The Use of '5A Learning Portfolio', a Technique of Learning Strategies Based on Self-Directed Learning and Metacognition to Enhance English Learning Skills of Thai Engineering Students

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Article History
Received: 12 February 2019 **Revised:** 13 March 2019 **Accepted:** 25 April 2019

Abstract
This study is an attempt to prepare Thai engineering students for the global market with required skills including the English language for communicating. The '5A learning portfolio', a technique created from integrating theories of self-directed learning, metacognition in language learning and learning portfolio, is proposed as a new learning pathway for the students to use it to develop themselves to acquire the required skills of global engineers. The research objective is to investigate the effect of the use of this technique of the Thai engineering students towards an English learning course. The data was gathered from a sample of 30; third-year students enrolled in the English Writing course at the Faculty of Engineering in a Thai university. The intervention of the course includes lesson plans, pre-tests/post-tests and a rubric for self-assessment for the '5A learning portfolio' of students. To analyze the data, the following methods were used: percentage, arithmetic mean score, standard deviation and t-test. The findings show the effectiveness of the technique through the higher learning achievement in the post test of the target group at the .05 level of statistic significance. The insights of the students' reports in their learning portfolio also showed the positive effect of the use of this learning technique.
Keywords: Learning Portfolio**,** Metacognition in Language Learning, Self-Directed Learning, 5A Technique, Engineering Students

Introduction
In recent years, academics and researchers in the engineering education in Asian and global context have mentioned the skills that workplace markets need from engineering graduates (Ayokanmbi, 2011; Beder, 2000; Riemer, 2002; Patil, 2005; Johri, 2010; Candy, 1991; Jesiek, 2013). They agree on fostering self-directed learning strategy, enhancing metacognition in their learning including English language competency which have been emphasized as the required skills the graduates should possess (Riemer, 2002; Patil, 2014; Thaky, 2014). The use of the Internet is also stressed as a vital learning source for engineers as a mean to develop themselves as life-long learners in their personal and professional life (Reimer; 2002; Patil, 2005; Johri, 2010). Other skills such as problem solving, critical and independent thinking have also been mentioned to stakeholders who need to be concerned about planning the engineering educational courses (Riemer, 2002; Patil, 2005; Johri, 2010; Candy, 1991; Jesiek, 2013).

Despite the need of English communication in local and global workplace, Thai students have a low level of English proficiency (Educational Testing Service, 2010), especially in their writing skills which is a tool used in communicating socially and in the workplaces (Tribble, 1996; Kitchakarn, 2012). According to researchers in the field of teaching English for engineering students in Thailand, their reports revealed similar results. Several factors leading to low English language communication competency included low motivation, lack of self-directed learning and little development of metacognition skills (Hart-Rawang & Li, 2008; Jarupan, 2013; Joungtrakul, 2013).

This research is an effort to find ways to prepare Thai engineering graduates for the rapid changing global markets with the required skills. The learning strategies in the structured style of '5A learning portfolio' have been proposed through an English writing course of the engineering students in a Thai university. This learning technique was integrated from literature review of theories of self-directed learning, metacognition in language learning, learning portfolio and related studies. It is expected to be an effective learning tool aiming to foster the students to develop the skills of global engineers including English language communication.

Research Objective

This study is to investigate the effect of the use of 'The 5A learning portfolio' towards the learning process of the Thai engineering students aiming to instill the required skills the global engineers need, namely Self-directed learning and Metacognition to develop their English writing skill.

