

A Study of Learning Outcomes, Attitudes and Environmental Conservation Behavior by Using Inquiry, Collaborative and Integrated Teaching Methods

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Abstract: Organization of environmental conservation learning-teaching activities at the primary education level can be regarded as importance to living in the future. In the violently natural changing condition there should be an appropriate model of learning and teaching the learner development activities. This study aimed, to examine efficiencies of the inquiry, collaborative and integrated teaching methods entitled Environmental Conservation with a requirement of 80/80 and to compare learning achievement, attitudes, behaviors and learning. The population used in this study consisted of Prathomsueksa 6/1 students, Prathomsueksa 6/2 students and Prathomsueksa 6/1 students, 30 students each, totally 90 students. The instruments used in this study were 15 plans for organization of inquiry learning, collaborative learning and integrated learning a 40 item achievement test, a 30 item scale on attitude toward environmental conservation and a 30 item scale on environmental conservation behavior. The statistics used for analyzing the collected data were men, percentage, F-test (ANOVA) and one-way MANOVA. The results of the study could be summarized as follows: The inquiry collaborative and integrated learning entitled Environmental Conservation for Prathomsueksa 6 had efficiencies (E_1/E_2) of 84.47/82.66, 84.84/83.58 and 90.12/87.50, respectively which was each higher than the established requirement of 80/80. The students who learned using the inquiry, collaborative and integrated teaching methods had different learning achievement at the 0.01 level of significance. The students who learned using the integrated teaching method had higher learning achievement than the collaborative and inquiry teaching methods. The students who learned using the inquiry, collaborative and integrated teaching methods had different attitudes toward environmental conservation at the 0.01 level of significance. The students who learned using the integrated teaching method had higher attitudes toward environmental conservation than the collaborative and inquiry teaching methods. The students who learned using the inquiry, collaborative and integrated teaching methods did not have different environmental conservation behaviors. The students who learned using the inquiry, collaborative and integrated teaching methods had different learning retention at the 0.01 level of significance. The collaborative teaching method had higher learning retention than the integrated and inquiry teaching methods. In conclusion, the model of environmental conservation learning by using the integrated teaching method was appropriately efficient and could develop learning achievement, attitudes and environmental conservation behaviors of the students at the primary education level. Therefore, teachers should be promoted and supported to implement the integrated teaching method in organization of learning and teaching environmental conservation at every primary education class level.

Key words: Learning outcomes, attitudes, environmental conservation behavior inquiry, collaborative, integrated teaching methods

INTRODUCTION

During the last decade, Thailand has been drastically affected by the globalization progress in sciences and technologies. There are tremendous changes in economics, social, cultures, politics and governmental

issues, especially in the recent nationwide economical development which concentrate on the growth (Vinai, 1998). Thus, various social problems in societies and environments followed. If these problems cannot be solved in timely manner, they will become more difficult. According to the evaluation of primary education

curriculum, the results of the students in Prathomsueksa 6, by the Department of Curriculum and Instruction Development in the area of knowledge and thinking, found that they got average scores in sciences 38.84% and international sciences 36.12%. Moreover, the Department of Curriculum and Instruction Development, Ministry of Education summarized the achievements of sciences learning that the students all over the country must be improved, otherwise, there will be great impact in the progress of national scientific and technology development. This corresponds with the sciences learning condition according to the fundamental education curriculum 2001 edition. In the academic years, 2005-2006 of the office of Educational Service area 3, Petchabun Province where the researcher is teaching, the average scores in sciences of the students in Prathomsueksa 6 are 49.51, 52.74 in the academic year 2006 and 2007.

Because of this problem situation, the researcher tried to study model of teaching by inquiry, collaborative and integrated teaching methods in creating learning-teaching activities in sciences for fundamental education level. The environmental context were provided in order to foster the young generation of their responsibilities in environmental awareness. The researcher analyzed and extracted the process to develop the collaborative teaching called the integrated teaching method which combine the inquiry teaching and the collaborative teaching into 4 steps, introduction, teaching or presentation the lessons to the class which are sub divided into 5 steps: To face problems, data collection for examining, experimenting, explaining, summarizing and evaluation and appraisal to bring back to the research of learning-studying in environmental conservation, development of learning results and build up attitude and environmental conservation behavior for further learning-studying.

