CHAPTER V

CONCLUSIONS, DISCUSSIONS AND RECOMMENDATIONS

The objectives of this study are to develop a local curriculum which integrates the process-centered teaching methods for grade level 4 students who study in mixed class groups and to analyze the results of implementation of the created local curriculum on the students' advanced thinking skills, awareness to their local environment, and cooperative behavior in learning. This study learns a group of 40 students of Regina Coeli College, Muang District Chiang Mai Province. These 40 students are composed of 20 students from Mathayom Suksa 4 and 20 from Mathayom Suksa 5. They study in mixed class group on their own interests. The researcher creates five research tools which are (1) the Plan to arrange an experience-based learning on local environment for grade level 4 students at Regina Coeli College in three Learning Units, (2) the Evaluation Forms to measure the levels of acquired advanced thinking skills in three sets of evaluation forms (i.e., on students' ability to analyze, synthesize and evaluate information) by means of the students' post-training (local environment course) tests, (3) the Evaluation Forms to measure the level of students' awareness of their local environment, which are applied after the students take the local environmental course, (4) the Observation Forms on students' cooperative behavior in learning which are used to observe the students' behavior during their learning in each learning unit (based on Learning Plan), and (5) the Self-evaluation Forms for measurement of the levels of cooperative behavior in learning during each learning unit.

The researcher utilizes this created local curriculum to arrange the learning activities for the students of Mathayom Suksa 4 and 5 who study in mixed class group, with a total class period of 36 hours in 18 weeks and the time spent outside the normal class period not less than 80 hours in one semester. During the study period, the teacher measures the acquired advanced thinking skills, the levels of student awareness of local environment through evaluation of works or tasks, and the cooperative behavior in learning using both teacher's evaluation and self-evaluation by the students (in the normal class). After the class period, the measurement of students' advanced thinking skills and awareness of their local environment is done through the evaluation forms, data analysis, and statistical data analysis using means, standard deviations and percentage.

Summary of the Findings

1. The development of a local curriculum integrated into process-centered teaching methods for grade level 4 students who study in mixed class group have evolved into a local environment course with a subject code of *Vor 40281*. With 1 (one) credit in three learning units, this subject is an elective course for grade level 4 students on the subjects of science. This integrated teaching method is focused on four processes, which are Project Work, Creative Thinking Learning, Problem-Based Learning, and Self-Directed Learning in order to develop advanced thinking skills,

awareness to the local environment, and better cooperative behavior in learning among the students.

2. The results of findings on the implementation of the created local curriculum.

2.1 Advanced thinking skills on three aspects. Evaluation on the students' Project Work shows that the means of scores for all three learning units stand at high levels, which are higher than the identified criteria. Comparison between learning unit reveals that the average scores for skills of analytical thinking is the highest, followed by those for skills of synthesis of information and then by those for skills to evaluate information. The students' scores for advanced thinking levels are progressively increasing from the Learning Unit 1 to Learning Unit 3.

Evaluation after the implementation of the curriculum shows that advanced thinking skills of the students are higher than the accepted criteria. On the analytical thinking skills the students score the highest average followed by on the information synthesis skills and then by the skills to evaluate information.

When the percentage of the class members who pass the criteria of quality evaluation of ONESQA (Office of National Education Standard and Quality Assessment, Public Organization) is considered, the mixed class group students have "passed" the standard scores for skills in ability to analyze information (95% of the students), to synthesize information (100% of the students), and to evaluate information (92.5% of the students).

2.2 Awareness to the local environment. From the creation of project works or tasks during the study, the students have scored in considerably high levels in all tasks after implementation of the course as the evaluation forms are concerned. The students have registered a high score on the awareness to the local environment. They obviously believe that the environmental conservation is not the obstacle to do things they like to do; although they disagree on discharging household sewage into Ping River, which allows algae and water insects to produce oxygen. When they go to forests, they do not want to bring wild orchids home for propagation, and they do not like high-rise hotel construction near their school.

