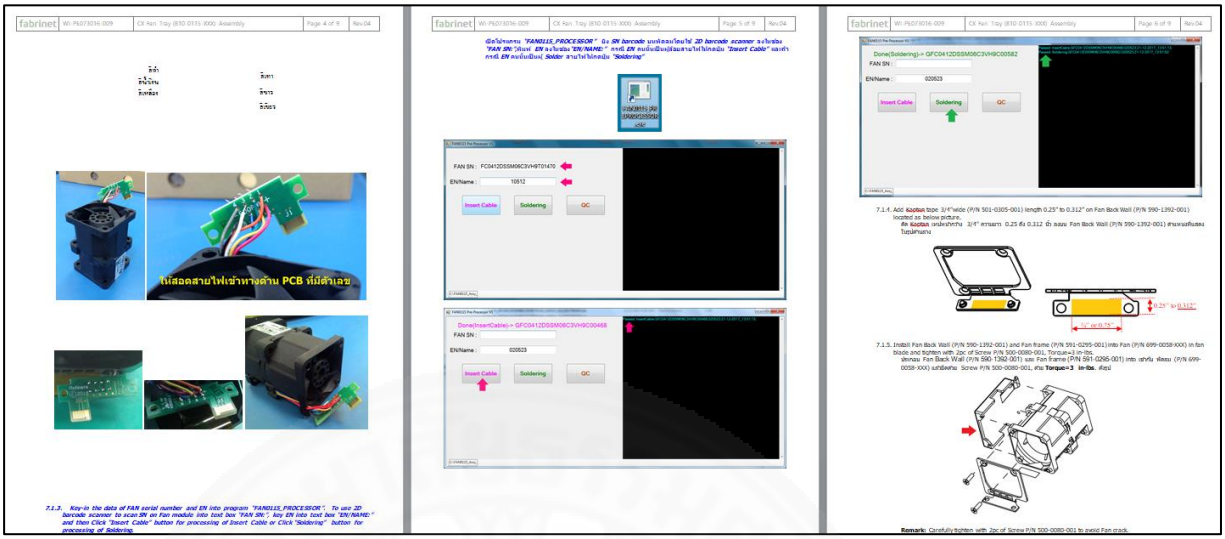

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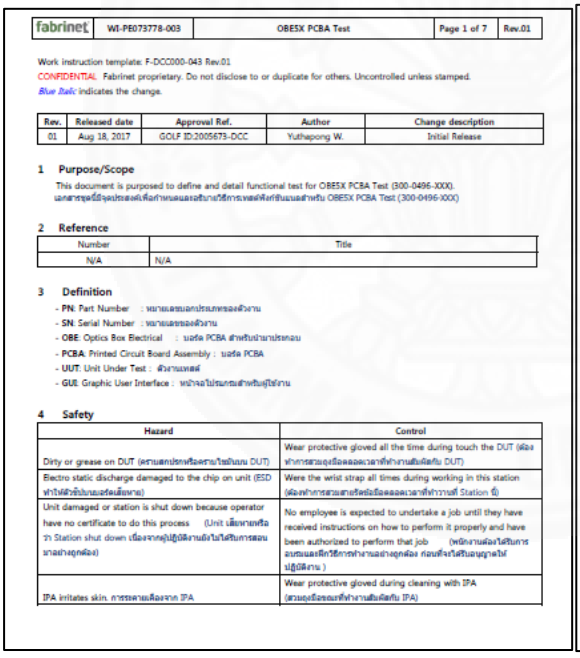

fabrinet | WI-PE073778-003 | OBESX PCBA Test | Page 1 of 7 | Rev.01

Work instruction template: F-DCC000-043 Rev.01

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Blue Italic indicates the change.

