Chapter 5

Conclusions, Discussions, and Recommendations

1. Conclusions

This chapter presents the results of the study using learner-centered training course to develop students' thinking skills. As mentioned previously, the objectives of this study were 1) to construct a learner-centered training course to develop learners' thinking skills, and 2) to examine learners' thinking skills before and after applying the training course.

The subjects of this study were divided into 2 groups. The first group was composed of 29 students who were studying in Mattayom 3 (grade 9) enrolled in the first semester 2010 in a secondary school in Chiang Mai. This group consisted of 19 male and 10 female students. The second group consisted of two teachers who taught English in the same secondary school.

The instruments used in this study were classified into 4 categories: 1) instruments for pre-study data collection consisting of questionnaire sets for both students and teachers, and interviews of students and teachers, 2) pre-test and post-test used to measure the thinking skills of students, 3) treatment instruments comprised of curriculum, curriculum evaluation form for experts and observation form for observers, and 4) formative assessment data collection instruments which included teacher logs, project work and portfolio. Data collected from these instruments were analyzed by descriptive statistics such as percentage, mean score, standard deviation, t-test, and content analysis.

The results of this study are presented as follows:

Objective 1: To construct a training course to develop learners' thinking skills.

Regarding the first research question, "does the learner-centered training course develop learners' thinking skills?", the findings of the study reveal that the learner-centered training curriculum is effective and is able to develop students' thinking skills.

There are many evidences to support this claim. First, the results of students' thinking skills after participating in the training course showed an improvement of the students' thinking skills after the course. Scores of pre-test and post-test which aimed at measuring students' thinking skills, showed a significant increase in the students' thinking skills. After comparison of the mean scores of pre-test and post-test for analytical, creative and practical thinking of the students, improved scores were measured at 13.86%, 21.15% and 1.32 13.2%, respectively. Overall thinking skills improvement was at 16.95%.

Based on the comparison of pre-test scores and post-test scores of thinking skills, the mean scores before and after participating in the training course showed significant difference. When considering the mean scores of pre-test and post-test of analytical thinking, creative thinking and practical thinking, each showed likewise significant difference. It can be interpreted, therefore, that the thinking skills and sub-skills of the students after training were then significantly increased.

During the training, students were evaluated by using formative assessments such as project work and portfolio, in order to check any improvement in the thinking skills of the students. Concerning project work, the scores indicated that students' thinking skills were at an excellent level. When focusing on the 3 main thinking skills (analytical, creative and practical thinking), the total score for the project work for each of the skills was at an excellent level as well. Regarding portfolio assessment, meanwhile, total score for the thinking skills collected was at a good level, together with that of analytical thinking. However, creative thinking was at an excellent level while practical thinking was at an average level. This showed that during the training, the students were able to continuously improve their thinking skills. Moreover, from the records of teacher logs of formative assessments (project work and portfolio), it was found that based on their project work, students learned to plan on how to start, work and set goals for their project. When presenting their project work, the students were able to learn to create the appearances of their own project work and apply their background knowledge into real life. For portfolio, students learned to create and organize their assignment into their own portfolio.

Secondly, the learner-centered training course was designed based on students and teachers' needs. The background information was collected from questionnaires and interviews, which were completed by students and teachers.

Thirdly, the curriculum of this learner-centered training course was considered valid and reliable because the two experts ensured the curriculum by evaluating the curriculum of the training course including lesson plans. According to the experts' evaluation, the mean score of the curriculum of the training course was at 4.16 (out of 5), which meant the curriculum was at a good level. The topics of curriculum evaluation, namely: 1) learning goals and objectives, 2) lesson procedures, 3) teaching assessments, 4) instructional procedures and strategies, 5) teaching materials, and 6) class organization, were measured at a good level and an excellent level. Before the implementation of the lesson plans, each unit was adjusted and improved according to the comments of the experts to improve the effectiveness of the lesson plans for the students.