2.3 Cooperative behavior in the learning of students during activities in each learning unit. The two-way evaluation methods (by teachers and through students' self-evaluation) produce consistent findings. The students in mixed class group have shown a high level of cooperative behavior in all listed tasks.

Discussion

From the findings the researcher has found some interesting issues deserving some discussions as the followings.

The integrated local curriculum with process-centered teaching methods for grade level 4 students who study in mixed class group is an efficient curriculum. The sample students who study in mixed class group are capable of advanced thinking level, i.e., analyzing, synthesizing, and evaluating information, in high level beyond the criteria and in very good level according to the criteria of ONESQA Public Organization. The curriculum can also implant good level of awareness to the local environment among the students. The students show awareness to their local environment, better cooperative behavior in learning, and good relationship to one another in high level as shown by the post-training evaluation forms. The most

probable cause for these achievements is their learning in the environmentally-related local curriculum course.

1. The Characteristics of the Curriculum are shown as the followings.

1.1 Contents of Arranging Learning Experience are the contents about local environment in the students' own environment in the context of Chiang Mai. The contents are closely related to the students' daily life and their very existence in society and country. The natural physical and biological environment as affected by the behaviors of human actors and the problematic conditions and problems in Chiang Mai are similarly interesting for the students and community member for the direct influence of one another. This kind of learning arrangement closely involves the concrete things ubiquitous for the learners leading to understanding for further consequential events in more general terms.

The contents are directed in such ways that the students are interested to learn more from local sources in local communities and indigenous knowledge, which are composed of knowledgeable persons with real life experience and willingness to transfer their knowledge, thoughts, feelings, cultures, beliefs in environmental conservation, and awareness to their progeny. The students, in turn, easily understand the facts, become aware to the real problems, and perceive the values and importance of environmental conditions where they live. They can apply this newly acquired knowledge into their daily lives, behave responsibly and consistently to the interests of their local environment, feel love to their own environment and become proud and protective to their own environment. During the course, the students express of their own environmental campaigns to the local environment throughout six project works they undertake: (1) study on the use of artificial chemicals in grape farms and use of organic vegetable farming, (2) study on the quality of water sources in Chiang Mai Province, (3) study on air pollution levels in Chiang Mai by measuring the amount of dust particles in the air, (4) study on air pollution in Chiang Mai by measuring the acidity level of the collected rain fall, (5) creation of a project for electricity saving in order to reduce global warming, and (6) study on waste management methods in Chiang Mai Province. The measurement of the students' awareness to the local environment after the class reveals that the students acquire higher level of awareness to the local environment. This means that they perceive the values and responsibilities for the local environment in form of environmental projects on the existing problems in communities and society. This expression reflects their awareness to the local environment including the self-initiated campaigns to awaken awareness among local communities to the real problems. The success of the self-conducted campaigns in the local communities reflects this awakened awareness.

The findings of the research are thus consistent with Rungjit Kongkham's (1998) findings among the students studying in the subject entitled "Environment Around Us" to create habits who show high levels of awareness on the environment and satisfactory study achievements. The same phenomenon is also noticed by Nantha Chutipatwipha (2002) who finds that the arranged teaching about local environmental and sciences according to the sufficient economy principle enhances the students' scores on environmental sciences, skills on environmental management, and awareness to environmental conservation (before and after taking such class). Similarly, Ratchaneekorn Ruedeerach (2003) teaches about environmental conservation by using a "conservation camps" with the normal learning group and

finds that the students' study achievements and attitudes toward the environment are different (before and after joining the camps) with the statistical significance at P=0.05. The research of Sirirat Siricheapchaiyan (2005) shows that students who learn by using the learning sets for science on quality of life have registered higher scores on science and awareness of environmental conservation after the study than before the study (statistical significance at P=0.01). Although this present study does not aim to measure the study achievement directly as these quoted studies, the sample students apparently can practice with correct principles the acquired knowledge from the study contents into Project Works and the Group Work. This mere fact proves that the sample students have gained knowledge in the environmentally-related contents very well.