Literature Review and Research Studies

Self-directed learning (SDL): One of the required skills for global engineers that academics in the field mentioned is self-directed learning (SDL) (Beder, 2000; Riemer, 2002; Johri, 2010; Candy, 1991; Murali & Rajaram, 2015). It is a process where the learners initiate to specify their own learning needs, aims, the appropriate learning sources and strategies, as well as, evaluating their learning results (Knowles, 1975; Candy,1991). Earlier preparing SDL for students will ensure a smoother transition to professional employment in engineering and other areas (Wilcox, 1996; Riemer, 2002; Mills & Treagust, 2003). Factors underlined the process compose of the learner's awareness of their learning goals, learning strategies, and learning evaluation (Knowles, 1975; Biggs, 2003). The suitable level of students to be instilled SDL. is at university level (Wilcox, 1996; Riemer, 2002; Zimmerman 2008) as they are able to analyze with metacognition to develop their learning to possess the skills they need including English language communication skills (Candy, 1991; Reimer, 2002; Zimmerman, 2008).

Metacognition in English language learning: Second or foreign language educators have mentioned the importance of Metacognition and defined it in similar meaning that refers to individuals' awareness and management of their learning processes including their own cognition (Flavel, 1980; Schraw, 1994; Swanson, 1990; Wenden, 1998). The concept of Metacognition is stressed that it is composed of two underlying components: metacognitive awareness and metacognitive strategies. Metacognitive awareness is the learners' knowledge about their learning, while metacognitive strategies refer to learners' regulation and management of their learning which encompass a wide range of activities: selecting the most useful strategies for a particular task; planning, monitoring, regulation and evaluation of learning (O'Mally & Chamot, 1990; Schraw, Crippen & Hartley, 2006).

In accordance with engineering educators in the ESL or EFL field (Riemer, 2002; Pahari, 2010; Patil, 2014; Thaky, 2014), the importance of English as a communication tool to

convey knowledge in the field through the Internet, as well as other skills such as problem solving, managing, critical and dependent thinking, evaluating, namely, metacognition skill, have been emphasized. Several key elements to develop English language skills of engineering students have been stressed on the learners. They must engage in active roles in the classroom providing conductive to communication and relevant to their interests and needs. Both process and product are important in the classroom and their insights to identify skills should have been fostered throughout the course. These learning and teaching activities will shape the future classrooms for global engineers (Riemer, 2002; Biggs, 2003; Brown, 2005; Pahari, 2010; Patil, 2014; Thaky, 2014).

In order to enhance the engineering students to develop their English communication competency and the required skills the educators in the field mentioned, suggestions from research studies on language learning strategy, especially the ones that focus on writing, are reviewed.

EFL writing research using SDL: Many researchers reported that achieving success in writing or having better English writing skills were required by teaching self-directed strategies, together with identified writing skills (Harris & Graham, 1996; Rubin, 2003; Harris, Graham & Mason, 2006). In order to achieve an adequate level of writing competence, low proficiency students must apply strategies that enable them to effectively plan, organize, write and revise a written product (Chamot, 1999; Chamot, 2005; Chamot & Keatley, 2003). Results from numerous researches revealed the increasing of students' writing achievement through explicit strategy instruction and a structured style of learning (De La Paz & Graham, 1997). High level of self-regulation and teaching them directly to be aware and use their metacognition strategies in language learning are mentioned as promising approaches to enhancing the writing skills of students (Harris & Graham, 1996; Harris, Graham & Mason, 2006). A number of research studies revealed the significant improvement of students' achievement, self-confidence, and proficiency in language learning related to the use of learning strategies (Chamot & Keatley 2003; Chamot, 2005; Oxford et al., 2004). In views of some language learning researchers, they defined learning strategies including SDL and Metacognition as techniques, approaches or deliberate actions that students take in order to facilitate the learning and recall of both linguistic and content area information (Rubin & Thomson, 1994). The researcher decides to use the word 'technique' for the attempt of proposing a structured style of learning and training engineering students to be strategic learners with explicit instruction of required skills and strategies. Therefore, research studies in the area of explicit and integrated strategy instruction including models for language learning strategy instruction are the next issue to be reviewed.