This study aimed to examine efficiencies of the inquiry, collaborative and integrated teaching methods entitled environmental conservation with a requirement of 80/80 and to compare learning achievement, attitudes, behaviors and learning.

MATERIALS AND METHODS

Three learning plans-the inquiry method: the knowledge plan on environment conservation of Prathomsueksa 6 in 5 subjects, 3 h for each subject. Total 15 h. The collaborative learning plan on environment conservation of Prathomsueksa 6 in 5 subjects, 3 h for each subject. Total 15 h. The integrated teaching learning

plan on environment conservation of Prathomsueksa 6 in 5 subjects, 3 h for each subject. Total 15 h.

Forty items for evaluation the results of environment conservation learning forms. Thirty items for attitudes toward environment conservation form. Thirty items for behaviors in environment conservation form Evaluation of endurance in learning form which is the same as the environment conservation learning forms. To create the materials, the researcher proceeds as following details: The inquiry teaching method, the collaborative teaching and integrated teaching plans in the scientific content group of environment conservation, Prathomsueksa 6 are; to create the inquiry for knowledge plan by studying the documents and researches relating to the learner-centered curriculum planning, the Fundamental Educational Curriculum 2001, learning group, the standard analysis and prepare the second step of learning context; prepare the learning units and the expected results of annual learning in Prathomsueksa 6 specified in the curriculum manual. The context of scientific learning group of the Department of Curriculum and Instruction Development.

Learning structure, curriculum and the schools where the inquiry teaching method, the collaborative teaching and integrated teaching activities had been used. Start to plan the inquiry learning method in the scientific content learning group applied to Prathomsueksa 6 on environment conservation. Write the plans according to the model of the Scientific and Technology Promotion Academy (Somchit, 1998) consisted of 3 steps in the inquiry learning by self-studying; creating 6 steps of learning activities of collaborative methods and 4 steps if integrated methods, respectively. Propose the learning plans to the advisor for approval. Then, ask for suggestions for improvement and materials examining from 5 experts to assure the accuracy of the context. The context of the teaching plan should be in line with the specified objectives Specify the criteria used for evaluation. Take the comments of the experts on the inquiry learning method, the collaborative and integrated learning plans in to consideration based on the above average scores of 3.51. The results show that the inquiry learning method is at high level. The average IOC of inquiry learning method from the experts equals to 4.46, from the collaborative method equals to 4.52 and integrated method equals to 4.71. Adjust and improve the three models according to the suggestions from the experts and try them out with 30 students in Prathomsueksa 6, Baan Koksad Community School who are not the sample group of environmental conservation. Use the tried out plans to improve the language used and contents to match with each class. Publish the complete

plans for the students in Prathomsueksa 6, Sritep Kindergarden School, Phetchabun Province.

Designing the learning evaluation form is proceeded as follows: The researcher designed the knowledge and understanding evaluation forms on the environmental conservation in 5 areas; natural resources and environment, the environmental conservation in the community, water resources conservation in the community, forestry resources in the community and energy conservation in the community in 4 items multiple choices all together 50 items. They emphasized on knowledge and understandings and applied in analytical thinking and environmental conservation synthetic in the community. The researcher studied how to design the evaluation forms and analyzed the techniques in evaluation forms. Then he adjusted them according to the suggestions of the experts and tried them out with students in 3 classrooms with 15 students in each class of Prathomsueksa 6, total 45 students at Ban Koksa-ad Community School who are not the sampling random group.

The scores given to each item of evaluation form in knowledge and understandings is 1 for the correct answer and 0 for incorrect or unanswered item. The 40 evaluation forms are selected by finding p-value, B value using the Point Bursarial Correlation). Choose the items with the positive B-value and higher than 0.20 (Booncherd, 1974) B-value between 0.20-0.82, p-value between 0.20-0.77, CL value using the formula KR-20 (Booncherd, 1974) and CL value equal to 0.89. Implement them to the sampling random group.