1.2 Integrated, Process-centered Teaching Methods means the arrangement of the learning experience on local environmental in Chiang Mai context to the students by focusing on the training of skills on thinking and activities for the students in direct experience and actual practice. The teacher is the person to urge the students to reflect what they learn from their experience, to summarize their learning to be new knowledge, and to promote the use of the knowledge in new situation. Similarly, the findings of Somsak Phuviphadawat's study (2001 : 39-41) reveal that in learning-by-doing the learners have chances to gain experiences and the urge to reflect things from those experiences to develop skills, attitudes, or new thoughts. Arranged learning activities in each learning unit are focused on direct experience as the main part and the learning is focused on four types of process, i.e., Project Work, Creative Thinking Learning, Problem-Based Learning, and Self-Directed Learning. The use of the pattern of activity arrangement is fitted to the overall contents appropriate to the contents in each plan at least in two methods. The prominent points of this study can be explained as what follows.

The Project Work Learning's prominent point is the utilization of different methods through which the students seek for knowledge and answers for their questions. This is the kind of learning where the students choose the subjects according to their personal or group interests. The choice is a shared decision-making. Many other learning types or patterns are also integrated together such as Group Process or Group Procedures, training to thinking, problem-solving, process-oriented learning, and brainstorming among the students in each group to select the inquiry subjects. The process is connected to the principle of thinking development known as Bloom concept of six steps of capability, which are knowledge, comprehension, application, analysis, synthesis, and evaluation levels. This is an example of creation of a student-centered learning in all steps of learning processes since the stages of planning, designing, creating, and applying, and evaluating the work. The teacher has the roles as the learning managers (Office of Education Council, 2007 : 1-2). The measurement of the levels for advanced thinking skills of the students during and after the course demonstrate the students' high capability in information analysis, synthesis and evaluation, which means that during the study they are able to connect the thoughts, separate the information, see the whole picture of environment, divide the picture into small parts, and arrange small parts into categories. They understand and perceive the relationships of all parts of information, integrate the knowledge and thought about the environment, and propose original solutions appropriately. They can judge the values and qualities of the environment by comparing the measurement

outcomes and certain criteria including as well as reasonably use the criteria to adjust the appropriateness of the thought and other actions.

Arranged experiences in form of creative thinking learning have the prominence point in the brainstorming to gauge group members' opinions in the group which exposes the potentials of every member to search for answers and to participate in group discussion. The students can begin their own initiatives, analyze, connect their discovery, create tasks, and solve problems. In addition, they can present their works and group works, criticize or offer opinions and evaluation for their own group works as well as to other group's works. The students learn to revise based on democratic ways and distribute their group work in form of display boards and exhibits using the miniaturized ecological systems. The six groups of students use the re-cycled, easy-to-find, materials to make ecological models: (1) the ecological systems along the Andaman Sea, (2) the model of ecological system of daily cattle farm, (3) the model of ecological system in the sea, (4) the model of ecological systems in the water, (5) the model of ecological systems in the desert, and (6) the ecological system in a rice field.