Research studies on language learning strategy instruction: A number of researches on language learning strategy instruction stated some key elements that the teacher should be concerned about. They are goal setting, self monitoring, self instructions, self evaluation, coping and self control and self reinforcement with the teaching and learning purposes on developing students' strategic behavior, knowledge and motivation (Harris & Graham, 1996; Chamot & Keatley, 2003; Chamot, 2005). Current models for language learning strategy instruction are Styles and Strategies-Based Instruction Model (Cohen, 1998), Cognitive Academic Language Learning Approach Model (Chamot, 2005) and Modern language and learning strategies (Grenfell & Harris, 1999). They differ in names of activities and steps in the models but they all share similar features based on developing students' knowledge about their own thinking and strategic processes and encouraging them to adopt strategies that will improve their language learning and proficiency (Chamot, 2005). Methods for identifying students' learning strategies are suggested in many ways on the basis of self-report. Examples of efficient methods researchers used to ask language learners to identify and describe their learning process and strategies include questionnaires, interviews, written diaries, journals,

and learning portfolios (O'Malley & Chamot, 1990; Oxford et al., 2004; Rubin & Thompson, 1994; Rubin, 2003). All of the methods focus on making students show evidence that they understand the strategies instruction and are using some of the strategies independently. These can help students to develop their own metacognition about themselves as strategic learners. The language to express their insight about observing their own learning process can be in their native language (L1) or the target language (O'Mally & Chamot, 1990; Harris & Graham, 1996; Chamot & Keatley, 2003). Numerous research studies suggested that the explicit learning strategy instruction should integrate the instruction into their regular course as it can provide opportunities for students to practice learning strategies with authentic learning tasks and it is the task of the teacher to facilitate the students' learning process to achieve the learning goal (Grenfell & Harris, 1999; Harris, 2003; Oxford, 1990). The researcher synthesized and integrated the concepts and key issues from literature review of research studies above to present 'a structured style of learning' with the attempt to implement the required skills, SDL and Metacognition in language learningthrough English language courses aiming to develop English proficiency of the students, learning strategies and skills needed. In this study, the writing course is focused as English writing is a basic and primary tool for communicating with people from all over the world with various purposes (Tribble 1996). The method for the students to identify their awareness of their learning process under the structured style is writing in both Thai (L1.) and English (the target language) in the form of learning portfolio as the students in the Faculty of Engineering and Architecture are familiar with the concept of managing their portfolios in their professional fields.

Learning Portfolio: According to educators (Zubizarreta, 2004; Klenowski, Askew & Carnell, 2006; Lo, 2010), a learning portfolio is a flexible, evidence-based process that combines reflection and documentation. It engages students in ongoing, reflective, and collaborative analysis of learning. It focuses on purposeful, selective outcomes for both improving and assessing learning (Zubizarreta, 2004; Klenowski, Askew, & Carnell, 2006; Lo, 2010). In this study, it is used as a tool for the students to identify their learning process following the learning strategies that are integrated and structured in the form of '5A technique' to develop themselves for required skills of global engineers through the English writing course lesson plan. Base on theories and studies in the literature review, the technique was specially constructed for the Thai engineering students who lack of self-directed and metacognition in language learning which underpin learning strategies to lead them to develop English communication skills. Training them to be strategic learners with awareness of required skills need to be simple and practical. Managing their learning documents with only 5 steps in the '5A' structure in the form of portfolio is a learning technique proposing in the study. The technique is called '5A learning portfolio' with details as follows:

The '5A learning portfolio': It is a learning technique composed of learning strategies for students to gain all the global required skills mentioned. The objectives of this technique are to urge the students to realize the important process in their learning, having sense and skill of self directed strategies to achieve their setting goals and developing their metacognition through their performances. Starting from building good attitude to motivate themselves, they are preparing to the learning with plans and management to access to learning sources. They should be able to summarize what they have learned and apply to their context. They are expected to do the record, observe and assess their applications and practices in order to develop their English communication skills, namely writing, more effectively through their learning portfolio of the course lesson plan of English Writing in Daily Life, one of the English courses in the Faculty of Engineering.