The designing of the attitudes toward environmental conservation evaluation form, the researchers proceeded as follows: Study the objectives of the content in scientific learning curriculum on the desirable attitudes toward the environmental conservation in Prathomsueksa 6. The objectives are the satisfaction of the students within their environmental conservation community. Studying the theories, context, concept, documents and researches relating to the attitudes. The questionnaires of the attitudes in learning the feelings and concept of the students in Prathomsueksa 6 toward the environmental conservation in 5 levels of evaluation forms with 40 items in total. Then, he adjusted them according to the suggestions of the 5 experts in context to examine the accuracy and clear language used and materials for research. The congruence of the attitudes evaluation forms with the IOC (Index of Item Objective Congruence) which should be higher or equal to 0.5 (Booncherd, 1974) in all of 40 items with IOC between 0.50 = 1.00. Improve and correct them according to the 5 experts' opinion and

suggestions to cover the knowledge, memory analytical and synthetic thinking in applying to daily routines. Try them out with the 30 students in Prathomsueksa 6 at Baan Koksa-ad Community School who are not the sampling random group.

The results of attitudes evaluation forms are analyzed to collect data in qualification which show that the attitudes evaluation forms using the B value by coefficient analysis of Pearson's model. Choose the B value which are positive and >0.20 (Booncherd, 1974), B value between 0.22-0.91. Reliability value using CL-coefficient alpha model by Kronbuck's method (Booncherd, 1974). CL value of the whole attitudes evaluation forms of 30 items equal to 0.86 which is >0.70 i.e. the plans can be the materials implemented to the sampling random group.

To design the behaviors in environmental conservation evaluation forms, the researchers proceeded as follows: study the objectives of the content in scientific learning curriculum on the desirable behaviors in the environmental conservation in Prathomsueksa 6. The objectives are the awareness and consciousness of the students within their environmental conservation community. The behaviors in environmental conservation evaluation forms of the students in Prathomsueksa 6 using the p-value and B-value of Pearson coefficient analysis. Choose the items with the positive B-value are positive and >0.20 (Booncherd, 1974). IOC between 0.39-1.00.

The results of 30 items in the behaviors evaluation forms are analyzed to find Reasonability value using CL-coefficient alpha model by Kronbuck's method (Booncherd, 1974). CL value of the whole behavior evaluation forms of 30 items equal to 0.88 i.e., the plans can be implemented to the sampling random group for further data collection.

RESULTS

The researcher presents the study of Learning Outcomes, Attitudes and Environmental Conservation by inquiry collective and integrated teaching as follows:

The comparison of means and standard deviation of the learning scores in attitudes and behaviors in environmental students by conservation by inquiry collective and integrated teaching methods before and after learning the results show that the students in Prathomsueksa 6 are higher in comparison with before and after learning. In general of 3 methods, before learning the means are equal to 26.00 and after learning equal to 34.89. Attitudes before learning 64.97 and after learning 77.80.

Behaviors in environmental conservation in general before learning 62.62 and after learning 79.22 as the hypothesis established.

The coefficient results before and after learning of the three variances found that the learning attitudes and behaviors toward environmental conservation of the students using inquiry, collaborative and integrated methods are different in 0.01 significance. This shows that each of the three methods has the effect on the scores of the learning, attitudes and behaviors toward environmental conservation differently. The researcher tried further test to consider the results before and after learning of the three variances. Exhibit the results before and after learning of the three variances found the students using inquiry, collaborative and integrated methods are higher at 0.01 significance.

The comparison of the endurance in learning in environmental conservation using inquiry, collaborative and integrated methods of the students in Prathomsueksa 6 after 2 weeks as shown in we found that the after learning results are higher than before learning at 0.1 significance. However, in 2 weeks later, the scores of the students are lower at $p < 0.00$ significance. The analysis shown in exhibit 12 found that the students using the inquiry method the scores are higher than before learning at $p < 0.00$ significance. However, in 2 weeks later, the scores of the students are lower at $p < 0.00$ significance. The students using the collaborative method the scores after learning are higher than before learning at 0.1 significance, however, in 2 weeks later, the scores of the students are lower at $p < 0.00$ significance and the students using the integrated the method the scores after learning are higher than before learning at 0.1 significance, however, in 2 weeks later, the scores of the students are lower at $p < 0.00$ significance.

