



**THE DEVELOPMENT OF A SELF-EVALUATION
MODEL FOR SECONDARY SCHOOL
ENVIRONMENTAL EDUCATION**

PAIRAT THIDPAD

With compliments
of

บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล

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**PAIRAT THIDPAD: THE DEVELOPMENT OF A SELF-EVALUATION
MODEL FOR SECONDARY SCHOOL ENVIRONMENTAL EDUCATION.**

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The main objective of this research was to develop a self-evaluation model for secondary school environmental education. The combined methods were employed in which the qualitative method was used in the participatory action research (PAR) in the stages of development and implementation of the model, together with the quantitative method in the stages of the model validation testing, efficiency evaluation and appropriateness evaluation. In the PAR, 4 target schools were selected as cooperating schools. Out of the total of 510 personnel in the cooperating school, 16 were randomly selected for the model validation testing, and 80 were randomly selected for its efficiency evaluation. Research instruments included those developed by the researcher, namely, a self-evaluation handbook, a workbook, a model validation testing questionnaire and a model efficiency evaluation questionnaire, together with evaluation and reporting form jointly developed during the participatory action research activities. For the model appropriateness evaluation, 120 evaluation experts were selected to criticize and evaluate the model, using the model appropriateness evaluation questionnaire developed by the researcher. Data were processed with the SPSS PC computer program. The index of model-performance congruence (IC) was employed for the model validation testing; mean, standard deviation, and t-test were employed for model efficiency evaluation; and mean, standard deviation, difference between the mode and the median, inter-quartile range, and F-test were employed for appropriateness evaluation in the model.

Research findings revealed that:

1) The participatory activities in developing the model, each school had to use specific strategies based on their real condition, together with the employment of the strategic approach, and the PAR process as the framework for development.

2) The developed model was named the DDS-PAR-385 Model. It is the model that is congruent with real practice. It has high efficiency and high appropriateness. After the participatory action, the schools' capability for self-evaluation was found to increase significantly in every aspect. Experts in every group agreed that the model was appropriate and beneficial for development of school environmental education. The rating means of the four groups were found to be not significantly different.

3) DDS-PAR-385 Model is the model of: double objectives evaluation, to evaluate school's environmental education achievement both at strategic and operational level, double evaluations, to evaluate both the school's environmental education and the evaluation results (meta-evaluation). It employed the strategic approach and the participatory action research (PAR) as the framework for operation, being conducted in 3 main stages with 8 steps of evaluation and to evaluate 5 main components of secondary school environmental education: student's desirable characteristics concerning the environment; teachers' knowledge, skills and participation in the school's environmental education; the school's environmental education management; the school's environment management and the school's environmental education services to the community.

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ไพรัช ติดยศผาด: การพัฒนารูปแบบการประเมินผลการจัดสิ่งแวดล้อมศึกษาด้วยตนเองของโรงเรียนมัธยมศึกษา (THE DEVELOPMENT OF A SELF-EVALUATION MODEL FOR SECONDARY SCHOOL ENVIRONMENTAL EDUCATION) คณะกรรมการควบคุมวิทยานิพนธ์: รัชชานนท์ สุกพงษ์พิเชษฐ, Ph.D., ประพัฒน์พงศ์ เสนาฤทธิ์ Ph.D., นพดล เจนอักษร, Ph.D., 242 หน้า ISBN 974-04-2330-2

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อพัฒนารูปแบบการประเมินผลการจัดสิ่งแวดล้อมศึกษาคด้วยตนเองของโรงเรียนมัธยมศึกษา ด้วยการวิจัยแบบผสมวิธี โดยวิจัยเชิงคุณภาพในการวิจัยปฏิบัติการแบบมีส่วนร่วม (PAR) ในขั้นของการสร้างและทำให้รูปแบบ ควบคู่กับวิจัยเชิงปริมาณในการหาความเที่ยงตรงของรูปแบบ การประเมินประสิทธิภาพของรูปแบบและการตรวจสอบความเหมาะสมของรูปแบบ โดยที่ในกระบวนการ PAR เลือกโรงเรียนเป้าหมายการปฏิบัติการ 4 โรงเรียน บุคลากรร่วมปฏิบัติการ 510 คน สุ่มตัวอย่างในการหาความเที่ยงตรงของรูปแบบ 16 คน การประเมินประสิทธิภาพของรูปแบบ 80 คน ใช้แบบฝึกปฏิบัติการ แบบตรวจสอบความเที่ยงตรงของรูปแบบ และแบบประเมินประสิทธิภาพของรูปแบบที่ผู้วิจัยพัฒนาขึ้นรวมทั้งแบบประเมินตนเองและแบบรายงานที่ร่วมกันพัฒนาขึ้นระหว่างการร่วมปฏิบัติการเป็นเครื่องมือการวิจัย ส่วนการประเมินความเหมาะสมของรูปแบบ เลือกผู้ทรงคุณวุฒิด้านการประเมินร่วมวิพากษ์และประเมินรูปแบบ 120 คน โดยใช้แบบประเมินที่ผู้วิจัยพัฒนาขึ้นเช่นกัน วิเคราะห์ข้อมูลด้วยโปรแกรม SPSS PC หาค่าเฉลี่ย ค่าเบี่ยงเบนมาตรฐานและ t-test ในการประเมินประสิทธิภาพของรูปแบบ ค่าดัชนีความสอดคล้องของรูปแบบกับการปฏิบัติจริง และค่าเฉลี่ย ค่าเบี่ยงเบนมาตรฐาน ค่าความแตกต่างของฐานนิยมและมัธยฐาน ค่าพิสัยควอไทล์ และ F-test ในการประเมินความเหมาะสมของรูปแบบตามลำดับ ผลการวิจัยพบว่า

1) การร่วมปฏิบัติการพัฒนารูปแบบการประเมิน ต้องใช้กลยุทธ์เฉพาะในการร่วมปฏิบัติการตามสภาพจริงของแต่ละโรงเรียน รวมทั้งใช้แนวคิดเชิงยุทธศาสตร์ และกระบวนการ PAR เป็นกรอบแนวทางการพัฒนา

2) รูปแบบที่พัฒนาขึ้นชื่อ DDS-PAR-385 Model (ดีดีเอส-พาร์-385) เป็นรูปแบบที่สอดคล้องกับการปฏิบัติจริง มีประสิทธิภาพและมีความเหมาะสม หลังร่วมปฏิบัติการพัฒนาการประเมิน โรงเรียนมีสมรรถนะในการประเมินตนเองสูงขึ้นในระดับมากทุกด้านอย่างมีนัยสำคัญทางสถิติ ผู้ทรงคุณวุฒิทุกกลุ่มมีความเห็นสอดคล้องกันว่าเป็นรูปแบบที่มีความเหมาะสมและมีคุณประโยชน์ต่อการพัฒนาการจัดสิ่งแวดล้อมศึกษาในโรงเรียน ในระดับมากที่สุด ค่าเฉลี่ยผลการประเมินแต่ละกลุ่มแตกต่างกันอย่างไม่มีนัยสำคัญทางสถิติ

3) DDS-PAR-385 Model เป็นรูปแบบที่มีวัตถุประสงค์ คือประเมินความสำเร็จทั้งระดับยุทธศาสตร์และระดับปฏิบัติการ มีการประเมินคู่ คือประเมินผลการจัดสิ่งแวดล้อมศึกษาควบคู่กับประเมินผลการประเมิน ยึดวิธีการเชิงยุทธศาสตร์และกระบวนการวิจัยปฏิบัติการแบบมีส่วนร่วมเป็นแนวทางการประเมิน โรงเรียนดำเนินการประเมินใน 3 ขั้นตอนหลัก 8 ขั้นตอนการประเมิน โดยประเมินความสำเร็จการจัดสิ่งแวดล้อมศึกษาของโรงเรียนทั้งระบบ 5 องค์ประกอบหลัก ทั้งคุณลักษณะทางสิ่งแวดล้อมที่พึงประสงค์ของนักเรียน ความรู้ทักษะและการมีส่วนร่วมในการจัดกระบวนการเรียนรู้สิ่งแวดล้อมศึกษาของครู การบริหารจัดการสิ่งแวดล้อมศึกษาของโรงเรียน การจัดการสิ่งแวดล้อมและสภาพแวดล้อมในโรงเรียน และการบริการสิ่งแวดล้อมศึกษาแก่ชุมชน

CONTENTS

	Page
ACKNOWLEDGEMENT	iii
ABSTRACT	iv
LIST OF TABLES	viii
LIST OF FIGURES	ix
ABBREVIATION	x
CHAPTER	
I INTRODUCTION	
1.1 Rationale and Justification	1
1.2 Objectives of Research	5
1.3 Definition of Operational Terms	6
1.4 Scope of Research	7
1.5 Research Conceptual Framework	8
1.6 Basic Assumption of Research	9
1.7 Limitation of Research	9
1.8 Expected Results	9
II LITERATURE REVIEW	
2.1 Environment Situation	11
2.2 Environmental Education	13
2.3 Secondary School Environmental Education	18
2.4 Related Innovation on Secondary School Environmental Education	21
2.5 Model Development Concepts and Theories	28
2.6 Participatory Action Research: PAR	37
2.7 Related Research	45
III RESEARCH METHODOLOGY	
3.1 Research Design	51
3.2 Research Process	51
3.3 Research Methodology	55
3.3.1 Participatory Action Research on Model Development	55
3.3.2 A Self-evaluation Model Efficiency Evaluation	58
3.3.3 A Self-evaluation Model Validation Testing	59
3.3.4 A Self-evaluation Model Appropriateness Evaluation	60
IV RESEARCH RESULTS	
4.1 Results of PAR on Model Development	64
4.1.1 PAR Mission	64
4.1.2 PAR Strategies	64
4.1.3 Results of PAR on School a Self-evaluation Development	65
4.1.4 Results of School's a Self-evaluation Implementation	74

CONTENTS(cont.)

CHAPTER	Page
4.2 Results of Model Verification	94
4.2.1 A Self-evaluation Model Efficiency Evaluation	94
4.2.2 A Self-evaluation Model Validation Testing	99
4.2.3 A Self-evaluation Model Appropriateness Evaluation	100
4.3 DDS-PAR-385 Model: A Self Evaluation Model for Secondary School Education	105
4.3.1 Background and Rationale	105
4.3.2 Development of DDS-PAR-385 Model	106
4.3.3 Definition of DDS-PAR-385 Model	107
4.3.4 Characteristics of DDS-PAR-385 Model	109
4.3.5 Components of DDS-PAR-385 Model	110
4.3.6 Implementation of DDS-PAR-385 Model in School	119
4.3.7 Usefulness of DDS-PAR-385 Model	120
V DISCUSSION	121
5.1 Research Methodology	121
5.2 Research Results	123
5.2.1 The Findings on Research Process	123
5.2.2 The Findings on Research Results	125
VI CONCLUSIONS AND RECOMMENDATIONS	
6.1 Research Results' Conclusion	131
6.1.1 PAR on Model Development	131
6.1.2 Research Results Concerning Model Development	133
6.1.3 DDS-PAR-385 Model	134
6.2 Recommendations	135
6.2.1 Recommendations for Utilization of Research Results	135
6.2.2 Recommendations for Further Research	136
BIBLIOGRAPHY	138
APPENDIX	
A Research Instruments	143
B List of Evaluation Experts and School Evaluation Teams	173
C Scope of Secondary School Environmental Education CSFs	187
D School Environmental Education a Self-evaluation's Tools	198
BIOGRAPHY	241

LIST OF TABLES

Table		page
1.	Lower Secondary School (LEEC) Learning Outcomes	21
2.	Upper Secondary School (UEEC) Learning Outcomes	22
3.	Objective and Methods in Each Step of the School's Self-evaluation Scheme	71
4.	Data Sources and Means of Data Collection According to the CSFs	77
5.	Key Performance Indicators, Target and Means of Computation	80
6.	PPR Ratwittayalai School's Environmental Education Success (strategic Result)	86
7.	PPR Ratwittayalai School's Environment Education Success (operation Result)	87
8.	Mean Scores (\bar{X}) and Standard Deviation (S.D.) of the Meta-evaluation	92
9.	Mean scores (\bar{X}) and Standard Deviations (S.D.) of the Teacher and Personnel's Participation and Experience in Evaluation before and after the Activities	94
10.	Number and Percentage of the Teachers Who Got More Knowledge and understanding in a Self-evaluation in Pre and Post-test	96
11.	Average Scores (\bar{X}) and Standard Deviation (S.D.) of the School' Readiness before an after the Participation Activities	97
12.	Average Scores (\bar{X}) and Standard Deviation (S.D.) of School Needs on Environmental Education Evaluation	98
13.	Comparison of Average Scores of Competency in Self-evaluation of School	99
14.	Congruent Indices of the Model-Performance of a Self-evacuation Model	100
15.	Number and Percentage of the Model Critique	101
16.	Average Scores (\bar{X}) and Standard Deviation (S.D.) for the Model Appropriateness	101
17.	Means (\bar{X}) and Standard Evaluation (S.D.) the Difference of mode and Median and Q.D. of Model Appropriateness	102
18.	Means (\bar{X}) Standard Deviation (S.D) Mode and Median Diference and Q.D. of the Model Usefulness	103
19.	Test Results of Statistical Difference of the Average Score (\bar{X}) of Model Appropriateness	105
20.	Research Tools, Means and Regarded Data	117

LIST OF FIGURES

Figure	Page
1. Research Rationale and Justification	5
2. Research Conceptual Framework	8
3. Environment Classification	12
4. Environmental Education & Environment Quality	15
5. CIPP: Type of Evaluation and Decision Making	32
6. Literacy Work and Source of Research Framework	50
7. Process and Research Procedure: Developing Self-evaluation Model	54
8. Research Procedure as Related to PAR Process	57
9. The Development of Self-evaluation Model for Secondary School Environmental Education: Research Procedures	63
10. The SWOT Analysis on School Environmental Education	66
11. Components and Steps of Evaluation Development	70
12. PPR Ratwittayalai School's Environmental Education Success (Strategic Results)	82
13. PPR Ratwittayalai School's Environmental Education (Operational Results)	82
14. Wat Makutkasat Secondary School's Environmental Education Success (Strategic Results)	83
15. Wat Kemapirataram School's Environmental Education Success (Operational Results)	83
16. Wat Kemapirataram School's Environmental Education Success (Strategic Results)	84
17. Wat Kemapirataram School's Environmental Education Success (Operational Results)	84
18. Sai Noi School's Environmental Education Success (Strategic Level)	85
19. Sai Noi School's Environmental Education Success (Operational Results)	85
20. PPR Ratwittayalai School's Environment Education Success (Strategic Result: Histrogoam)	86
21. PPR Ratwittayalai School's Environment Education Success (Strategic Result; Histrogram)	87
22. Success and a Self-evaluation of Secondary school's Environmental Education: A Result of PAR	93
23. DDS-PAR-385 Model: A Self-evaluation Model for Secondary School Environment Education.	109
24. The Relationship between the CSFs, KPIs and Data of School Environment Education.	115

ABBREVIATION

UN	= The United Nation Organization
UNEP	= The United Nation Environment Programme
UNESCO	= The United Nation Education Science and Culture Organization
TDRI	= Thailand Development Research Institute
PPP	= Polluter Pay Principle
SWOT	= An analysis of Strength, Weakness, Opportunity and Threat. (It's generally used for an organization or job analysis).
QA	= School Quality Assurance
SBM	= School-based Management
SAR	= Self-assessment Report
NPM	= New Public Management
RBM	= Result-based Management
CSF	= Critical Success Factor
KPI	= Key Performance Indicator
NPE	= New Performance Evaluation
PAR	= Participatory Action Research
WSA	= Whole-school Approach
CIPP	= Content, Input, Process and Product
IC	= Model-performance Indices of Congruence
S.D.	= Standard Deviation
Q.D.	= Quatile Deviation (inter quartile range)
NGOs	= Non-government Organizations
LSSC	= Lower Secondary School Curriculum
USSC	= Upper Secondary School Curriculum
BEC	= Basic Education Curriculum
EECC	= Energy and Environment Conservation Curriculum
MERC	= Ministry of Education Religion and Culture
PBB	= Performance - Based Budgeting
PDCA	= Plan, Do, Check and Act: A Quality Cycle
US	= The United States
SSR	= Self-study Report
QC	= Quality Control
PCO	= Provincial Coordinating Office
TEAM	= Teamwork, Eternity Evaluation, Awareness of Evaluation and Monitoring Evaluation: Evaluation Strategy
GO Reform	= Government Management System Reform
MEES	= Management of Environmental Education System
MES	= Management of Environment System
EES	= Environmental Education Service
ESER	= Environmental Education A Self-evaluation Report
SE 1-7	= A Self-evaluation Form: Test & Questionnaire (Form 1 - Form 7)
SER 1-7	= A Self-evaluation Report Form (Form 1- Form 7)
AIC	= Appreciation Integration and Contribution: A Participation Technique
DDS-PAR-385 Model	= The Model of Double Objectives, Double Evaluation, Strategic Evaluation with PAR Process, 3 Main Steps, 8 Evaluation Activities, on 5 School's Environmental Education Complements

CHAPTER I

INTRODUCTON

1.1 Rationale and Justification

For sustain living on earth, human beings and other living and unliving things have to be in equal, dependent and sustainable living. Human beings have not to disturb or destroy their own environment that was closely related to each other by nature. (Weerawattananon, Winai.,1998: 12) However, by human difference, human population growth and human consuming behavior, together with scientific progress have changed people's way of life to destructive way for environments and natural resources that becomes the main cause of environment crisis. It may be said that *“human thought, human belief and human self-centered behavior, together with the progress of science and unequal development in the last 50 years had changed human way of life to be insufficient consumers and consumed much more energy and natural resources, much more than the disturbed resources and environment can recover to their own natural way”* (Jhamwittayapong, Orasri., 1999: 17)

The endeavor to solve environment problems and reduce environment crisis for equal living and sustainable development was tangible by the United Nations first international meeting on environment in Sweden (1972) and the United Nations Environment Programme (UNEP) was founded by the end of that meeting. In 1975 UNEP and the United Nations Education Science and Culture Organization (UNESCO) got the first meeting on environmental education in Belgrade, Ukoslavia. According to the Belgrade charter, principles and methods of environmental education was submitted and accepted as an environmental education guidelines (Weerawattananon, Winai. et al., 1997: 5) For sustainable development, the Earth Summit was held up for environment and development in Rio de Janeiro, Brazil (1992). The declaration for sustainable development," Rio Declaration on Environment and Development" was declared, together with important principles such as "Polluter Pays Principle (PPP), Precautionary Principle, Environmental Impact Assessment (EIA), etc." The meeting adopted a global plan, Agenda 21, to confront the world's pressing needs and environmental education was its strategy to be sustain (TDRI, 1998: 5) Moreover, the local meeting on environmental education were also held up and accepted that *“people's appropriate attitude and participation were the best strategies to solve environment problems and education was also the best strategy to change people attitude and participation behaviors.* (Keating, 1993: 7) *By the way, environmental education is important not only to make people know about environment but also to change people's thought, belief and behavior for their equal living in the sustain natural resources and environment.”*

Environmental education in Thailand can be provided in formal education, informal education and non-formal education. As in formal education, environmental education is provided with three main procedures: Being integrated in other subjects; Being taught as a special subject; Environmental activities. The main purposes are to educate pupils to be aware of natural resources and environment conservation and to participate with pleasure in environment problem solving for sustain development. (Ministry of Education, 1991: 6) However, the objective of environmental education in each education level is also different. The general objectives emphasize on knowledge, awareness, value, responsibility and environmental ethics as follows: (1) To make people know about surrounding environments and be aware of the important of environmental and resources for economic, culture and quality of life; (2) To change people's values and behaviors in utilizing appropriate resources for economic, social and living, together with participation in environment quality development; (3) To make people's responsibility on environment, reasonable in solving problem and system mind; (4) To make community ethic on environment. (Department of Environment Quality Promotion, 1997: 1)

By the above objectives of environmental education, student have to study about environment in holistic way. They have to know the causes of resource damages, the cause of equal eco-system, the holistic relation of climate, biodiversity, and dependent system of living, together with the environmental problems, rate of energy used and law material damage as well as the environmental problems impacts. (Jhamwittayapong, Orasri., 1999: 9) To achieve those objectives, 4 strategies on environmental education are performed in learning processes as the followings: (1) Choosing critical environment problems to be learning contents and activities; (2) Integrating environmental education in all levels of school curriculums; (3) Learning by problem-solving process and from near to far problems; (4) Making students and citizens good habit of environment preservation. (Ministry of education, 1993: 6) Environmental education is necessary for all secondary schools and students, that is more than 4,102,574 students or nearly 30% of total students and most of secondary schools are under the Department of General Education. (Ministry of Education, 1996: 44)

Being based on Thai Lower and Upper Secondary School Curriculum (modified series B.E. 2533) and Basic Education Curriculum that will be utilized in 2003, environmental education is preformed in school by three main procedures: (1) To be integrated in all subject-groups of the curriculum such as science, mathematics, social studies, physical education and personality development, etc.; (2) To be set up as a selecting or alternative subjects; (3) To be set up as environmental projects or activities. Students are free to choose their own favorite subjects and activities, as well as, teachers and schools are free to approve students' grade and graduation. Because of these diversity of school environmental education management, results and quality of environmental education are rather different and unaccepted.

The SWOT analysis of environmental education management operated by secondary school administrators found that the first four weakness of secondary

school environmental education were as the followings: (1) The objectives of environmental education were unclear and unrelated to characterize students' appropriate behavior as a whole; (2) Environmental education management was not unity and an efficiency (planning, teaching and evaluating); (3) Administrators and teachers did not appreciate in environmental education objectives, contents and activities; (4) School had not been evaluated in environmental education dimension. (Office of Permanent Secretary, Ministry of Education, 1999: 18) The weakness of environmental education in the opinion of administrators are very much similar to those of Rung-arun Project that accepted as environmental education innovation. The project was concise that 3 weakness of Thai environmental education were: (1) Thai education's objectives and contents did not cover and unable to develop each learner as a whole; (2) although the curriculum is improved, teachers do not change their teaching behavior; (3) learning is limited in classroom with teachers' dictation and textbooks, in addition, it is not related to actual situation and crisis. (Jhamwitayapong Orasri. 1999: 67) In addition to those weakness, most of secondary schools do not have an internal evaluation for continuous improvement that is the cause of environmental education problems. (National Education Commission, 2000: 5) In conclusion, secondary school environmental education management has unclear and disunity objectives, together with its unconcrete and uncontinuous evaluation that lead to environmental education quality development.

In accordance with the 1999 National Education Act, schools' quality improvement is the highlight of the educational reform. There must be standards and quality assurance system (QA) in all levels of education, (section 9 (3)) both internal and external quality assurance systems. (section 47) Besides, external and internal quality assurance systems must be involved in school management system. (section 48) Education reform is to change education system as a whole: Education management must be based on school, namely school-based management (SBM); Learning by learners-oriented approach; Managing quality assurance system to assure school quality in the school quality system; Schools have to evaluate themselves as a self-evaluation and self-reporting continuously (SAR) to their upper units and stakeholders.

In accordance with the 1999 Governmental Management System Reform Plan, all secondary schools under Department of General Education as the governmental units have to improve its service quality and bring the best services to stakeholders. Schools have to change their management to be new public management (NPM) that focuses on results (result-based management: RBM) which raises concrete critical success factors (CSFs) and key performance indicators (KPIs), together with changing personnel management, laws, budgeting system and working culture of government officers. (Office of Civil Governmental officer Committee, 1999: 8) It's also raised in the Ninth Period Plan (2002 - 2006 A.D.) of Education Religion and Culture, that utilize new public management strategy for management mission. (Ministry of Education, 2002: 30) According to education reform and government management reform, secondary schools not only to raise quality assurance system to assure education quality but also to raise service quality. They have to use strategic plan for school development, to raise CSF and KPI of school success to be

evaluated, together with self-evaluation based on schools' critical success factors and key performance indicators.

For an evaluation, it's accepted as a critical strategy and main administrative procedure. Evaluation methods will guide all administrative procedures. Both performance audit and strategic performance evaluation are called *new performance evaluation* that evaluate both in strategic and operation level (Suwanmala, Charat., 1996: 16) New performance evaluation is closely related to new public management and self-evaluation for school quality assurance, by which self-evaluation is accepted as new method of evaluation and empowerment evaluation. Although, self-evaluation is the most important strategy for quality development and sustain development, it's also the fact that, most of secondary schools have not been continuously evaluated, (Office of National Education Commission, 2000: 5) especially, self-evaluation in the dimension of environmental education that related to QA system and RBM.

Because of the facts that: environmental education evaluating is the critical strategy of natural resources preservation and environment development; secondary schools as the critical and essential units that necessarily perform the concrete environmental education operation; the weakness of environmental education in secondary school, especially secondary school environmental education evaluation; the necessity of secondary school to perform self-evaluation for their quality assurance; and the necessity of schools to evaluate their success by result-based evaluation as performed for new public management, secondary schools have to perform self-evaluation on environmental education to improve their environmental education for their quality assurance continuously. For those mandates of education reform and new public management, secondary schools have to perform self-evaluation on environmental education to improve environmental education and school quality continuously. The important aspects of evaluation in influencing school development as a whole that will be operated systematically, continuously and empowering, The main problems of school environmental education is lack of a practicable and appropriate evaluation model and the weakness of environmental education evaluation in the researcher's instruction experience, together with the researcher's belief, that the evaluation model will bring to environmental education development as a whole, environmental education is the critical strategy for sustain development and PAR is the critical strategy for sustain environmental education in secondary school, the researcher found its necessity and decided to develop self-evaluation model for secondary school environmental education in partial of school quality assurance as the rationale and justification in figure I

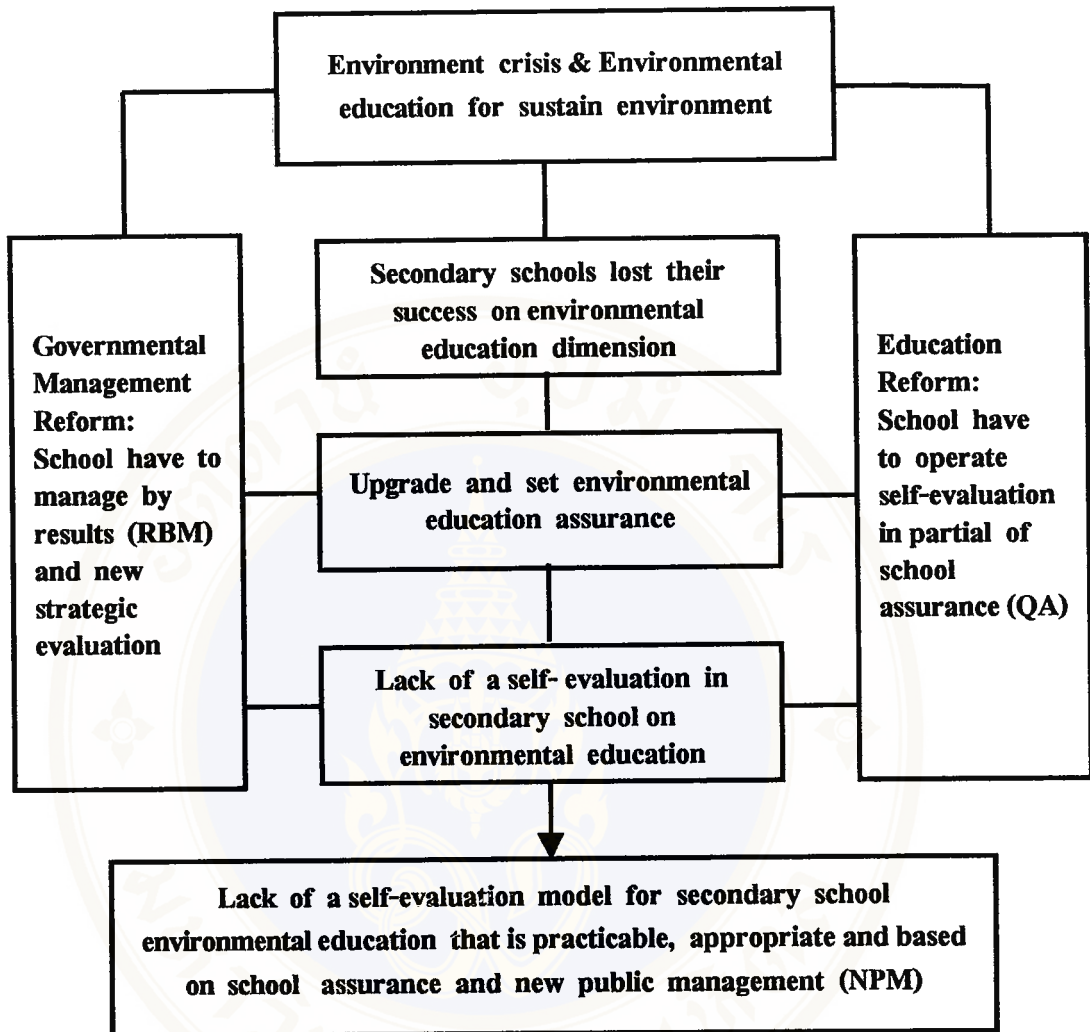


Figure 1. Research Rationale and Justification

1.2 Objectives of Research

The purpose of this study was to develop a self-evaluation model for secondary school environmental education, together with 4 specific objectives as follows:

1.2.1 To participate in school self-evaluation on environmental education and self-evaluation model building.

1.2.2 To verify the validity of a self-evaluation model for secondary school environmental education.

1.2.3 To evaluate the efficiency of a self-evaluation model on secondary school environmental education.

1.2.4 To evaluate the appropriateness of a self-evaluation model for secondary school environmental education.

1.3 Definition of Operational Terms

1.3.1 **Model Development** is defined as to build, to verify, to evaluate, to improve and to present an appropriate self-evaluation model for secondary school environmental education.

1.3.2 **Self-Evaluation** is defined as an auditation and evaluation on school environmental education success that operated by school personnel or school environmental education teachers.

1.3.3 **Evaluation Model** is defined as a concept and methodology of evaluation that consists of evaluation objectives, success to be measured, steps and evaluation procedures, application of evaluation results and meta-evaluation.

1.3.4 **Environmental Education** is defined as school environmental education management, school environment management, school environmental education learning activities, students' environmental characteristics, and school environmental education service.

1.3.5 **Self-Evaluation Model for Environmental Education** is defined as concepts and methodologies of school self-evaluation on environmental education that consist of evaluation objectives, the success of school environmental education to be measured, evaluation methods and school environmental education service.

1.3.6 **Secondary school** is defined as lower and upper secondary schools under Department of General Education, Ministry of Education.

1.3.7 **Critical Success Factors (CSFs)** are defined as main components of school environmental education success to be measured.

1.3.8 **Key Performance Indicators (KPIs)** are defined as key methods to measure school environmental education progress and success or how to measure the CSFs.

1.3.9 **Target** is defined as operation levels or target of school environmental education success.

1.3.10 **Model Efficiency** is defined as the model's practicable, model's capability to evaluate and model's capability to develop school self-evaluation competency.