The elements of the '5A learning portfolio' compose of 5 steps that require the students to reflect their information as required in each step and record it in their learning portfolio,

which will be used as a behavioral point indicator as a part of the course evaluation. Each '5A' set shows the record of their self-directed learning to develop their English language communication skills for each learning action. The record can be in Thai or English and even in the form of pictures. The students will present their learning portfolio with their self evaluation marks based on the rubric given, at least two times, before mid-term and final tests. The technique of '5A learning portfolio' follows 5 steps as follows:

Attitude (A1): This is the first important step in the learning process. Every time the students come to class or start to learn outside, they are asked to write down positive words or pictures to encourage themselves in their effort to the learning issue including setting goals in learning or communicating in English in the learning topic. They can search phrases of motivation and positivity from the Internet but they need to write down to explain in their language (Thai or English) why they choose the phrases and they need to record the sources. With positive attitude and the task to reflect their idea in the document, they are gradually trained to build up confidence and motivate themselves to be ready to learn and step to learning sources.

Access to learning sources (A2): With positive attitude, the students manage to access to learning sources, either to implicit knowledge sources as class instructors, foreigners, friends or to explicit knowledge appeared in many forms such as Internet, televisions, books or other medias, by themselves, to seek for information to suit their goals.The researcher stresses the importance of this second step of the '5A learning portfolio' technique. According to the researcher's experience of teaching engineering students for more than 30 years, they rarely pay attention on acknowledging or giving credits to learning sources and sometimes this always leads to problems of copyright violation, plagiarism and so on. In their documents under the step of 'A2', they have to record details of the sources, e.g. date, time, topic, names of the instructor, websites or any form of their learning sources. They are instructed to realize the importance of acknowledging and giving credits to the learning sources, both in academic and social references. This skill is instilled to prepare them to be the global engineers.

Adopt the learning issues (A3): The third step to identify their learning process is synthesized under the task of 'A3'. When they access to the learning source, they are instructed and trained to possess the ability to summarize or adopt what they have learnt and manage to identify it in the portfolio document. Teaching and learning materials, according to each learning topic in the course lesson plan, are gathered under the cover of A3 sheet. Note - taking, summarizing of grammar rules, vocabulary and expressions of English language that have been taught are reflected in their own styles. These can be done in Thai. If they search from learning sources outside class, e.g. websites or YouTube clips, they have to write down what they have adopted that are related to the learning topics and keep these as files of 'A3' in their '5A' learning portfolio.

Apply & Assimilate (A4): With their note-taking and summarizing rules, vocabulary, expressions or patterns to communicate in English according to the learning topics, the students will apply the adopted knowledge to the given exercises and assignments. Exercises are provided in class for them to apply the rules to practice their English communication skill. Assignments on the learning objective are given for them to apply the rules and assimilate what they have adopted to their own context on their own time. Their pieces of work will be copied; one for the teacher and the other kept under the cover of A4. of each '5A' set they direct themselves to perform. The fourth step of the '5A' technique is the evidence of their writing work.

Assessment (A5): Every cycle of their self-report on their learning must end with the fifth step 'A5: Assessment'. The last structured-strategy is fostered to train the students to evaluate their learning products (work pieces they produce in the 'A4' step) while they regulate their learning process to find out their mistakes from the writing rules they have adopted in the 'A3' step. They are encouraged to assess their work on their own, with the answer key, with

the instructor or friends. They are trained to comment their work based on the learning issued and also give positive words to encourage themselves for further development in language learning. They can write comment in simple forms of English or in their L1 (Thai).