Rev.	Released date	Approval Ref.	Author	Change description
01	Aug 18, 2017	GOLF ID:2005673-DCC	Yuthepong W.	Initial Release

1 Purpose/Scope

This document is purposed to define and detail functional test for OBESX PCBA Test (300-0496-XXX).
เอกสารชุดนี้มีจุดประสงค์เพื่อกำหนดและอธิบายวิธีการทดสอบฟังก์ชันสำหรับ OBESX PCBA Test (300-0496-XXX)

2 Reference

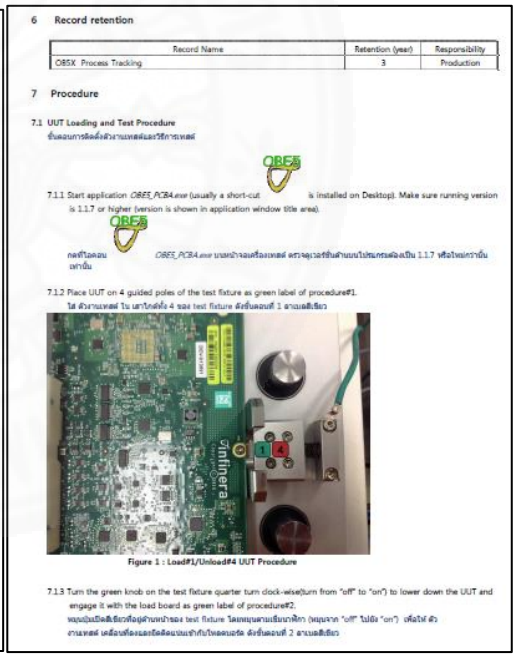
Number	Title
N/A	N/A

3 Definition

- **PN**: Part Number : หมายเลขของชิ้นส่วน
- **SN**: Serial Number : หมายเลขของตัวงาน
- **OBE**: Optics Box Electrical : บอร์ด PCBA สำหรับผ่านประกอบ
- **PCBA**: Printed Circuit Board Assembly : บอร์ด PCBA
- **UUT**: Unit Under Test : ตัวงานเทสต์
- **GUI**: Graphic User Interface : หน้าจอโปรแกรมสำหรับผู้ใช้งาน

4 Safety

Hazard	Control
Dirty or grease on DUT (คราบสกปรกหรือคราบไขมันบน DUT)	Wear protective gloved all the time during touch the DUT (ต้องทำการสวมถุงมือตลอดเวลาที่ทำงานสัมผัสกับ DUT)
Electro static discharge damaged to the chip on unit (ESD ทำให้ตัวชิ้นงานเสียหาย)	Were the wrist strap all times during working in this station (ต้องทำการสวมสายรัดข้อมือตลอดเวลาที่ทำงานที่ Station นี้)
Unit damaged or station is shut down because operator have no certificate to do this process. (Unit เสียหายหรือ Station shut down เนื่องจากผู้ปฏิบัติงานยังไม่ได้รับการสอนงานอย่างถูกต้อง)	No employee is expected to undertake a job until they have received instructions on how to perform it properly and have been authorized to perform that job (พนักงานต้องได้รับการอบรมและมีการทำงานอย่างถูกต้อง ก่อนที่จะได้รับอนุญาตให้ปฏิบัติงาน)
IPA irritates skin. การระคายเคืองจาก IPA	Wear protective gloved during cleaning with IPA (สวมถุงมือตอนที่ทำงานสัมผัสกับ IPA)



6 Record retention

Record Name	Retention (year)	Responsibility
OBSX Process Tracking	3	Production

7 Procedure

7.1 UUT Loading and Test Procedure
ขั้นตอนการติดตั้งตัวงานเทสต์และวิธีการเทสต์

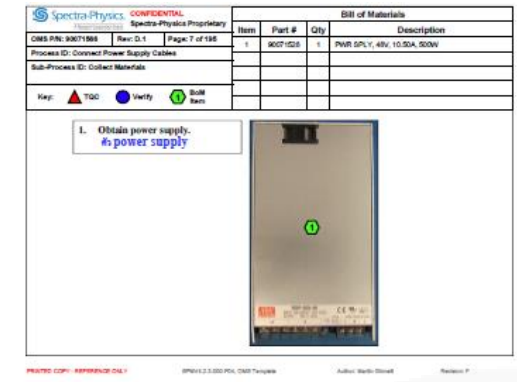
7.1.1 Start application *OBES_PCB4.exe* (usually a short-cut is installed on Desktop). Make sure running version is 1.1.7 or higher (version is shown in application window title area).
กดที่ไอคอน *OBES_PCB4.exe* บนหน้าจอเครื่องเทสต์ ตรวจดูเวอร์ชั่นด้านบนโปรแกรมต้องเป็น 1.1.7 หรือใหม่กว่านี้เท่านั้น