The learning arrangement through a problem-based learning arrangement shows a strong point which is a creation of understanding and problem solution because problem stands at the focus of the teaching. Therefore, problems brought to be the starting points of the teaching are problems often found in local Chiang Mai near the students' own environment. Torp and Sage (1998: 14-16) state that these problems should be related to daily lives of the learners because these problems are the starting points of the learning process and the reinforcement in development of the skills in searching for information and solving problems (Boud and Felleti, 1997 : 14 ; Barraws and Tamblyn, 1980 : 18; Finkle and Torp, 2003 : 1). The researcher brings the ubiquitous problems in Chiang Mai such as the overused natural resources, forest fires, garbage problems, flood problems, waste water disposal, and polluted air as the starting points in teaching and identifying the situation for students to solve problems such as through creation of the miniaturized ecological systems for living beings in them. In certain period of study the students are responsible for self-learning, assisting one another within the groups, discussing and searching for knowledge, and finding solutions in accordance with of the concept of Dolmans and Schmidt (1995 : 228-331) and Greenwald (2000 : 28) that mentions about the skills for self-learning to set the learning targets, to implement activities, to evaluate the self-learning, to display independence in learning in sub-groups, and to exchange opinions in the groups. The learning is challenging and enjoyable. In addition, the researcher provides the learning materials such as computers, libraries, or printed materials through which the students may get advice, evaluation means, and answers. These same roles for teachers are also offered by Kulaya Tantiphalacheeva (2005 : 77-80) who suggests that the learners are motivated and assisted in summarizing crucial issues when they have guidelines in searching for knowledge, discussing, asking questions, and exchanging opinions. This suggestion is in accord with the proposition of Torp and Sage (1998 : 14-16) that teachers have responsibilities to be the persons who advise, arrange the learning environment, and promote the students to be independent learners. Students are trained to be the problem-solvers and developed to be self-directed learners. In addition, the integrated learning in school and daily life would train adaptation

capacities of the learners to their environmental conditions and problem solutions to make them useful members of society (Ratchaneekorn Hongpanat (2004 : 43-52).

The learning methods through the environmental problems in Chiang Mai as the base of the learning lead the students to the real problems so they can analyze, create solutions and alternatives, evaluate the alternatives. These are the methods correlated with development model of the youth in learning society of the 21st century that focuses the students to learn in the society as the basis of their knowledge. They can apply the acquired knowledge in daily lives and in solving real problems.

Self-directed learning arrangement. The strong point in this kind of learning is that the students can learn independently from printed materials and websites. The researcher prepares the printed materials that are related to the subjects of the environment to the students by arranging a knowledge corner in the library and introducing the lists of printed materials and websites for the students. In order to facilitate the more extensive search, the students also study from other printed materials of their own interests. The students have an extensive database to share with other members of the groups. The group's works become convenient, well-supported with broad information, and sufficient as the basis for analysis and decision-making to produce the group works or tasks. In addition, this convenience urges the students' to analyze, synthesize, criticize and able to think efficiently for solutions for problems and decisions (http://www.improved-reading.co.th/Bord04.htm), including to build thinking capacities, creativity, understanding the world's latest situation, and vivid imagination(http://www.school.net.th/library/create-web/1000/generality/10000-8057. .html). The development of students' left and right brains is also enhanced (http://www.improved-reading.co.th/Bord04.htm).

Furthermore, the students have educational and data search activities by themselves through the websites teachers have suggested as well as the websites of their own interests through which they can assess various sources of information. They are free to choose the contents and to identify the independent learning hours in accordance with the individual teaching theory about students who are freed to choose the contents, times, and activities on their own. This situation is also applicable to the teaching theory of cooperative behavior of the students to learn together in groups through media (e-mails, web boards, chat rooms) in which the students, other learners, and friends in class can take part in the learning. A known teaching method of Gagne provides a learning guideline about the students' choice of activities, arrangement of the methods for analysis and synthesis, and presentation of the information according to their own understanding and volition (http://www.nectec.or.th/courseware/cai/0030 .html), which is good for the efficient learning. Thanomporn Laoharjaratsaeng (2001 : 88-90) similarly presents the positive things about learning through websites that it promotes the concept of life-long learning for the learners who persistently seek for knowledge. The positive value includes the building of the skills to assess their own independent study, opening the chance for students to access information conveniently and efficiently, and supporting a learning environment that connects what they learn and the problems found in reality. The focus on creation of learning according to real life context and problems is in accordance with the concept of constructivism which allows the student access to experts in several branches of science all over the world. Students or learners can communicate and ask questions or information directly to experts. The observation for the self-learning of the student

shows that they have the methods to look for general information in websites but for details they need detailed printed materials.