1.3.11 **Model Validity** is defined as the model - performance congruence.

1.3.12 **Model appropriateness** is defined as model's possibility and model's benefit to develop school environmental education.

1.3.13 **Participatory Action Research (PAR)** is defined as methods of search that create knowledge and innovation by mean of participation in working process.

1.3.14 **Cooperative development schools** are schools those be involved in PAR process to develop their own environmental education evaluation and school self-evaluation model.

1.4 Scope of Research

1.4.1 A self-evaluation model to be developed is a model for secondary school environmental education evaluation that consists of objectives, environmental education critical success factors to be evaluated, evaluation methods, evaluation results utilization and meta-evaluation.

1.4.2 Participation was performed in actual operation only in cooperative schools to develop self-evaluation model by PAR process.

1.4.3 Building school's environmental education self-evaluation model was based on school evaluation problems and these relative concepts: CIPP evaluation model; result-based management evaluation; new public evaluation; school assurance evaluation; and whole school approach (WSA)

1.4.4 Applying 8 PAR processes to build up self-evaluation model in 5 main steps: (1) Preparation and school survey; (2) Model formulation; (3) Model implementation; (4) Model verification and efficiency evaluation; and (5) Model appropriateness evaluation.

1.4.5 Model formulation is covered with 4 evaluation processes : Reviewing of school environmental education vision; Setting school environmental education CSFs; Setting school environmental education KPIs; Evaluation strategies.

1.4.6 Model implementation is an actual operation of evaluation that consists of 5 evaluation activities: Setting the targets; Setting data and measurement; Data collation; Reporting and Meta-evaluation.

1.4.7 Verifying model validity by school administrators and teachers who actually participated in model building process. Evaluating model efficiency by school participated personnel. Evaluating model appropriateness by 4 groups of environmental education stakeholders: High level administrators of Ministry of Education who's the policy makers; Environmental education experts; Environmental education supervisors; Actual school environmental education evaluators.

1.5 Research Conceptual Framework

1.5.1 The presented self-evaluation model had to be practicable, acceptable, and tangible, together with being in partial of school administration, school assurance and based on education and governmental administration reform that emphasized on sustain evaluation of environmental education.

1.5.2 The research conceptual framework was based on Stufflebeam's CIPP evaluation model that being modified by result-based evaluation, strategic evaluation, school quality assurance evaluation, together with whole school approach (WSA), PAR process and model building methods. According to the previous concepts, school environmental education have to be evaluated in systematic components: Contexts; Inputs; Processes and Products as Stufflebeam (2001: 1) had conducted evaluation in CIPP model. CIPP of school environmental education as provided by Rung-arurn Project, as in whole school approach consisted of: school environmental management; school environmental education instruction; school environmental education activities; and community relation activities.(Office of Rung-arurn Project, 2001: 10) School environmental education success had to be presented as critical success factors (CSFs) and key performance indicators (KPIs) and the CSFs had to be evaluated in 7 steps of the RBM. (Andersen Consulting, 1999: 40) The objectives of school environmental education were involved both strategic and operation level and the development of evaluation had to be processed in PAR process and strategic methods. Model had to be verified through model validation by participated school teachers, model efficiency evaluation by measuring school self-evaluation competency and model appropriateness by environmental education experts and evaluators as in figure 2.

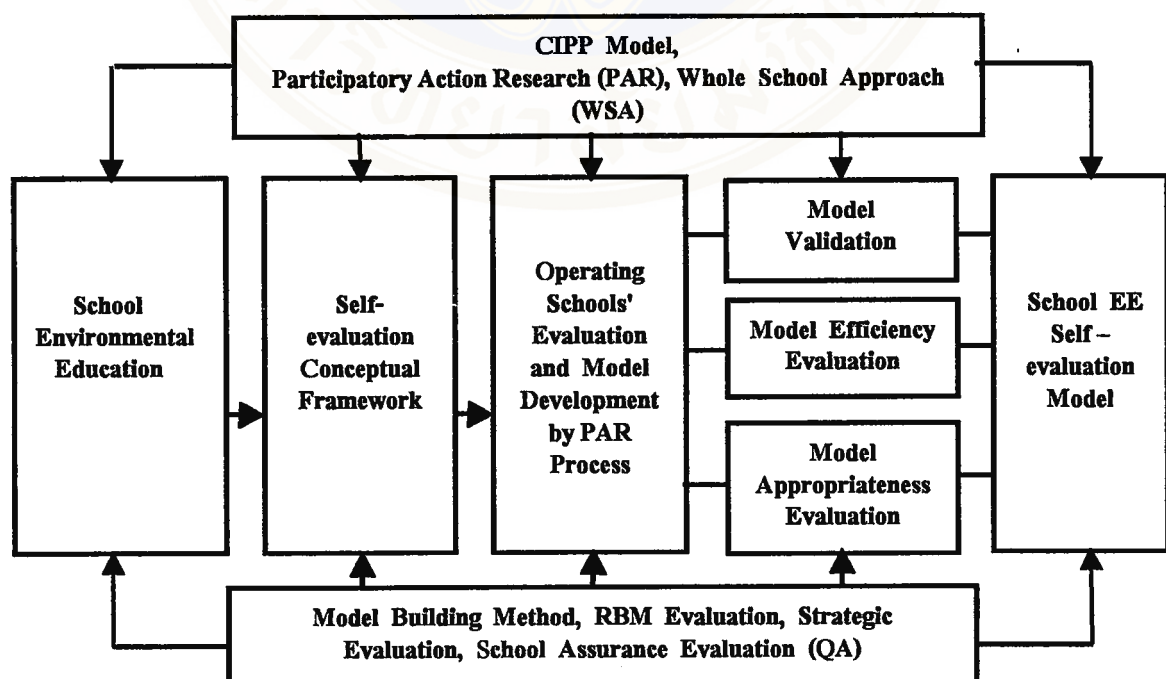


Figure 2. Research Conceptual Framework: The Development of a Self-evaluation Model for Secondary School Environmental Education

1.6 Basic Assumption of Research

1.6.1 In operation process, school administrators and teachers have to be aware of the necessity of evaluation development, take a part and co-operate in model building as a part of school quality assurance and school administration.

1.6.2 Cooperative schools were absolutely free to select school evaluation's objectives, CSFs, KPIs, methods, results utilization and meta-evaluation by themselves.

1.6.3 Model validation was model-performance congruence evaluation and actually participated school teachers were key informants.

1.6.4 Model appropriateness evaluation was an evaluation of model's possibility and benefits to develop environmental education and school self-evaluation.

1.6.5 A self-evaluation model to be presented had to be an efficiency, effectiveness, practicable, appropriate and possible model. The difference between mode and median was not exceed 1.00 and the interquartile range (Q3-Q1) was equal or less than 1.5

1.6.6 Evaluation experts and teachers were absolutely free to discuss and take response in the seminar and also to answer the questionnaires.

1.7 Limitation of Research

1.7.1 This research methodology was based on PAR in four different secondary schools but only one summarized self-evaluation model was presented.

1.7.2 Research's period was limited. (1 semester) It completed only one cycle of school evaluation activities. The dynamic component of the model were not perfect, it should have been developed continuously.

1.7.3 School environmental education critical success factors and key performance indicators were set by mean of members' consensus and actual operation. They should have been develop to be standard measurement.

1.8 Expected Results

1.8.1 Cooperative schools shall have an appropriate self-evaluation model to develop their environmental education and their environmental education.

1.8.2 Other secondary schools shall be able to use this model as guidelines to manage, evaluate and develop schools' environmental education.

1.8.3 Due to this model, the environmental education evaluation will be a part of school management and school quality assurance.

1.8.4 The model will be an important tool of Ministry of Education, Department of General Education and other educational offices to Promote secondary schools on environmental education development, education assurance and education reform.



CHAPTER II

LITERATURE REVIEW

Because of the research purpose was to develop self-evaluation model for secondary school environmental education, therefore, the reviewed literature and research related were as follows:

- 2.1 Environment Situation
- 2.2 Environmental Education
- 2.3 Secondary School Environmental Education
- 2.4 Secondary School Evaluation
- 2.5 Model Building Concepts and Theories
- 2.6 Participatory Action Research
- 2.7 Research Related

2.1 Environment Situation

2.1.1 Definition

Environment, in principle level meaning, Meerate (Meerate, Supanee., 1996: 47) and Chankae (Chankae, Kasem., 1993: 47) defined in similar terms “**Our surroundings**” that composed of both living things and unliving things, both natural and man-made, both concrete and abstract and both useful and unuseful. It was defined in common terms and based on human beings. In operational terms, *Environment is everything related to human being both natural and man-made. So, environment is oneself and its related surroundings.* It can be classified into two types:

Natural Environment: It's what generated by nurture. It's can be classified into physical and biological environment, by which, the physical environment is non-biological that being origination as soil, water, air, mineral and energy and the biological environment is some what being biotic forms nature as plants, animals and human being that's usually called natural environment.

Man-made Environment: It's what created by man, either internal or external environment. The internal environment is abstract as thought, filling and skill etc. and the external environment is tangible as food, clothes, residence and medicine etc. Man-made environment is sometimes called cultural environment. Types of environment can be classified as in figure 3.

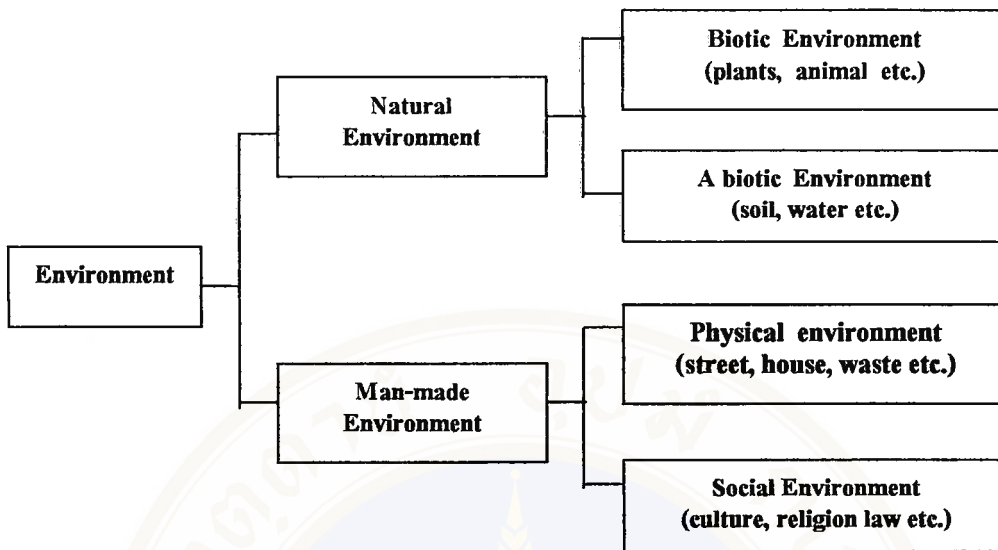


Figure 3. Environment Classification

2.1.2 Environment Properties

Each environment has its own property that is closely related to the others both in structure and function. Specific properties of environment are as follows: (1) Unique and specific aspects; (2) Dependent and being closely related to each other; (3) Clustered and systematic living; (4) Chain reaction destruction; (5) Dynamic. Its properties have been related in systematic and equal by nature, that's called *Equality of Environment* (Meetate, Supanee., 1996: 49) Because of environment's specific properties, they shall be destroyed in chain reaction damage while a part of them are destroyed, and that's the main effects on environment crisis.

2.1.3 Environment Situation

Self-centered behaviors of human being and unsustainable development have been destroyed related structure and function of environment and become to be an environment crisis. Rung Arun Project, (Jhamwittaypong, Orasri., 1999: 16) classified environmental situation into 3 main environment crisis as follows:

1) Natural Resource and Environment Crisis: Being consumed and destroyed by human being, natural resources and environments are being in crisis. For example; if present consumption patterns continue, two out of every three people on earth will live in water stressed conditions; by the next 20 years, 25 per cent of the world's approximately 4,630 mammal species and 11 per cent of the 9,675 bird species will be at significant risk of total extinction etc. (UNEP. 1999: 7)

2) Natural Crisis: Over consumption on natural resources and pollution have been disturbed and destroyed related structure and function of environment, especially, the natural environment. It has been broken down the natural way as long as it is impossible to be recovered. For example; global emissions of CO₂ reached a new high of nearly 23,900 million tones in 1996, nearly four times

of the 1950 total; without the Montreal Protocol, level of ozone depleting substances would have been five times higher by 2050 than they are today etc. (UNEP. 1999: 4)

3) Human being Crisis: The degeneration of natural resources and pollution cause human being's troubles. It effects human quality of life. For example: exposure to hazardous chemicals has been implicated in numerous adverse effects on human beings from birth defects to cancer; global pesticide use results in 3.5-5 million acute poisonings a year; climate change and the increasing of ultraviolet effect the increasing of skin cancer etc.

One of the evident of the crisis was provided by a special survey of the scientific committee on problems of the environment of the international council for science. The survey was informed by 200 scientists from 50 countries. Most of the responded scientists expected that the major environment problems of the 21st century would stem from the continuation and aggravation of existing problems that currently did not receive enough policy attention. The issues cited most frequently were: climate change (51%); the quantity and quality of water resources (29%); deforestation and desertion (28 %); and the problems were arisen from poor governance in both national and international levels.(UNEP. 1999: 13)

2.1.4 Cause and how to solve Environment Problems

Over population growth and special progress of science and technology have changed human ways of life to those in negative impacts to environment. Human belief of having more power beyond nature, more capacity to control nature and self management become to human crisis of thought that causes environmental crisis. It is usually said that human crisis of thought is the original cause of environmental problems. Therefore; solving environmental problems have to be based on changing human thought and human environmental behavior and we all believe that education strategy and education processes are the best instruments for changing human behavior. Thus, *environmental education is the most essential strategy for solving all environmental crisis.*

2.2 Environmental Education

2.2.1 Definition

Environmental education, as a technical term, is an educational process related abstract and non-abstract environment that change natural condition effecting to human being. It is performed to create human attitude, behavior and value to improve quality of life and environment. (Weerawatananon, Winai., 1997: 3) In operational term, environmental education is an educational processes to create value and understanding, to increase human experience and necessary attitude in human and environment relations that lead to decision making on environmental quality preservation. (Taotong, Watana., 1991: 1) In managerial term, environmental

education is the process to create human awareness and responsibility on environment. (Kanhawon. L, 1997: 10) It shall be concluded that environmental education is an education process on environment to create human appropriate environmental behavior that have to be performed in environment, with environment and for environment.

2.2.2 Environmental Education Philosophy

Environmental education is based on these fundamental philosophies including: (1) There is only one earth, so all parts of environment connected each other to be one and nothing on earth stays alone; (Weerawattananon, Winai., 1996: 1-2) (2) Human being is a part of environment, so human ways of life have to be in accordance with the world environment existence; (Meetate, Supanee., 1996: 53) (3) Human belief, attitude, value and behavior destroy natural resources and increase environment problems; (4) Limitation of human need to solve environmental problem has to change human thought, attitude, value and behavior that can be changed through environmental education process; (5) Environmental education is the critical strategy to change human behavior to solve environmental problem for sustainable living and development.

As mentioned above, *“all environments are related to each other to be one, human being is a trouble part of environments that can be developed by environmental education.”*

2.2.3 History of Environmental Education

Environmental education have been originated in America since 1970, as in the United State Environment Act. It has been known spread wide when the United Nations (UN) hold up the first international meeting on environment in Stockholm, Sweden in the year 1972 which the United Nations Environment Education Program (UNEP) was founded. After that UNEP and UNESCO held up the first workshop on environmental education in Belgrade, Ukoslavia, in the year 1975. That first environmental education workshop provided essential principles of environmental education. After that first meeting in methodological term, *Environmental Education* is a systematic methods and educational technology to bring environmental knowledge to people to be sustain and good quality of environment. (Chankeo, K., 1993: 71) In the similar view point, Environmental education Act of the United States (1970) mentioned that environmental education was educational process about the relation of human beings and their environment both natural environment and man-made environment, together with the relation of population, resources, preservation, technology and planning about urban and the country (Weerawattananon, W., and Sripanphong. B., 1996: 12)

It shall be concluded that environmental education is the educational process, related to environment, for all in getting awareness, knowledge, attitude, skill, ability to evaluate and participation in environmental problems' solving in

communities, nations and the world wide. Environmental education gives not only knowledge but also feeling, attitude, skill and social activities, that's called human appropriate behavior, for sustain living of human beings and environments. The relation of environmental education and education shall be shown as in figure 4.

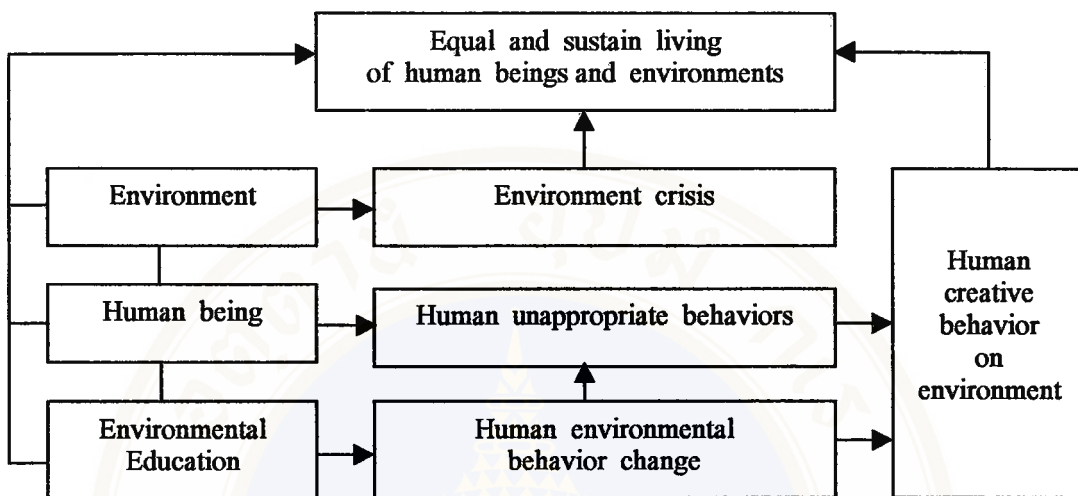


Figure 4. Environmental Education & Environment Equality

The meeting on environmental education was held up many times both in an international and regional level to improve environmental education.

2.2.4 Aims of Environmental Education

The Belgrade Charter provided the purposes of environmental education those are to educate the world population on getting awareness concerning environments and their problems, as well as knowledge, attitude, motivation together with people's participation at both individual and social level in order to solve the previous environmental problems and also to prevent the new ones. (UNESCO in Weerawatananon, Winai. and Sipanphong, Banchuen.,1994: 27) Moreover, The Tbilisi International in Conference on Environmental Education, in Russia in 1977, (UNESCO, 1996: 26) specified the goal of environmental education in 3 items: To promote the world population getting awareness in situation and relations of economy, society together with politics in rural and urban ecology; To improve the world population knowledge, attitude and skill to prevent and improve environment; To create the appropriate behavior patterns of people related to environment both in individual and social levels.

2.2.5 Objectives of Environmental Education

The Belgrade International Environmental Education Conference Agenda (Weerawatananon, Winai., et al., 1997: 5) has specified individual and society to achieve this following aspects:

2) **Knowledge:** To encourage individual and social groups' understanding for all environment system and its problems, including responsibility to such problem;

3) **Attitude:** To develop individual and society's social value which related or be stable to environment as well as having a motivation to participate in protecting, solving and improving environmental problems;

4) **Skill:** To help individual and social group specialized in solving environment problem;

5) **Evaluation Ability:** To help individual and social group in evaluation environmental measure, project education in such aspects as political, economic, social, moral and education ecology;

6) **Participation:** To help individual and social group in developing a sense of responsibility and regarding environmental problem as an emergency issue by firmly believing in appropriate action of solving problem.

2.2.6 Principles of Environmental Education

Belgrade Charter (Weerawatananon, Winai., et al., 1997: 5-6) specified environmental education principle as the followings:

1) Environmental education have to study all environment both natural environment and man-made environment, including ecology, political, economics, technology, social, law, culture and ethics;

2) Environmental education should be lifelong education;

3) Environmental education should be an interdisciplinary;

4) Environmental education should be emphasis on participation in presentation and problem solving;

5) Environmental education should be holistic and authentic and regional differences;

6) Environmental education should study all environment both in present day and in the future;

7) Environmental education should be aware of the development on whole environment and its impacts;

8) Environmental education should be promoted to persuade people to participate in solving environmental crisis at local environmental and its problem;

2.2.7 Environmental Education Implementation

An innovative workshop on environmental education in Tbilici, Russia (1997) (Weerawatananon, Winai., et al., 1997: 7) provided 12 methods of environmental education as follows:

1) To study all environmental aspects both natural environment and man - made environment;

2) To study for lifelong education;

3) Environmental contents should be an interdisciplinary;

- 4) To study different environmental contents from local to global level;
- 5) Emphasize on present environmental events link up to the past;
- 6) To construct values and co-operation, from locally to internationally, in preventing and solving environmental problems;
- 7) To believe that environment is the foundation of development and progress of the country, society and humanity;
- 8) To persuade students to take roles on environmental learning and experience that bring to social acceptance;
- 9) To construct and link learners' sense, knowledge, skill and value clarification that emphasis on sense of belonging on local environmental problem;
- 10) To help students' finding of the actual facts of environmental problem;
- 11) To emphasize the diverse of environmental problems and skills on solving problem;
- 12) To study the diverse environment, based on environment contents, actual practice and direct experience of the learners.

2.2.8 Environmental Education in Thailand

1) **Forms** : Environmental education in Thailand can be educated in all forms of education; formal education, non-formal education and informal education.

2) **Objectives**: Department of Environmental Quality Promotion (1997: 1) provided four main objectives of environmental education as follows: (1) To make people understand the surrounding environment and aware of the relationship and its influence on economic, culture and quality of life; (2) To construct people's value and behaviors on life development, together with the participation on environmental preventing and problem solving; (3) To create human moral conducts and responsibility for environment, and environmental problems with reasonable method; and (4) To build community and social value on environment.

3) **Policies**: The 8th National Economic and Social Development Plan included 10 environmental education policy as the followings: (1) Promotion and support environmental education to make peoples' overruns and participation in environment quality development; (2) Promotion and support environment information network in all levels, nation to wide-community; (3) Setting up environmental training program for environmental personnel both pre-service and in-service training; (4) Support school environmental education and activities, emphasize on awareness and ended behavior of environment and natural resources consumption; (5) Integrating environmental education in all forms and curriculum of nonformula education; (6) Support mass media and non governmental organization, (NGOs) in participation and people Patricia Aptiva persuasion environment quality development; (7) Encouragement school and communities to develop their physical environment in tidy, healthy, lively and in natural condition; (8) Encouraging environmental education desertion, including: management; curriculum; instruction; teacher training; and instrument services; (9) Support and

setting up environmental education co-operation with foreign countries, both in bilateral and multilateral, and both in regional and global levels.

4) **Strategies:** Ministry of Education (1991: 6 - 8) provided 4 main strategies for Thai environmental education: (1) Choosing the most important environment crisis to be the issues of learning and activities; (2) Integrating environmental education in all levels of curriculum and all educational aspects; (3) Setting up learning activities to be preformed; (4) Changing students and people's behavior to be appropriate environmental behaviors.

To attain the environmental education objectives, *learning about environment, in environment and for environment* is accepted as the best of environmental learning strategy.

2.3 Secondary School Environmental Education

2.3.1 Curriculum

Secondary school environmental education is performed in 3 main curriculum: Lower Secondary School Curriculum (modified issue, 1990); Upper Secondary School Curriculum (modified issue, 1990) and Basic Education Curriculum that shall be implemented in 2003. (Department of Education Technique, 1990)

In accordance with Thai secondary school curriculum, environmental contents are integrated in these curriculum important subjects and group of subjects as follows:

1) Lower Secondary School Curriculum (LSSC)

Subject group – Science

S 101, S 102, S 203, S 204, S 306	Science	compulsory
S 019	Sun-light	alternative

Subject group - Social Studies

S 101	Our Country	compulsory
S 203	Our Continent	compulsory
S 305	Our world	compulsory
S 051	Environmental Education	Alternative
S 061	Fundamental of Geography	Alternative
S 017	Ethics	compulsory - alternative
S 026	Southeast Asia	compulsory - alternative
S 027	Present word	compulsory - alternative
S 053	Population and Environment	compulsory - alternative
S 071, S 072, S 073	Our Community.	compulsory - alternative

Subject group – Personality Development

Ph 015	Health Studies	compulsory - alternative
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Ph 018 Health Problems	compulsory - alternative
Art 010, 012, 204, 305, 306 Art and life	compulsory
Art 0144, 0115 Thai Art	alternative
Art 0116 Local Arts	alternative

2) Upper Secondary School Curriculum (USSC)

Subject group – Science

S 411, S 412, S 503, S 504	
S 615, S 616 Physical Science	compulsory - alternative
S 411, S 412, S 503, S 504	
S 615, S 616 Biotic Science	compulsory - alternative
S 441 Biology	compulsory - alternative

Subject group - Social Studies

S 503 Social Study	Compulsory
S 011 physical geography	Alternative
S 081 Energy and Environment	Alternative
S 082 Population and Quality of life	Alternative
S 012 World Economic Geography	Alternative
S 013 Agricultural Geography	Alternative
S 0210 Thai social and culture History	Alternative
S 0214 World Present Issues	Alternative
S 0051 Human being and Social	Alternative

Subject group - Thai Language

Th 035 Local Literature	Alternative
Th 051 Language and culture	Alternative
Th 071 Thai Grammar	Alternative

Subject group - physical Education

Ph 504 Health Studies and Quality of life	Compulsory
Ph 012 Health Problems on Environment And occupation	Alternative

Subject group - Arts

Art 011, Art 012 classical Arts	Alternative
Art 0117, Art 0118 Local Arts	Alternative
Art 0225, Art 0226 Local drama	Alternative

3) Basic Education Curriculum (BEC)

Subject group - Science

Learning Content 1	Living things and Process of Living
Learning Content 2	Life and Environment
Learning Content 3	Matter and Matter Properties
Learning Content 4	Power and Movement
Learning Content 5	Energy
Learning Content 6	Earth Changing Process

Learning Content 7 Astronomy and Space
 Learning Content 8 Nature of Science and Technology

Subject group -Social Studies, Religion and Culture

Learning Content 1 Religion Morals and Ethics
 Learning Content 2 Citizens Duty ,Culture and Way of Life
 Learning Content 3 Economics
 Learning Content 4 History
 Learning Content 5 Geography

Subject group - Health Studies and physical Education

Learning Content 1 Human Growth and Development
 Learning Content 2 Life and Family
 Learning Content 3 Movement Activities, Games, Thai Sports and
 International Sports
 Learning Content 4 Health Care, Competency and Disease Protection
 Learning Content 5 Life Safety

2.3.2 Secondary School Environmental Education Management and Instruction

1) It is performed in school in 3 main methods: (1) Being integrated in other subjects and learning contents of the curriculum; (2) Being set up as special and alternative subjects of the curriculum; (3) Being set up as environmental education activities

2) Being managed and instructed as curriculum management. Science or social studies teachers are promoted to be environmental education teachers and one of school assistant principal takes responsible for environmental education, environmental projects and activities.

3) For Basic Education Curriculum, learning contents and learning results (standard) are clearly set up in related subject groups, science, social studies, health studies and physical education both in national curriculum and school curriculum that appropriate environment contents shall be integrated appropriately to be learned.

2.3.3 Environmental Education Evaluation

Most of the environmental education instructions and activities are integrated in other subject groups, the environmental education evaluation in secondary schools could be performed in 3 main methods:

1) Being evaluated as a part of the integrated subjects, by which learning objectives and learning results of environmental education are also evaluated;

2) Being evaluated as special subjects in case of being set up as special environmental education alternative subjects;

3) Being evaluated by environmental education activities and by project evaluation.

Each curriculum subject, included learning results, is evaluated and judged environmental education learning result by each subject teacher separately. School graduates students with separate passed subjects that's not able to know the school environmental education succeed as a whole and in environmental education dimension.

2.4 Related Innovation on Secondary School Environmental Education Evaluation

2.4.1 Energy and Environment Conservation Curriculum. (EEC)

Office of Rung-arun Project on Energy and Environment Preservation (2001: 47 - 52) provided Energy and Environment Preservation Curriculum's frameworks for lower and upper secondary school. It's environmental education framework that's suitable for integrating environmental education contents in both lower and upper secondary school. The frameworks are as follows:

1) **Objectives:** To develop Thai youth in all environmental aspects: mental health; value; awareness; eagerness; thoughtfulness; problem solving intention; skill and moral bravery to conserve energy and environment in sustainable development.

2) **Important Aspects:** It's the curriculum that integrate energy and environment conservation in all school activities as a whole school system. Being Emphasized on participation, integration both in interdisciplinary model and multidisciplinary model and learning outcomes. It's the curriculum that shall be integrated the development of learners' mind, knowledge and skill.

3) **Learning Outcomes:** Curriculum's learning outcomes in lower and upper secondary school shall be shown as in table 1 - 2

Table 1. Lower Secondary School (LEEC) Learning Outcomes

Affective	Cognitive Domain	Psychomotor Domain
1) Getting a firm hold of energy and environmental conservation ethics	1) Being able to evaluate information and make decision to prevent and solve environmental problems	1) Changing consumption behavior and way of life to conserve energy and environment
2) Being in moral, responsibility, charity and grateful on nature and environment	2) Being able to analyze the problems' causes, and impacts of using energy for economic social and politic	2) Taking an essential role to conserve and build up energy and environment
3) Believing and getting a firm hold of Thai way of life ; "Kin pordee-you pordee"	3) Being able to analyze the impacts of technology on energy, natural resource and environment.	3) Participating in community to conserve and build up sustainable development.

Affective	Cognitive Domain	Psychomotor Domain
4) Being in a habit of energy and environmental information collation.	4) Being able to utilize environment conservation methods to solve energy and environment problems.	4) Utilizing appropriate methods to conserve energy and natural resources.
5) Being in a habit of thoughtfulness and being interested in environmental information.	5) Being able to understand the actual problems of energy and environment of community and the country.	5) Making decision to by and use efficiency products and do not disturb environment.
6) Being aware of participation in energy and environmental conservation.	6) Being able to understand the impacts of human using energy behavior to environment.	6) Having skills to solve environment problem for all and in peaceful methods
7) Being satisfied with environmental and nature.	7) Being able to understand the systematic relationship of human being, energy and environment.	7) Having skills and methods to conserve energy and environment.
8) Being aware of self - role and responsibility to conserve energy and environment.	8) Being able to understand environment crisis both in present and in the future.	8) Having skills of observation, survey experiment for energy and environment problem solving and conservation
9) Being aware of energy and environment value for human living.	9) Being able to understand energy and environment's roles and their essential to families agriculture, industry, communication etc.	