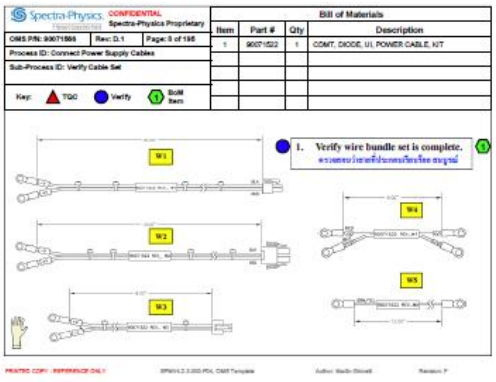
7.1.2 Place UUT on 4 guided poles of the test fixture as green label of procedure#1.
ใส่ ตัวงานเทสต์ ใน เสาไกด์ทั้ง 4 ของ test fixture ตัวชิ้นตอนที่ 1 ลาเบลสีเขียว

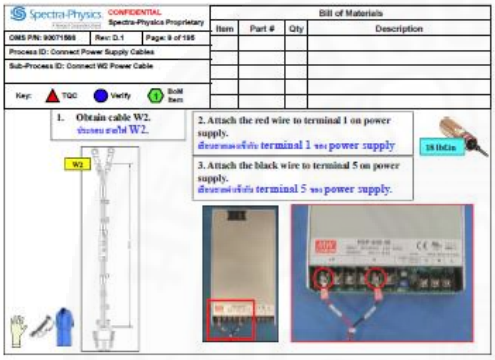
Figure 1 : Load#1/Unload#4 UUT Procedure

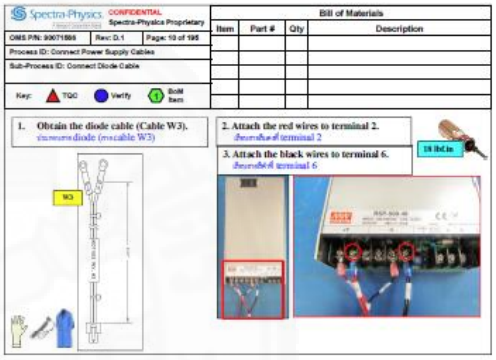
7.1.3 Turn the green knob on the test fixture quarter turn clock-wise(turn from "off" to "on") to lower down the UUT and engage it with the load board as green label of procedure#2.
หมุนปุ่มสีเขียวที่ของผู้ด้านหน้าของ test fixture โดยหมุนตามเข็มนาฬิกา (หมุนจาก "off" ไปยัง "on") เพื่อให้ ตัวงานเทสต์ เคลื่อนต่ำลงและยึดติดแน่นเข้ากับโหลดบอร์ด ตัวชิ้นตอนที่ 2 ลาเบลสีเขียว

E9









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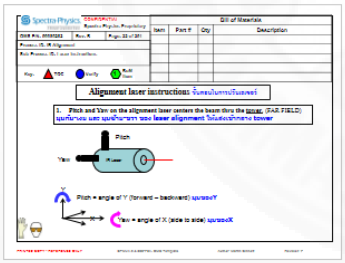

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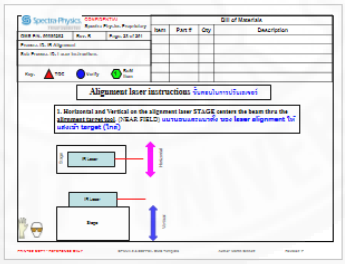

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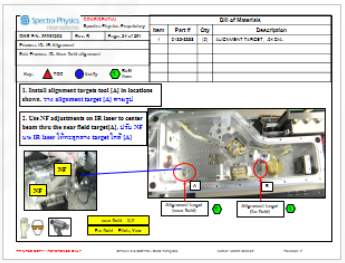