The arranged learning activities inside normal class period or outside class period are focused in such ways that the students can learn from activities. The activities inside normal class periods are studying from the slides, experiments, group activities, lectures of trainers, movies, self-learning in libraries and websites, and exchanges of knowledge between persons and groups. This kind of learning proves to be spending more hours than the previously planned. The activities outside the class period are research in libraries and websites, group activities, creation of tasks or works, launch of project works, study on local environment, visits to the learning sources in the communities, exhibitions, interviews with individuals, etc. These activities open chances for the students to study their personal or group interests. They can work in persons or in groups. For this kind of learning activity the students spend their time after the class or during appointed weekends. Studies in the local communities necessitate cooperation between sectors and organizations to facilitate the study well, although this requires long time and high budget. However, this kind of activity trains the students through direct experiences. They learn together in various forms, build relationships with others, think jointly with “Heart, Head, and Hand” together with creativity, and help one another from the starting until the end of the learning. And this group work shares similar qualities to the samples in the work of Yupin Pothirat (1994) that finds about higher level of cooperation among the students who have learned in group work than those who have never learned in such group work.

The integrated process-centered teaching method. The strong point of this method is its focus on the practical experiences that promote the students to accomplish, to think, to love reading, and to respond to the targets of the Basic Education Curriculum of B.E 2544. It creates students with the desired characteristics on creativity, hunger for knowledge, hunger to study, love to read and seek for knowledge, show skills and potentials in arrangement, communication and use of technology. These students are also able to adjust to proper thinking methods, to select effective working methods appropriate to the situation, to build skills in thinking and creating ideas, to nurture skills in leading their lives, and to build awareness to natural resources and environment.

2. Arranging the Mixed Class Group Study. The sample group is gathered by the teacher through an advertisement about the launch of local environmental course in Chiang Mai to the students of Mathayom Suksa 4 and 5 with detailed information about the course, intended students groups, the learning methods, and the study hours. The students of Mathayom Suksa 4 and 5 levels apply quickly to the course more than the planned numbers. The researcher thus can not accept all these applicants and must select them through a simple random sampling (drawing lots). The students who fail to take the course are still allowed to participate in some of the activities outside the class period such as activity of checking river water quality using algae and water insects and study on ecological systems with various learning sources.

The researcher arranges the group of students into groups composed of three to four students per group from each level. The students are allowed to choose the group to be its members. In working together, roles and responsibilities are identified

within the groups (i.e., chairperson, secretary, and group members). These roles are rotated among the group member for each task. During the earliest class, however, the students of both levels are not familiar to each other that they need longer time to arrange the groups and the chairperson of each group are students from Mathayom Suksa 5. But in later activities arrangements, the roles and responsibilities are switched depending on the selection by the group members. When the students from Mathayom Suksa 4 have roles as chairperson, those from Mathayom Suksa 5 show respect to these younger chairpersons. The sharing or division of tasks for each group is done through members' choosing the tasks of their interests and suitability. Sometimes the group members from different groups are interested in the same topics that they have to discuss who to take certain topics. Group chairpersons must divide the responsibilities among their respective group members before the works proceed. The general atmosphere in outside and inside classroom is that all members participate in doing the tasks well. Whoever the chairpersons, regardless of class levels, must identify the group targets, join in the planning, identify the steps of work performance, show opinions, listen to members' opinions, discuss matters logically and reasonably, solve conflicts or problems, decide together, join together in decision application, join the evaluation, and respect final consensus of the groups. These leadership skills are important in working together with others. Mixed class group opens the chances for students to work in groups and working together with others (Department of Curriculum and Instruction Development, 1999: 52).