Table 2. Upper Secondary School (UEEC) Learning Outcomes

Affective	Cognitive Domain	Psychomotor Domain
1) Getting affirm hold of energy and environment conservation ethics.	1) Having clear vision on energy and environment conservation and sustainable development.	1) Being able to persuade community to conserve energy and environment in Local, national and international levels.
2) Being in moral, responsibility, charity and grateful on nature and environment	2) Having clear vision on recompense energy for quality of life development.	2) Having skills to compromise the energy and environment conflicts that's based on civil benefits.
3) Believing and getting a firm hold of Thai way of life "Kin pordee you por dee"	3) Being able to evaluate the energy impacts in the community.	3) Having skills and able to solve energy problem and to make reasonable decision on energy and environment.

Affective	Cognitive Domain	Psychomotor Domain
4) Being in a habit of energy and environment conservation.	4) Being able to analyze the causes and impacts of energy use to social, economic, and politic in national and international level, in present and future.	4) Participating in presenting self-opinion on energy and environment to the public.
5) Being in a habit of thoughtfulness and being interested in environment information	5) Being able to analyze the impacts of technology on energy, natural resource and environment.	5) Participating in energy conservation and recompression activities.
6) Being aware of participation on energy and environment conservation	6) Being able to analyze the organizations' roles and network at local and national level on energy and environment conservation	6) Being able to plan and perform efficiency energy and environment management.
7) Being satisfied with environment and nature.	7) Being able to apply energy and environment conservation methods and principle for sustain development.	7) Being able to initiate new methods on energy conservation and saving.
8) Being ware of self-role and responsibility to conserve energy and environment.	8) Being able to understand the present conditions and trends of energy use and energy problems	8) Having skills and able to identity energy and environment problems.
9) Being aware of energy and environment values for human living	9) Being able to understand how to use technology for energy and environment management	9) Buying and using products that save energy and do not destroy environment.
10) Accept natural equality laws.	10) Being able to understand the laws and measurement on energy and environment promotion.	10) Being able to choose the activities to solve energy and environment problems.
11) Recognizing and taking respond to events those impact energy and environment problems.	12) Being able to understand the recompense energy and its impacts	11) Having skills and be able to survey and experiment for energy and environment conservation.
	12) Being able to tell energy and environment crisis.	
	13) Being able to describe the relationship of human, energy and environment.	

4) Learning Contents' Framework: The contents of this curriculum are gathered to answer 6 main questions: (1) Where can we get energy? (2) For what human being need energy? (3) How do human being, energy and environment relate? (4) What's the energy problem that effect the environment? (5) What will be happened if energy and natural resources are in extravagant using? (6) How to change people's consumption value to be Thai way of life "Kin pordee and you pordee style?"

5) Learning Activities: Learning activities are provided as follow:

- (1) To be based on child-centered, the children are the center of learning process, with active participation, physical; mental health; emotion; and social that let the child able to construct their own knowledge and use all parts of their brain;
- (2) To participate in group working, setting the cooperate targets and let the child change their opinions, discuss and build up their own concepts of energy and environment;
- (3) Learning in actual environment as authentic learning;
- (4) Encouraging the child to be bold to think, to do the right thing for the public;
- (5) To construct awareness, value, ethics and moral conduct of energy and environment conservation.

6) Learning Evaluation: To evaluate based on learning outcomes:

- (1) Actual operation for evaluating skill and activity participation;
- (2) Project's activity success;
- (3) Collection of modern information of energy and environment issues;
- (4) Evaluation should be managed in authentic evaluation on learning activities. All stakeholders, teachers, peers, students, parents and community are involved in evaluation process and diversity of instruments are to be used such as questionnaire, observation, interview, checklist and portfolio etc.

2.4.2 Environmental Education Reform

According to the 1999 National Education Act, (Office of the National Education Commission, 2000) 10 aspects of Thai education are reformed as follows:

1) Objectives: Education shall aim at the full development of the Thai people in all aspects: physical and mental health; intellectual; knowledge; morality; integrity; and desirable way of life so as to be able to live in harmony with other people. (Section 6)

2) Principles: Educational provision shall be based on the following principles: (1) Lifelong education for all; (2) All segments of society participating in the provision of education; (3) Continuous development of the bodies of knowledge and learning processes. (Section 8) In organizing the system, structure, and process of education, the following principles shall be observed:

- (1) Unity in policy and diversity in implementation;
- (2) Decentralization of authority to educational service areas, educational institutions, and local administration organization;
- (3) Setting of educational standards and implementing system of quality assurance for all levels and all types of education;
- (4) Raising the professional standards of teachers, faculty staff, and educational personnel, who shall be developed on a continuous basis;
- (5) Mobilization of resources from different sources for provision of education;

(6) Partnerships with individuals, families, communities, community organizations, local administration organizations, private persons, private organizations, professional bodies, religious institutions, enterprises, and other social institutions. (Section 9)

3) Education Rights and Duties: All individuals shall have equal rights and opportunities to receive basic education provided by the state for the duration of at least 12 years. Such education, provided on a nation wide basis, shall be

of quality and free of charge. Parent or guardians shall arrange for their children and those under their care to receive compulsory education, as well as further education according to the families' capacities. (Section 11) Individuals, families, communities, community organizations, private organizations, professional bodies, enterprises and other social institutions, which support and provide basic education, shall be entitled to appropriate benefits (Section 14)

4) Education Forms: There shall be three types of education: formal, non-formal, and informal.

(1) Formal education shall specify the aims, methods, curricula, duration, assessment, and evaluation conditional to its completion.

(2) Non-formal education shall have flexibility in determining the aims, modalities, management procedures, duration, assessment and evaluation conditional to its completion. The contents be appropriate, respond to the requirements, and meet the needs of individual groups of learners.

(3) Informal education shall enable learners to learn by themselves according to their interests, potential from individuals, society, environment, media, or other sources of knowledge.(Section 17)

5) Education Guidelines: Education shall based on the principle that all learners are capable of learning and self-development, and are regarded as being most important. The teaching-learning process shall aim at enabling the learners to develop themselves at their own pace and to the best of their potentiality.(Section 23) Education approaches shall:

(1) Give emphases to knowledge, morality, learning processes and integration of the subject matter;

(2) Provide substance and arrange activities in line with learners' interests and aptitudes, bearing in mind individual deference;(Section 24)

(3) Promote the running and establishment all types of lifelong learning resources; (Section 25)

(4) Assess learners' performance through observation of their development; (Section 26)

(5) Prescribe core curricula and school curricula; (section 27)

(6) Aim at human development with desirable balance regarding knowledge, critical thinking, capability, virtue and social responsibility; (section 28)

(7) Strengthen the communities by encouraging learning in communities themselves; (Section 29)

(8) Develop effective learning process. (Section 30)

6) Educational Administration and Management: In accordance with the 1999 National Education Act, the Ministry of Education, Religion and Culture (MERC) is scheduled to be established by 20 August 2002. After the reorganization of the administrative structure; it is expected that public educational administration and management will be decentralized to local organization. During this transitional period, the current system of educational administration is summarized as follows:

(1) Educational administration is under the mandate of MERC (Ministry of Education Religion and Culture).

(2) Ministry shall have 4 main pillars: National Council of Education; Religion and Culture Commission; Higher Education Commission. Level

of administration will be divided into two levels: central and national level and educational area level.

(3) The Ministry shall decentralized powers in educational administration regarding academic matters, budget, personal and general affairs to the committees and offices of education, religion and culture of the educational service areas and the educational institution in the areas. (Section 39)

(4) In each institution providing basic education and that lower-than-degree level, there shall be a board supervising and supporting the management of institution. (section 40) For the new educational management, the Ministry shall decentralize powers in educational administration and management regarding academic matter, budget, personnel and general affairs administration directly to the Committee and Offices for Education, Religion and Culture of the educational service areas and the educational institutions in the areas. It will be a school-based management.(SBM)

7) Educational Standard and Quality Assurance: There shall be a system of educational quality assurance to ensure improvement of education quality and standards at all levels that shall be comprised of both internal and external quality assurance. Internal quality assurance shall be regarded as part of educational administration which must be a continuous process which requires self assessment and annual reports to be submitted to parent organizations, agencies concerned and the public. (Section 47, 48)

8) Teachers and Educational Personnel: There shall be promoting and developing system, including production and further refinement so that teaching will become a highly respected profession. New development procedures provided as the following: (1) Establish the fund for development of teacher; (2) An organization of teachers have the powers and duties for setting professional standards; (3) Teachers, administrators of educational institutions and other educational personal shall have professional licenses.

9) Resources and Investment of Education: There shall be mobilization of resources and investment in term of budgetary, financial support and properties from: the state; local organization; individuals; families; private organizations; professional bodies; religious institutions; enterprises; other social institution sand forming countries.

10) Technology for Education: The State shall support technologies for education by distributing frequencies, signal transmission devices, and other infrastructure necessary for radio broadcasting, television, telecommunication radio and other media of communication for use in provision of education, religions and cultural affairs as necessary.

Education reform, in accordance with the 1999 National Education Act, have been influenced secondary school environmental education reform as follows:

(1) Learning process have to include ability to preserve natural resources and environment; (Section 7)

(2) Secondary school education approaches have to give emphasis on integrating knowledge, understanding and experience in management, conservation and utilization of natural resources and the environment in a balanced and sustainable manners; (Section 23)

(3) Learning process shall provide activities in line of learners' interests, knowledge for solving problems, authentic experience, balanced integration of subject matter, and learning at all times and in all places; (Section 24)

(4) Assessing the learners by actual behavior development, formative test as authentic assessment;

(5) Ensuring the improvement of environmental education quality and standard in partial of school quality assurance. So as to achieve a quality assurance, secondary school have to assess the success of environmental education to assure school quality.

2.4.3 Governmental Administration System Reform

In accordance with the 1999 Governmental Management Reform Plan, (Office of Civil Government Officer Commission, 1999) governmental management aspects have to be changed in five elements:

1) Mission and management: Governmental organizations have to reduce unessential activities and ensure non-governmental organization or private sectors to take over of those activities. Governmental organizations' mission must be clear and focused on customer (people). Management must be based on results called Result Based Management (RBM) that focus on results, (outputs and outcomes) strategic planning and New Public Management. (NPM)

2) Budgeting system: Budgeting system have to change to be performance-based budgeting. (PBB) Results, outputs and outcomes are focused and controlled, (not management activities) together with accrual basis accounting shall be provided to be performed for all governmental organization.

3) Personnel Management: Personnel management shall be changed in selection, salaries, promotion, remuneration, welfare and other benefits.

4) Laws: The establishment process of laws for all governmental management shall be easy, convenient and purposeful. The law have to give benefits for individuals and communities, together with individuals' participation in making laws.

5) Working Culture and Value: For new public management (NPM). Government officers have to change their values to be based on five creative values: To be bold to do the right thing; To be honest and responsibility; To be transparency and accountability; To be in equal treatment; To emphasis on the results of work. For management culture and value reform, governmental organization goals shall be focus on civil services, result-based management, good governance, performance based budgeting, as well as the efficiency and effectiveness of work.

So as to reform the management system, that's the government's plan, secondary schools under the Department of General Education as a government organizations have to change their management systems as follows:

1) To be new public management (NPM) that focus on result-based management; (RBM)

2) To evaluate the management results by RBM process. Critical success factors (CSF) and key performance indicators (KPI) shall be set up to be evaluative goals;

3) To manage by management reform strategies, strategic planning that including school environmental education vision, mission, CSF, KPI, strategy and how to perform whole school environmental management;

4) To be in sustain development and self-evaluation shall be the critical strategy for school environmental education development.

2.5 Model Development Concepts and Theories

2.5.1 Model Development

1) Definition: Model in general meaning, is the methods of working operations and also the best practice of each good work, for example: construction model, management model and school evaluation model .

Education Dictionary, by Good (1973) being collected and provided model in four different meaning: (1) An example form of an object to construct and to be reconstructed; (2) An object from to be copied; (3) A chart or figure that represent object, principle or though; (4) Series of related factors that's being added up to be components and social symbols those can be written in both arithmetics symbol and descriptive language.

Rangchaikul, Yoawadee. (1999: 27) provided model meaning in constructive methods. It was the methods of human being to transmit their own understanding and imagination for things or events. The method is transmitted in different characters. For example; drawing, diagramming, workflow and 4 arithmetic concepts: (1) Copying transmutation or transmit from understanding to system structures, that easy to understand; (2) A concise form of systematic relation of symbols and principles; (3) To emphasis on important elements that lead to similar understanding; (4) To communicate total elements in one figure.

As being defined by Good and Yoawadee, model was defined in two main aspects: Tangible models or physical models; the model of airplane, models or physical models, the model of airplane, house, car etc; Abstract model or qualitative model.

Furthermore; Stoner & Wangle (1986: 2) provided the similar meaning, model was a simulation of an event so as to understand the event easily; It was defined as the conceptualization of series of events by rationale of formal system to make clear relationship of related terms; Amble, (1971: 1) defined as model building in social science, an endeavor to describe the matters in concept, together with building and presenting the related structure to make better understanding.

In accordance with the definitions above, "Model" is the translation of individual's thought understanding and imagination about events and matters tangibly. That's transited by any media for easily understanding, concisely and systematically.

2) Types of Model: Keeve (1988: 561-565) divided educational and social model into 4 types: (1) Analogue model, to compare abstract relations to

concrete materials that make better understanding e.g. comparing the enrollment of school students to putting water in-out of the tank; (2) Semantic model, to explain or describe the events by verbal languages, diagrams or figures to show the components and component relation of those event e.g. school learning model; (3) Mathematical model, to show the elements relationship by an mathematical equations; (4) Causal model, being developed from path analysis technique and semantic model by constructing causal relationship of the variables.

Further more; Rangchaikul, Yaowadee. (1999: 27) divided model by mean of implementation into four aspects as follows: (1) simulation model; (2) example model; (3) systematic and related figure model; (4) workflow model.

The classifications of Keeve and Rangchaikul are different; the first emphasis on aspects of model writing, the later emphasis on model implementation.

3) Model Components: In accordance with model studies, both in related literature and related dissertation, model's components were not static. Its components were based on its specific topics. For the selected evaluation models, their components were generally involved:

- (1) Evaluation objectives;
- (2) Contents or what's to be measured;
- (3) Steps and evaluation methods;
- (4) Result utilizing and work improving;
- (5) Evaluation efficiency and effectiveness;
- (6) Indicators, criteria and judgement.

4) Model Development Process: Keeve (1988: 560) provided 4 principles of model construction: (1) Models must be composed of the related structure of variables more than linear relations; (2) Models must be guidelines for forecasting what to be happened from model using that can be inspected with empirical data; (3) Be able to indicate the reasoning mechanism of the issues, so model was not only forecasting tools but also events description; (4) Be able to be tools to create new paradigms on new aspects of variables.

Abell (1971: 5-7) provided 5 steps of model building based on hierarchy of scientific sophistication as follows: (1) Setting a unit of analysis to confirm the model objectives and to establish concept framework; (2) Interpreting concepts to be variables and set out criteria to measure variables' relations; (3) Building structure of relations; (4) Presenting and evaluating relation structure; (5) Building model.

As providing in Keeve's principle and Abell's model building steps and other related literatures, steps and strategies of model development are divers but at least two main steps or activities are generally performed:

- (1) Model building (construction & formulation)
- (2) Model verification (validation & evaluation)

2.5.2 Evaluation Theories

1) Definitions: Evaluators provided different meaning of evaluation as the following:

(1) A process of data collection and preparation for the best decision making on alternatives; (Stufflebeam, 1971)

(2) A process of searching or judging values or amount of materials by evaluation standard, together with the judgement by internal and external criterions; (Good, 1973: 220)

(3) The consequence judgement between performance and objective; (Mehrens & Lehman, 1984: 5)

(4) The term to explain and judge people or groups of people's properties as well as projects; (Rangchaikul, Yaowadee. 1999: 7)

As being defined by previous evaluators, evaluation is a process of data collation, value and property judgement with collected data and choosing the alternatives. Three steps of the evaluation process are involved: choosing the matter to be evaluated; developing the process to explained the evaluated matter correctly and accurately; presenting the results to make decision.

2) Evaluation Theories: Rangchaikul, Yaowadee., (1999: 28) mentioned about evaluation model as an endeavor to present figure of thought that involved figure communication, thought, principle as well as systematic relations of events. Evaluators tried to present their own evaluation model in order to interpret their evaluation thoughts and principles, therefore; evaluation model could be called evaluation theories, that should be evaluated model objective, validity and reliability continuously.

3) Classical Evaluation Model: The development of evaluation as a field of professional practice was spured by number of evaluators. These included Tyler (1942), Cambel & Stanley (1963), Cronbach (1963), Stufflebeam (1967), Scriven (1967), Stake (1967), Alkin (1969), Provus (1967) etc. (Stufflebeam, 2001: 8) These original evaluation model are classical models. (Rangchaikul, Yaowadee., 1999: 30) Each classical model can be summarized as the followings:

(1) Tyler's Rational and Model of Evaluation

Tyler (1969) provided this model for classroom evaluation. He believed that students' achievement evaluation would bring to learning development. The main objective of this model was to compare students' learning results after teaching to the behavioral objectives that being set before teaching.

(2) Cronbach's Concepts and Model

Cronbach (1963) estimated that evaluation should be the way to collect and use information for decision-making on educational program. He adviced that evaluation should not be performed by only testing, but four components of learning were to be measured: learning process; students' capability; students' attitude; and follow-up.

(3) Scriven's Evaluation Ideologies and Model

Scriven (1969) estimated that evaluations were the goal oriented procedure for activities' value judgement. He divided evaluation into two formative evaluation and summative evaluation, together with goal-based evaluation and goal-free evaluation.

(4) Stake's Countenance Model

Stake (1967) emphasized systematic and meaningful evaluation. The evaluation was focused on the rational contingency and congruence, together with matrix value measurement in 3 evaluation standard: inputs; operations;

and outputs. He also supported Scriven's goal-free evaluation, called responsive evaluation, that include systematic evaluation procedures: having conversation with project authority and stakeholder; setting the scope of the project; reviewing project activities; searching for activities' objectives; collecting evaluation issues and problem to be measured; setting data; selecting evaluators and tools; collecting data; preparing for discrimination; identifying the problems; and reporting.

(5) Alkin's Concepts of Evaluation

Alkin estimated that evaluation was the process of selecting data for decision making or selecting project activities, that should be evaluated to set project objectives. It involved: setting the project objectives; planning the project activities; monitoring project procedures; developing the project; and accreditation or repealing the project.

(6) Hammond's Concepts and Model of Evaluation

Hammond emphasized on local evaluative innovations, that evaluated 3 dimension of school achievement: leaning behavior dimension; leaning management dimension; and behavioral objective to judge students' leaning outcomes or student dimension.

(7) Provas's Discrepancy Evaluation

Provas considered evaluation was a standard criterion and searching the gaps between actual and standards. The gaps should indicate project deficiency. He also considered evaluation had to be performed in all project performance.

(8) Stufflebeam's CIPP Model

Stufflebeam considered evaluation as the process to increase the necessary information for decision making in 4 system's components: Context; Input; Process; and Products (CIPP). It shall be more described in 4)

4) CIPP Model: Stufflebeam and others (1971) disseminated CIPP model in their well-known book namely "Educational Evaluation and Decision Making" Stufflebeam defined evaluation term as a process of needed data setting, data collecting, data analysis, and information presentation and report for decision making. It's provided in the following aspects:

- (1) Evaluation was a continuous process.
- (2) Evaluation process had to identify the needed data.
- (3) Evaluation process had to collect the needed and indicated data.
- (4) Evaluation process had to collect data to be information.
- (5) Constructed information might be meaningful and useful.
- (6) Information had to be presented for decision making and choosing the alternatives.

Worthen & Sanders (1973: 134) summarized Stufflebeam's concepts in 3 steps:

- (1) Setting out the needed data;
- (2) Collecting data;
- (3) Analyzing, collecting and presenting information.

Four components of management system have to be evaluated:

(1) Context evaluation: C Context evaluation is an ex-ante evaluation. The objective is to make decision about project rationale, projective problems and project appropriateness.

(2) Input Evaluation: I Evaluation objective is to consider the sufficient of project's input or resources, as well as technology and plan.

(3) Process Evaluation: P Evaluation objective is to find out project deficient to be solved, to find out data to improve and to record important data and events.

(4) Product Evaluation: p It's objective is to compare the project results and the project objectives, as well as to reaped the project.

Couple activities of evaluation are performed in CIPP: evaluation performance and decision making. Each step of CIPP involves couple performance as in figure 5

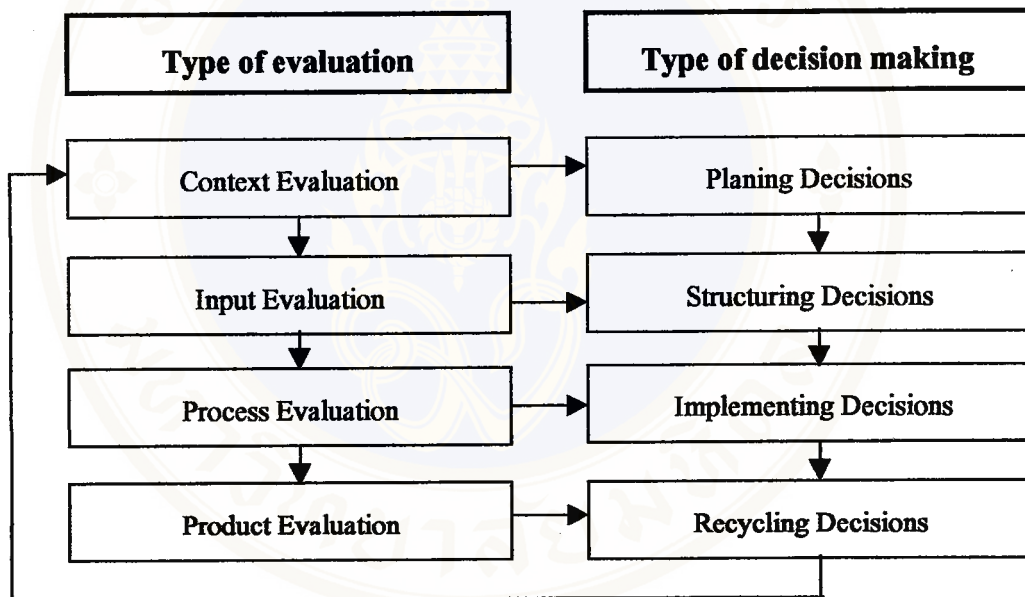


Figure 5. CIPP: Type of Evaluation and Decision Relations

5) Model for School Evaluation: Rangchaikul (1999) concluded that there were two main components of school evaluation: Data and information collecting to make decision; and using criterion to make evaluation judgement, together with 4 models of school evaluation in the United States: (1) Evaluation for accreditation, performed by school self-study with internal audit and external evaluation by states committee; (2) Evaluation for school accountability, preformed by states and school accountability report; (3) Regional audition, performed by education region and to take local accountability; (4) Specific evaluation, performed by individual as an informal evaluation. Sander also focused that all model of school evaluation above were not able to evaluate all school component, for example; learning achievement evaluation deserted students' emotional, social ability, physical behaviors and moral conducts; Deserting career evaluation; lack of participation; and evaluation of evaluation.



Gallegos (1994) (Gallegos in Vongvanich 2000: 20) indicated the school evaluation weakness in the United State in five aspects involving:

- (1) Not clearly mentioned about the evaluators' training;
- (2) No clear evident for school evaluation standard;
- (3) Not clearly defined on systematic evaluation;
- (4) Not clearly mentioned about evaluation quality;
- (5) No indicators on school personal quality.

2.5.3 School Environmental Education Evaluation Components

1) Evaluation Objective: It was provided as the following:

(1) Suwanmala, Charat. (1996: 20) provided 4 objectives of new public evaluation (NPE): (1) To know goal-results appropriateness both in strategic results of organization and operation results to be improved; (2) To compare the results to work standards; (3) To assess the efficiency of resources using; and (4) To improve the efficiency of using resources and organization quality.

(2) Department of Educational Technique (1996: 3) set out the objective of evaluation for school quality assurance depended on type of evaluation: (1) Self-evaluation, to monitor, control and improve performance activities; (2) Internal evaluation, to improve school activities in strategic and operation level by upper unit and school; (3) External evaluation, to accredit school quality.

(3) Meksawan, Tipawadee. (1998: 12) provided result-based management (RBM) objectives, were to evaluate the results of the organization involving: economy, efficiency, effectiveness as well as productivity.

(4) Stufflebeam (1971) provided evaluation objectives related to CIPP evaluation and decision making: planning decision; structuring decision; implementing decision; and recycling decision.

In accordance with those above evaluation objectives. school environmental education objectives shall be focused on both school total achievement and operation results for continuous improvement.

2) Results and Components (to be measured): Evaluators had limited evaluation components as follow:

(1) Stufflebeam evaluated 4 systematic components as project procedures to be measured involving: context; input; process; and product (CIPP).

(2) Kaplan & Norton (1996: 6) provided four balanced components of organization to be measured, namely Balance Scorecard, as in RBM process involving: customer perspective; internal perspective; innovation perspective; and financial perspective.

(3) Office of Rung-arum Project, the critical project for energy and environment preservation (2001: 52) provided school student's 4 components to be measured as in EEC curriculum: actual performance and skill; result of school project and activities; continuous information recognition; and attitude and concepts development of students in each level.

(4) Office of the National Education Commission (2000: 69-71) set out educational standards to be measured and accredited, those involved 27

standards in 3 dimensions: learner dimension; management dimension; and input dimension.

(5) Andersen Consulting (1998: 45) provided the results of the organization to be measured as critical success factors (CSFs) that's involved economy, efficiency, effectiveness and productivity. For NPM the CSFs should have been set out appropriately.

(6) U.S. Department of Education (2000: 5) provided 4 components of school quality to be measured: school contexts; Teachers component; classroom component; and learning component.

In accordance with the evaluators' view points, school environmental education results to be measured have to be composed of school environmental teachers as an input, school environmental education management and school environment management as a school process, students' environmental characteristics and school's community service on environmental education as a school output and outcome. Schools' environmental education results to be measured shall be involved:

- (1) Students' environmental needed characters and moral conducts;
- (2) Teachers' competency on environmental education;
- (3) School environmental education management;
- (4) School environment management and learning environment management;
- (5) School environmental education services.

3) Steps & Strategies: Evaluators performed evaluation steps and strategies as follow:

Rangchaikul, Yaowadee. (1999: 280-290) provided 6 steps of project evaluation involving: (1) Literature reviewed; (2) Setting evaluation objectives; (3) Defining scope of evaluation; (4) Limiting indicators and data; (5) Data analysis; (6) Evaluation summarizing.

Andersen Consulting (1998: 43) divided RBM procedures into two main steps and seven evaluative steps as follows:

RBM Development: (1) Vision & Mission Revision (2) Organizing Critical Success Factors (CSFs) and (3) Organizing Key Performance Indicators (KPIs)

RBM Implementation: (1) Setting out the Targets (2) Limiting & Collecting Data (3) Collating Data and (4) Reporting

National Education Commission (2000: 13) provided three main steps of school evaluation for school assurance including: (1) School preparation on personal & tools (2) School quality operation: plan; do; check and act.(PDCA) and (3) School evaluation report.

Office of the Permanent Secretary, Ministry of Education (2001: 272) provided 6 steps of strategic evaluation involving: (1) Revision of organization goals involved vision, mission, CSF, KPI and targets; (2) Strategic formulation (3) Evaluation preparation; (4) Evaluation operation; (5) Report; (6) Review.

Furthermore, 8 principles of school evaluation were also provided: (1) Holistic Evaluation: School results had to be evaluated as a whole by whole school approach;

(2) Definite Goals and Results: School results to be evaluated should be clear, conclusive and accepted;

(3) Distinctive Competency: Chose the best and most appropriate tools and strategies to assess;

(4) Systematic Evaluation: Chose evaluation goals, methods, tools, timeliness in systematic approach;

(5) Continuity Evaluation: Performed evaluation process continuously as an evaluation cycle;

(6) Participated Evaluation: Focused on participants and stakeholders' participation in all valuation procedures;

(7) Result-based Evaluation: The components to be evaluated focused on school results;

(8) Diversity Evaluation: Chose the appropriate and diverse methods and strategies, e.g. self-evaluation, internal evaluation, external evaluation, together with different appropriate tools to be used.

For those evaluators' viewpoints, evaluation procedures should be concluded that there were at least 3 steps of school self-evaluation including: *self-evaluation development; self-evaluation implementation; and self-evaluation improvement*, and strategic processes were also implied in evaluation principles.

4) Evaluation Results Utilization: Though, the utilization of evaluation result is highly accepted as the most important aspects of evaluation, but most of evaluators have not provided any clear utilization. Most of them ended their evaluation process in reporting step that included little information about evaluation result utilizing, for example:

The National Education Commission (2000: 183) provided 3 steps of school self-study report (SSR) as followed: (1) Defining the user groups, study stakeholders who use evaluation results and plan to present evaluation result to those groups; (2) Laying out report contents, set the specific and understandable report outlines; (3) Setting reporting forms, choose the appropriate form of data presentation and evaluation reports. For the result utilization, having teachers' know evaluation results and plan to solve the problems were also provided.

Office of Permanent Secretary, Ministry of Education (1999: 10) provided the target groups for reporting internal and self-evaluation of schools and educational offices as follows:

(1) Report to upper units and stakeholders;

(2) Report in full paper report and concept paper;

(3) Report contents involved organization vision, mission CSF, KPI, evaluation results, problems and needs.

For school self-evaluation, the utilization of the evaluation result is rather important. It's a critical link of an evaluation cycle that leads to sustain evaluation and sustain development.

5) Meta-evaluation: It was mentioned as the following:

Stufflebeam, et al. (1971) accepted that meta-evaluation could be ensured the efficiency and the effectiveness of evaluation in 4 aspects:

(1) evaluation profit; (2) evaluation appropriateness; (3) evaluation possibility; and (4) evaluation accuracy.

Scriven (1969) indicated that evaluators were critical variables on evaluation value, evaluators should be professional and meta-evaluation should be performed during evaluation process.

Rangchaikul, Yaowadee. (1999: 19) indicated that evaluation quality standards should be based on evaluation process involving:

(1) Evaluation goals: evaluation information could respond evaluation goal & need;

(2) Evaluation methods: evaluation process; strategies, tools, data collection, statistic as well as informants could be able to attain accuracy judgement.

(3) Evaluation results: results could be utilized profitable and trustable as well as evaluator expert.

2.5.4 School Evaluation for School Quality Assurance

1) Definition School Assurance: was defined as the following:

National Education Commission (2000: 7) defined as school management and school activity to develop school quality.

Department of Education technique (1999: 10) defined as school measurement to make assure that the accredited schools were able to provide quality education and graduates' qualities were at quality standards.

Department of General Education (2000: 8) also defined as an education development process involved school processes and activities to develop school quality so as to ensure and assure students, parents, and social that schools were efficient, student were qualified and being accepted by community.

As the previous definition, school assurance is a system of school quality development and ensuring to make assure that schools' performances and results were at standard quality.