DISCUSSION

From the research, we found that the integrated the method which was developed from the emphasized on learner-centered theoretical concept. Concentration on the development of the students' good behaviors, intellectual, happiness and consciousness in environmental conservation and natural resources.

This can be summarized as follows: The students using the integrated the method have higher scores than those using the integrated and the collaborative methods because the activities created in the integrated methods are mixed with the competent, moderate and weak students group. They shared responsibilities among their groups. The students created found the arousing

activities by themselves. They tried out by themselves and with the others in the groups until they actually experienced by themselves. The students practiced in the real experiences and situations in their communities such as the forests River resources, Pa Sak River, energy resources, Oil Drilling Platform in the local area. They paid attention and enjoyed doing the assignments from the teachers with learning-teaching activities. Consequently, the efficiency of learning occurred in the principles of applying theories of skills, intellectual and brain growth.

The studying on the learning plan and the ready made plan on energy and Living environment found that the students have higher achievements after learning. The study of activities development on the natural environmental conservation, Prathomsueksa 5 found that the students have higher achievements than before learning. The study on the Learning of Natural Environmental Conservation in Nong Chok Wank Kamphaeng School found that the students learned with activities have higher achievements after learning than before learning in congruence with the research of Josiah *et al.* (2007) they found that students taught EE concepts using the participatory approaches developed a more positive attitude to the environment, with those in the full participatory group having the best attitude scores. The results also indicate that students who worked in the small groups demonstrated a more favorable attitude. The participatory approach affords the students to learn and work more effectively with others which made them more sensitive to the necessity of having a descent respect for the opinions of others and be more sensitive to their environment which in congruence that the attitudes toward the learning after learning ate higher than before learning.

The students using the integrated the method in attitudes development have higher scores than those using the integrated and the collaborative methods because the activities were created the knowledge components by themselves, tried them out and realized the problem situations of environmental and natural resources damages. The achievements in learning process was higher than the other methods which the students did not participate in the learning-teaching activities as much as the teachers, so, the attitudes toward the environmental conservation in the other methods are not interesting and too far from themselves. The results, therefore are not good as they should be. The study of achievements and attitudes toward environment by using the activities in environmental conservation of the students' camp with the normal students found that the achievements and Attitudes after learning is higher than

before learning at 0.5 significance and congruence with the research of Chiang *et al.* (2005) found that students can learn at their own pace, constructing knowledge by collaborative learning and using tutor assistance to solve their problems immediately, means that the effect of experiences outside the classrooms to the attitudes toward the environment should be better attitudes toward the environment after learning than before learning.

The comparison of behaviors in environmental conservation of the students in Prathomsueksa 6, at Srithep School using the integrated, collaborative and integrated methods found that they have same behaviors in environmental conservation which are not in line with the required hypothesis. The same or similar scores of behaviors in environmental conservation using the integrated, collaborative and integrated methods found out that they have similarly good behaviors because they let the students brainstorm in problem solving, enable them to improve the abilities in thinking Individually. They can apply the skills of thinking practiced with their friends appropriately as the learning methods by integrated and collaborative required in their behaviors in environmental conservation in their own communities.

The comparison of endurance learning in environmental conservation using the integrated, collaborative and integrated methods are varied at 0.01 significance in line with the required hypothesis that the students using collaborative method have higher endurance learning than those who used the integrated and inquiry methods which mentioned that the students worked together and understand the context which stacked into their memories which the principles of memories depending on the learning procedures, difficulty levels, learning participation as much as possible, motivation to learn and the emotions of the students (Prapat, 2003).

CONCLUSION

From the research, we found that the outcomes of learning, attitudes and endurance are higher by using the integrated teaching method than the others because it emphasized on the student-centered roles. The revision of the context for better understanding the problems and

activities motivated them to learn and remember very well. Thus, the outcomes of learning, attitudes and endurance environmental conservation are higher.

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