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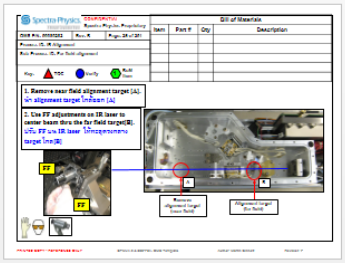

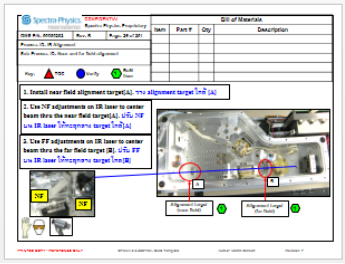

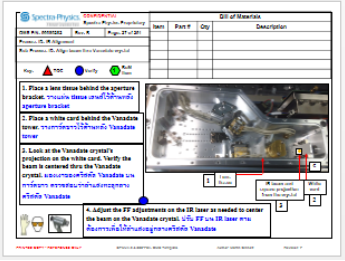

APPENDIX G

Material in the classroom of Week 1

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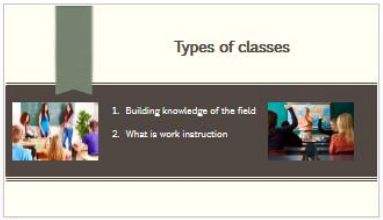

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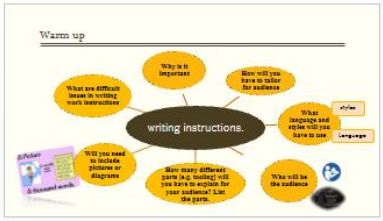

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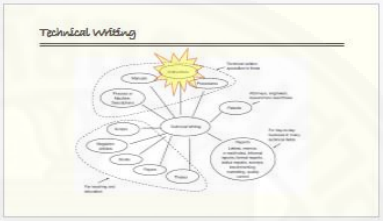

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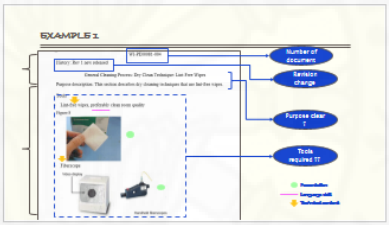

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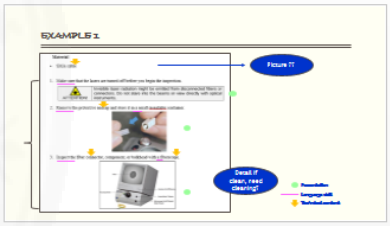

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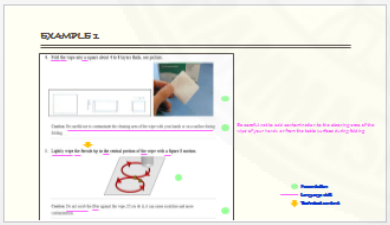

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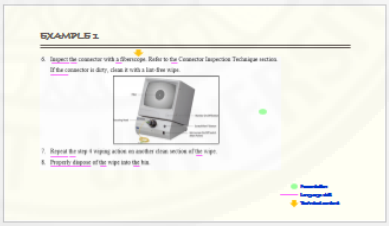

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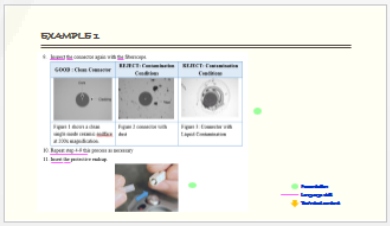

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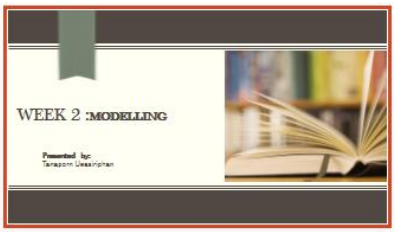