Besides the experts' evaluation, results of the observation form done by the two evaluators who observed the teaching and learning activities, indicated that teaching preparation, methodology, presentation, teachers' questions used, interaction and personal characteristics of teachers indicated that teaching performance was at an excellent level. The comments, reflections and evaluation from the evaluators during the time of teaching and learning also provided valuable information in developing the curriculum. Thus, it can be interpreted that the curriculum was well organized and could lead to excellent performance. Based on the two experts' curriculum evaluation before the implementation and the evaluators' reflections during the time of learning including those from the teacher logs, it can be inferred that the learner-centered curriculum of the training course was valid and reliable and had the potential to be able to develop students' thinking ability and skills.

In conclusion, the learner-centered training course could develop learners' thinking skills because it provided opportunities for students to practice their thinking skills. Moreover, based on the two experts' evaluations and observers' reflections when the training course was conducted, the learner-centered training course was valid and reliable.

Objective 2: To examine learners' thinking skills before and after applying a training course.

There were two evidences which indicated that the learners' thinking skills increased after participating in the learner-centered training course.

First, before the implementation of learner-centered curriculum, the results revealed that the mean score of the thinking skills of the students was measured at 14.37 (out of 45). After the implementation of the learner-centered training course, results showed that the post-test mean score was 22.00, with an increase of 16.95%. After comparing the scores of thinking skills collected before and after the implementation with the use of a t-test, results showed a significant increase. It can be concluded, therefore, that students' total thinking skills had developed after participating in the learner-centered training course.

Looking into the 3 main types of thinking skills (analytical thinking, creative thinking and practical thinking), the pre-test (before training) and post-test (after training) mean scores were compared using the t-test. Results indicated that the mean scores of the tests in the 3 thinking skills (analytical, creative and practical) before and after the implementation of training course also significantly increased. It can be concluded, therefore, that students had developed these 3 types of skills after participating in the learner-centered training course. Concerning the students' improvement on the three thinking skills, it showed that the their creative thinking skills developed the highest, followed by the analytical and practical thinking skills in descending order.

As previously mentioned, the sub-skills of analytical thinking skills consist of analysis, synthesis and evaluation skills, while sub-skills of creative thinking skills include fluency, flexibility, originality and elaboration, while practical thinking skills are comprised of application and adaptation. In this regard, the study revealed the following results.

On the sub-skills of analytical thinking skills, results from the t-test showed that these sub-skills of the students showed significant improvement as indicated by their pre-test and post-test scores which were significantly different. This means that the analytical thinking skills of the students improved after participating in the learner-centered training course.

When looking into the sub-skills of creative thinking, results from the t-test showed that the students' fluency, flexibility, originality and elaboration skills were also significantly increased.

In relation to practical thinking skills, results also revealed improvement of the sub-skills of practical thinking which was significantly increased as indicated by the mean scores at 19.8%, and 6.6%, respectively.

Secondly, students' thinking skills were investigated to determine any improvement during the training course through their portfolio and project work. Results showed that students' thinking skills had improved based on the total score of thinking skills collected from project work at 85.80% which was at an excellent level.

Meanwhile, total score of thinking skills collected from portfolio was 74.80% or at a good level.

Based from the results of pre-test, post-test, project work and portfolio scores, it can be concluded that the analytical, creative and practical thinking skills including all their sub-skills of the students were improved after being trained in the learner-centered training course.

2. Discussions

2.1 The learner-centered teaching methodologies on the learner-centered training course were effective in developing students' thinking skills.