The purpose of the learning activity arrangement is to promote the students in mixed class group to have chance to do activity together both indoor and outdoor activities. They can have not only good interaction in the group but also build their learning potential on thought, mind and skills to live with others. Each of them can use their own capability to accomplish group tasks, combining their heart, head and hands. The interaction with colleague and the atmosphere of peer pressure will lead them to achieve the targets as group members who share satisfaction and enjoyment to work together. (Department of Curriculum and Instruction Development: 1999: 52)

Moreover, the younger students (Mathayom Suksa 4) from the mixed class group are more likely to gain benefits from older students (Mathayom Suksa 5) because the former can learn from the latter on the local environment, on techniques to study well, on selecting good courses outside the school, or on lack of knowledge on certain subjects. The students from Mathayom Suksa 5 can help the younger students on study. This fact results in planning for additional knowledge including proper revisions for the study contents for Mathayom Suksa 4 students. Nevertheless, the students from both levels can exchange experiences with each other such as on taking special courses, on competitive exams to get scholarships in student-exchange programs, on preparation to study in graduate levels, on other social activities inside and outside the school together, on exchange of opinions about many things like knowledge, music, entertainment, sports, and relationship between older and younger students. The research of Milburn (1981) also shows that younger children gain benefits from the study in mixed class group more than the older ones and they have positive attitudes toward the school more than the students from normal class. In addition, Miller (1991) summarizes that mixed class group study creates a good inter-dependence between classmates. Students who highly appreciate the teaching in mixed group class have positive attitudes toward the school and toward themselves, and have tendency to build good relationships in their society. The structure of the

mixed group class facilitates the students' development. The teaching characteristics support the students to be responsible and to spend more time to learn independently with beneficial effects. The development of the skills of the students at the same time to be independent and cooperative with classmates (Mason & Burns, 1994) enables a proper working system in teams.

The observation of behavior of students during the class in each learning unit and the students' self-evaluation on their own behavior in every learning plan show that the students display high levels of cooperative behavior in learning. Although in the earlier period from week 1 to week 3 one group of students has conflict between its members but the members adjust their behaviors into better cooperative behaviors after the activities continue into week 4. This shows that the students in mixed class group participate in group activities on expression of opinions, listening and accepting opinions of other members in groups, finishing the assigned tasks willingly, and helping one another. They join in their Heart, Head and Hand.

Beside the Issues that have been discussed above, there are also other Impacts from Developing the Curriculum that can be summarized as the followings.

1. Positive Impacts

1.1 Students gain knowledge and various experiences from many learning sources and local indigenous knowledge, i.e., using high quality microscopes in Biology Laboratory, learning with Master and Doctoral students. The students also have positive attitudes toward learning science, have clear targets in learning, and show high level of determination in learning.

1.2 Students respect themselves, become proud of their own behavior toward the participation in campaigns to effect positive changes toward their local environment.

1.3 Students participate in activities of the various sectors of the environment to accomplish good things for the society such as becoming volunteers to protect the Doi Suthep-Pui National Park.

2. Negative Impacts

The actual conditions in their society that the environment is degraded or destructed by human action such as the invasion on Ping River, the policy of reservoir building in Ping River, the release of sewage directly to Ping River, the release of toxic substances from factories that creates protests from the networks of people who love Chiang Mai against responsible sectors. Another regretful fact in their society is the gross failures of law to punish the wrongdoers who break the environmental laws. The environmental problems become serious problems at the community, national, and global levels. These ubiquitously apparent facts create desperation among the students in their launching the Project Works and environmental campaigns in the communities because they can not fight against the causes of the environmental problems in the society.

3. Problems and Obstacles Found During the Implementation of Curriculum

3.1 The implementation of the plan in the last two weeks before the end of curriculum is cancelled because the students must prepare their final exams in other subjects. After finishing these final exams, the students come back to environmental

course's normal class. The experiment of this curriculum has lost its continuity for the postponement for two weeks longer than the original plan.

3.2 The study in mixed class group, arranged once a week, forces the students to meet one another not often as the study in normal class, in which they study together most of the time. This arrangement reduces the frequencies of the students' meeting, consultation, or shared group activities during day time.