2) School Assurance Objectives: Department of Education Technique, (1996 : 3) provided 3 education assurance objectives:

(1) To support schools to be able to develop school quality;

(2) To support schools' quality to national standard quality;

(3) To persuade local and community to be in charge of school quality development.

3) School Quality System: Department of General Education (2000: 8) provided education system for school assurance in three main activities:

(1) A quality development process of schools that involved education standard setting, school development, data collecting and school self-evaluation and usually called Quality Control (QC);

(2) Internal audit and intervention, together with school self-study report and improvement that usually called Quality Audit (QA);

(3) Quality assessment (QA) and accreditation by quality external units. National Education Act 1999, (Office of National Education Commission, 2000: 20-21) provided 3 quality assurance evaluation process that involved: self-evaluation; internal evaluation; and external evaluation.

4) Activities for School Assurance: Ministry of Education (2001) as an Advertisement on School Quality Assurance, November 25th 2001, provided schools' activities to develop school qualities in nine activities:

- (1) Arranging management structure to be quality assurance supplier;
- (2) Founding school quality assurance committee;
- (3) Managing information system for quality assurance;
- (4) Setting school education standards;
- (5) Performing school quality improvement plan;
- (6) Performing education activities as provided in school quality improvement plan (SQIP) and controlling;
- (7) Performing quality audit, review and report by school quality assurance committee;
- (8) Evaluate students' achievement in each class - range;
- (9) Performing school quality annual report to upper unit, stakeholders and the public.

In accordance with the National Education Act and quality assurance concepts above, school have to evaluate and to be evaluated as follows:

- (1) Performing quality self-evaluation by working group permitted by school quality assurance committee, together with quality self-evaluation report and quality annual report to stakeholders and the public;
- (2) Parent organization with jurisdiction over schools and schools themselves perform an internal audition at least 3 times in each 3 years and report evaluation result to school and jurisdictions;
- (3) All schools have to be evaluated as external evaluation by Office of Education Accreditation and Evaluation at least once in the year 2005.

Internal Quality Assurance System focused on school self-development, Self-reliance, self-evaluation and self-report (SSR) that should be unity and continuously performed.

2.6 Participatory Action Research: PAR

2.6.1 Definition of Participatory Action Research

These following persons have defined an resembled meaning as follows:

Chantavanich, Supang. (1996: 68) mentioned that PAR was the learning from experience through an enthusiastic participation of all party relating with research's activity starting from defining problem, implementation, follow up and evaluation. For this research, "action" mean activity conducted by research project which might include development on water supply, energy or nutrient condition, etc. In general, action was always dealing with a particular aspect of development. And participation mean participation of all party dealing with analysis of a particular problem condition or situation, process of decision making and ending up with implementation of this research. Thus PAR was the blending of these two ideas.

Chaiteeranuwatsiri, Manee. (1996: 98-99) mentioned that PAR was research guidance which was different from natural-science research in terms of concentration on accepting opinion of people by which researcher had to:

- 1) evaluate relationship between researcher and people all the time;
- 2) periodically revise research objective in order to check whether it is according with villager's opinion or not. These could indeed lead to participation and changes of community.

In PAR, it was assumed that researcher or developer and people had comparable qualification in defining problem or selecting action leading to develop quality of life. Research problem was therefore imitating from people, not hypothesis of researcher or developer. This revealed that either people, researcher or developer had a comparable role in defining problem and selecting action. This researcher was the blend of theatrical knowledge and disciplinary method of researcher, goal and objective of developer, need and erudition of people.

Ramsuit, Pantip. (1997:31) mentioned that PAR was the democratic process in which a specific amount of people had applied their knowledge from research study and self-practice to improve / edit or alter their own society. Therefore, PAR was the research pattern that changing the role of people from being tested to be the participation of research through the whole process of research, starting from decision making on research imitation in each community, processing evidence and information for further defining research problem, selecting/specifying problem issue, constructing tools for data collecting, analyzing and proposing the discovery, including distributing knowledge obtained from research for further practice.

PAR was connected to adult education because of its ability to see human's fighting for freedom. It was said to be the mirror reflecting individual and group's attempt on converting knowledge to democratic being. Thus this fighting included individual participation with researcher. In other words, PAR would be the connection of formal knowledge from government, expert's knowledge from vocation and fundamental knowledge from themselves.

Sudprasert, Kamol. (1997: 8-9) had defined meaning of PAR as followed:

PAR was research of discovering knowledge pursued the principle of traditional scientific research. The difference was only objective of PAR, which was aimed at solving problem of development and being research operated by participation of community and co-worker joining in both research process and mutually utilized research output.

PAR was the research process which its action was flexible by the consideration on action for generating response which leading to reasonable improve/edit. These could be done by making research to be process of social learning, basic for action and consideration as reaction later.

PAR was the process of cooperation depending upon the group's discovery of problem and argument. Then analyzing cause of problem (economic, social, politic, administration, culture and individuality). The most important was an action must be cooperated in group both for short and long period of time. Moreover, PAR was the research process which was inalienable to democratic process.

2.6.2 Philosophy and Principle of PAR

Tandon (Tandon in Ramsuit Pantip., 1997: 30-34) mentioned about PAR by following significant principles:

1) Give priority or respect to people's knowledge by accepting that fundamental knowledge as well as system of creation knowledge or initiation of knowledge, which might different from academician's knowledge, were still practiced and widely accepted among people / poor. It was to solve their problem of life.

2) Improve people's capability and potential by promoting, lifting up and developing their confidence so that they could analyze and synthesize their own problem. It was to apply their potential instead of ignoring it or looking down as it was being worthless.

3) Provide knowledge befitting to people and poor by allowing them to have knowledge arise in their own social system so that they could understand/interpret the meaning as well as apply it appropriately.

4) Pay attention to people's periscope through PAR which enabled to raise the question matching with people's problem such as problem of alienated from land or other natural resources, struggle with oppression from influential person. These questions were formerly ignored and not concentrated by researcher.

5) Release cognition. PAR encouraged people and poor to think freely by themselves. They could understand their own situation and problem as well as was able to depend on their instinct in analysis and investigation on fact.

Maguire (Maguire in Ramsuit Pantip.,1997: 34) mentioned that PAR was the research which consisted of process of social investigation; education and action to push forward person who being oppressed or lacked of opportunity to participate in creating knowledge of society. Anyhow, these three process of creating knowledge was not being only the new process of research methodology but they also were the guideline for altering individual and social-being systematically. It was said that PAR was concentrating on development of judemactical science of people in order to improve their living and quality of life as well as changes of social infrastructure and relationship.

Rmasuit, Pantip. (1997: 34-35) mentioned that PAR could go deep into social experience concretely such as concentration on conquering or solving problem suspected by people. An attempt to achieve PAR was enable to define target befitting to a particular problem and could guide people what was their indeed need or want as well as pointed out their mistake on cognition related to their own problem. These could indicate social situation that opposed to their need and methodology responded their need as well as disclosed the mechanism controlling oppressive process. Moreover, PAR was also recommending activity, which intervned and altered process of society.

In summary, main goal of PAR consisted of:

- 1) Discover fundamental knowledge being widely accepted;
- 2) Support good understanding of culture;
- 3) Create balance between science, academic knowledge and fundamental knowledge;

4) Accept disparity of social and economic condition.

Chaiteeranuwatsiri, Manee. (1996: 98) mentioned that philosophy of PAR was defined as followed:

1) PAR was dynamic and organic process. It started from reality as what is today's problem, how about the belief on evolution of economy; society; politic; language and culture, and what could be.

Thus PAR project was characterized as followed:

(1) Flexible and adaptive;

(2) Unable to determine time frame;

(3) Unable to (should not to) define activity in advance;

2) PAR believed that:

(1) Person who lacked of opportunity could also work in team;

(2) Ability and resources of today and future had to be comparable

allocated to project which was certainly supervised and controlled;

3) PAR started from how people feel toward problem (or their own need) and toward thinking, understanding and action which resulting in transformation either by individual, community, dimension of intelligence/ spirit, physics and other environment;

4) PAR process consisted of knowledge discovery and action must be consecutively implemented and being endless within one cycle. Also, this process must be going on as long as person who lacked of opportunity was assembled;

5) People's knowledge (popular knowledge, indigenous knowledge) was as important as academician or developer's knowledge.

2.6.3 PAR Process & Steps

Ramsuit, Pantip. (1997: 42-43) had summarized PAR process as followed:

1) Preparation of community: To make community be ready in PAR, research project would start by several aspects such as community renovation, promotion on collaborated decision making in the matter of ranking problem priority or selecting representative, etc.

2) Construction of understanding: Trained local researcher to know about local situation, role of local researcher, establishment of local community in the form of leadership, promotion on relationship;

3) Determined research format: Local research team participated in determining research format such as splitting general problem into sub-problem so that it could be solved part by part. Next, determined method of data collection by a particular research tool; informant; sample size as well as tool construction, questionnaire and questioning approach, etc.;

4) Collected data by trained person;

5) Processed and analyzed data: Local research team would participate in processing and summarizing data, providing remarks or criticism as well as analyzing cause of information and summarizing as extensive discovery with recommendation;

6) Consulted with community: The purpose was to return community the information obtained from study so that they could check and edit those

information as well as analyzed/ summarized or recommended research team. This consulting process might be shown in the form of picture or several graphic pattern toward public or people's community. Evaluation on reaction toward information and mutual decision making by community had also be assembled;

7) Planned for community: Trained planning team to write project and boosted capability of establishing community's organization. Project written by planning team had to be consulted or inspected; edit (if any), and proved by community before asking for fund given by related organization;

8) Applied plan: Mobilizing of personnel and energy resources in community to implement or established plan based on PAR;

9) Followed up and evaluation: Mutually followed up/ supervised and evaluated by researcher team and community;

Chaiteeranuwatsiri, Manee. (1996:102) mentioned PAR process as followed:

1) Determined extensive guideline for community and research problem had to be mutually determined with people;

2) Entered community to make familiar and study about community's leader / representative who was said to be "representative" or "center" and would be developed as co-worker. These could benefit to researcher, people or local research team: LRT;

3) Mutually consulted between researcher and local research team:

(1) To mutually define extensive problem which would be further inspected;

(2) To mutually determine methodology and process of study;

(3) To mutually determine training method to understand those methodology and process;

(4) To mutually establish curriculum, determine appointment and training activity dealing with prepared material and practical guideline.;

4) Researcher and local research team mutually surveyed community;

5) Mutually analyzed information and defined problems raised from survey in which these problem would be authentic problem leading to PAR process;

6) If there were obstacles or achievement, repeated step 3 again.

Always repeating this step.

Sudprasert, Kamol. (1994: 13) provided PAR process in 9 steps:

1) Selected target community: Target community must be systematically selected. Firstly, collecting data about community or people's participation in project. Next, determining criteria for screening target community. Screening target community should be approved by governmental or non-governmental agency as well as research director or coordinator. Then, meeting was conducted to make final decision and recorded as evidence.

2) Created atmosphere of community acceptance: It was an idea of making research coordinator be accepted by community. In other words, this step had to be agreed by local executive or community leader who had authority to allow team entered community. Being accepted or trusted by people making those coordinators were likely to becoming the part of community.

3) Specified problem and solved the problem potentially: Community would start on research once the activity was conducted by community pursuing its objective, that's to study need and want of community, specify problem of community, find out potential methodology of solving problem and consider its restriction. In order to understand this part, the definition of need and want were defined as the gap between "what should be" and "what it was".

At this moment, it was necessary to distinguish the whole idea of need or want, such as the word "want to show" and "want to feel", step of want started from basic want or fundamental need and the difference of want and need.

4) Planned for practice: This step described about the strategy and technique of how to prepare development project which related with objective determination; time consuming; resources; size of manpower and activity. Utilization of necessary resources required community's preparation form both inside and outside area which had to propose or submit application to related agencies.

5) Implemented on agenda: Achieving agenda by action research mean coordinator must be careful on changes emerging in any part of agenda and plan was changed when there was the heavily feedback happened.

This step described how people implemented their own project. Agenda had to be disseminated and stimulated an implementation. Financial management must be transparently responsible. Mobilizing of resources and determining task must follow the plan.

6) Member training: People was requested to be trained/ practiced on evaluation of management and problem solving. Community was necessary to periodically conduct meeting as well as evaluation on project to study how to improve project's output.

7) Evaluated on feedback/ given information back: Community and research coordinator had to record a daily memorandum. Management and activities related to project were entirely recorded as evidence. It was the memory recorded after each part was implemented. Evaluation or edit (if necessary) and to be done by coordinator. Summarized evaluation was done after finishing all step of implementation. And, their evaluation would describe methodology facilitating evaluation on process and achievement of project.

This task was achieved by periodically following up and evaluating. Community might develop its own implementing calendar which could be in the form of table or fish bone. This was done to show step of task being the tool for follow up and evaluation. Community might conduct evaluation on meeting of process evaluation, recorded as document and evaluated people's participation as well as be able to provide feedback to coordinator for further analyzing other information.

8) Twisted/circumambulated and developed PAR system: This step took place when community started to solve the difficult problem but still rely on step of planning. Community started to apply principle and technique from PAR to solve the problem such as problem of environmental pollution, problem of insufficient social service, problem of low income, problem of female being oppressed in work place, etc.

Each time community rotated to provide technique and knowledge obtained from PAR, coordinator or director or research had to assign more responsibility to community. Ratio of responsibility might be 75-25 for first time, 50-

50 for second time, 25-75 for third time respectively. Finally, coordinator or director of research would leave overall responsibility to community's agency.

9) Prepared for leaving and disseminated achievement: This step described about creating skill on PAR for leaving preparation of coordinator or director step by step. Before coordinator or director left community, they had to make sure that PAR had been cultivated as the process of problem solving by community. In other words, there should have evaluation on input of education which enabled community applied PAR to solve the problem by itself. Furthermore, strength of community's organization; vision; completeness of project had also been evaluated. Financial stability had indicated that PAR was deeply in blood lineage of community or not. At the same time, we could observe the trace on PAR applying in other projects of community as well.

To an end of PAR project, report on action research had to be printed and disseminated as well as proposed in seminar. Additionally, PAR was presented to people who was interested to apply this approach. It was noted that dissemination would be done when PAR was clearly proved as being efficiently and effectively.

2.6.4 Participator in PAR

Chantavanich, Supang. (1996: 71) mentioned that there were 3 participators in PAR: namely, people who was the representative of community; researcher who was the representative of academician interested in development and; developer who was the representative of government or non-governmental developing organization. Researcher and developer were outsider while people was insider.

Ramsuit, Pantip. (1997: 2-3) mentioned about participator in PAR that it was the coordination between outside academician and target group (inside researcher). Thus the word 'target' consisted of several groups such as geographic group such as in working place; in adult education, social group, movement group and other projects, researcher who worked with homeless people, people group, poor in city group, immigrant group, female, labor, male group, HIV addicted group, old people group, cripple group, etc. These groups had confronted with many kinds of problem, either problem from industrial society; advanced technological society and underdeveloped society in third world (Africa, Asia and Latin America), etc. However, the goal was giving priority on person who lacked of opportunity and being oppressed.

2.6.5 Advantages of PAR

Chaiteranuwatsiri, Manee. (1997: 100) mentioned as followed.

1) Impact on community:

(1) Person who lacked of opportunity would be enlightened to have more education. They were able to think and analyze situation around themselves correctly as well as being confident in participating on economic, social and politic activates for fully benefiting themselves and community;

(2) Main problem in community would be solved. Person who lacked of opportunity would have more opportunity. Providing knowledge; resource

and other benefit in community would be more righteous in order to enhance quality of life in community.

2) Impact on researcher:

(1) Researcher (especially leader of research project) would know technique of collective working with community as well as know the truth of development;

(2) Researcher had reached his / her own aspiration.

3) Utilizing of people's knowledge in PAR process. In PAR, besides academic knowledge of researcher and developer, people's knowledge were regarding extremely important. People's knowledge was likely to reflect community's potential of development. Learning the truth in community would lead to favorable cognition and benefited to application.

Ramsuit, Pantip. (1997: 83-84) had mentioned benefit of PAR by defining as these following objective.

1) Provide skill on research; academic; training and analyzing problem and information.

2) Develop technology befitting local need of economic and social.

3) Make documents for community such as research report, curriculum training manual, audiovisual aid and other activity plans.

4) Analyze structure of community such as process of communication between individual situation as well as local and outside article.

5) Establish successive organization such as special committee, community/provincial/regional and national network cooperation.

6) From such essence, PAR; therefore, was suitably with methodology development or new innovation. By implementing on authentic condition of each target group, new innovation would be accepted and belongings to participator which effected to continuum practice and development. Apart from obtaining new innovation (by applying PAR), there also generated promotion of collective problem solving, mutually leaning. By this way, promotion of collective practice and learning through authentic condition and life style had enhanced a sense of ownership which would become the critical power to solve the heavier problem and continuum development.

2.6.6 Guideline of PAR for Secondary School Environmental Evaluation

Development on environmental management evaluation by school through PAR system would be achieved by these following practice:

1) Implementation must rely on the belief that all instructor had potential in learning and developing evaluation on methodology of environmental education befitting the quality of education guarantee system;

2) Implementation was based on principle of participation, learning with development by authentic condition, creation mutual value and sense of ownership as well as relying on what school's staff indeed desired;

3) It was necessary to apply each step of PAR appropriately by determining target group clearly, creating acceptance by formulating mutual objective of development, mutual planning; implementation and evaluation on development. It

was necessary to appropriately revise, deliver and leave out so that school would have continuum development.

2.7 Related Research

Related research for this chapter had revised 3 important topics. They were research on curriculum and teaching of environmental education, research on evaluation environmental education and research on self-assessment by arranging as followed.

2.7.1 Research on Curriculum, Management and Teaching of Environmental Education in Scodary School

Chansupat, Jiraporn. (1991) had researched about the development of environment in primary school and high school's curriculum during academic year 1898-1981. The purpose was to study the beginning of development and trend of environmental education by documentary study. The critical findings was the appearance of environmental education in various subjects since educational revolution in 1898. Its development consisted of 3 ages; namely, age of natural education, age of conservative education and age of environmental education. Curriculum of environmental education in primary school and high school were similar in terms of beginning and development by its content would be inserted in various subjects since 1975 onward. Then, selective course and social study were provided. Environmental education management had been developed only process of providing environment but process of training skill on problem solving, process of creating value to confront with authentic condition were still missed. Therefore, environmental education management was not achieving objective of environmental education. Buddakert, Juthatip. (1993) had studied about management on curriculum of social study in terms of environmental education in high school under Department of Elementary Education; Prajuabkirikan. It was an intensive study about curriculum management and was found that school had managed curriculum and teaching very well *but instructor still lacked of teaching skill; knowledge; understanding on content of environmental education; media and source of knowledge. Additionally, it was found that high school had no planning an-evaluation on curriculum management and implementation.* Likewise, Boonprasert, Bandit. (1991) had studied about providing activity on social study to develop awareness on environmental conservation. According to perception of instructor in high school, it was found that social study still lacked of teaching equipment; lacked of attention and cooperation from student; lacked of support from student and executive in construction activity to create awareness on environmental conservation.

Jankana Jarunan. (1993) had researched about condition and problem of teaching on population and environmental course in high school of school district 9. It was done by asking instructor in high school and found that instructor had defined objective to encourage learner had knowledge and understanding on population and environment by providing content befitting with curriculum and

emphasizing on environmental conservation. And, to encourage student working in team by mutual planning and implementing activity strengthen curriculum. Accordingly, executive had enhanced teaching by establishing teaching plan, classroom timetable and conducting a meeting among learner, academic department, chief of a particular course and instructor. Most instructors taught by lecture and provided special project for promoting environment in school. Evaluation was done by an objective test.

Chaiteeranuwatsiri Manee., et al. (1998) had researched and evaluated on participatory action for developing student; family; school and community through the process of environmental education. It was regarded as development on environmental education in school, and community of Ban Pailam school, Banglane district; Nakornpathom had been assigned as target group. Research found that (1) School had problem of environmental education management in school and community which was necessarily to be solved. And, the critical problem was an uncontinuity of activity on environmental education, general environment in school had no facilitated to development of desirable characteristic of environment, lunch was insufficient for student. (2) From evaluation on achievement of environmental education in school and desirable characteristic of learner, it was found that school could fairly manage environmental education and student of Ban Pailom school had desirable characteristic on environment. (3) This implementation had encouraged related person had more knowledge; understanding and participated in environmental education, school had more concretely executed on environmental education as well as instructor could evaluate result of management by authentic situation and all student could participate in activity based on their interest.

Finally, Office of Rung-arun Project (1999); which was the project of developing innovation on environmental education for energy and environmental conservation, had developed curriculum of energy and environmental conservation which contained these following essences (1) Training on curriculum of energy and environmental conservation for primary school and high school which consisted of principle and reason; objective; important characteristic; learning result; scope of content; guideline for conducting activity; educational media; measurement/evaluation and activity supporting learning. (2) Renovation had two levels-school level and grade level. (3) Element of curriculum frame, which regarded as the heart of learning, was learning result; guideline for conducting activity; measurement and evaluation on learning. Instructor applied learning result as teaching plan which included defining learning's objective; selecting content; conducting learning/teaching activity; determining measurement and evaluation methodology. Learning/teaching activity could be conducted at least two types-Multidisciplinary model and inter-disciplinary model. However, measurement and evaluation had to continuum implemented throughout management of learning's experience and multi-methodology so the measurement of learner's behavior would cover all three aspects of learner's development.

2.7.2. Research Output Related to Evaluation on Environmental Education

Office of Rung-arun Project (1999) had developed research on indicator of project success (related to energy and environmental conservation). Indicator was determined for 3 levels-level of activity as 9 groups consisted of 1) Index of curriculum; learning & teaching; media and overall evaluation on activity. 2) Index of training curriculum. 3) Index of administrative management in school. 4) Index of assembly juvenile. 5) Index of activity supported learning of energy and environmental conservation. 6) Index for coordinator office of provincial Rung-arun Project (PCO). 7) Index of school's community relation activity. 8) Index of administrative management on Rung-arun project. 9) Index of Rung-arun project output.

Furthermore, evaluating group of Rung-arun Project had proposed these following recommendations. (1) Searching for built-in evaluation and follow up team should begin as project was initiative developed so that design of activity and other projects consistent to built-in evaluation and follow up activity. They should be strictly and concentrated selecting as well as continuum implementing project until the final. Accordingly, built-in evaluation and following up team both metropolitan and regional must know and understand philosophy of project very well as well as give priority to project, convince to project approach, understand objective of each activity and periodically set up meeting / seminar for summarizing implementation of built-in evaluation and following up team. (2) Report of evaluating team must be systematically organized. And, mechanism should be set up to consider problem or proposal from built-in evaluation and following up team. In addition, design of activity should have time-lag in order that executive could apply suspect information to solve project's problem. And, built-in evaluation and following up team must propose frame of index evaluation to utilize as guideline for evaluating each activity; including tools for data collection. (3) Evaluation report by written was not necessarily to contain a specific elaboration but should concentrate on communication. Specific evaluation should submit to related executive and meeting attendant. If proposal was accepted and edited or practiced pursuing an agreement, the problem situation for target group might be better developed later. (4) Proposal of evaluation. The feeling of practicer that being treated fastidiously, was still existing in Thai society. Friendly proposing of evaluation had been understood that the proposal was for mutually development and being the critical condition of high evaluating acceptance. At the beginning, built-in evaluation and following up team was concentrating on analysis of guideline proposal to make project's principle and methodology being widely accepted as well as concentrating on analysis of activities whether was it sufficiently to encourage project achieving its goal. At the end, the concentration was on proposing mechanism guidance or alternative enhancing project's favor sustenance. For unity of implementation, proposal or recommendation should not be in the form of instruction toward arena officer but it should present to project's executive for considering and further giving orders. There should have a talk imitative in the case that activity, was found during evaluation, would be clearly damaged if there had no suggestion. Proposal of valuation had to aiming at

presenting to organization or project level; which resulting in acceptance of improvement or development, rather than presenting to individual which resulting in self-protection.

Department of General Education (1998) had developed research on criteria of evaluation for searching excellent school relating to maintaining environmental activity. It was found that criteria of evaluation consisted of 1) atmosphere and environment around school. 2) Personnel relationship in school. 3) Maintaining environmental activity in school. 4) Environmental administration in school. 5) Environmental cooperation between school and community.

2.7.3. Research on Self-study and Built-in Evaluation

Wongvanich, Suwimol. (2000:15) had researched and developed built-in evaluation system in school. The objective was to develop built-in evaluation system which having the unity principle considered as assisting planning procedure for further built-in evaluation pursuing an Act of National Education. From research, it was found that most school had no systematical self-study; official staff had not participated in evaluation and output was not applied in administrative planning or developed/improved or managed education as it should be. Research about staff's readiness in built-in evaluation found that 88% of instructor had perceived on educational measurement established by Office of National Education; and more than 95% of instructors were willing to participate in built-in evaluation and be ready to study built-in evaluation. The top three ranked contents which most instructors had been necessarily developed consisted of an interpretation of output. Tools creation and information analysis. Anyhow, group of instructor had recommended to provide training, document or manual of built-in evaluation. Moreover, it was found that about 31% of instructors were worried about this task because they had never experienced in this implementation.

Success of built-in evaluation could be measured by four variables. They were 1) Personnel's understanding on internal evaluation. 2) Team work of personnel in school 3) Opportunity of consecutive and sustainable built-in evaluation. 4) Attempt on utilizing output for developing school. There were five series of factors describing success of built-in evaluation-built-in evaluation system (6 variables) totally 23 variables. This research found that first series of factor was able to describe success 71.9% and when next series of factor was added one by one, degree of success would increase 4.1%, 2.2%, 12.2% and 7.5% respectively. In total, five series of factors (23 variables) were able to describe success 97.8%. Variables which effected to success of school's implementation and having a positive coefficient value was the capability of core factor which being the critical basis of built-in evaluation (.59), personnel characteristic of executive in terms o degree of education (.33) and experience in evaluation of executive (.47). Motivating variable of evaluation by instructor had negative coefficient value (-.36). Qualitative analysis said that devoted executive administered on built-in evaluation and closely followed up an implementing evaluation had extremely effected to success of school's evaluation.

Built-in evaluation system was developed, so-called TEAM-D consisted of 5 sub-systems. They were 1) design of operation plan and evaluation frame system. 2) database and information processing system. 3) detection of evaluation standards system. Anyway, built-in evaluation system developed was the system being adjacent to PDCA cycle and being school-based evaluation (school was the working base). To uplift such implementation, school had to follow principle of TEAM which consisted of 4 criterions. They were team-work, eternity evaluation, awareness on evaluation and systematically monitoring evaluation. These were to achieve 3 aspects of standard objective which was IPO standard consisting of input standard, process standard and output standard.

The most important element of built-in evaluation were preparation and development of personnel, determination school's objective; and standard evaluating criteria, evaluation planning, design of database and information processing, detection of evaluation standards and unity of evaluation and design of evaluation report, especially self-study report, design of operation plan and evaluation frame for developing school's implementation. Hence, school had to design stimulation and follow-up system as well as promotion on implementation to push forward built-in evaluation become successful

From a revised literary work, an essence leading to determined research frame was shown in Figure 6.

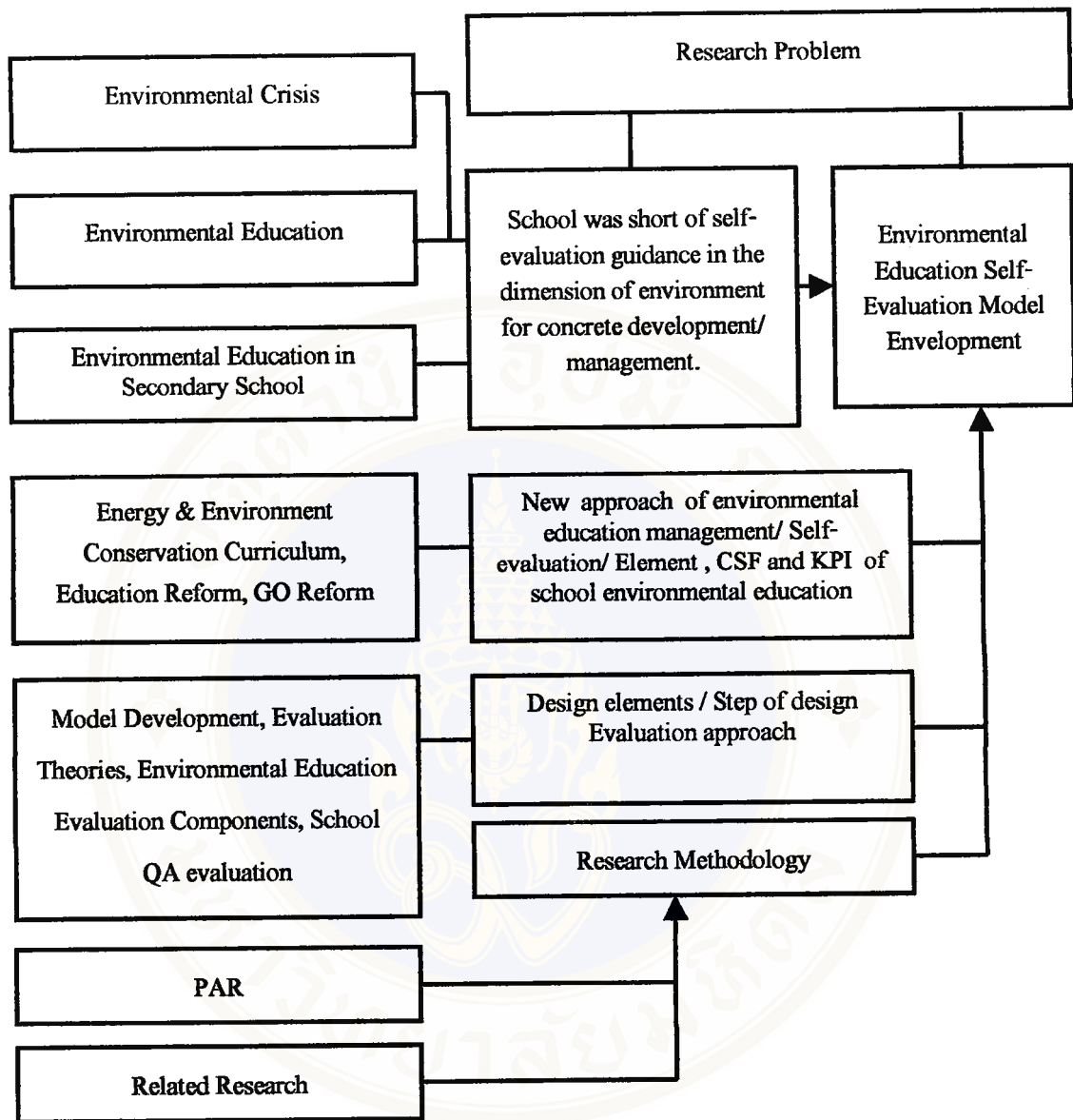


Figure 6. Literacy Work and Source of Research Framework

CHAPTER III

RESEARCH METHODOLOGY

This research aimed to develop a self-evaluation model for secondary school environmental education that had to be developed by the participation and the acceptance of all school personnel and related people. Moreover, the model should be corresponded to the actual situation and be practical for the cooperative schools. Also, this model should be the pattern for all other schools which were in similar environment and being adaptable, suitable and practicable for schools in general. Therefore, the model development should be based on the following research methodology.