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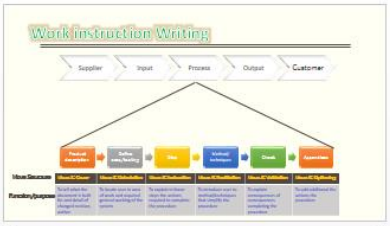

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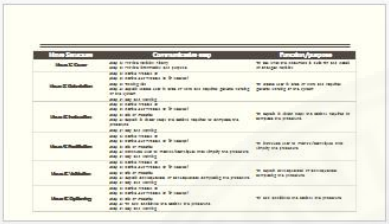
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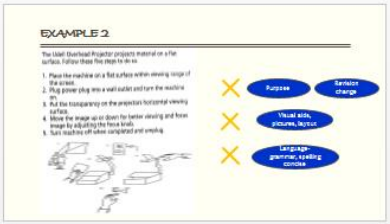

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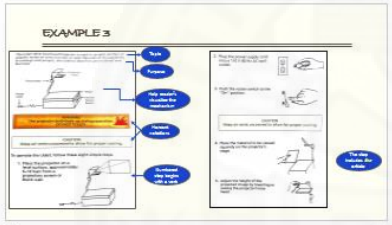

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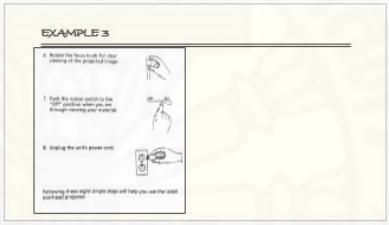

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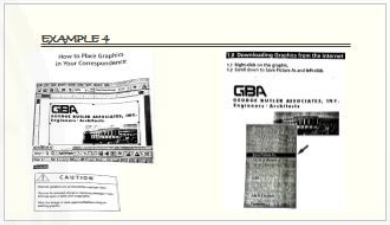

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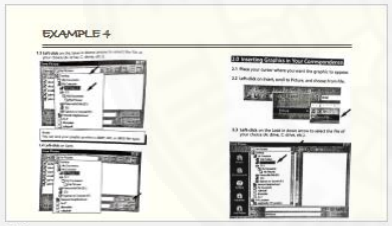

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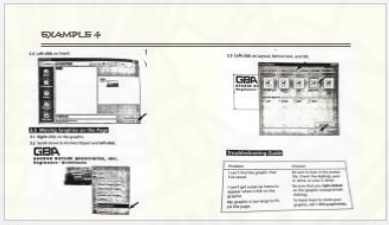

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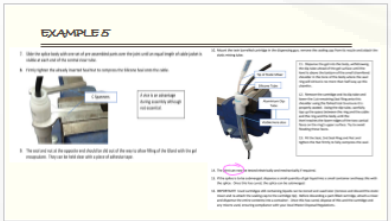

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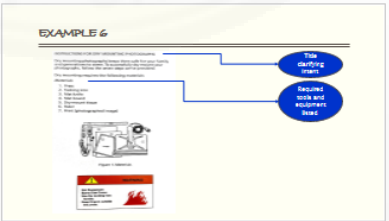

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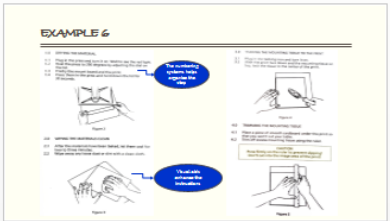

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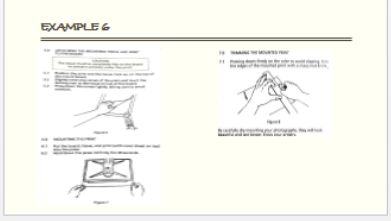

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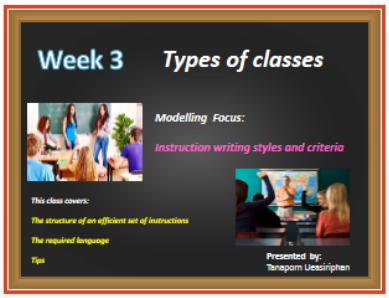
Material in the classroom of Week 3