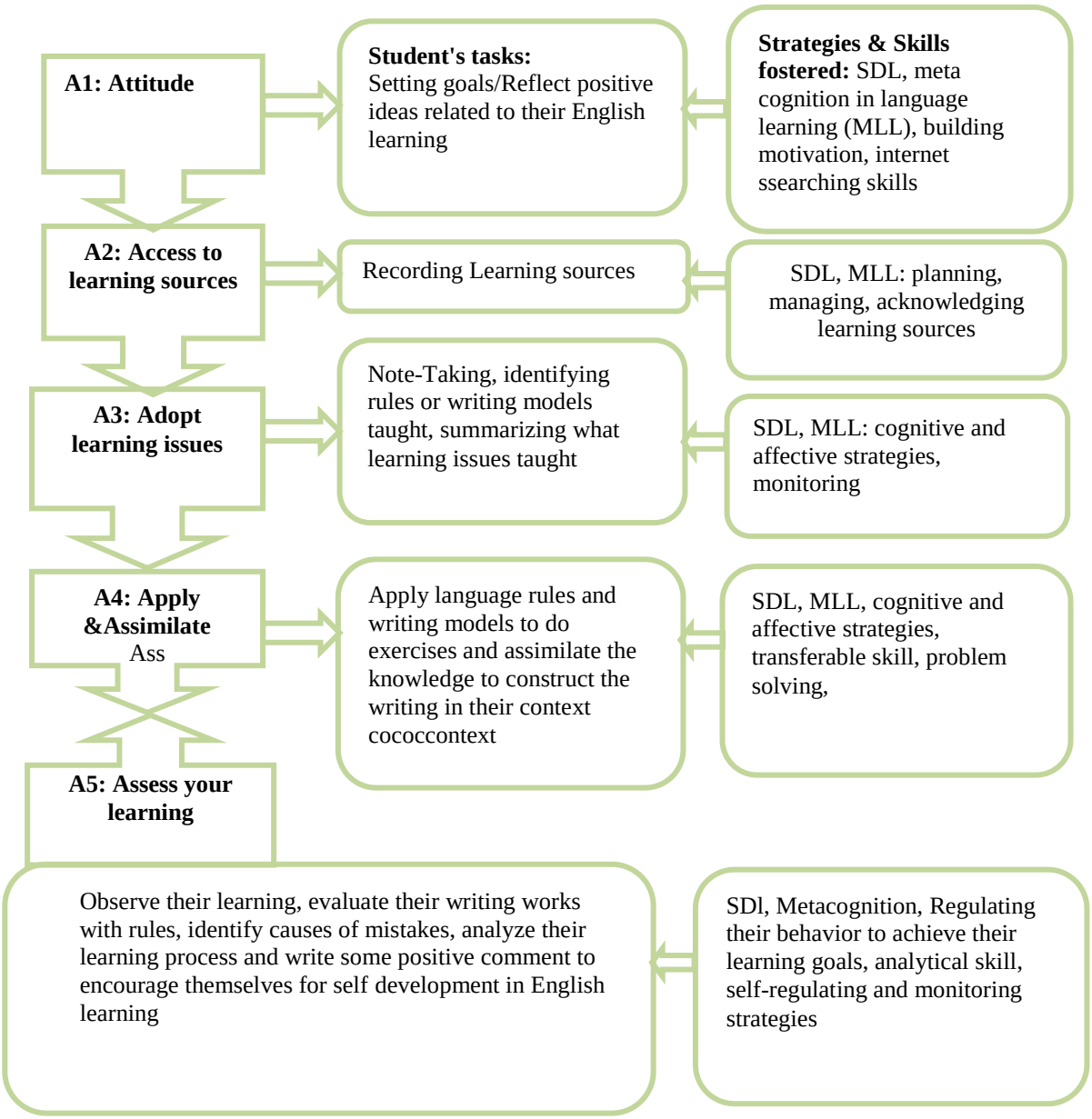

Figure 1 The technique of '5A learning portfolio' to enhance required skills

The technique of '5A' learning portfolio is a proposed learning tool the researcher aims to use it to instill the required skills the global engineering graduates need. However, it needs the evidence to proof its effectiveness as expected with the following research methodology.