3.1 Research design

Research & Development with a combined method was applied: Qualitative design by Participatory Action Research (PAR) was to be used in building evaluative model; Quantitative design was to be used for model verification; validation testing, efficiency evaluation and appropriateness evaluation For the model efficiency evaluation, readiness and competency of school teachers and personnel on evaluation should be evaluated before and after the operation as a pretest-posttest design. Model appropriateness should also be confirmed before dissemination.

3.2 Research process

The research process of the development of secondary school environmental self-evaluation model was processed in 5 stages:

3.2.1 Stage 1: Research Preparation

The research was to get the research and the preparation ready to practice with 4 research activities as the followings:

- 1) Studying and collecting related documents of the research, including the situation of cooperating schools (target schools) on self-evaluation development, the evaluative development, environmental education in secondary schools, the new innovative management of environmental education, participatory action research, the related research and the actual situation of the target schools;

- 2) Preparing research project and cooperative school on self-evaluation development project, including offering research outline and ask for the permission of operating cooperative schools on self-evaluation development of environmental education project;

- 3) Conducting self-learning manual on practical self-evaluation development of environmental education and worksheets;

- 4) Constructing the research tools for the self-evaluation model's test of validation, efficiency evaluation and appropriateness evaluation.

3.2.2 Stage 2: Model Formulation

It was the stage of the participatory action in formulating secondary school self-evaluation on environmental education. PAR was to be used to construct school teachers' awareness, understandings, acceptance and participatory action in stipulating vision, mission and critical success factors (CSF) and key performance indicators (KPI) of environmental education of the cooperative schools by self-evaluation development, comprised of 5 research activities as the followings:

- 1) Selecting 4 secondary schools to be cooperative schools as target schools or participating schools for self-evaluation development on environmental education;
- 2) Forming school teachers' awareness of evaluation development, pointing out the importance of self-evaluation on environmental education of secondary schools;
- 3) Formulating school teachers' awareness of school self-evaluation problems and necessity of evaluative development, together with the school evaluation competency pre-test;
- 4) Participating in self-evaluation development by participating in the revision of vision and mission, defining school's CSF and KPI on environmental education by assigning school personnel to study the manual by themselves in advance and participate in the practice of the assigned tests;
- 5) Defining strategies and self-evaluation procedure.

3.2.3 Stage 3: Model Implementation

It was the stage of determined participatory action in evaluation of the provided procedures. All schools have the participatory action in determining target of environmental education of each KPI and participating in determining data which will be collected from each KPI and determining implementations and participate in evaluation, including analyzing and reporting. In the evaluation, personnel are assigned with their own evaluation which shall be processed in 5 research activities as the followings:

- 1) Determining targets of environmental education of schools in each indicator as the standard for result comparison;
- 2) Determining data which should be checked, evaluated and collected according to the indicators of measurement, including implementing devices in evaluation;
- 3) Compiling and analyzing evaluative data;
- 4) Reporting evaluative results in accordance with the model and its' procedures which were intended for all relevant people and the public to know;
- 5) Informing and knowing the evaluative result for improving the school environmental education in the part of responsibilities of individuals and all departments.

3.2.4 Stage 4: Model Confirmation

It was the stage of participatory action compiling and analysis of evaluative procedures which were the last stage of PAR and could be proceeded in 5 research activities as the followings:

- 1) A synthesis and seminar in the evaluative model in the school level, the procedures and the results of participatory action must be compiled by all schools;
- 2) A synthesis of evaluative pattern in overall perspectives: This stage is a compiled synthesis of participating schools in evaluative development;
- 3) Testing of validity in the context pattern whether it was correlated to the actual participatory actions;
- 4) Assessing self-evaluation model efficiency for secondary school environmental education as the schools' competency evaluation post-test;
- 5) Preparing seminar project of cooperative schools in evaluative development. This project aimed to prepare the model and devices in assessing model appropriateness.

3.2.5 Stage 5: Model Appropriateness Assessing and Reporting

This stage was to present the model of self-evaluation to the experts on environmental education evaluation, including: high level executives, qualified experts, supportive relevant people and school teachers. The seminar could lead to the discussion and the model's appropriateness evaluation among them and as a consequence, to improve the pattern at the last stage before publicizing. There were 5 research activities in this stage:

- 1) Providing the seminar conferences on the project of self-evaluation development of environmental education in cooperative schools. This activity is comprised of setting up the seminar, reporting the outcomes of the project, discussing and evaluating evaluative model. The participants of seminar consist of the high-ranked executives of Ministry of Education, the qualified people in the environmental education, supporters of environmental education and school teachers as operatives who should be divided into group of 35 people, totally 140 people.
- 2) Analyzing evaluative data, for comparing and finding out the correspondences of evaluation among groups in the evaluation list;
- 3) Improving the model, for improving the model, pertaining to evaluative results and notices of the qualified people to have the completed matter, including: the model's name, the purpose of evaluation, the implementation of environmental education in schools which were used to evaluate process and evaluative procedures. Of the application of evaluative results and the evaluative procedures of evaluative results;
- 4) Reporting and publicizing the model;
- 5) Conducting research report and documentation for publicizing research results.

Following these above research procedures, it caused the success in processing, since it should have caused the new research concept, research project, the project of cooperative schools for self-evaluation development and devices in evaluation, the readiness of evaluation of schools and manual, and finally practice are as follows:

Stage 1: School personnel's awareness and needs, schools' vision, mission, critical success factors (CSFs) and key performance indicators (KPIs) of the main results of school environmental education;

Stage 2: School Environmental education's targets and data, evaluative devices, evaluative action, analysis of data and a reporting of evaluative results;

Stage 3: Outlining the model, devices for evaluating model, seminar conference project and the preparation or internal seminar conferences;

Stage 4: The completed pattern of documents, the results of evaluative model and documents of research report;

Stage 5: Research processing and succeeding research procedure in all stages which could be demonstrated in figure 7

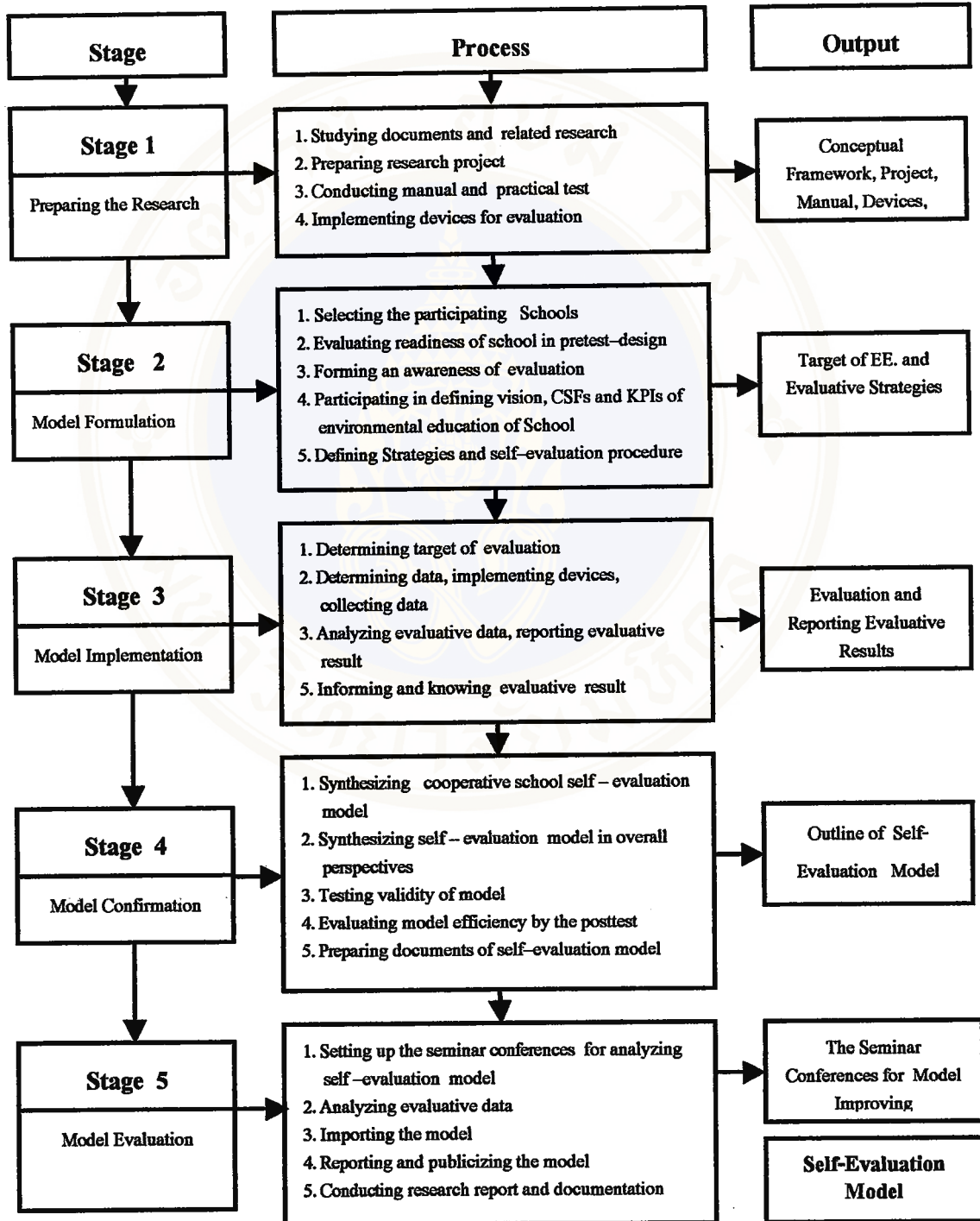


Figure 7. Process and Research Procedure : Developing a Self-evaluation Model

3.3 Research Methodology

3.3.1 Participatory Action Research (PAR)

PAR was the key method to perform participation action in developing evaluative model, as the results, for self-evaluation on environmental education of the secondary schools. It emphasized on actual action in actual situation of cooperative schools, schools' self-reliance, an exact participation of school personnel and relevant people from all school departments. The cooperative schools had to develop and performed self-evaluation on environmental education by the supporting of research cooperator. Furthermore, the research cooperator formulated and developed self-evaluation model from the actual participation action with schools. This research methodology can be determined by following processes:

1) **Population:** The secondary schools under the Department of General Education which provided for Mattayomsuksa 1- Mattayomsuksa 6, totally 1,853 schools.

2) **Sampling:** Selecting the sample of schools in the target group, cooperating in specified evaluative development which were the secondary schools in Bangkok and in boundary with the special characteristics of requirement in intensive encouragement of environmental education and need to be cooperated in the project of cooperative schools for self-evaluation development in an amount of 4 schools together with 510 of school teachers including, executives, teachers and educational personnel, being participated in developing operation.

3) **Research devices:** Devices implemented in the research were as follows:

(1) Manual for self-learning, documents for teachers and educational personnel of cooperative schools to learn by themselves for evaluative development during the participatory development that being manipulated by the researcher with the support of the Innovative Governmental Management Center, Ministry of Education;

(2) The documents of the cooperative development schools project in self-evaluation in environmental education, as participatory action conducting;

(3) Practical worksheets in self-evaluation development on environmental education which were developed and succeeded by researcher.

4) **Research process:** It was operated according to the process of Participatory Action Research in these following 8 stages:

(1) **Determining Target Group:** Selecting 4 samples of cooperative schools for self-evaluation development and sample of personals as the target group, comprising of the executives, educational personnel and educational committee in participating schools in evaluative development, totally 510 people;

(2) **Creating Atmosphere of Acceptance:** Being operated by cooperating in participation in conference of identification, publicizing relevant documents and meeting teachers in the small group;

(3) **Determining Problem and Purpose:** Identified evaluation purpose included evaluative results and school's readiness by the pre-test, participating in SWOT analysis of school environmental education, and participating on determining

schools' vision, mission, critical success factors (CSF) and key performance indicators (KPI) in environmental education;

(4) **Defining Evaluative Plan:** The participatory action in defining target and data which regarded strategies, evaluative plan, devices in evaluation which the people who took responsibility evaluate and identify evaluative plan to relevant people in all department sectors;

(5) **Evaluative Conducting:** To conduct evaluation of the results from environmental education pertaining to plan, devices and the defined time, including analysis presenting and reporting evaluative results;

(6) **Evaluation of Evaluative Results:** The cooperation of evaluating and revising results of evaluative conduct by making the conference of evaluative result review at the school level;

(7) **Constructing the New Findings:** To have the participatory synthesis and check the school – leveled model;

(8) **Presenting the Performance Outcome:** A synthesis of results and combined pattern of all schools by letting representatives of schools take part in criticizing the pattern and presenting the pattern to Schools as participating schools in the evaluative development.

Research procedure in developing model was correlated to the PAR process as could be seen in figure 8.

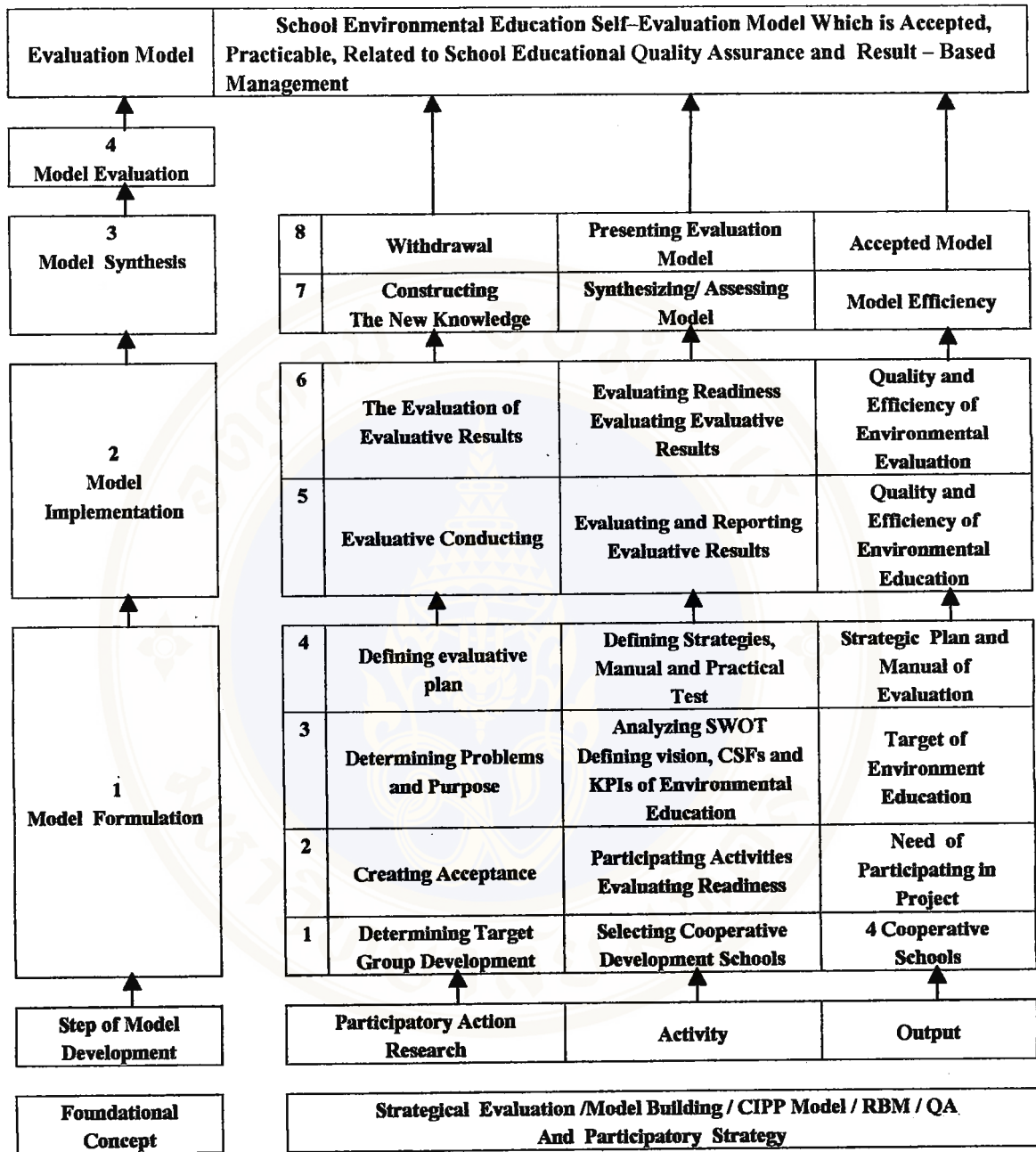


Figure 8. Research Procedures as Related to PAR Process

3.3.2 A Self-evaluation Model Efficiency Evaluation

The evaluation of model efficiency was conducted to evaluate school teachers' capability in evaluating and self-learning on environmental education management of cooperative schools before and after the developing operation. This evaluation was to ensure that the participating schools have improved their capability in evaluating, their self-learning on environmental education management after participating in the self-learning environmental education management development workshop according to PAR process. The research methodologies were as follows:

1) **Objective:** The objectives of this study was to evaluate the capability and the needs in evaluating and self-learning on environmental education of participating schools.

2) **Research Methodology:** This evaluative research, the One-group Pretest-Posttest Design Technique was to be used to evaluate the capability in evaluating and the self-learning on environmental education of the participating schools.

3) **Variables:**

(1) The school teachers' experience in evaluating environmental education;

(2) The teachers' knowledge and understanding in evaluating and environmental education;

(3) The schools' potentials in evaluating environmental education;

(4) The schools' needs in evaluating environmental education.

4) **Population:** The study population were the personnel of the cooperative schools, including schools' directors, teachers, educational personnel and school board members, totally 510 people.

5) **Sampling:** The research used purposive sampling technique in the selection of the key informants. These include 4 school directors, 16 assistant school directors, 40 department heads or their representatives, 20 representatives from academic institutions or relevant personnel (5 people from each school). Totally, the sample group includes 80 people who were appointed members of the School Environmental Education Evaluation Development Board.

6) **Measurement Device:** The measurement device used in this research was the Model Efficiency Evaluation Questionnaire (School Environmental Education Capability Evaluation Questionnaire), developed and based on 4 key factors of successful variables. The questionnaire, therefore, comprised of 2 key devices: (1) Test on knowledge and understanding in environmental education management and evaluation; (2) Rating scale questionnaire, used for evaluating the teachers' participation, the schools' potentials, and the schools' needs in environmental education management and evaluation. The subjects are classified into 5 levels, namely,

- | | | |
|---|---|-------------------------------------|
| 5 | = | Having maximum potentials and needs |
| 4 | = | Having high potentials and needs |
| 3 | = | Having average potentials and needs |
| 2 | = | Having low potentials and needs |
| 1 | = | Having minimum potentials and needs |

The rating criterions were as follows: (Best,1970: 90)

4.50 - 5.00	=	Maximum
3.50 - 4.49	=	High
2.50 - 3.49	=	Average
1.50 - 2.49	=	Low
1.00 - 1.49	=	Minimum

The validity of the measurement device is examined by 3 experts in 3 fields of study, each one from each field. These experts are academics in the fields of environmental education, management, and evaluation. To ensure the reliability of the measurement device, the device was pre-tested with 30 teachers who are not the study group, and draw α coefficient value according to Cronbach's technique (Cronbach, 1974) The α coefficient value was .97

7) **Data Collection:** The needed data was collected by giving out questionnaires to the subjects to evaluate with the researcher waiting to collecting them back. Aside from the questionnaires, the researchers also collect data by interviews, participant observation and field study.

8) **Data Analysis and Statistic Used:** The data was analyzed by SPSS program. As for the open-ended questions, this research uses the content analysis technique, drawing the average (\bar{X}), standard deviation (S.D.), percentage and comparing the schools' potential before and after participation with t-test technique.

9) **Application and Research Report:** The evaluation result before the workshop is used as a part of information in defining the problems in evaluation in PAR process. The evaluation results after the workshop and test is used in the comparison and assurance of the development of the schools' self-evaluation potentials. The research result was reported as a part of the research on self-evaluation model development.

3.3.3 A Self-evaluation Model Validation Testing

Test of model validation was one of model verification. The Content Validation Technique was used for validating the self-evaluation model in model synthesis process. The synthesized model is assessed whether it matched the actual valuation implemented or not. It is assessed by the participants, using the following process:

1) **Objective:** The objective was to validate the content of the secondary school self- evaluation model synthesized from the workshop.

2) **Research Methodology:** The model is validated by checking its Index of Model-Performance Congruence (IC) by letting the participants examine if the model is congruent with the performance.

3) **Variables:** The studied variables were: (1) Objectives of the evaluation; (2) Environmental education standard to be evaluated; (3) Evaluation process and evaluation techniques; (4) Application of evaluation results; (5) Assessment of evaluation results.

4) **Population:** The research population were 4 groups of school personnel who participated in the evaluation model development, including school

directors, teachers, environmental education teachers, and school board members, totally 510 people.

5) **Sampling:** The research applied purposive sampling technique, selecting 4 people from the management, 4 teacher representatives, 4 environmental education teacher representatives, and 4 school board member representatives, totally 16 people.

6) **Measurement Device:** The measurement device used to examine the content validity of the model developed from the model's components and characteristics was the Model Validation Testing Questionnaire. The representatives were asked to score the model according to the following rating system:

+1 The representative was sure that the model components were congruent with the performance.

0 The representative was not sure if the model components were congruent with the performance.

- 1 The representative was sure that the model components was not congruent with the performance.

The research used IC value as a criterion for selecting the model's components. The performance model components had to have IC value equivalent to or over 0.5 The researcher was the one who collected data, gave out the tests, and collected the model validation test.

7) **Data Analysis:** The data collected was analyzed by giving frequency of the opinions collected and examining the IC value of the scores collected based on the following formula:

$$IC = \frac{\sum R}{N}$$

When IC = Index of Model-Performance Congruence

R = Result of accumulated scores of the representatives' opinion

N = Number of the representatives of participants

8) **Application and Research Finding Report:** The results of the assessment of the model validation and evaluation, as well as the report is used as a part of the appraisal model development research.

3.3.4 A Self-evaluation Model Appropriateness Evaluation

In the final process of model development, the model was assessed its practicality and benefits by organizing a seminar among experts and persons related to the assessment of the environmental education in secondary schools. The researcher and the schools which had collaborated in developing the appraisal model presented the result of the project implementation and the evaluation model to the seminar attendants to discuss, share their ideas and evaluate the operational model according to the research procedures below:

1) **Objective:** The objective was to evaluate the appropriateness of secondary school self-evaluation model on environmental education, synthesize opinions and improve the model.

2) **Research Methodology:** The evaluation research method was provided by organizing a seminar among academics and the personnel involved in the school environmental education evaluation, with presentation of the model, followed by discussion, evaluation and model improvement.

3) **Variables:**

(1) Status, gender, education, and experience in environmental education of the evaluators;

(2) The practicality of the model, as well as the objectives, critical success factors, process, implementation process, the assessment of evaluation result and model development process;

(3) The benefits or advantages of the model, and objective definition process, evaluation methods, components of successful model, evaluation process, and the benefits in academic development in schools;

(4) The seminar attendants' opinions towards the model.

4) **Population:** The study population were academics, and personnel involved in the management of environmental education in secondary schools, namely experts in general environmental education, high range executives in the Ministry of Education, representatives of the units in charge of promotion of environmental education in schools and personnel of the cooperative schools participated in the development of the evaluation.

5) **Sampling:** The purposive sampling technique was used in selecting the seminar attendants who are key informants as the representatives. These included 17 executives from the Ministry of Education, 35 experts in environmental education evaluation 42 people who are in charge of the promotion of environmental education in schools, and 40 representatives of the school participated in the development of the self-evaluation model, totally 134 people.

6) **Measurement Device:** The measurement device used in the study was the Self-evaluation Model Appropriateness Evaluation Questionnaire, developed from the components and benefits of the model. This was a rating scale questionnaire, comprising of 4 parts: (1) General Information of the Evaluators; (2) The Practicality of the Model; (3) The Benefits of the Model; and (4) General Opinions of the Evaluators.

The model's practicality and benefits are classified into 5 levels namely;

5	=	Most practical and beneficial
4	=	Very much practical and beneficial
3	=	Moderately practical and beneficial
2	=	Not quite practical and beneficial
1	=	Least practical and beneficial

The criteria for the rating of average value of evaluation result, according to Best's theory (Best, 1970) were as follow:

4.50 - 5.00	=	Most practical and beneficial
3.50 - 4.49	=	Very much practical and beneficial
2.50 - 3.49	=	Moderately practical and beneficial
1.50 - 2.49	=	Not quite practical and beneficial
1.00 - 1.49	=	Least practical and beneficial

7) Data Collection: The data was collected from the discussion on the model in the seminar by giving out the evaluation questionnaires to the seminar attendants to evaluate and collected them back after the end of the seminar.

8) Data Analysis and Statistic Used: The data was analyzed by using the SPSS program to draw the \bar{X} , S.D., Mode, Median and Q.D. The components of the model were selected from the consensus of the four groups. The proper and efficient components had not over 1.50 of Q.D., with the variant between Mode and Median not over 1.00

9) Model Improvement and Research Finding Report: The results of the model discussion and evaluative data were synthesized. The components which did not gain consensus from the four groups would be improved according to the suggestions agreed by over 3 groups. As for the report of the research result, it was disseminated in the form of journal and a research report, which was a part of the evaluation model development research.

The development of self-evaluation model for secondary school environmental education research procedures were shown in figure 9

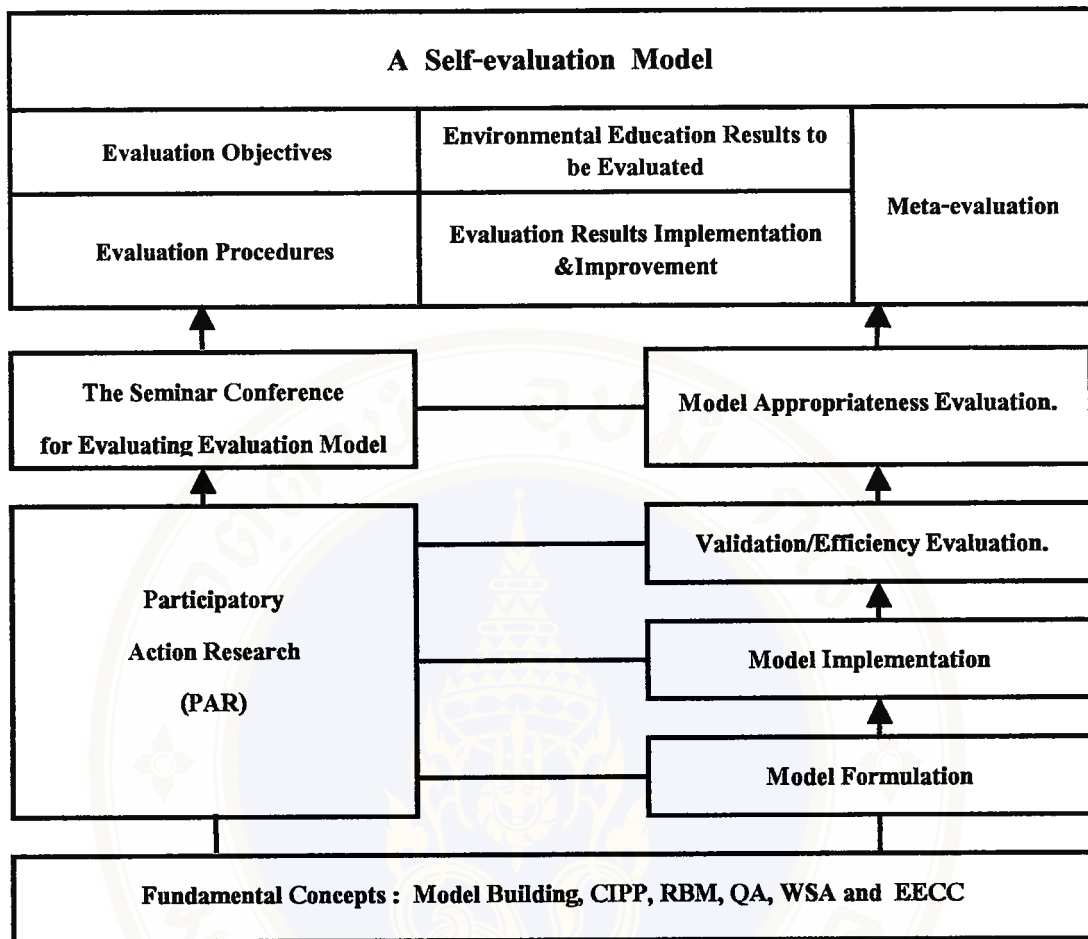


Figure 9. The Development of a Self-evaluation Model for Secondary School Environmental Education: Research Procedures

CHAPTER IV RESEARCH RESULTS

The presentation of the findings will break down into 3 continuous parts: the findings of PAR on model development; the findings of model development spin off and the model of self-evaluation on secondary school environmental education.

4.1 Results of PAR on Model Development

4.1.1 PAR Mission

It was to develop self-evaluation and self-evaluation model on environmental education with PAR processes in the schools who participated in the evaluation development and model synthesis.

4.1.2 PAR Strategies

The strategy was to jointly impious so as to trigger the results based on that of the commitment. The research had chosen 5 means (methods) in jointly implementing. In all, 5 strategies had been adopted namely:

1) **The Cooperating School for Evaluation Development Project Strategy.** It was adopted as the following procedures:

(1) Lodging for project permission and propagation prior to implementation.

(2) Selection of the schools who were willing to join in the development process to participate.

(3) The project was implemented and administered in the same manner as any general project of the schools. The role taken by the researcher was a school consultant.

2) **The Actual Schools Conditions Implementation Strategy.** The procedures stated that:

(1) Jointly implementing the development efforts according to each schools actual conditions.

(2) It was held that problems, needs and choices in solving the problems and implementing the development activities arose from actual problems, needs and implementation of each schools personnel and teachers.

(3) The innovations were checked and new bodies of knowledge were built concretely for each schools personnel and teachers by adopting the pre-test and post-test in the implementation.

3) **The Participation Strategy.** It stated that:

(1) All concerned parties; including administrators, teachers, educational personnel and representatives who were stake holders; had to thoroughly participate in the process.

(2) All concerned parties had to participate in all steps of PAR and in all procedures of the evaluation, i.e. participation in thinking, planning, implementing, evaluating and accepting the evaluation results.

4) The Self-reliance Strategy. It stated that:

(1) The manuals for developing teachers' understanding were provided for them so they were able to study by themselves in advance and the manuals were accompanied with exercises which were required to be used as a framework for evaluation development.

(2) The schools were urged to develop their own self-evaluation in most and all steps of the development.

(3) The personnel were urged to study the innovations and build their own bodies of knowledge.