4. The Factors Leading to Success

The integrated process-centered teaching methods can be successful under the maximum condition for success as the followings.

4.1 The students are ready, interested, and willing to launch activities both inside and outside the classroom. They are responsible together as group and enthusiastic in group activities.

4.2 The teachers are ready for the arranged learning activities to promote the students' independent development naturally with their potentials. The teachers can adjust the learning plan according to the appropriate situation and thus support the students to learn with the environment from various learning sources. The teachers are advisers to advice the students, to devote time for the students outside the classroom with all groups, to facilitate the learning processes, and to oversee achievement of the group's objectives.

4.3 The parents are ready to support the study, to provide convenient learning sources, and to allow study from other learning sources.

Suggestions

Suggestions in Development of the Curriculum in Environmental and Implementation of the Curriculum are summarized as the followings.

1. Better consideration to select the topics to be used as the proper contents to study on the local environment not only from the study methods from research reports, documents, and reported opinions in mass media or public gatherings, but also from influential persons from open floor discussions. These resources must be brought together to analyze, synthesize, summarize, and prioritize their important parts to build the topics from arrangement of the discussion-related activities with the students, survey-related activities for the students, observation of the problems and conditions around the school environment, and summary of the problems found to be set as the topics in learning activities.

2. The subject of local environment utilize the study hours in two periods per week. Therefore the class hours would be two continuous periods for convenience and continuity of learning activities.

3. The time used for arranging the activities should be flexible because the activities the students undertake outside the class prove to consumer longer time than the planned hours. The researcher is thus compelled to arrange the possible time with the Academic Section for next to the free hours for the students (or break hours or the last periods in certain days) to resume the cancelled activities. The students, nevertheless, can proceed with the activities successfully in each week.

4. The developer of environmentally-related curriculum should plan the arranged activities inside the class period and outside class period and including cooperation with other learning sources in order to facilitate the learners to prepare for

the study. The roles of the teachers include the synthesis and learning from the research findings to be used in making plan together in doing activities outside the class according to the students' needs.

5. When implementing the curriculum for continuous utilization, the other school administrators should be made aware and thus join the promotion for the larger use of the curriculum in the school and the teachers in subjects of Science should implement the curriculum professionally.

6. When using the mixed class group study to arrange the learning activity and during evaluation on the study achievement, the teachers should consider choosing the contents of the new subject for the students in mixed class group. If certain groups of the students already known the learning contents better than the other groups of students, this fact may cause the unnecessary advantages or disadvantages for the students in the study. If such limitations have inevitably occurred, the teachers can arrange the other forms of curriculum in which measurements or study evaluations on study achievement are developed in other forms such as free activity, club activity etc.

7. The implementation of the arranged activities in the created local environment course like the one the researcher has created should be applied appropriately after consideration of the environmental context of the school to implement it. As Chiang Mai Province is a province in the Upper North Region of Thailand and the school implementing this curriculum is in the same region, the activities arranged are possible to be used or slightly adapted to the real situation. For schools in other regions, this learning plan must be applied with necessary adjustments in its contents as appropriate to the local situation.

8. For studies with learning sources in the local communities, the teacher may ask for help on budget from the networks of parents, community members, environmentally-related sectors, and environmental organizations to facilitate the learning and reduce the burdens on school budgets for learning activities.

Recommendations for Future Research

1. The course of local environment should be arranged according to the guidelines for the arrangement of curriculum focusing on needs, necessities, interests or activities of the students so that it can integrate the process-centered teaching methods with direct experiences and problem solutions. Students are trained to be aware of the problems and the needs to solve the problems, to know how to analyze, synthesize, evaluate and make decisions to behave properly, and to build positive awareness to the environment and to the students' own lives.

2. The development of curriculum can be arranged in each subject for both compulsory and elective courses and for free activities to response to the needs and interests of the students. The curriculum should be flexible and able to promote the learning activities of mixed class group in Mathayom Suksa levels so that there is development in each subject for the students in each grade level to choose to study.