Research Methodology

Setting, Participants and design: The study aims to investigate the effect of the '5A' technique in making the learning portfolio of Thai engineering students to develop themselves to possess required skills including English communication skill, namely writing, through an English course. The quasi experimental research design (pre-test and post-test)

was used with the population of engineering students of Rajamangala University of Technology Tawan-Ok (RMUTTO), Bangkok, Thailand. The samples were all 30 engineering students who enrolled the English course (English Writing in Daily Life) provided in the Faculty of Engineering during the second term of the 2017 academic year.

The instruments: The research instruments consisted of the course lesson plan integrated with activities involving the students' management of their 5A learning portfolio, pre-test and post-test with a scoring rubric based on the course learning outcomes, and a rubric for student's self-evaluating of the 5A file form in their portfolio.

Pre & Post Test: Pre-test and post-test consisted of 20 items of sentence level writing (word order, subject verb agreement, capital letters, punctuations etc.) and 4 short paragraphs under the learning main topics) to measure the learners' achievement according to the course learning outcomes. For the validity of this instrument, the researcher gathered the test items from the two teachers of the course and they made a scoring rubric together for reliability in giving marks. Then the tests with the scoring rubric and the course lesson plan were handed to three higher education experts under the IOC process. The IOC value of the tests and the scoring rubric were 0.8, which is above 0.1. The pilot study was conducted with a group of students consisting of 15 students in the same course in the previous academic term before experimenting. The two teachers gave marks for the trial writing works with the rubric and adjusted the tests and rubric to gain similar results before launching the experiment.

The course description and its lesson plan with activities for the students to use the '5A learning portfolio' technique: EnglishWriting in Daily Life is one of English courses provided in the Faculty of Engineering and Architectural, RMUTTO. The course objective is to enable students to communicate in English Writing in Daily Life. At the end of the course the students are expected to have competency to write in English to communicate to people outside class, both in local and global context with basic rules of writing in English (grammar, punctuations, capital letters, spelling, etc.). Evaluation of the course comes mainly from two parts, knowledge in the subject which can be identified as learning topics on the course and specific behaviors required. The course contains 15 weeks with mainly 10 lesson plans of 4 major topics of the course learning outcomes: describing people, places, festivals and preferences. For the present study, in the first week the students were explained about the course objectives, learning outcomes and evaluation via the use of the '5A learning portfolio', namely its purpose and steps to perform the learning activities required to achieve the learning outcomes of the course. Pre-test is also done in this week. Two weeks was deducted for midterm and final examination and one week before the two tests was for revisions of the learning topics and sharing information sessions of the '5A learning portfolio' including self mark-giving for each A step in their recording from the rubric provided. Instructional methods and materials covered examples of writing paragraphs with grammar rules and vocabulary in the learning topic context through PowerPoint and clips. Each topic took two weeks and required at least two writing tasks.

The students were encouraged to use the '5A' learning portfolio as the self report of their learning process starting in the structured steps, from A1: Attitude, A2: Access to learning sources, A3: Adopt to what they have learned, A4: Apply what they have learned and Assimilate it to their work and A5: Assess what they have done in their learning, in order to get the products (the writing tasks given). They were also inspired to get high behavioral marks according to numbers of times of their SDL to record their learning activities following steps in each element of '5A learning portfolio' technique as stated in the rubric. Throughout the intervention of the course lesson plan, the students were fostered to be familiar with the concepts of SDL and were gradually trained to possess metacognition skills in language learning through the discussions about their attempt to perform the writing tasks and each

step in recording their 5A learning port folio.The lesson plan was also under the IOC. process. The value was 0.9. which was above 0.

The rubric for student's self-evaluating of the 5A file form in their portfolio: This instrument was designed to help motivate SDL for the students to manage their '5A learning portfolio' to meet the requirements of behavioral marks of the course. It provided guidelines for students to keep record of their actions required in each step in order to gain high marks based on the behavioral learning outcome (30 % of the course achievement). The students used this rubric to self-marking for evaluating their '5A learning portfolio' two times, around mid- term and before final exam. The rubric concept was stressed that the more the students made '5A' set, it meant they directed themselves to learn, both language and learning strategies. More times meant more marks. However, the marks from this part were not directly used in analyzing for the research results. It was a part of research instrument for the target group to understand the skills and strategies fostered in the course required tasks. It was an instrument under the lesson plan IOC process with the same value.