5) The Participation in the Whole-School Development Strategy.

It stated that:

(1) Identifying the factors of the school environmental education which covered the whole system of the school that included contexts, inputs, processes and achievements of the school's environmental education.

(2) Evaluating the whole system of the school's environmental education organization.

(3) Organizing the evaluation system of the school's environmental education which related to their whole systems.

4.1.3 Results of PAR on School Self-evaluation Development

1) Selection of the Targeted Schools

The schools selected to join the project of environmental education self-evaluation development project; cooperating schools were under the Department of General Education which situated in Bangkok Metropolis and adjacent provinces. They were the following 4 schools:

(1) Wat Makutkasat Secondary School, Bangkok Metropolis;

(2) PPR Ratwittayalai School, Nakorn Pathom Province;

(3) Wat Kemapiraram School, Nonthaburi Province;

(4) Sai Noi School, Nonthaburi Province. Each school has different environmental problems. They voluntarily applied to join the project.

2) Conditions of School Environmental Education Evaluation

All schools had similar conditions of the environment education evaluation which can be summarized as follows:

(1) The learning objectives in environment education as prescribed in the curriculum was not clearly integrated and united as the whole picture to be implemented by the school.

(2) There was no concrete evaluation in environmental education dimensions. Besides, the achievement as a whole could not be assessed.

(3) There was no application of the evaluation result to improve the environment education organizational, systematically and continuously. Besides, there was a lack of standard evaluation tools.

(4) The Personnel lacked confidence in implementation of the new method of evaluation. Beside, the schools lacked responsible personnel. The teachers as well as other educational personnel thought that environmental education was simply an added-up burden. As a result, passed the rather to any assigned teacher.

In addition to the identified problems, the participation in analyzing the environmental situations (SWOT) and the evaluation of the targeted schools' environment education organization had identified strengths, weaknesses opportunities and threats as a whole which are shown in Figure 10.

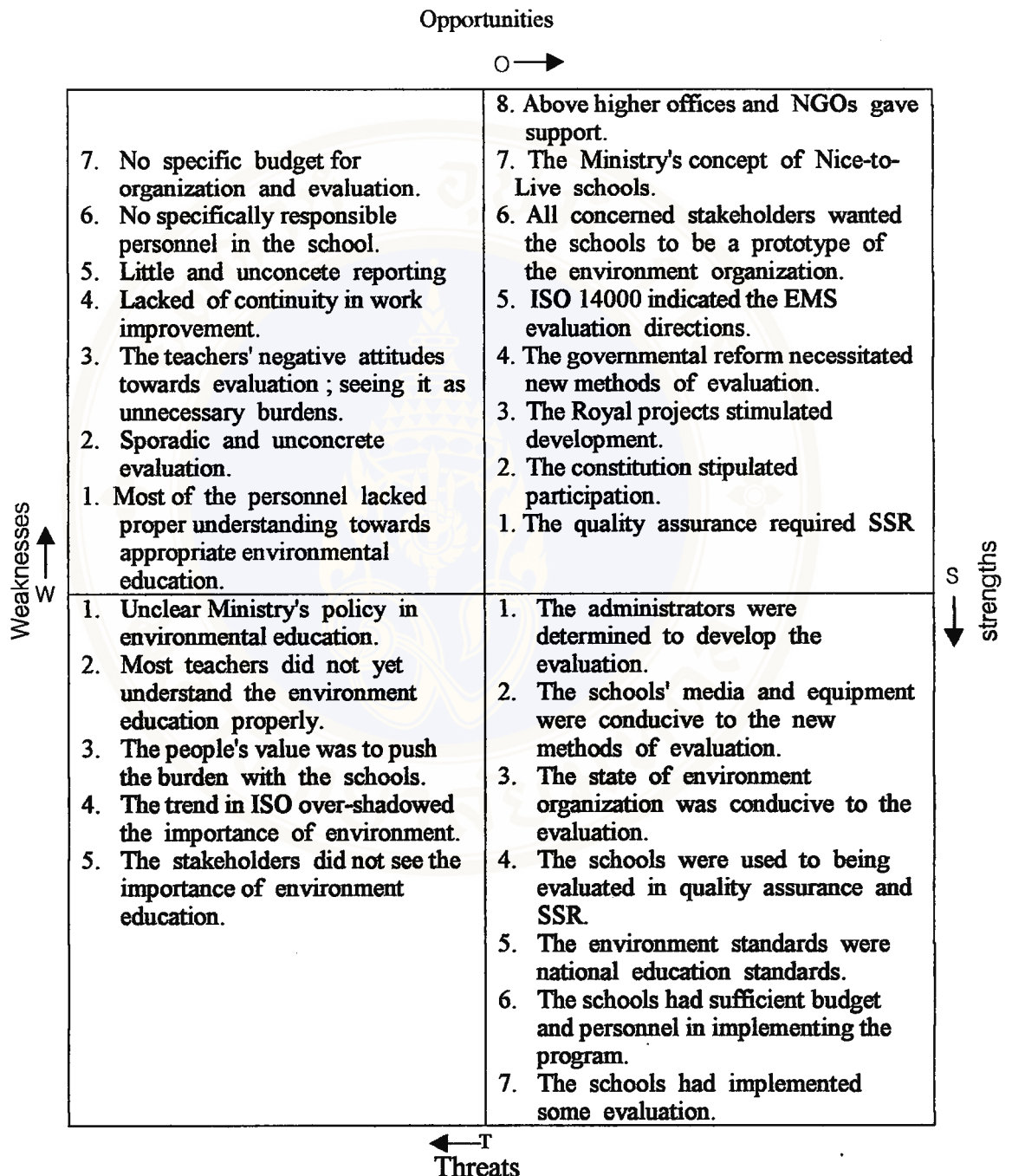


Figure 10. SWOT Analysis on Schools' Environmental Education Evaluation

3) Employing the Strategies in School Self-evaluation

Upon the cooperative school environmental education states which were strengths, weaknesses, opportunities, and threats that have already been mentioned, the school evaluation teamwork had jointly implemented the strategies for each school's self-evaluation in the development of environment education, the 6 major strategies were adopted as follows:

(1) The New Method in Implementation Evaluation Strategy:

It was an active-advancing strategy which was congruent with the new method in implementation evaluation, its major techniques were: *evaluation of the school's environmental education whole system*, its impact to the community (contexts), skills in environment education of the teachers (inputs), management of environmental education and environment in the schools (process), and the desirable characteristics of the learners (product), which was the whole school evaluation (strategy was laid down by O5 + O6 + S1 + S6); *the evaluation objectives were identified at 2 levels*, in order to answer the questions on the achievement as the strategic and operational levels (strategy was laid down by O4 + S1 + S6).

(2) The Environmental Education Quality Assurance Strategy:

It was an evaluation which was based on quality assurance. The techniques were as follows: *organizing the evaluation system so as to make it congruent with the schools quality assurance*, the tasks were self-evaluation and reports of self-valuation together with internal evaluation and external evaluation (strategy was laid down by O1-S4+S5); *developing self-reliance evaluation which was based on actual conditions*, with essentially oriented to actual environmental education and how to implement evaluative results (strategy was laid down by O6+O1+S1+S6).

(3) **The Evaluation Result Joint Admission Strategy:** It was an evaluation which was re-enforced from evaluation by ways of: *re-enforcing the joint evaluators*, praising the evaluation development team and the people who cooperated in the evaluation (strategy was laid down by O6 + S1 + S6); *ensuring the people who were outstanding*, as a wear to re-enforce sustainable development (strategy was laid down by O8 + S1 + S5 + S6).

(4) **The Building Co-axis and Evaluation Network Strategy:** It was a strategy to innovate in correcting the weaknesses in the evaluation of the school's program of environment education by ways of: *adjusting and changing beliefs in environmental education*; by accelerating and building of proper understanding in organizing and evaluating environment education for school personnel, by self-studying from the manuals, and building of co-axis and network of persons in environmental education by having the administrators to be the change agents (strategy was laid down by W1 + S1 + O1); *organizing the teachers of environment education*, by having all the teachers teach environmental education, having the persons responsible as specific leaders who were entitled to specific expenses for the evaluation of environmental education by themselves and having the board of evaluation and budget allocation in the same manner with other school's projects (strategy was laid down by W6 + W7 + S1 + S6); *accelerating the building of terrible attitude to evaluation*, by loving and believing in the importance of evaluation, specifically evaluation of environmental education for development (strategy was laid down by W3 + S1 + S4).

(5) The Evaluation for Development Strategy: It was an innovative strategy by ways of: *organizing the system bringing the evaluation results for development*, by taking the evaluation results to improve and develop the environmental education in the schools continuously and reporting the results of self-evaluation to the concerned people and the public concretely and continuously (strategy was laid down by W4 + W5 + O4 + S2 + S6); *organizing the new method of evaluation*, by accelerating the system, organization and implementation of the environmental education project-based on the new method of evaluation and informing the achievements concretely and continuously, applying the evaluation results to improve the operation which had the impact on development of the school's environmental education (strategy was laid down by W2 + O1 + O4).

(6) The Community Environmental Education Strategy: It was a reactive strategy which operates in 2 essential techniques: *setting up the monitoring and evaluating system of the environmental education of the community*, by cooperating with NGOs to push on clarified policy of the Ministry of Education on environmental education and evaluation (strategy was laid down by S1 + S2 + S6 + T2 + T3 + T4); *using media to foster awareness of the schools and the public*, by building up understanding and conscience in educational evaluation (strategy was laid down by S2 + S6 + T2 + T3 + T5).

4) Identification of Objectives for Self-evaluation

The objectives for self-evaluation were jointly identified as:

(1) To reveal the results of environmental education whether it had reached the strategic goals as a whole of the school and the operational goals in each specific area as set.

(2) To learn of the effectiveness and the efficiency of the school's environmental education organization.

(3) To learn of the achievements of educational efforts in the school's environmental educational dimensions.

(4) To bring about the application of evaluation results in improving and developing the school's environment education continuously.

5) Targets of the Evaluation

The school had its own system and evaluation of environmental education according to the new method of implementation evaluation which was highly elective. It could indicate the achievement of the environmental education both at strategic and operational levels and concretely. The teachers, educational personnel and concerned people participate in all steps of evaluation. The results were recognized and utilized in work improvement continuously which results in graduates and evaluation of environmental education continuously.

6) General Methods in School Evaluation Development

All operative schools had participated in undertaking the evaluation by the following means:

(1) All schools declared their policies of self-evaluation on environmental education as a part of the learning, teaching activities and quality assurance as their major policies.

(2) They set up an evaluation development and environmental education self-evaluation board comprising the administration, deputies, department heads, subject-cluster chiefs, environment education teachers, teacher representatives

and community representatives who were responsible for the implementation of the schools' environment education self-evaluation.

(3) Fostering understanding among the schools participating in the evaluation development project, they were supposed to understand the procedures, evaluation methods and roles in the evaluation by attending the seminars, studying the manuals and concerned documents.

(4) They participate in developing the system and self-evaluation of environment education of each school according to the new method of evaluation, quality assurance and 10 steps of achievement-oriented evaluation, which its details would be discussed later.

(5) Some steps of the evaluation needed to have public hearings in order to gain consensus from the whole school's teachers and the stake-holders. The matters consult critical success factors, key performance indicators at the evaluation development stage; the consensus was sought regarding the tools and evaluation means at the evaluation stage; and in improving the project at the evaluation result application stage.

(6) A seminar was organized every time when an evaluation circle was completed.

(7) A measure was devised to ensure that the evaluation results would be applied by specifically notifying only the organizations who were responsible and they were required to report back the results of such improvements.

(8) The system and model of the environmental education self - evaluation project were organized. A seminar was also organized to gain consensus from all concerned.

(9) Steps of Participation in Self-evaluation Development.

7) Steps of Participation in School Evaluation Development

It provided as the following steps:

(1) **Instruction of Understanding:** At this step, understanding and awareness of importance and necessity of environmental education and evaluation of environmental education were instructed.

(2) **Setting-up of Responsible Board:** The board was to be responsible for the development of the evaluation and evaluation. The members were selected from all parties in the school.

(3) **Identification of Evaluation Factors:** It was carried out in a workshop. The sessions took time to revise visions and commitments, CSF, KPI and goals of environmental education.

(4) **Evaluation:** This step was the beginning of research undertaking. In the sessions, they choose a evaluation methodology, research tools and research methodology.

(5) **Application of the Evaluation Results:** It was the propagation and reporting stage whereas the school took the evaluation information to the public.

(6) **Evaluation of the Evaluation:** This was the last stage of the evaluation. It stressed the propagation of the evaluation information to the public.

The implementation of all the 6 steps were still at the development process. Besides the methodology, the researcher also had wears of academic subject cluster development. The steps in the evaluation development was summarized as in Figure 11 below:

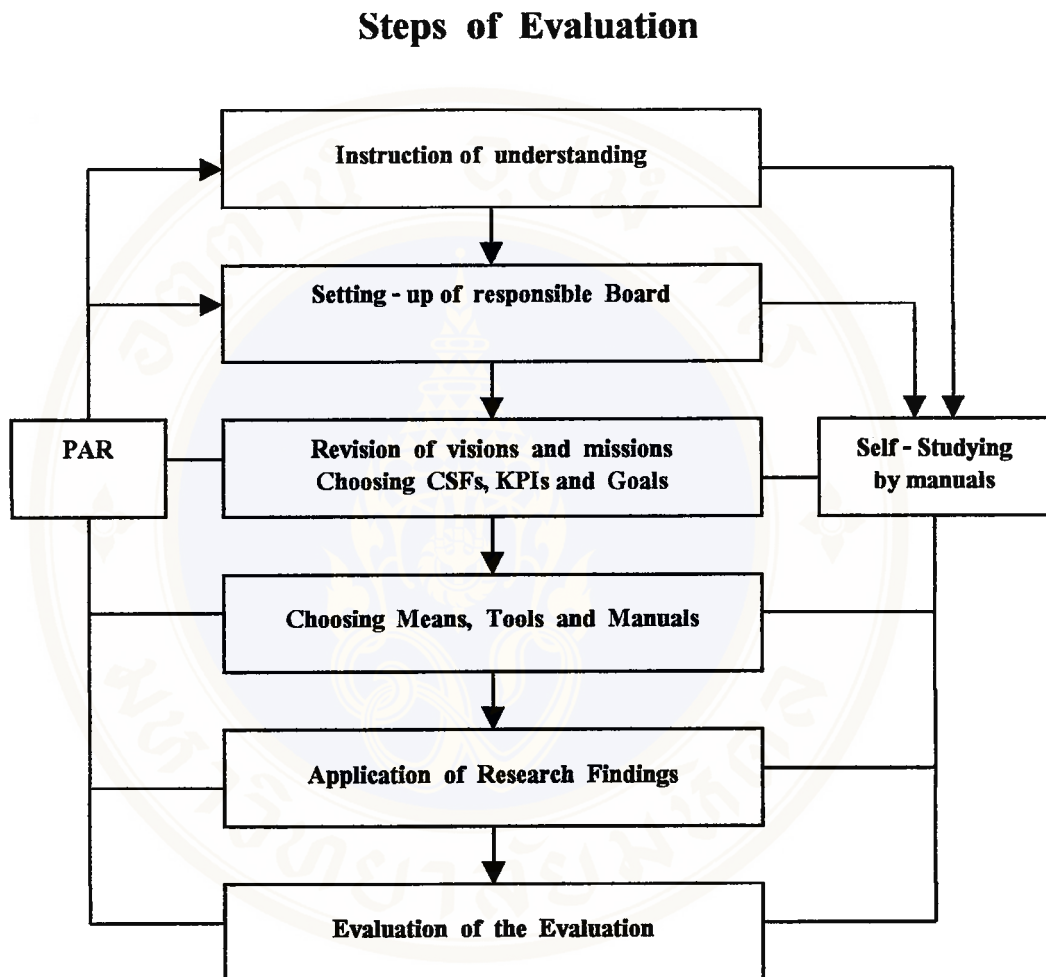


Figure 11. Components and Steps of Evaluation Development

8) Steps of the School's Self-evaluation

Each school undertakes its own environment education evaluation by exercises in the mammal in 10 following stages:

First step: Checking the school's visions of environmental education;

Second step: Checking the school's missions of environmental education;

Third step: Identification the school's critical success factors (CSF) of environmental education;

Fourth step: Identification of key performance indicators (KPI) of environment education;

Fifth step: Identification of targets and standards of environmental education;

Sixth step: Identification of data, means of data collection, tools and evaluation implementation;

Seventh step: Analysis the data and data collation;

Eighth step: Reporting the self – evaluation;

Ninth step: Application for improvement;

Tenth step: Evaluation of the evaluation (meta- evaluation).

9) Implementation Methods of School's Self-evaluation

Each step of the school's self-evaluation schemes had its objectives and methods and important emphasis which are shown in table 3.

Table 3. Objectives and Methods in the Step of School's Self-evaluation scheme

Steps	Objectives	Methods
<p>1 Checking the visions of the school's environmental education</p>	<p>To learn and gain confidence in the targets and directions of the school's environmental education</p>	<ol style="list-style-type: none"> 1. Visions of the school in organizing its environmental education meant the future's possible conditions seen together by its staff who were concerned with the matter. 2. Favorable visions of the school's environment education had to be commonly accepted, clear, possible and challenging. 3. Checking if the school had visions regarding the environmental education. If not, a process to identify them should be device. 4. Analyzing the school's visions to identify its targets or achievements in what manner and how to go about to reach the targets, at what level and what were the principles in jointly organizing the environmental education. 5. The operation as in 2) would identity missions, goals and results, benchmark and values of the school in environment education.

Steps	Objectives	Methods
<p>2 Checking the missions in environmental education.</p>	<p>To learn of the school's missions which have to implement in the organizing of environmental education.</p>	<ol style="list-style-type: none"> 1. The mission was the task which had to be accomplished for results as in vision. 2. The missions in environmental education had to be congruent with the school's visions and major tasks. 3. Checking the perfection of the missions as appeared in the visions. 4. Adding more missions so as to maximize the school's environmental education achievements. 5. Reviewing the common reasons to identity the operational missions.
<p>3 Identification of critical success factors of the school's environmental education.</p>	<p>To identify the critical success factors k of environment education to be evaluated.</p>	<ol style="list-style-type: none"> 1. Critical success factors (CSF) of the school's environment education meant things to be accomplished as the project's targets. 2. Good CSF had to be products and results of the implementation and congruent with the missions and visions, precise, simple to understand, accepted and the school was able to control them. 3. Identification of critical success factors in organizing environmental education (CSF), the school's vision, missions, and objectives of the environmental education. 4. Three levels of operation were identified so as to make them congruent to each other. They were school's strategic or holistic level; mission and operational levels of each subject section.
<p>4 Identification of key performance indicators (KPI) of the school's environment education.</p>	<p>To identify key performance indicators of successes of the school's environment education.</p>	<ol style="list-style-type: none"> 1. Key performance indicators (KPI) meant key indexes used to indicate the success in each critical success factor (CSF) or the most important index in each CSF. 2. Good KPI had to be congruent with CSF; indicated levels of progress ; and successes in operation. 3. Considering the identification of KPI of each CSF in each level. 4. One CSF should not have too many KPI. Normally one CSF has 1 - 2 KPI. Less KPI result in less evaluation missions. 5. KPI of each mission were different. The KPI for environmental education should be used to measure effectiveness, efficiency economy, quality and timeliness of the implementation. 6. Normally, KPI were stated in quantitative terms and indexes such as numbers, ratios, proportions, rates and indexes.
<p>5 Target identification of the school's environment education.</p>	<p>To identify levels of success which are targets are targets of the organization of environment education.</p>	<ol style="list-style-type: none"> 1. A target was a level of success which was the minimum target or standard of the operation. 2. A good target should not be either too low or too high, but should be clear and challenging. 3. Identifying targets of success of the organizing of environment education according to the strategic level index or holistic index of the school or the mission level which broke down into aspects. There was no need to identify the targets at the subject section revel in the case of school-level evaluation.

Steps	Objectives	Methods
<p>6 Data collection of organizing of environment education evaluation</p>	<p>To identify data, data sources, means of data collection for the evaluation and the operation of evaluation according to the identified KPI</p>	<p>4. The identified targets of success had to be a consensus and accepted by all people concerned. 1. The data collection stage was a lever of evaluation by identifying the data which were to be evaluated, data sources, tool construction and evaluation undertaking respectively. 2. Obtaining the data had not to be troublesome or complicated. 3. Identifying the data to be used in KPI as specified. 4. Identifying the data sources which were to be collected and evaluated. 5. Differentiating evaluation means and evaluation manuals. 6. Undertaking to collect, measure and evaluate to get hold of the stated data.</p>
<p>7 Analysis of data in the organizing of environment education</p>	<p>To take the data from item 6 to process as indexes and analyze to yield the answers according to the stated KPI</p>	<p>1. The collected data had to be specific which were necessary for analysis. 2. The processing system had to be simple and easy; the results were concretely shown; and a saver was device for data protection. 3. Comparison of the results had to be done with the stated targets. 4. The data which were collected from checking and evaluation had to be systemized. 5. The data were recorded and processed. 6. The results were analyzed and compared with the stated targets.</p>
<p>8 Reporting the evaluation of the organizing of environment education</p>	<p>To present the analysis results and report them to the people concerned.</p>	<p>1. The presentation format was made to be simple, economical and could perform concrete forms of illustrations. 2. The results were presented to the stake holders and the public.</p>
<p>9 Meta evaluation</p>	<p>To review and evaluate the whole system of evaluation so as to maximize its efficiency.</p>	<p>1. Organizing a seminar to review the evaluation results and checking the result application to develop environment education and improve the evaluation. 2. Using the evaluation form together with the seminar. 3. Reporting the progress of the environment education organization and assessing the self-evaluation scheme.</p>
<p>10 Application of the evaluation results.</p>	<p>To be able to use the evaluation results in improving the organizing of environmental education at its best.</p>	<p>1. Analysis of the evaluation results classified by order of success. 2. Analysis of the causes and responsible units who were notified for conventions. 3. Follow up the application of evaluation results.</p>

4.1.4 Results of School's Self-evaluation Implementation

Results of joint implementation in the organizing of environment education have been holistically for the 4 schools as described below:

1) Reviewing Visions

Working together in reviewing their visions, each school had slightly different essence in of their visions. The vision of each school is listed below:

Wat Makutkasat Secondary School: "Wat Makutkasat school has to be a leader in organizing environment education; integrating it according to the curriculum; management of internal environment; and promoting the development of environmental education in the community by taking that the environmental education organizing is everyone's business so the learners will have desirable characteristics in environment; the school is conducive to be a service center for environmental education of the community"

PPR Ratwittayalai School: "Our college has to be the prototype of environmental education organization at the national level. The college must be nice to be in; the learners have desirable characteristic and satisfied by community"

Wat Kemapirataram: "Wat Kemapirataram School is a nice school to be and work in. It has nice environment which is conducive to organization of the learning; teaching of environmental education."

Sai Noi school: "Sai Noi school must be able to administer and organize the environment up to the international; and be the leader in matters of preservation and development of the environment in the community."

2) Reviewing Missions

Every school had identified new missions in organizing of environmental education in 4 following areas:

- (1) Teaching and organizing of environmental education;
- (2) Management of environmental education;
- (3) Management of the environment within the school;
- (4) Extension of environmental education in the community.

3) Identification of Critical Success Factors (CSFs) of the Environmental Education to be Evaluated

The evaluation committee of every school has chosen 5 critical success factors for strategic results (CSF₁) and 12 critical success factors for operational results (CSF₂). As standards for the evaluation of the environmental education. They are the followings:

CSF₁(1) The students have desirable characteristics in regard to the environment.

CSF₁(2) The teachers have the knowledge and skills in teaching and organizing environmental education.

CSF₁(3) The environmental education management must be a new public management.

CSF₁(4) The schools are nice to be in and able to organize the environment worthy being a "prototype"

CSF₁(5) The schools are the centers in the matter of environment development of the community.

CSF₂(1) The students have appropriate knowledge regarding the environment.

CSF₂(2) The students have proper behaviors regarding the environment and participate in preserving and developing the environment.

CSF₂(3) The teachers have appropriate knowledge and behaviors towards the environment as anyone's "prototypes."

CSF₂(4) The teachers have appropriate knowledge and be able to integrate the subject as the criteria specified.

CSF₂(5) All teachers have enough participation in organizing the schools' environment education.

CSF₂(6) The schools manage environmental education in a new public management; result-based approach.

CSF₂(7) The schools integrate environmental education in the learning / teaching process specified by the curriculum concretely.

CSF₂(8) The schools organize the internal environment in such a way that it is nice to be in and conducive for environment learning.

CSF₂(9) The schools manage the schools' environment as well as being "a prototype" for anyone.

CSF₂(10) The schools serve academic services in preserving and developing the environment for the community.

CSF₂(11) The schools participate in environment preservation and development of the community.

CSF₂(12) The community is satisfied with the schools' organizing of environmental education and community's environment activities.

4) Identification of key performance indicators (KPIs)

The schools have identified the KPIs for evaluation which are congruent with the correspondent 5 CSF₁ and 12 CSF₂.

KPI₁(1) Proportion of the school students who have desirable characteristics towards environment.

KPI₁(2) Proportion of the school teachers and educational personnel who have enough knowledge and participate in environmental education organizing.

KPI₁(3) Percentage of school's success in environmental education management.

KPI₁(4) Percentage of school's success in organizing the environment conditions and the environment management.

KPI₁(5) School satisfaction indexes in joining the community's environment development activities.

KPI₂(1) Proportion of the students who have appropriate knowledge regarding environment as specified by standards.

KPI₂(2) Proportion of the students who have desirable characteristics towards environment.

KPI₂(3) Proportion of the teachers who have desirable knowledge, values and behaviors towards environment.

KPI₂(4) Proportion of the teachers who have knowledge and being participated in organizing environmental education as specified by criteria.

KPI₂(5) Proportion of the teachers who participate in the school environmental education activities.

KPI₂(6) Percentage of school's success in environmental education management.

KPI₂(7) Percentage of school's success in organizing of learning process on environmental education as specified in the curriculum.

KPI₂(8) Percentage of school's success in the school's environment organizing to facilitate the teaching and learning.

KPI₂(9) Percentage of school's success in environmental management.

KPI₂(10) Percentage of school's success in community's environmental education service.

KPI₂(11) Percentage of school's success in the community's environment activities participation.

KPI₂(12) Percentage of stakeholders' satisfaction on school's organizing environmental education and participation the community's environment activities.

5) Identification of Targets

Every school has provided similar targets in organizing environment education as follows:

KPI₁(1) Proportion of the students who have desirable characteristics towards environment = **95 percent.**

KPI₁(2) Proportion of the teachers and educational personnel who have knowledge and participate in environmental education organizing = **100 percent.**

KPI₁(3) Percentage of success in environmental education management = **80 percent.**

KPI₁(4) Percentage of success in organizing the environment conditions and the environment management in the school = **80 percent.**

KPI₁(5) Satisfaction indexes in joining the community's environment development activities = **80 percent.**

KPI₂(1) Proportion of the students who have appropriate knowledge and understanding regarding environment as specified by standards = **90 percent.**

KPI₂(2) Proportion of the students who have desirable characteristics towards environment = **90 percent.**

KPI₂(3) Proportion of the teachers who have desirable knowledge, values and behaviors towards environment = **100 percent.**

KPI₂(4) Proportion of the teachers who have knowledge and understanding and participate in organizing environment education as specified by criteria = **100 percent.**

KPI₂(5) Proportion of the teachers who participate in the organization of environment education = **100 percent.**

KPI₂(6) Percentage of success in environmental education management = **80 percent.**

KPI₂(7) Percentage of success the organizing of environmental education process as specified in the curriculum = **80 percent.**

KPI₂(8) Percentage of success of the school's environment organizing to facilitate the teaching and learning = **80 percent.**

KPI₂(9) Percentage of success of the school's environment management = **80 percent.**

KPI₂(10) Percentage of success of the school's services in environmental education = **80 percent.**

KPI₂(11) Percentage of success of the school's participation in the community's environment activities = **80 percent.**

KPI₂(12) Percentage of stakeholders' satisfaction on school's organizing environmental education and participation the community's environment activities = **80 percent**

6) Identification of Data Evaluation and Means of Data Collection

(1) Data, Source of Data and Data Collection

The aim was to obtain the data to form as key performance indicators (KPIs) according to the cooperative schools had identified. They are presented in table 4.