From this study on the development of the thinking skills of the students, results showed that among the six teaching methodologies employed, three teaching methodologies (hands-on learning, cooperative learning and project work learning) were proven more effective in improving the thinking skills of the students. By using the hands-on learning teaching methodology, the development of the thinking skills of the students were observed. During the first activity, the students showed that they had freedom to think and on the topic of travel, students chose their favorite tourist attractions to be included in their travel brochures for Chiang Mai visitors or travelers. After that, students applied their thinking skills in imagining and planning the design of their own work. When they finished, they compared their brochures within their own group. From this activity, students practiced their analytical thinking skills. Students had to analyze, synthesize and evaluate their knowledge background on the best tourist attractions using their own thoughts. The students then practiced their creative thinking skills by generating their own ideas in creating and designing their brochures. In this activity, students needed to brainstorm, generate and design their own work, but they also needed to share their comments by giving scores and discussing their peers' brochures. From this learning activity, it was found that students were able to practice their analytical thinking skills in analyzing, synthesizing and evaluating, particularly when they compared and discussed their peers' brochures. Moreover, students used their application and adaptation skills in practical thinking by presenting the tourist places in Chiang Mai to new visitors.

In the second activity of hands-on learning that dealt with the topic of entertainment, students started to learn about magazines. Students were divided into groups of five, and within their own groups, they chose stories and topics which they were interested in and used them to create their own magazines for their school. From this activity, students learned how to use their analytical thinking by organizing their interesting stories and topics for their own magazines. Students also applied their flexibility, originality and elaboration skills in creative thinking by making their own unique magazines. Moreover, students were able to use their application and adaptation skills in practical thinking by choosing topics in relation to their interests and their school as well. In addition, while students were doing their work, it was observed that students paid good attention to their work and were interested to make it better. Rillero and Haury (1994) stated that "hands-on learning" involved the child in a total learning experience as it enhanced the student's ability to think critically and helped the students to remember the material better and to transfer that experience easily to other learning situations. Moreover, hands-on-learning revolved students

who are either not as talented or have not shown interest in school to become more interested in their learning.

For the second teaching methodology of this study which was cooperative learning, two models applied in the training course were brainstorming and jigsaw reading activities. For brainstorming, students needed to use their background knowledge to brainstorm whatever related to the lesson with their peers. In this case, students needed to apply their background knowledge and generate it as much as they could. From the brainstorming activities, students practiced motivating themselves before learning the lesson by using their background knowledge that matched with the lessons that they were going to learn in their groups. Students were actively involved with the lessons rather than receiving information only (Gunter, 1995). The students started to maximize their knowledge with each other because when they learned from each other, they started to share or expand their opinions, used questions, compared and chose which they agreed or disagreed on. From this learning, it helped the students to practice their analytical thinking skills. Students became responsible for teaching content as they had opportunities to learn during the preparation and presentation while increasing their knowledge and information (Gunter, 1995). This study concluded, therefore, that students showed their cooperative learning behaviors as follows: 1) students started to practice motivating themselves before learning the lesson by applying their background knowledge that matched with the lesson, and 2) students learned from each other, started to share or expand their opinions, created questions, compared and chose which they agreed or disagreed on, 3) students completed their work before submitting to the instructor, and 4) students organized their work in their group by themselves,. These behaviors or responses are related to cooperative learning characters according to Johnson, et al. (1986) as follows: 1) positive independence learning, 2) individual accountability, 3) shared responsibility for each other, and 4) effective group processing.

Cooperative learning also led students to develop higher level thinking skills and from this activity, by applying their analytical thinking skills through 1) sharing or expanding their opinions, 2) using questions, and 3) comparing and choosing what they agree or disagree. According to Penitz (2000), cooperative learning led students in developing their higher level of thinking skills, encouraging them to have greater responsibility for learning, exploring alternate problem solutions in a safe environment and stimulating critical thinking while helping students clarify ideas through discussion and debate.

For jigsaw reading activity, students started to understand what they read which were different from the others in their group and later, giving them explanations. After that, students tried to help each other in answering questions which were related to their reading passages. From the jigsaw, students were able to use their analytical thinking skills by 1) analyzing and inferring their background knowledge with the lessons, and 2) sharing their perspectives with peers through evaluation and comparison of their class assignments. Wee and Jacobs (2006) studied the implementation of cooperative learning with secondary school students and they found that during teaching reading, one major element appeared when students developed their higher order thinking, they led the class to read the text and would answer the questions on the text. They stressed that students not only provided answer to the questions, but they also explained their thinking behind their answers.