Results

Learning achievement: The objective of this study is to investigate the use of '5A learning portfolio' technique through the intervention of the course lesson plan to compare their learning achievement with pre and post-test. The result was reported as in Table 1.

Table 1 Comparison of Pre-test and Post-test mean score before and after learning by the 5A technique

Test	***N***	***M***	***SD***	***t***	***df***	***p***
Pre-test	30	7.47	1.85	18.77	29	0.00*
Post-test	30	15.03	1.72			

*$p < .05$, two-tailed

Table 1 illustrated that Post-test mean score(M = 15.03, SD = 1.72) were higher than that of Pre-test (M = 7.47, SD = 1.85). The standard deviations of Post-test spread out from the average less than Pre-test. This could be explained that Post-test mean scores were closed to the average than Pre-test after learning by the 5A technique. The result of t-test showed that the Post-test mean score (M = 15.03) was significantly and statistically higher than that of Pre-test (M = 7.47) (p< .000).

Apart from the prior objective of the study which focused on the learning achievement, perceptions of the students towards the use of technique following structured tasks in each step were identified and reported in another paper due to the limitations of this report length. However, the reports of the students' perceptions towards the use of this technique were summarized from the A5 part as the task provided data to answer the objective of this study.

Insights of the students on their learning development in their portfolio: Following the course lesson plan, the students awareness of the skills and strategies they use to perform the tasks were raised through the discussion phases with the teacher. The task in 'A5: Assessment' reflected their positive effect of the use of this technique towards their English language writing development. More than half of them (17 students, 56.6%) commented that they found the benefit from following each step trying to perform the tasks in order to achieve behavioral marks.For instance, one student with high behavioral marks commented, "I felt each steps in the technique leads me to understand the learning content and raise my confidence to produce the writing tasks." Other five students (16.7%) stated the benefits of SDL and metacognition in their language learning, "we never know the strategies before, but

with the clear explanation and the structure of the tasks in each step, we are confident to direct ourselves to learning sources such as the learning websites to produce the English writing tasks. 5 students (16.7%) gave similar opinion on the part of 'A5: Assessment' of their learning that this technique could help them developtheirmetacognitive skills and lead to achieving higher marks in the writing tests. Only 3 students (10.0%) had no comment on this task.

Discussion

The effect of the use of '5A' in the course lesson plan to help develop the students English communication skill: There are many reasons to support the positive results according to theories underpinning the technique. With the rubric designed to urge the students to self- mark giving with minimum to maximum times to produce as many of '5A' sets, the students are instilled the self-directed skilled in order to get high marks. When they follow the steps to record information required in their 5A learning portfolio, their metacognition skills are trained and these yield to their learning which are in accordance with many research findings (Brookfield, 1984; Garrison, 1997; Dahlgren and Dahlgren, 2002; Harris, Graham & Mason, 2006; Klenowski, Askew & Carnell, 2006; Lo, 2010). These emphasize the benefits of fostering students to possess self-directed learning skill as they will gradually develop their learning process, starting from taking initiative to specify their own learning needs and objectives, choosing materials and resources to suit their goals; monitoring and evaluating their progress. Consequently, they get higher achievement in their language learning (O'malley and Chamot, 1990; Wenden & Rubin, 1987; Wenden, 1998, Zimmerman, 2008; Tracy et.al, 2009). The higher scores of writing in English post-test of the students after the use of '5A learning portfolio' technique to produce their learning portfolio of the course can also be explained with the results of researchers (De La Paz & Graham, 1997; Garrison, 1997: Harris, Graham & Mason 2006; Tracy et al., 2009). It is stressed that developing writing skill come mainly from the ability to monitor and direct one's own composing process. Students who are being taught on SDL with insightful understanding of their language learning process can facilitate their learning effectively (Sawyer, Graham & Harris, 1992; Harris, Graham & Mason, 2006). The results proved that making students aware of their metacognition in their language learning led to increasing students' writing ability as stated in a number of researchers which highlighted the importance of dealing with the students attitude towards their language learning. The students were able to use the explicit strategy instruction to take charge of their learning including anticipate, monitor and reflect upon their own cognition and this can lead to enhancing writing skill (De La Paz & Graham, 1997; Sawyer, Graham & Harris, 1992; Harris, Graham & Mason,2006).