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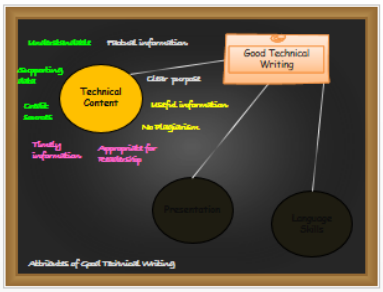

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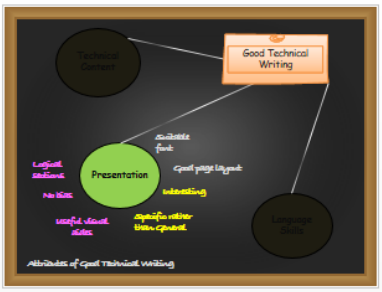

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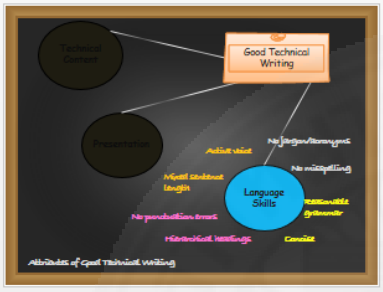

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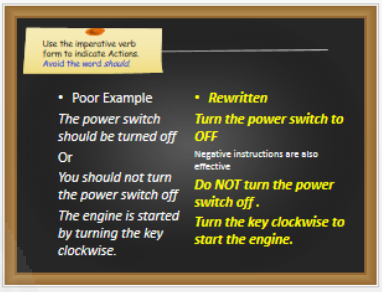

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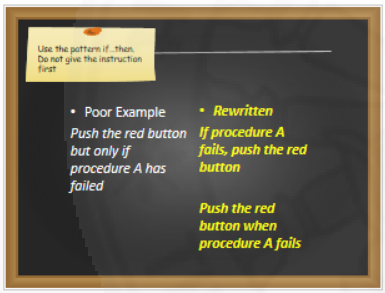

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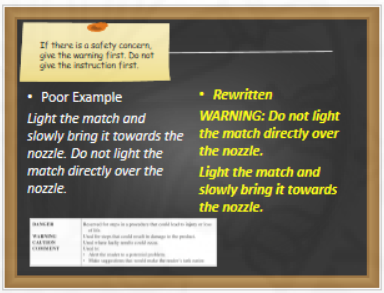

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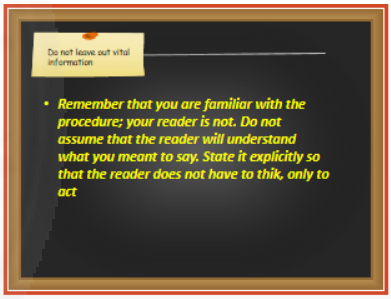

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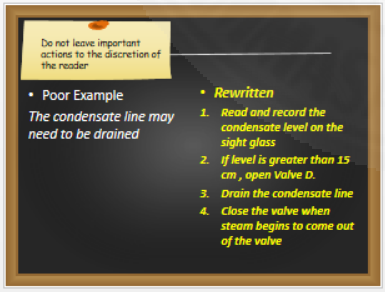

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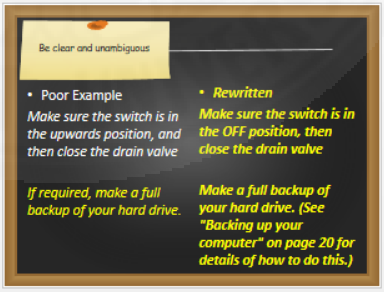

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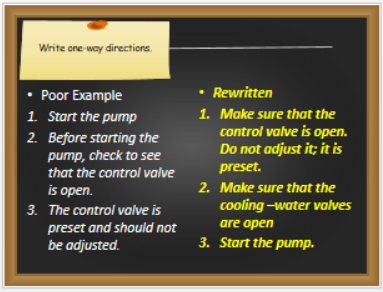