Table 4. Data Sources and Means of Data Collection According to the Key Performance Indicators (KPIs)

Key Performance Indicators		Employed Data	Data Source	Means or Data Collection
KPI ₁	KPI ₂			
(1)	(1)	D ₁ Number of students who passed the environment-oriented subjects.	Students' File L/U.	Survey
		D ₂ Number of students who passed environment fundamental criteria	Exam. Results	Exams.
		D ₃ Number of students having appropriate environmental behaviors	Assess. Results	Evaluation
		D ₄ Number of students participating in the environment preservation and development	Survey Results	Survey
		D ₅ Arrearage score of students' test in knowledge and understanding on environment	Exam. Results	Exams.
		D ₆ Arrearage score of students' level of Awareness in environment preservation and development	Assess. Results	Evaluation
		D ₇ Arrearage score of students' level of participation in environment preservation and development	Assess. Results	Evaluation

Key Performance Indicators		Employed Data	Data Source	Means or Data Collection
KPI ₁	KPI ₂			
(2)	(3)	D ₈ Number of teaches who have basic knowledge in environment as specified by criteria.	Assess. Results	Exams.
		D ₉ Number of teachers who have proper values towards environment	Survey Results	Survey
(3)	(4)	D ₁₀ Number of teachers who have appropriate knowledge and understanding towards environment education		
		D ₁₁ Number of teachers who organize learning activities and participate in environment organization activities.	Survey Results	Survey
		D ₁₂ Average score of success level evaluation in organization and participation of the teachers of environment education	Assess. Results	Evaluation
(3)	(6)	D ₁₃ Average score of or the evaluation the school's plan of environment education preparation	Assess. Results	Evaluation
		D ₁₄ Average score of the evaluation of timing and implementation of CSFs, KPIs and standards of environment education organization.	Assess. Results	Evaluation
		D ₁₅ Average score of the new mental of environmental education evaluation.	Assess. Results	Evaluation
		D ₁₆ Average score of the integration of environment education in the curriculum evaluation.	Assess. Results	Survey
		D ₁₇ Average score of success level Evaluation of the school's organization of environment education.	Assess. Results	Evaluation
(4)	(8)	D ₁₈ Average score of success level evaluation or the school's organization of its environment.	Assess. Results	Evaluation
		D ₁₉ Average score of organization the school to be nice to be in evaluation.	Assess. Results	Evaluation
(4)	(9)	D ₂₀ Average score of the school's environment management evaluation.	Assess. Results	Evaluation
		D ₂₁ Average score of environment Management to facilitate environmental education evaluation.	Assess. Results	Evaluation
		D ₂₂ Average score of academic service sin environment to the community evaluation.	Assess. Results	Evaluation
(5)	(10)			

Key Performance Indicators		Employed Data	Data Source	Means or Data Collection
KPI ₁	KPI ₂			
	(11)	D ₂₃ Average score of participation in environment activities in the school's community evaluation.	Assess. Results	Evaluation
		D ₂₄ Average score of the community's satisfaction in the school's participation in organizing environment education and activities.	Assess. Results	Evaluation
		D ₂₅ The teachers' and community's levels of expectation in academic services and the school's participation in environment activities.	Survey Results	Survey

Assess. = Assessment, Exams. = Examination

(2) Evaluation Tools / Data collection

In order to obtain data in evaluation. They had participated in identifying scopes of critical success factors and tools used in the evaluation. They also checked the quality of the tools by trying them with Bang Yai School's students, Nonthaburi Province. Each tool has undergone trailed with 30 students. They are:

- SE 1: Evaluation Data Recording & Checking Form;
- SE 2/1: Environmental Characteristics Evaluation Form for Lower-Secondary School students (Degree of difficulty = .65 and $\alpha = .76$);
- SE 2/2: Environmental Characteristics Evaluation Form for Upper-Secondary School students (Degree of difficulty = .45 and $\alpha = .87$);
- SE 3: Knowledge and Participation in Environmental Education Evaluation Form for Teachers (Degree of difficulty = .50, $\alpha = .84$);
- SE 4: School Environmental Education Management Evaluation Form ($\alpha = .95$);
- SE 5: School Environment Management & Organizing Evaluation Form ($\alpha = .85$);
- SE 6: Schools' Extension of Environmental Education in the Community Evaluation Form ($\alpha = .76$);
- SE 7: School Environmental Education Self-evaluation Evaluation Form ($\alpha = .79$);

(3) Evaluation Data Report Tools

In order to report the evaluation data systematically, continuously and favorably, assisting the administration, they had thus jointly identified the data report form and the people responsible to the report as follows:

- SER 1: Student and Student's Learning Results Report Form;
- SER 2: Environment Characteristics of Students Report Form;
- SER 3: Knowledge, Behaviors and Participation in Organizing Environmental Education of Teachers Report form;

SER 4: Evaluation Data of Environment Education Management Report Form;

SER 5: Evaluation Data of School Environment management & Organizing Report Form;

SER 6: Evaluation Data of the School's Environmental Education extension in the Community Report Form;

SER 7: Meta - Evaluation Data Report Form;

7) Data Analysis

Employing SPSS/PC program for the computation, the formularies for computation are identified in Table 7; whereas:

KPI = Key Performance Indicators

KPI₁ = Strategic Results KPI

KPI₂ = Operational Results KPI

KPI(1) = Indicator (number)

D = Data

D₁ = Data at list order

Table 5. Key Performance Indicators, Target and Means of Computation

Order of KPIs	Key Performance Indicators (KPIs)	Targets	Means of Computation (%)
KPI1 (1)	<i>Proportion of students who have desirable environmental characteristics</i>	90%	$\frac{D_1 + D_2 + D_3 + D_4}{4 D} \times 100$
KPI2 (1)	Proportion of students who have knowledge savageness and behavior in environmental as specified by criteria	90%	$\frac{D_1 + D_2 + D_3 + D_4}{4 D} \times 100$
KPI2 (2)	Levels of students' knowledge, understanding and awareness	70%	$\frac{D_5 + 4D_6 + 4D_7 \dots}{\text{Sum of total scores of 3 Areas}} \times 100$
KPI1 (2)	<i>Proportion of teachers who have knowledge and skills environmental education as specified by criteria</i>	100%	$\frac{D_8 + D_9 + D_{10} + D_{11}}{4 DD} \times 100$
KPI2 (3)	Proportion of Teachers who have desirable knowledge, values and behaviors in environment.	100%	$\frac{D_8 + D_9}{2 D} \times 100$
KPI2 (4)	Proportion of Teachers who have knowledge. Understanding and participation in organizing environment education as specified by criteria	100%	$\frac{D_{10} + D_{11}}{2 DD} \times 100$
KPI2 (5)	Level of success in organizing learning / Teaching and participating the environment education activities of teachers.	70%	$\frac{D_{12}}{5} \times 100$
KPI1 (3)	<i>Level of schools' success of new method of environmental education management.</i>	80%	$\frac{D_{13} + D_{14} + D_{15} + D_{16} + D_{17}}{25} \times 100$
KPI2 (6)	Level of success of achievement - oriented environmental education organization administration.	80%	$\frac{D_{13} + D_{14} + D_{15}}{15} \times 100$
KPI2 (7)	Level of success of learning / Teaching and activities of environment education organization	80%	$\frac{D_{16} + D_{17}}{4D} \times 100$

Order of KPIs	Key Performance Indicators (KPIs)	Targets	Means of Computation (%)
<i>KPI1 (4)</i>	<i>Level of school success on environment management for environmental education</i>	80%	$\frac{D18 + D19 + D20 + D21}{20} \times 100$
KPI2 (8)	Level of success of the school's environment management	80%	$\frac{D18 + D15 + D20}{15} \times 100$
KPI2 (9)	Level of success of environment management to facilitate environment education	80%	$\frac{D21}{5} \times 100$
<i>KPI1 (5)</i>	<i>Success indicators of environment education service management for the community</i>	80%	$\frac{D25}{5} \times 100$
KP2 (10)	Success level of environment education services for the community	80%	$\frac{D22 + D23 + D24}{15} \times 100$
KP2 (11)	Success level of participation in the school's and community's environment preservation in the community	80%	$\frac{D22}{5} \times 100$
KP2 (12)	Percentage of stakeholders' satisfaction on school's organizing environmental education and participation the community's environment activities	80%	$\frac{D24}{5} \times 100$

8) Self-evaluation Reporting

After the data were analyzed by comparing with the identified targets, the school reported its must at least report in the 3 manners:

- (1) Initial reports to the administrator.;
- (2) Reports to the concerned organizations.;
- (3) Reports to the stake - holders and the public.

As in (1), the school reported the initial data to the administrator whereas in (2) the school presented its self - evaluation report (SER), and in (3) it reported in any form of media which was appropriate.

Working together in evaluation, each school had holistic and operation results of the evaluation as follows:

PPR Ratwittayalai School's Environmental Education Success Strategic Results

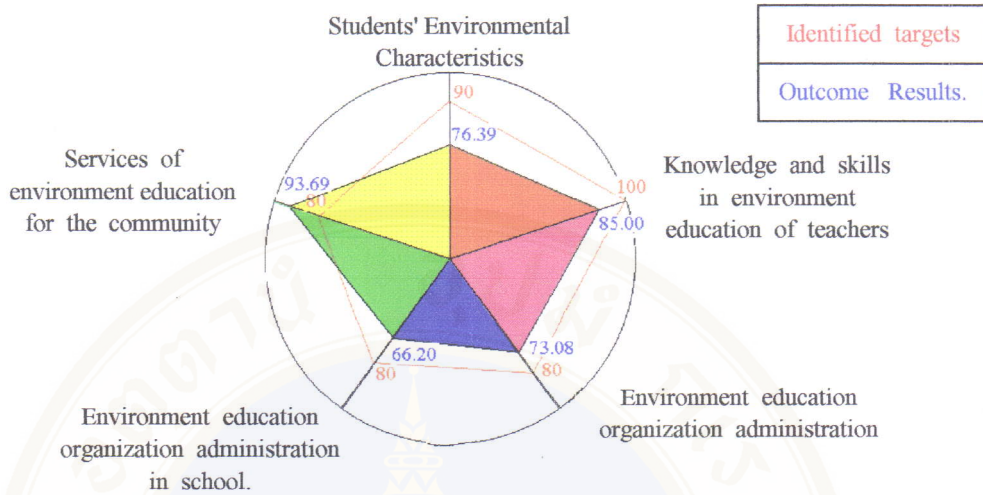
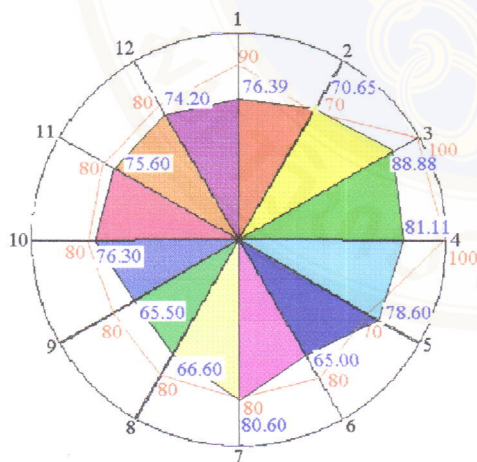


Figure 12 PPR Ratwittayalai School's Environmental Education Success.(Strategic Results)

Operational Results



- 1 = Students have desirable environmental characteristics.
- 2 = Students' awareness and participation in environment preservation.
- 3 = Teachers have desirable knowledge, values and behaviors in environment
- 4 = Teachers have knowledge and participate in or organizing environment education as specified by criteria.
- 5 = Teachers' teaching and participation in the environment education activities.
- 6 = Administration of environment education organization
- 7 = Teaching and activity organization of environment education..
- 8 = Administration of environment education organization.
- 9 = Organization of environment for environment education organization.
- 10 = Administration of environment education in the community.
- 11 = School's and community's participation in the environment activities.
- 12 = School's and community's expectation in organizing environment education.

Figure 13. PPR Ratwittayalai School's Environmental Education Success. (Operational Results)

Wat Makutkasat Secondary school's Environmental Education Success Strategic Results

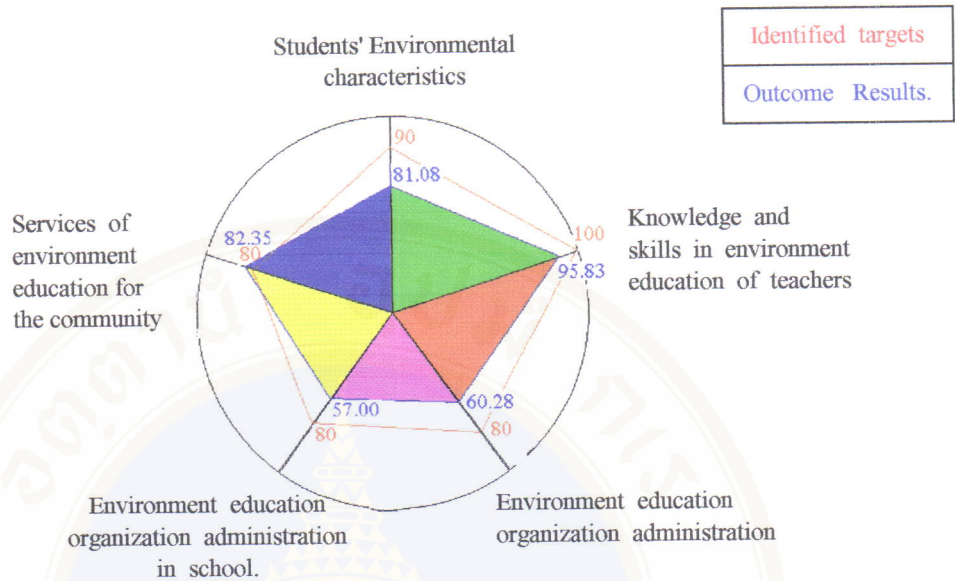


Figure 14. Wat Makutkasat Secondary School's Environmental Education Success. (Strategic Results)

Operational Results

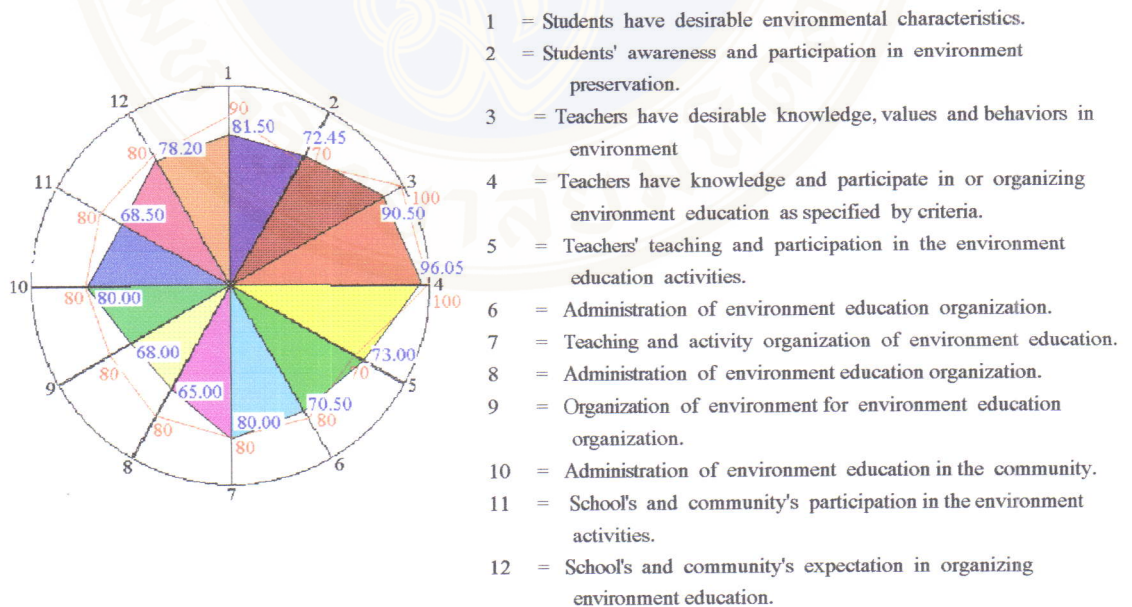


Figure 15. Wat Makutkasat Secondary School's Environmental Education success. (Operational Results)

Wat Kemampirataram School's Environmental Education Success Strategic Results

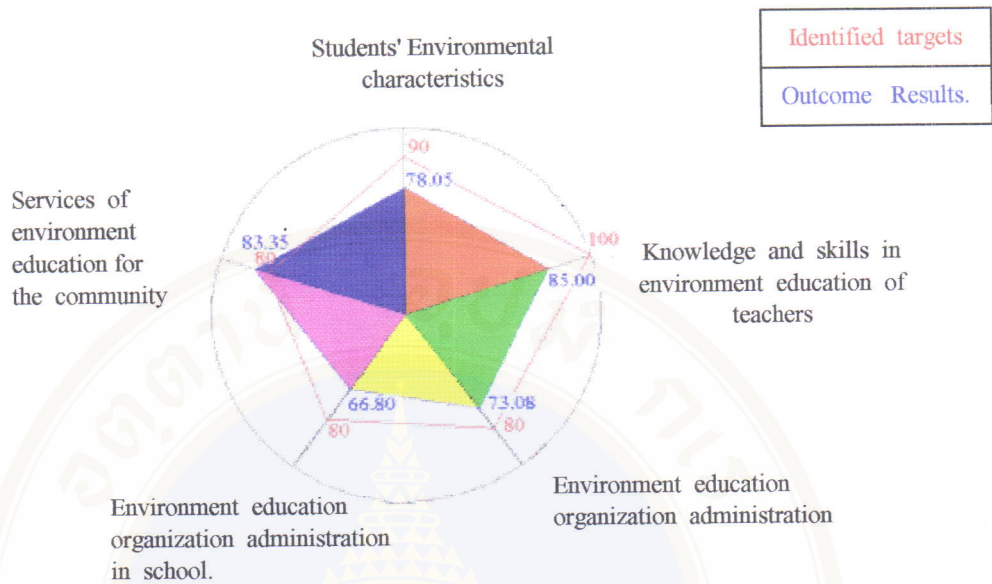


Figure 16. Wat Kemampirataram School's Environmental Education Success (Strategic Results)

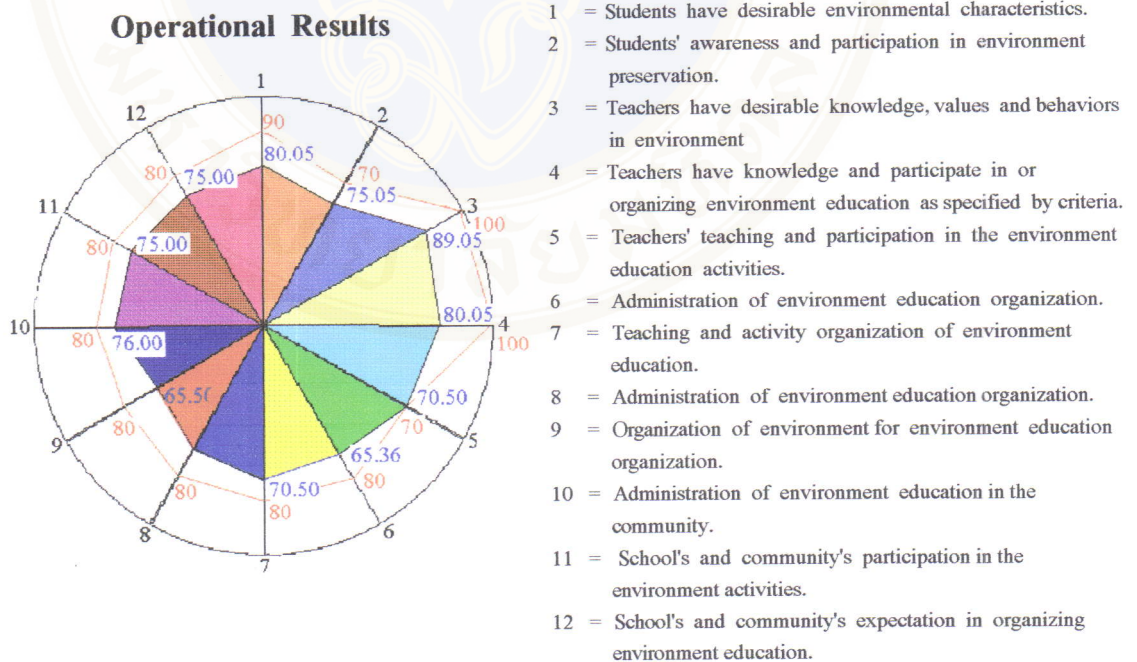


Figure 17. Wat Kemampirataram School' Environmental Education Success. (Operational Results)

Sai Noi School's Environmental Education Success Strategic Results

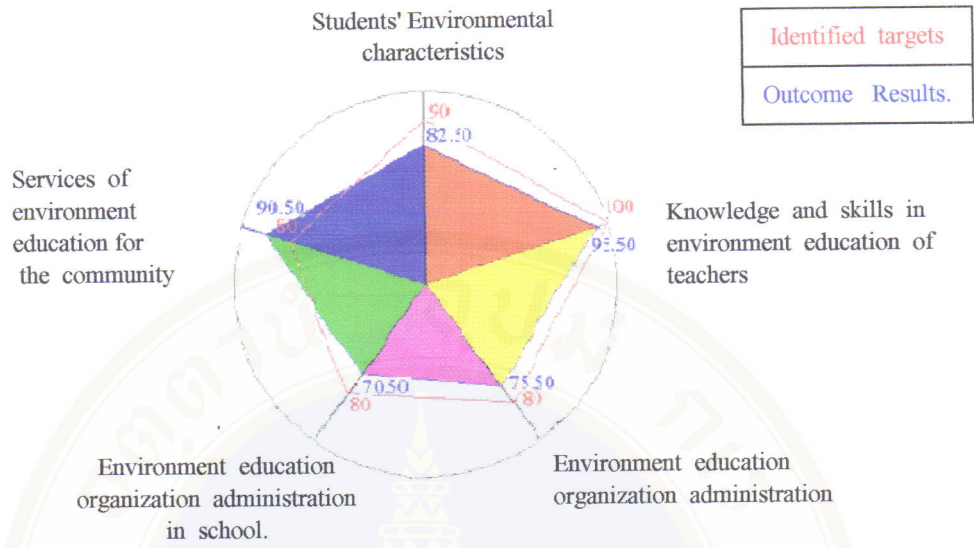
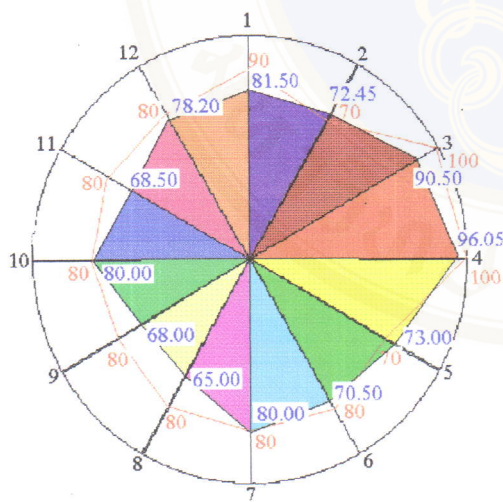


Figure 18. Sai Noi School's Environmental Education Success. (Strategic Results)

Operational Results



- 1 = Students have desirable environmental characteristics.
- 2 = Students' awareness and participation in environment preservation.
- 3 = Teachers have desirable knowledge, values and behaviors in environment
- 4 = Teachers have knowledge and participate in or organizing environment education as specified by criteria.
- 5 = Teachers' teaching and participation in the environment education activities.
- 6 = Administration of environment education organization.
- 7 = Teaching and activity organization of environment education.
- 8 = Administration of environment education organization.
- 9 = Organization of environment for environment education organization.
- 10 = Administration of environment education in the community.
- 11 = School's and community's participation in the environment activities.
- 12 = School's and community's expectation in organizing environment education.

Figure 19. Sai Noi School's Environmental Education Success. (Operational Results)

The presentations in other manners are carried out in the same way as that of PPR Ratwittayalai School as follows:

PPR Ratwittayalai School’s Holistic Environmental Education Successes (Strategic Results)

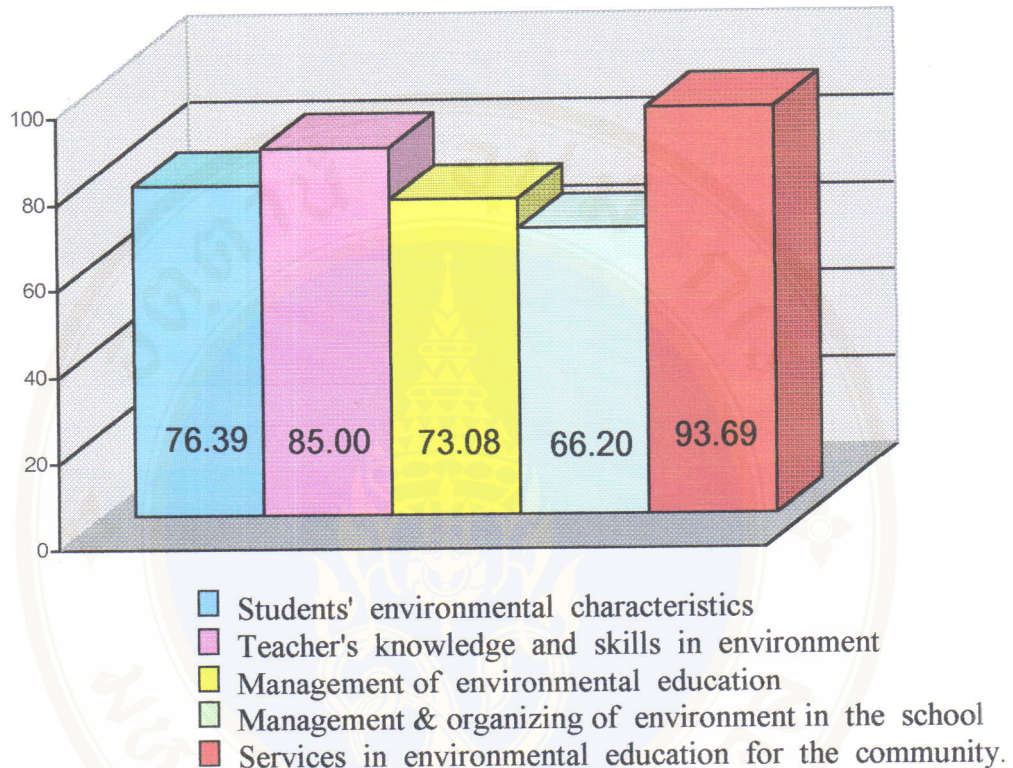


Figure 20. PPR Ratwittayalai School’s Environmental Education Success.(Strategic Results-Histogram)

Table showing successes of environmental education of PPR Ratwittayalai School, classified by mission.

Table 6. PPR Ratwittayalai School’s Environmental Education Success

Mission	Percentage
1. Students' environmental characteristics	76.39
2. School's knowledge and skills in environment	85.00
3. Administration of environment education organization	73.08
4. Administration of environment education in the school	66.20
5. Services in environment education for the community.	93.69

The bar graph below illustrates the environment organization of PPR Ratwittayalai School's classified by critical success factors (CSFs)

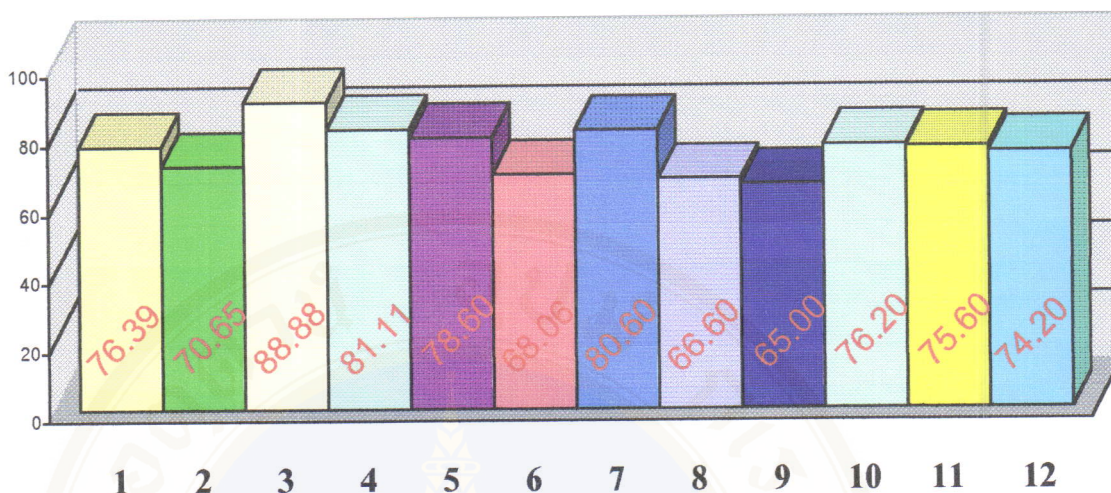


Figure 21. PPR Ratwittayalai School's Environmental Education Success. (Operational Results-Histogram)

The table below intestates the successes in environment organization of PPR. Ratwittayalai School, classified by critical success factors (CSFs)

Table 7. PPR Ratwittayalai School's Environmental Education Success.(Operational Results)

No	Critical Success Factors (CSFs)	Percentage
1	Students have desirable environmental characteristics	76.39
2	Students have knowledge, awareness and participation in environmental preservation.	73.65
3	Teachers have desirable knowledge , values and behaviors towards environmental.	88.88
4	Teachers have know ledge and participate in environmental organization as specified by criteria	81.11
5	Teachers' teaching and participation in environmental activities.	78.60
6	Environmental education organization administration	68.06
7	Teaching and activity organization of environmental education.	80.60
8	Environmental education organization administration	66.60
9	Environment management to facilitate environmental education.	65.00
10	Environmental administration in the community	76.20
11	Participation in environmental activities of school and community.	76.60
12	School's and community's expectation in organizing environmental education.	74.20

(Example of data recording in SE 1 Form)

self-evaluation

SE 1

Self - Evaluation Data Recording and Data Checking Form
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PPR Ratwittayalai School

NOTE : This SE 1 Form is an evaluation data recording form. It is to make the data easy for checking and analysis, it is advisable that head of working group record this form and the form should be endorsed by director of the school, or a person designed by him / her, to approve the data before recording them in a computer.

Data details						Data Code	Informants
1. No. of the students					129	D	Registration section
No. of students, classified by classes							
Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12		
30	30	22	32	30	29		
2. No. of teachers and ed. Personnel					45	DD	Registration section
No. of teachers, classified by subject clusters							
Thai	5	Social	5	Works	5		
Math	5	Studies Health Ed.	5	Foreign	5		
Science	5	Arts	5	Others	5		
3. No. of students who passed environment content subjects					179	D1	Registration section
No. of students who passed, classified by classes.							
Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12		
30	30	22	32	30	29		
4. No. of students who passed basic environ. Test					110	D2	Dept. Head
No. of students who passed basic environ. Test, classified by classes.							
Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12		
15	19	16	24	22	14		
5. No. of students who have desirable environmental behaviors.					140	D3	Dept. Head
No. of students who have desirable environ. Behaviors, classified by classes.							
Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12		
28	16	16	30	27	23		

Data details						Data Code	Informants
6. No. of students participated in environ. Conservation and development activities.					118	D4	Dept. Head
No. of students who participated in environ. Consecution and development activities classified by classes							
Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12		
23	19	18	17	21	20		
7. Average score of students' basic environment.					10.8	D5	Dept. Head
Average score of the students, classified by classes.							
Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12		
11	10	10	11	10	13		
8. Average score of students' environment. Behaviors					4.00	D6	Dept. Head
Average scores of the students, classified by classes.							
Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12		
4.18	3.94	3.91	3.91	3.92	4.18		
9. Average score k of students' participation in environment preservation and development					3.89	D7	Dept. Head
Average scores of the students, classified by classes							
Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12		
3.85	3.77	3.92	3.95	3.91	3.94		
10. No of teachers who basic knowledge in environment as specified by criteria					38	D8	Section/ subject cluster Heads
No. of the teachers who have the knowledge, classified by subject clusters							
Thai	4	Social Studies	5	Works	3		
Math	4	Health Education	4	Foreign	5		
Science	4	Arts	4	Others	5		
11. No. of teachers who have appropriate values towards environment as specified by criteria					42	D9	Section/ subject cluster heads
No. of the teachers who have app. Values classified by subject clusters							
Thai	4	Social Studies	4	Works	4		
Math	4	Health Education	5	Foreign	4		
Science	5	Arts	5	Others	4		

Data details						Data Code	Informants	
12. No. of teachers who have knowledge and understanding toward basics of environ. Education organization as specified by criteria						36	D10	Section/ subject cluster heads
No. of the teachers who have knowledge and understanding classified by subject clusters								
Thai	4	Social Studies	4	Works	4			
Math	4	Health Education	4	Foreign	4			
Science	4	Arts	4	Others	4			
13. No. of teachers who organize learning activities and participate in organizing environ .ed .activities as specified by criteria						37	D11	Section/ subject cluster heads
No. of the teachers mentioned above, classified by subject clusters								
Thai	3	Social Studies	5	Works	4			
Math	4	Health Education	4	Foreign	3			
Science	5	Arts	4	Others	5			
14. Average score of success evaluation in organizing learning activities and participating in environ. Education activities as specified by criteria						3.93	D12	Section/ subject cluster heads
No. of the teachers who have the knowledge, classified by subject clusters								
Thai	3.94	Social Studies	4.18	Works	3.82			
Math	3.81	Health Education	4.18	Foreign	3.77			
Science	3.92	Arts	3.91	Others	3.91			
15. Average score of evaluation results in preparing and implementing the school's environ ed. Plan.						3.91	D13	Academic Head.
16. Average score of evaluation results in identifying CSFs and KPIs in environ ed. Organization						3.25	D14	Academic Head.
17. Average score of evaluation results in new method of environ ed. Organization						3.05	D15	Academic Head.
18. Average score of evaluation results in integrating environ ed. Of the organization						3.81	D16	Academic Head.
19. Average score of success evaluation in school's organization of environ ed. Activities						4.25	D17	Academic Head.