The last teaching methodology was project work learning where students showed behaviors in thinking skills development. Students indicated that they had

freedom to think by themselves as evidenced by opting to choose their own countries that they were interested in. Then students made up a plan and set up goals for their project work by themselves. Students took their own responsibility to study about their traditions and prepared to present them to their peers in the class.

Looking at the learning process using project work, students were allowed to use their analytical thinking through this learning activity when 1) students first needed to choose their interested topics and later, 2) when they analyzed and synthesized goals and plan for their project work. At this time, students were able to manage topic contents and time to make their project work interesting. 3) By using their practical thinking skills in application and adaptation, students were able to search and chose related information with their topics and later, through their creative and practical thinking skills, they were able to generate, apply, and adapt different ideas when writing their project and then presenting them in their groups. From this learning step of project work activity, students were promoted to study their lessons more using other sources. After that, 4) students had to use their analytical thinking skills to be able to analyze, synthesize, and evaluate their ideas for class presentation. At the end, 5) students engaged their practical thinking skills once more when applying the knowledge that they had learned from their project and had presented to their class. In the last two steps of the project work activity, students were able to learn to solve by themselves any problems that might have occurred as they needed to think of self solutions to the problems. Poovipadawon (2001) stated some positive aspects of doing project work with students such as: 1) students were supported to have opportunities to study and search more knowledge from many other interesting sources; 2) students were promoted to use their higher order thinking skills; 3) students were encouraged to use their skills in managing their time and their projects; 4) students were supported to have learning autonomy; and, 5) students were assisted to solve the problems creatively.

2.2 Training students to exercise their thinking skills leads them to become autonomous learners.

Besides developing students' higher order thinking skills, this study also found that the learner-centered training course promoted students to become autonomous learners. This course, as an accomplishment of this study, aimed to use the English language training course as a means to train learners' thinking skills. Besides mastering these thinking skills, students also developed learning independence or learner autonomy and showed characteristics of being autonomous learners. In this study, students' learning autonomy was presented in three parts.

The first part came from observations made during the learner-centered training course. According to the sets of questionnaires and interviews given to teachers and students, both teachers and students believed that learner-centered learning could help students develop their own thinking skills. Cotterall (1995) presented data on learner beliefs involving language learning (tactics for setting goals, choosing materials and tasks, planning, monitoring, and evaluating progress). As stated, learner beliefs were considered important in planning for autonomy because these beliefs together with attitudes from learners, have a profound influence on their learning. The design of the learner-centered training course was based on learner-centered learning that corresponded with learners' needs, beliefs and interests. Based on the concept of a

learner-centered learning, students were allowed to have free interactions with their teachers, peers and even lessons.

During the performance of the activities of the learner-centered training course, students were shown to acquire characteristics of being autonomous learners: 1) students took responsibility for their own learning through their learning styles. Thanasoulas (2000) who studied learner autonomy and how it can be fostered found that it was very helpful to students to be aware of strategies or even identify the ones they used, and that autonomous learners had insights about their learning styles and strategies. 2) Students searched more knowledge from outside of their class, and 3) the students used their own learning methodologies. Murray (2006) studied autonomous learning behaviors on targets of learning autonomy behaviors and principles as the solution to organize a language program by using various tools of European Language Portfolio, Task-Based Language Teaching and the Internet, and found that a categorized set of autonomous learning behaviors consisted of 1) searching knowledge from external resources, and 2) applying learning styles and strategies.

The second part of the observations from class interactions was concerned with the investigation and recording using teacher logs. From these logs, three obvious student class interactions showed that the students were able to develop their learning autonomy, as follows: 1) the students linked their background knowledge with that in the classroom and then applied it in real situations and 2) the students chose their own topics of study, set goals on their learning, planned, organized and evaluated their work in order to make them more interesting. This interaction was related to characters of autonomous learner from Dickenson (1996) who stated that students who had autonomy learning characters were those who monitored their own learning, and those who chose their own instructional materials, set their learning objectives and organized them together with the planning of work duration for each objective.