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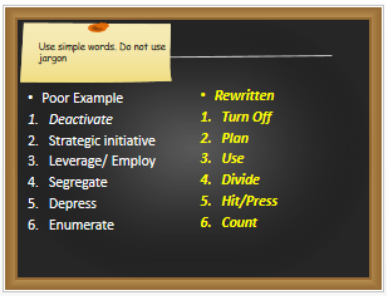

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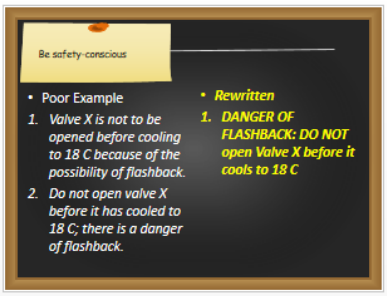

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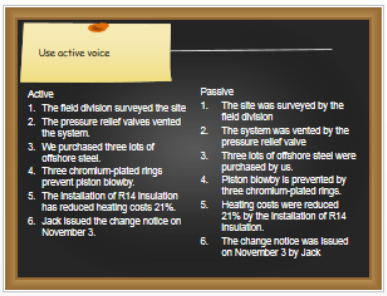

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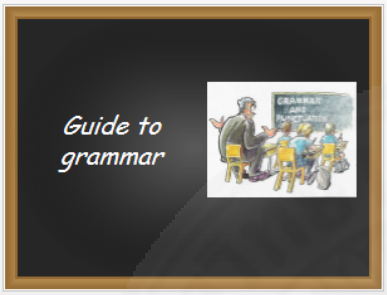

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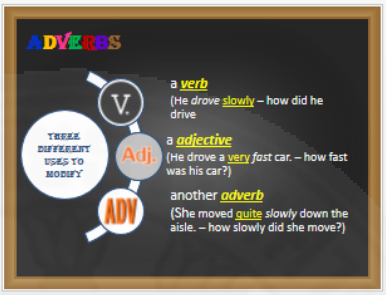

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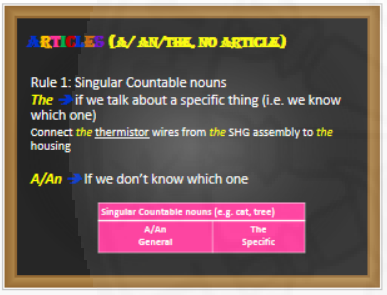

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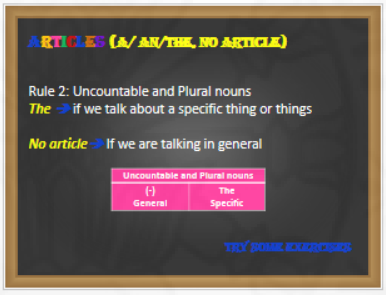

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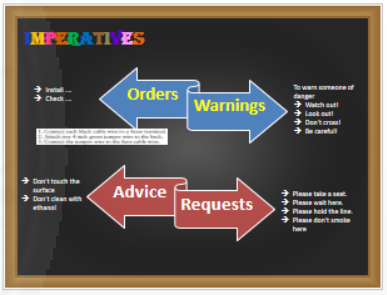

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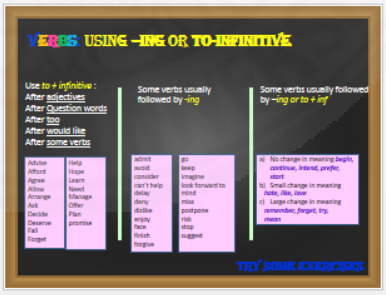

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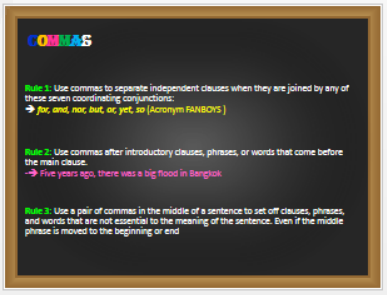