Insights of the students on their learning development in their portfolio: Some insights of the students reflected on the last step in their learning portfolio, A5: Assessment, can be evidence that this '5A learning portfolio' technique helps develop their English language learning. Most of their self report stated that they gradually understood and realized the benefit of SDL and metacognitive strategies in the structure of '5A learning portfolio' technique while they had tried to perform the tasks as required. This was in accordance with a number of researchers who stressed the importance of SDL (Ryan, 1993; Garrison, 1997; Brookfield, 1998; Dalhlgren & Dahlgren, 2002) and the impact of realizing in their metacognition could lead to development in language learning (O'Malley & Chamot, 1990; Shraw, 1998). They indicated the strategies as major keys to help learners transfer skills, knowledge, and strategies across contexts and situations (Azevedo & Witherspoon, 2009; Schraw, 2000; Veenman, Van Hout-Wolters, & Afflerbach, 2006).

It could be claimed that the '5A' technique is the tool to reflect these strategies with the explicit structure of a learning portfolio. This was also in the same line of research results which ascertained the effective use of learning portfolios to engage students in ongoing, reflective, and collaborative analysis of learning with purposeful, selective outcomes for both improving and assessing learning (Zubizarreta, 2004; Klenowski, Askew & Carnell, 2006, Lo, 2010).

It could be summed from the results that the '5A' learning portfolio could be used as an effective learning tool to help the Thai engineering students to develop English communication skills and other skills required for global markets.

Limitations and Further Research

It should be noted that this research was the attempt to propose the new learning tool integrated mainly from SDL and Metacognition which educators in professionals including engineering focus on building them as attributes of graduates in 21st century. With realization, understanding and insight of the strategies according to the design of the course lesson plan with the use of the '5A learning portfolio' technique, the students could develop themselves to skills required, including English language communication. Although the findings of the study showed the positive results, they were only a good start. There were some limitations to be mentioned for further research. The numbers of participants were only 30 and the one group research design could be skeptical of the research result validity. Further research on the use of this technique should concern of these points for more reliable outcomes.

Due to limit of this presentation scope, information gathered from the students during the intervention has been recorded to wait for further research. Qualitative research on the strategies the students use through each step of the technique is interesting for further studies as well as the perceptions of the students on the use of this technique. Other English language communication skills such as reading, listening and speaking are also considered to be used with the '5A learning portfolio' technique.

Conclusion

This research proposed the structured learning tool consisted of two major key strategies; SDL and Metacognition through a method of learning portfolio in the form of '5A' technique, starting from A1: building good attitude to A2: access to learning sources, then step to A3: adopt what they have learned to apply and assimilate their language learning to produce their work in A4 step through the last step of the technique, A5: assessment their learning product and process. The purpose of the study was to find out the effect of the tool throughout the intervention of the lesson plan of an English writing course, enrolled by the third year engineering students in a Thai university. The technique aims at training them to be engineering graduates in the 21st century with skills and learning strategies needed. The findings showed positive results in the higher achievement post-test after the intervention with '5A learning portfolio' technique and some positive self report on the students' development in their portfolio. It could be claimed that the '5A learning portfolio' technique is the tool with the clear structure to foster Thai engineering students to develop themselves for better English communication skill and possess the required skills that are needed in the global workforce markets. It is hoped that this technique will be used and developed to appropriate context by stakeholders responsible for developing quality of Thai engineering graduates in the future.

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