The third class interaction, students expanded their learning by searching and applying outside sources of knowledge and presenting new topics to their friends in the English language, as related to a study of Thanasoulas (2000) on concepts of learner autonomy. It was found that there were seven main characters of autonomous learners and one of them indicated that students who had learning autonomous learning characters were ready to take risks in continuing to communicate using the target language at all cost.

The last part showed observations from project work learning and portfolio assessment, where students presented their learning autonomy behaviors during the learner-centered training course. From the project work learning, students followed steps of constructing their project work: 1) planning how to start their projects, 2) setting goals for the projects - these first two learning behaviors showed that students significantly demonstrated the behaviors of being autonomous learners, 3) creating and organizing their own projects, 4) choosing their own topics, 5) having active approaches in searching outside knowledge themselves, and 6) presenting their project work to the class in English. For portfolio assessment, the students followed two steps: 1) students took responsibility on keeping their own work and learning assignments; and 2) they selected pieces of work which they thought were masterpieces and also made relevant reflections.

From the project work learning and portfolio assessment, it could be noticed that the learning environments promoted students to become autonomous learners. From these learning styles, students had more opportunities to learn and do things by

themselves especially when they participated in their learning leading them to develop themselves to become active learners. According to Tudor (1993), learner-centeredness is not a method, nor may it be decreased to a set of rules. However, it is an approach that views students to have more active and participatory roles in the learning and teaching process than in traditional approaches.

Moreover, students needed to choose their own plans, goals, topics, contents, pieces of work to present to their peers and teacher, and work by cooperating with their peers in their groups; these learning environments supported students to involve with their learning, learn to make decisions on their learning and become autonomous learners. Altan and Trombly (2001) tried to create a learner-centered environment by giving students opportunities to research and choose their content materials through discourse communities outside the classroom. The results of the study revealed that involving students in this teaching process enabled them to better understand lesson goals and objectives, value communicative tasks and activities, generate topics, choose materials, and work cooperatively. This could be related to a character of autonomous learner of Dickenson (1996) where students were learning to assess progress by themselves, taking an active approach to the learning task at hand, having a tolerant and outgoing approach to the target language and ability in the achievements of their learning.

2.3 Some sub-skills of the three types of thinking skills slightly improved after attending the learner-centered training course.

After attending the learner-centered training course, the students' thinking skills, as shown in the three sub-skills of thinking skills (evaluation, flexibility and adaptation), improved slightly when compared with other sub-skills.

When looking into the details of the lesson plans, it was observed firstly that those sub-skills improved only slightly because the lesson plans for training the three sub-skills were not designed consistently in the order of easy to difficult. The latter did not follow steps of thinking skills difficulty. The lesson plans followed only the contents from the lessons and the students, therefore, might not be able to improve their thinking skills step by step; there might be some sub-skills which were difficult for them. According to Heuer (1999), although thinking skills can be learned by practicing like playing tennis and swimming, they require more effort than what many teachers realize. To emphasize thinking skills, a teacher must well organize the course objectives and must be aware of his or her own values, perceptions, assumptions and judgments.

Secondly, the evaluation, flexibility and adaptation sub-skills of analytical, creative, and practical thinking skills, respectively, required time and background knowledge to develop the thinking skills of the students. The processes of developing these sub-skills needed activities which could reinforce practicing in some amount of time. From this study, it showed that when students were not trained continuously, when they did not have much background about the three sub-skills, and when the teacher did not motivate the students enough to expand their thinking skills while learning the language, the students might not be able to show or present their ideas clearly and fluently. Ustunluoglu (2010) stated that language teachers can activate thinking skills in the classroom by highlighting self-awareness; that is, they can help the learners have and show understanding of themselves and their surroundings. By means of interactive approaches and materials, teachers can help students be aware of

their perceptions, assumptions, prejudices and values and can help students break old habits to construct a new point of view. It will take much effort but students will enjoy discovering themselves as they learn a language.