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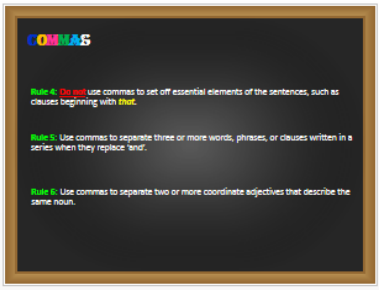

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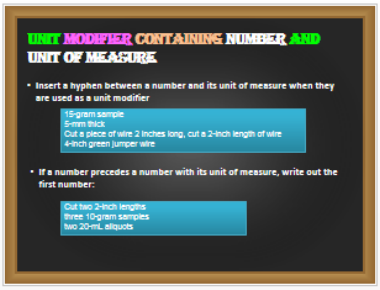

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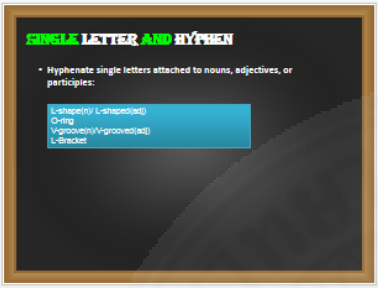

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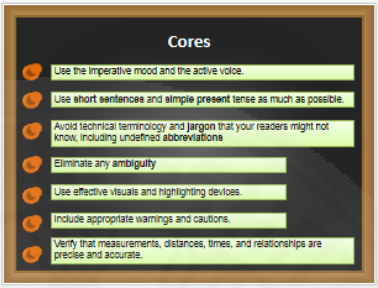

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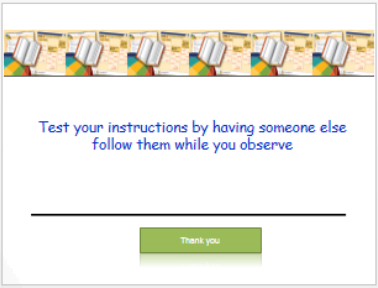
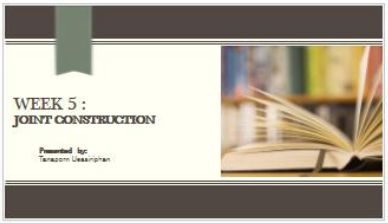


30 ★

Material in the classroom of Week 5



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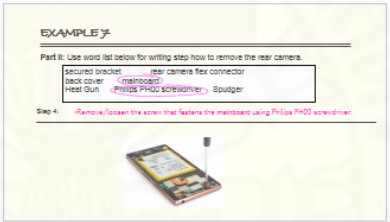

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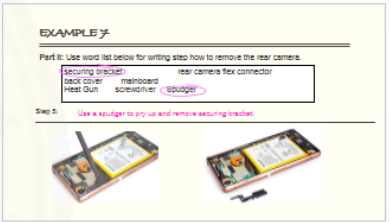

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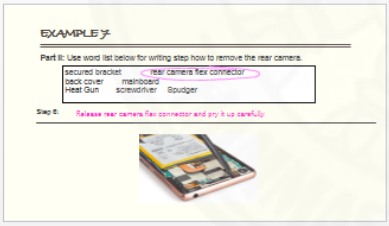

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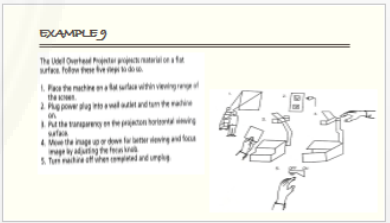

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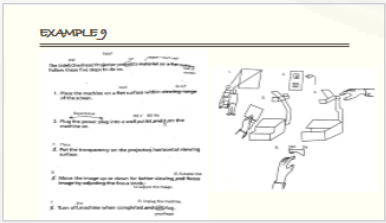

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BIOGRAPHY

Name	Miss Tanaporn Ueasiriphan
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Educational Attainment	Thammasat University (2017) The Master of Arts, English Language Teaching
	Thammasat University (2013) The Master of Engineering, Industrial Development
	King Mongkut University of Technology Thonburi (2005) The Bachelor of Engineering, Electronic and telecommunication
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	Project Engineer Sony company