Thirdly, when looking into details from the observation form, teaching and learning methodologies, and the teaching approaches, it was found that the lesson plans did not provide more training in flexibility and adaptation sub-skills. It was also observed that the lesson plans on the evaluation, flexibility and adaptation sub-skills allowed the students to practice twice only during the learner-centered training course, which was considered to be insufficient in clearly improving the students' sub-skills. It can be said then that the sub-skills of evaluation, flexibility and adaptation did not reinforce one another. In this study, there were 28 lesson plans included in the learner-centered training course, which covered three main thinking skills: 15 lesson plans covered analytical thinking with 8 on analysis, 2 on synthesis and 5 on evaluation; 8 lesson plans covered creative thinking with 1 on fluency, 2 on flexibility, 3 on originality and 2 on elaboration; and, 5 lesson plans covered practical thinking with 3 on application and 2 on adaptation. It can be seen that the three sub-skills of the students on evaluation, flexibility and adaptation was a small part of the course. In addition, the study showed that only lesser number of teaching methodologies was devoted to the practice of the students' sub-skills of evaluation, flexibility, and evaluation, which were covered by only 6 teaching methodologies and 4 topics. The study needs to provide more variety in lesson plans for training the students to improve their thinking skills. According to a study of Fahim and Sa'eepour (2011), 15 topics were applied to the experimental group who was allowed to choose only 8 topics based on their interest. This was similar to the steps offered by Halvorsen (2005) who suggested that in holding the debate in the classroom, it would start from introducing the topic to the students and giving them some text to take home for research and to gather relevant information.

3. Recommendations

At the end of this study, four weak points were found. First of all, this study chose to examine only one group of students so no comparison was made on the development of the thinking skills among other groups. It would have been better to examine another group in order to compare other factors that might cause development of the thinking skills of students.

Second, the order or sequence of the lesson plans used for training of the three sub-skills was not designed consistently in succession from easy to difficult. Besides, the order of lesson plans did not follow the steps of thinking skills difficulty. The order should have followed the order of difficulty because the students might not have enough background on the introduced teaching methodologies and activities.

Third, more than one semester was required for the students to practice their thinking skills. The students had a limited time of seven weeks only to be trained and improved. A longer duration of training should therefore be taken into consideration because if the training time was conducted much longer, the results of the study on the development of the students might have been different.

Lastly, one of the weak points of the study was the insufficient variety of teaching methodologies used for the students to practice in order to be competent in the three higher order thinking skills. More multiple teaching methodologies should

be applied in the future study. Moreover, other kinds of teaching methodologies could be applied to cause more development of the students' thinking skills.

Nevertheless, this study had three strong points. The initial part of the study was done with meticulous process as it investigated the needs and beliefs of the students and teachers about thinking skills, after which this information was applied to construct the learner-centered training course. Furthermore, evaluation of the training course by the two experts led to an improved learner-centered training course before it was offered to the students. While the training course was being implemented, the two experts also evaluated the lessons for further adjustments to meet the needs of the students.

Again, the learner-centered training course curriculum helped students to develop or be competent in their higher order thinking skills. This study found the most relevant teaching methodology for developing the thinking skills of the students, which involved two teaching methodologies - cooperative learning and hands on learning. The teacher logs revealed that students enjoyed and became more interested in the role-playing activities in their group work, and students also had fun with their learning when it was the time for creating and constructing their own assignments. Thus activities could be provided to allow students to experience learning by doing, and thus promoting them to become autonomous learners, and meeting the requirement of National Education Act B.E. 2542 (1999).

For further study, first, it is important to arrange the environment and characteristics of the classroom to meet the demands of the students. Different ways and methods of enabling lessons for students to be fully engaged in the classroom activities are considered important to cause an increase in the development of higher thinking skills. Second, the study could examine a younger group of students who might be more receptive and might have their thinking skills easily be trained than when they are already grown up.