Data details		Data Code	Informants
20. Average score of evaluation in the administration of environment as the prototype	2.66	D18	Services Head.
21. Average score of evaluation of the administration of environment as the prototype	3.51	D19	Academic Head.
22. Average score of the school's evaluation on "being nice to be in"	3.82	D20	Academic Head.
23. Average score of evaluation on environment organization and to facilitate environment education	3.25	D21	Academic Head.
24. Average score on evaluation of academia services in environment education in the community	3.81	D22	Head of Evaluation Team
25. Average score of evaluation in participation of environment activities in the community of the school.	3.78	D23	Academic Head.
26. Average score of evaluation in satisfaction of environment ed. Organization and participation of environment activities in the community of the school.	71	D24	Services Head.
27. Average score of evaluation in the teachers' and community's expectation in environment education organization and participation in the school's environment activities.	4.02	D25	Services Head.

Signed *somsak Hasitpanichkool* in approving the data
(Mr. Somsak Hasitpanichkool)
 Title Assistant Director of PPR. Royal College
 Date the data recorded : 26 Feb. 2002

9) Application of the Evaluation Results

The data obtained from SER 1 - SER 7 and from either evaluation forms, lower than expected, will be reported to the administrators who will in turn inform the responsible persons to connect the situations. The data report for improvement are conveyed by different report forms.

10) Meta-evaluation

The evaluation of evaluation for self-evaluation according to SE 7 in this scheme, all concerned person will be asked to participate and report the results by using SER 7. The holistic results are presented in table 8.

Table 8 Mean Scores (\bar{X}) and Standard Deviations (S.D.) of the Meta-evaluation of the Cooperative school

Evaluation Items	Wat Makut		PPR		Wat Kema		Sai Noi	
	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.
1. Clearness and suitability of the evaluation's objective setting	3.55	1.05	.80	1.00	4.00	.80	3.80	1.05
2. The evaluation results indicate the holistic success of school environmental education	4.25	.79	4.32	.70	4.29	.71	4.24	.80
3. The evaluation results can be used for improving the environmental education	4.28	.78	4.26	.72	4.29	.78	4.18	.74
4. The evaluation results indicate concrete success in organizing the environmental education	3.26	.92	4.29	.71	4.20	.59	4.14	.60
5. The evaluation steps are clear and easy to follow.	4.14	.67	4.21	.62	4.21	.66	3.95	.67
6. The personate participate thoroughly	3.95	.67	4.0	.67	4.24	.39	4.15	.50
7. Key factors for evaluation and the indicators are clear.	4.29	.71	4.20	.59	4.14	.60	4.14	.67
8. The evaluation tools are easy to handle and flexible.	4.21	.62	4.21	.66	3.95	.36	4.00	.67
9. The evaluation is congruent with the quality assurance.	3.97	.82	3.87	.81	3.96	.82	3.84	.75
10. Self-evaluation is part of the administration.	3.95	.85	3.96	.79	3.88	.80	3.88	.77
11. The report means is easy and concrete.	3.83	.72	3.78	.78	4.02	.80	4.15	.88
12. It gives the holistic picture of environment education.	3.97	.78	3.92	.76	4.00	.67	4.20	.59
13. It builds up competency in self-evaluation for the personnel.	4.29	.59	4.14	.60	4.28	.78	4.25	.79
14. It elevates academic potentials for the teachers .	3.36	.78	4.12	.62	4.29	.78	4.24	.80
15. It builds an ever - lasting continuity in the evaluation of environment education organization.	4.30	.78	4.12	.62	4.29	.78	4.24	.80
Total	4.00	.75	4.09	.84	4.13	.69	4.03	.59

The participation in development of self-evaluation of the 4 Schools in 10 steps has obtained the cooperation from the schools' administrators, schools' board members of self-evaluation development and concerned people. The schools themselves have access to means in operating self-evaluation in the environment dimensions which they can apply it in quality assurance endeavors and in the schools' evaluation for after purposes. The holistic picture of the operation is presented in Figure 22.

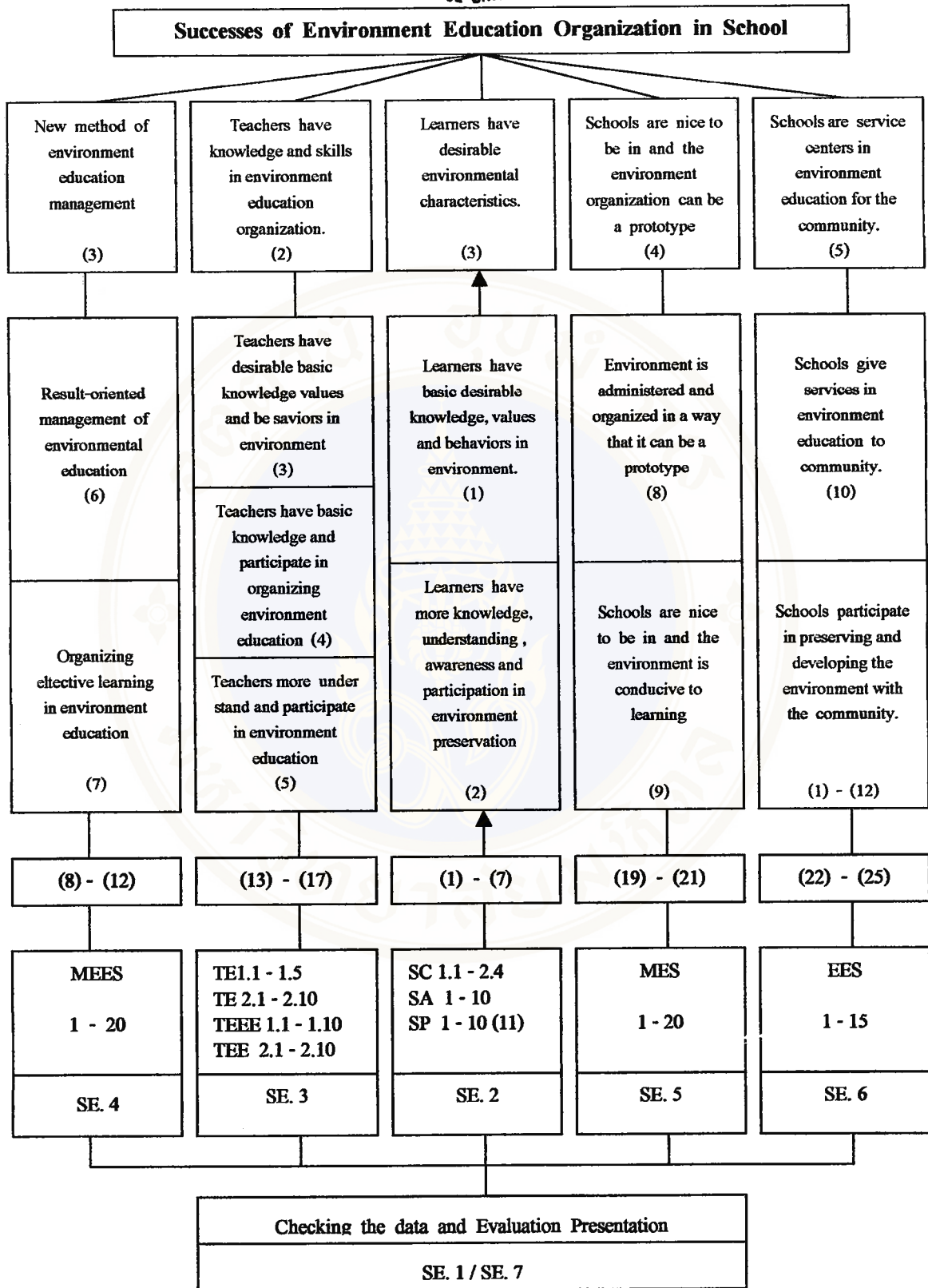


Figure 22. Successes and Self-evaluation of Secondary School's Environment Education: A Result of Participatory Action Research.

NOTE :

<i>CSF₁</i>	=	<i>Strategic level critical success factors.</i>
<i>CSF₂</i>	=	<i>Operational level critical success factors.</i>
<i>Data</i>	=	<i>Data which are to collected for evaluation in and ordinal scale</i>
<i>Measured constituent</i>	=	<i>Scope of success of each CSF which is to be measured under the detail of CSF.</i>
<i>Tool</i>	=	<i>An evaluation form in this self-evaluation. The details are returned to in 6)</i>

4.2 Results of Model Verification

4.2.1 A Self-evaluation Model Efficiency Evaluation (school competency in evaluation development and participation)

1) The Evaluation of Teachers' Experiences and Participation in Environmental Education

Upon assessing the teachers' and educational staff's participation and experiences in organizing environmental education by themselves, it is found that, after participating in the self-evaluation development of environment education, the teachers and educational personnel gain more experiences and in all experiences which are evaluated as shown in table 9.

Table 9. Mean Scores (\bar{X}) and Standard Deviations (S.D.) of the Teachers' and Educational Personnel's Participation and Experience in Evaluation; before and after the Activities.

Evaluation Items (self - Evaluation Activities)	Pre-test		Post-test	
	\bar{X}	S.D.	\bar{X}	S.D.
1. Identification of visions in environmental education of the school	2.75	1.13	3.97	.82
2. Organizing of strategic plans and operational plans in developing the school's environmental education	2.75	1.08	3.87	.81
3. Identification of missions or tasks in organizing in the school's environmental education	2.75	1.08	3.96	.82
4. Identification of critical success factors (CSFs) of the school's organizing of environmental education	2.67	1.19	3.84	.75
5. Identification of standards of school's environmental education	2.70	.92	3.95	.75
6. Identification of objectives of school's environmental education	2.75	1.02	3.96	.79
7. Identification of objectives regarding environmental education in the subject you teach so as to make it congruent to the school's objectives of environmental education	2.55	1.06	3.88	.80
8. Identification of key performance indicators (KPIs) of the school's objectives of environmental education.	2.45	.99	3.88	.77
9. Identification of KPIs of environmental education in the subject you are responsible for	2.49	.96	3.76	.71
10. Identification of minimum performance criteria of target of school's environmental education	2.51	.87	3.70	.69

Evaluation Items (self - Evaluation Activities)	Pre-test		Post-test	
	\bar{X}	S.D.	\bar{X}	S.D.
11. Choosing self-evaluation methods by oneself	2.58	.97	3.82	.72
12. Identification of data and data sources of environmental education which are to be evaluated	2.53	.96	3.78	.78
13. Preparation of evaluation tools and manuals of environmental education of the school	2.53	.96	3.78	.78
14. Evaluation of environmental education in school	2.62	1.05	3.88	.73
15. School's environmental education evaluation result processing	2.61	.97	3.89	.72
16. Annual presentation and reporting of evaluation and results of environmental education	2.61	.97	3.89	.72
17. Annual seminars to present evaluation and results of environmental education	2.64	1.04	3.92	.76
18. Development or use of computer programs for data processing and reporting the school's environmental education	2.41	1.09	3.74	.81
19. Evaluation and reporting environmental education organized in your responsible subject (s).	2.18	1.07	3.79	.79
20. Comparison of environmental education evaluation of school level with subject section level.	2.50	1.08	3.97	.78
Average Total Scores	2.57	0.90	3.85	0.59

It is found in Table 9 that the average score of participation holistically has increased from 2.57 to 3.85 after the joint activity. It shows that the teachers has participated more in environmental education evaluation after the activity ($X = 2.52$ to $X = 3.85$). It is also found that the scores have increased in all aspects after the activities, i.e. the teachers participate more in all aspects. It has increased the most in the vision identification activity. Comparing the evaluation results of the school and subject section levels, the mean scores of the areas environmental education mission identification, environmental education objective identification, standard of environmental education identification, after the activities are 3.97, 3.97, 3.96 and 3.95 respectively. The activities that teachers participate the least are the use of computer programs in data processing, the environmental education objective identification, organizing seminars to present the results of environmental education organizing, the success of environmental education indicator identification and preparations of manuals and tools in the school's self-evaluation on environmental education. The mean scores are 3.62, 3.70, 3.74, 3.76 and 3.78 respectively.

2) The Evaluation on School Teachers' Knowledge Regarding the Self-evaluation on Environmental Education

The evaluation results of such an activity indicates that after the activity the teachers have more knowledge and understanding in such matters. The percentage of the respondents who obtained the right answers increases from 44.0 to 65.2 as illustrated in table 10.

Table 10. Number and Percentages of the Teachers Who Got More Knowledge and Understanding in Self-evaluation on Environmental Education in Pre-test and Post-test

Contents of Knowledge and Understanding	Pre-test		Post-test	
	No - of Right Answers	Percentage	No - of Right Answers	Percentage
1. Vision of environmental education	62	81.6	76	100
2. Strategic planning	52	68.4	75	98.7
3. How to analysis SWOT	54	71.1	75	98.7
4. Operational plans	17	22.4	18	23.7
5. Objective identification	13	17.1	29	38.2
6. Results-oriented budgeting	56	73.7	75	98.7
7. New method of management	15	19.7	34	44.7
8. Environment education standard identification	58	76.3	75	98.7
9. The relationships between RBM and environmental education management	16	21.1	51	67.1
10. Result-based management	55	72.4	75	98.7
11. Steps of new approaches in performance evaluation	56	73.7	76	100
12. Key performance indicator identification	58	76.3	75	98.7
13. Self-evaluation	19	25.0	38	50.0
14. The evaluation in basic education curriculum	60	78.9	76	100
15. Steps of school self-evaluation	9	11.8	24	31.6
16. Strategic evaluation	59	72.6	76	100
17. Critical success factors of school's environment education	3	3.9	3	3.9
18. Causes of environmental crisis.	4	5.3	15	19.7
19. The management of environmental education	1	1.3	15	19.7
20. Self-evaluation on environmental Education	3	3.9	10	13.1
Average Total scores	33.5	44.0	49.5	65.2

From table 10, it is found that the percentage of right answers has increased from 44.0, before the activities, to 65.2, after the activities. It indicates that after the practical sessions, the teachers have gained more knowledge and understanding in the self-evaluation of environmental education organization. The areas which they gain the most knowledge and understanding are visions identification, steps of new approaches in evaluation and the evaluation in basic education curriculum. The respondents score 100 percent right answers in the 3 areas.

3) The School's Readiness Evaluation in Environmental Education Self-evaluation

Upon evaluating the schools' readiness in environmental education organizing self-evaluation, it is found that the schools have more readiness after participating the activity i.e. the average score (\bar{X}) has increased from 3.26 to 4.27 as shown in table 11 below:

Table 11. Average Scores (\bar{X}) and Standard Deviations (S.D.) of the Schools' Readiness before and after the Participation Activities

Readiness Item Preparation in self-evaluation of Schools Environment Education	Pre-test		Post-test	
	\bar{X}	S.D.	\bar{X}	S.D.
1. The school identifies its visions in environmental education clearly	3.34	1.22	4.25	.82
2. The school identifies its strategic plan and operational plan in environmental education clearly	3.25	.88	4.32	.79
3. The school identifies key performance factors, standard's and critical performance indicators clearly in advance	3.25	.94	4.32	.70
4. Key performance factors and critical performance indicators of the school are congruent each other at both school and subject levels	3.17	.96	4.29	.71
5. The school identifies data, data sources and tools for checking and evaluation clearly	3.36	1.21	4.24	.80
6. The school particularly, prepares processing programs for the school's environmental education	3.20	1.11	4.28	.78
7. The school provides checking and evaluation of environmental education organization at both school and subject cluster levels systematically and continuously,	3.12	.88	4.26	.72
8. The teachers, educational personnel and concerned people participate in identifying visions, plans and evaluation of the school's environmental education	3.29	.98	4.29	.78
9. The school organizes self-evaluation report (SAR) in environmental education to enable the stakeholders to know and use the results to improve the organization continuously	3.22	.96	4.18	.74
10. The school provides continuous propagation results of environmental education	3.37	1.06	4.29	.76
Average Total Scores	3.26	0.92	4.27	0.65

From table 11, it is found that the average score in readiness of the school has increased from 3.26 to 4.27, after participating the activity. It shows that the school is more ready in its self-evaluation of the environmental education, i.e. from moderate level (3.26) to a high level (4.27). Besides, when considering the school's readiness in each item, it is found that, after participating the activity, the school is more ready in all aspects. That is, the school is most ready in the areas of identifying strategic and operational plans in environmental education; and in identifying key performance factors (standards) of the school's environmental education ($\bar{X} = 4.32$). All the other aspects are at high levels ($\bar{X} > 3.50$).

4) The School Needs and Securing Assistance in Evaluation on Environmental Education Evaluation

The results reveal that before participating the activity the schools needs the assistance in self-evaluation at a high level. However, after the activity participation, the schools feel less to have the assistance. The results are shown in table 12.

Table 12 . Average Scores (\bar{X}) and Standard Deviations (S.D.) of School Needs on Environmental Education Evaluation; before and after the Participation

Needs Items	Pre-test		Post-test	
	\bar{X}	S.D.	\bar{X}	S.D.
1. The joint identification of visions and values for environmental education of the schools	4.29	.71	2.76	.54
2. Identification of strategic plans for the schools' environmental education	4.20	.59	2.64	.53
3. Identification of critical success factors (CSFs) and key performance indicators (KPIs) of the schools' environmental education	4.14	.60	2.62	.59
4. Preparation of tools to check and evaluate results of environmental education	4.14	.67	2.61	.61
5. Identification of processing programs for the evaluation of the schools' environmental education	4.21	.62	2.61	.61
6. Preparation of self-evaluation results in the schools' environment education	4.21	.66	2.71	.63
7. Identification CSFs and KPIs of subject-cluster and subject levels to made them congruent with that of the school.	3.95	.67	2.71	.59
8. New methods of evaluation	4.00	.59	2.83	.62
9. Development of evaluation of environmental education standards for school level	4.24	.59	2.83	.62
Average Total Scores	4.15	.50	2.69	.46

From table 12, it is found that average score in needs evaluation for assistance of the schools in the operation of self-evaluation of environmental education has decreased from 4.15, in the pre-test, to 2.69, in the post-test. It indicates in a way that the schools less want assistance after they have participated in the activity or they have more readiness after such participation. In addition, the assistance needed has decreased in all items, and decreased from high to moderate in all items.

6) The Comparison of Average Scores of School's Competency on Self-evaluation before and after Participating the Activity

Comparing the schools' competency in that domain reveals that the schools' competency in self-evaluation on environmental education before and after participating the activity is statistically different, at .01 level of significance, as shown in table 13.

Table 13. Comparison of Average Scores of Competency Evaluation in Self-evaluation of the Schools, before (pre-test) and after (post-test) Participating the Activity

Competency Items	Pre-test		Post-test		t-value
	\bar{X}	S.D.	\bar{X}	S.D.	
1. Experiences and participation in the evaluation of environmental education	2.57	.90	3.85	.59	20.277**
2. Knowledge and understanding regarding the evaluation of environmental education	8.82	2.59	12.57	1.78	11.835**
3. Readiness in self-evaluation of the school	3.25	.91	4.27	.64	16.551**
4. Assistance needed in self-evaluation	4.15	.50	2.69	.45	20.286**

P = .01

From table 13, reveals that average score assessing the participation in self-evaluation of the teachers before participating the activity is 2.57 and after the participation is 3.85 they show a significantly statistical difference at .01 level. The average score in assessing the knowledge and understanding has increased from 8.82 to 12.57 which has a significantly statistical difference at .01 level. The average score of the schools' readiness in self-evaluation has increased from 3.25 to 4.27 which indicates a significantly statistical difference at .01 level. The average score in assistance needed has decreased from 4.15 to 2.69. It also indicates a significantly statistical difference at .01 level. The average score after the participation of the activity is higher than that of before participation. The average score in knowledge and understanding in self-evaluation is post-test is higher than the pre-test. The average score of the schools' readiness evaluation post-test is higher than the pre-test. However, the average score in assistance needed of the schools' post-test is lower than that of the pre-test.

4.2.2 A Self-evaluation Model Validation Testing

The checking is carried out to test the content validity of the model by finding the congruence index of the model in the real practice. It is found that the synthetic model has the contents which are congruent with real operations of PAR. The total congruence indices (IC) are .76 as shown in table 14.

Table 14. Congruence Indices of the Model-Performance of Self-evaluation Model for the Secondary School's Environmental Education

Order of checking persons	Model's objectives	KPI Assessed	Evaluation Steps and Methods	Application of Evaluation Results	Meta-evaluation
1	+1	+1	+1	0	0
2	+1	+1	+1	0	0
3	+1	+1	+1	+1	0
4	0	+1	+1	0	+1
5	0	+1	+1	0	+1
6	0	+1	+1	+1	+1
7	+1	+1	+1	+1	+1
8	+1	0	+1	-1	+1
9	+1	0	+1	+1	-1
10	+1	0	+1	+1	+1
11	+1	+1	+1	+1	+1
12	+1	+1	+1	+1	0
13	+1	+1	+1	+1	0
14	+1	+1	+1	+1	+1
15	+1	+1	+1	+1	+1
16	+1	+1	+1	+1	+1
ΣX	13	13	16	10	9
IC	.81	.81	1.0	.62	.56

Total IC = .76

From table 14, it is found that IC of every components of the model is higher than .50 Thus, it can be regarded that all components are synthesized from real implementation in developing self-evaluation of the schools' environment education organization. The components, steps and the method of evaluation are most congruent with the real implementation; their IC = 1.0 Second in the order is the components in identifying objectives and successes to be evaluated; their IC = .81 The components in meta-evaluation are the least congruent; their IC = .56

4.2.3 A Self-evaluation Model Appropriateness Evaluation

1) **General information of the model's assessors.** The total number of people participating in the critique sessions is 110. Every person criticizes, gives suggestions regarding the model and the questionnaires returned are 86 which accounts for 78 percent. 60.46 percent of the assessors are male; most of them own master's degrees (73.25 %); have more than 10 years in environmental education experience (82.55%); and have extended the environmental education organization in schools (32.55). The details are shown in table 15.

Table 15. Number and Percentage of the Model Critiques, Classified by Status

Status	Number	Percentage
1. Sex		
Male	52	60.46
Female	34	39.54
2. Educational Backgrounds		
Bachelor's Degree	8	9.30
Master's Degree	63	73.25
3. Environmental Education Backgrounds		
● Less than 5 years	10	11.62
● 5 - 10 years	5	5.81
● more than 10 years	71	82.55
4. Assessing the modal status		
● High - Ranking Administrators in MOE	15	17.44
● Experts in Environmental Education	25	29.06
● Schools' Extension officers for Environmental Education	28	32.55
● Teachers Responsible for Environmental Education organization	18	20.93

2) Total Results of the Model Appropriateness Evaluation; Classified by Groups of Critiques

From the critique seminar for the model appropriateness evaluation as a meta-evaluation of the self-evaluation model on environmental education of secondary schools, the 4 groups of critiques see that the model is suitable and feasible. They also point out that the model is most useful to the development of environmental education organizing in schools. The average score of the evaluation is 4.64 as shown in Table 16.

Table 16. Average Scores (\bar{X}) and Standard Deviation (S.D.) of the Model's Appropriateness Evaluation.

The Critique Groups	Evaluation Results		
	\bar{X}	S.D.	Levels
1. High-ranking administrators in MOE	4.76	.42	Most
2. Experts in environmental education	4.69	.57	Most
3. Schools' promotion officers for environment education	4.52	.69	Most
4. Teachers responsible for environment education evaluation development	4.68	.38	Most
Total	4.64	.59	Most

From table 16 shows that the average score of the model appropriateness evaluation is at the most suitable level ($X = 4.64$). It indicates holistically that the critiques view its model and hustlers as the most satisfactory. When considered in each group, it appears that the high-ranking administrators from the Ministry of Education, the experts in environmental education, the school's extension officers and the teachers responsible for the evaluation development for environment program have given the average scores as 4.76, 4.69, 4.52, and 4.68

respectively. It demonstrates that every group sees that the model is suitable and useful at highest levels.

3) Results of the Model Appropriateness Evaluation, Classified by their Components and Critical Success Factors of the Model

The critiques see that the critical success factors of each component are appropriate at the highest level ($\bar{X} = 4.58$). The 4 groups of critiques have congruent opinions. The difference between the mode and median is holistically .34 and the quartile deviation (Q.D.) is .31. They are congruent as specified criteria and shown in table 17.

Table 17 Means (\bar{X}), and Standard Deviation (S.D.), the Differences of Model and Median and Quartile Deviation of Model's Appropriateness Evaluation, Classified by the Model's Critical Success Factors

Model's Component Items	\bar{X}	S.D.	Mo-Md	Q.D.	Levels of Suitability
1. Identification of objectives of the model to enable the evaluation at both strategic level of the schools holistically and operational level for convection and improvement	4.78	.42	.00	.00	Most
2. The evaluation of environmental education in the school's whole system	4.56	.52	.50	.50	Most
3. Identification of critical success factors and key performance indicators for the evaluation are carried out in education and congruent in all levels	4.40	.64	.00	.50	Much
4. Identification of missions which are minimum criteria for successes are identified in advance	4.44	.61	.50	.50	Much
5. Selection of means in data collection and evaluation methods are congruent with the regarded data	4.42	.58	.00	.50	Much
6. Provision of all concerned parties in school to participate in the evaluation	4.60	.60	.00	.50	Most
7. Provision of the evaluations to use the results for continuing improvement of the environmental education	4.70	.49	.00	.50	Most
8. Choosing participatory action research (PAR) in the implementation of self-evaluation development of environmental education in the school	4.52	.57	.00	.50	Most
9. Clear identification of evaluation steps (3 major steps and 8 steps in continuing and assessing development)	4.60	.54	.00	.50	Most
10. Concrete direction for the evaluation application in the school's environmental education improvements	4.48	.63	.00	.50	Most

Model Component Items	\bar{X}	S.D.	Mo-Md	Q.D.	Levels of Suitability
11. Identification of double evaluation in the evaluation cycle in order to enable the improvement and development while the improvement is improved on the way	4.59	.52	.00	.50	Most
12. Identification CSF and KPI scopes in order to ease the evaluation tool preparation	4.56	.59	.00	.50	Most
13. The school's are given the opportunities to school's readiness	4.70	.53	.00	.50	Most
14. The model development has been as a school's joint evaluation development project in a manner that it is an action research and practical	4.17	.53	.00	.50	Most
15. The model is assessed by a seminal forum. The assessors from all concerned parties are invited to participate in the evaluation	4.17	.48	.00	.50	Most
Total	4.58	.54	.34	.31	Most

From table 17, It is found that the average scores of the model's appropriateness evaluation is holistically 4.58, the difference between mode and median, and The quartile deviation are .34 and .31 respectively. It shows that the assessors see that the model is most suitable, and all groups of the assessors have congruent opinions (Mo-Md = .34 and Q.D. = .31) When the critical success factor (CSFs) are considered in each component, the assessors see that CSFs of all aspects are useful to the development of environmental education organization in the schools at the most level.

4) A Self-evaluation Model Usefulness Evaluation

The Critiques see that the model is the most useful for school environmental education development both in total and in each critical success factors of model components which are shown in table 18.

Table 18. Means (\bar{X}) Standard Deviation (S.D.) Mode and Median Difference and Quartile Deviation of the Model usefulness, Classified by each CSF

Evaluation Items	\bar{X}	S.D.	Mo-Md	Q.D.	Levels of Evaluation
1. Identification of objectives of the model to enable the evaluation at both strategic level of the schools holistically and operational level for convection and improvement.	4.72	.45	.00	.50	Most
2. Evaluating in both strategic level and operational level	4.67	.58	.00	.50	Most
3. Provision of PAR in evaluation development	4.65	.61	.00	.50	Most

Evaluation Items	\bar{X}	S.D.	Mo-Md	Q.D.	Levels of Evaluation
4. Provision of strategic methods in Evaluation	4.72	.50	.00	.50	Most
5. Provision clear evaluation steps before the Operation	4.76	.46	.00	.50	Most
6. Evaluating 5 components 12 operation CSFs and 25 main data	4.58	.60	.00	.50	Most
7. Evaluating in continuous process for continuous environmental education development	4.74	.49	.00	.00	Most
8. Reporting evaluation results systematically, continuously and concrete	4.74	.49	.00	.00	Most
9. The unity build-up in environmental education management in the school.	4.55	.64	.00	.50	Most
10. Team works build-up in the school	4.70	.53	.00	.50	Most
11. Teachers' participation in academic work development	4.74	.49	.00	.50	Most
12. Development of the administration effective in line with the educational reform	4.71	.51	.00	.50	Most
13. Education quality assurance according to the school's education quality assurance	4.65	.53	.00	.50	Most
14. Extension of the school's and community's environmental preservation and development	4.79	.41	.00	.00	Most
15. Development of academic work and innovation in education	4.70	.49	.00	.40	Most
Total	4.69	.61	.03	.30	Most

Form table 18, reveals that the average scores of the model's holistic usefulness evaluation are 4.69, Mo-Md = .03 and Q.D. = .30 It indicates that the assessors see that the model is holistically useful to the development of environmental education at the most level. All groups of the concerned paritic of assessors have congruent opinions (Mo-Md and Q.D. are less then the specified criteria. When the critical success factors (CSF) are considered in each aspect, it appears that every CSF is useful to the development of the most level.

5) Results of Variance Analysis of the Average Scores (\bar{X}) of the Model Appropriateness

When the variance of average scores (\bar{X}) at the model's appropriateness evaluation, it is found that the average scores given by the 4 groups of assessors have an insignificantly statistical difference at 0.5 level it shows that the 4 groups of assessors see congruently the suitability and usefulness of the model as shown in table 19.

Table 19. Test Results of Statistical Differences of the Average Score (\bar{X}) of Model Appropriateness Evaluation by the Assessors.

Variance Sources	DF	SS	MS	F
1. Evaluation of Model's Appropriateness				
- Among groups	3	.772	.257	1.667
- Within group	82	12.656	.154	-
Total	85	13.428	-	-
2. Evaluation of Model's Usefulness				
- Among groups	3	.908	.3.3	1.805
- Within groups	82	13.754	.168	-
Total	82	14.663	-	-

P = .05

4.3 DDS-PAR-385 Model: A Self-evaluation Model for Secondary School Environmental Education

1.3.1 Background and Rationale

The environmental crisis at all levels are more critical on the rise and will effect everyone on earth. Thailand in a development stream form the west, is no exception, will certainly affected by such impacts. However, there is a turn of educational strategy that education which stresses a change of belief, views and human behaviors towards the environment or using environmental education as a main strategy in turning all environment crisis will ultimately lead to the resource preservation, environment development and sustaining and balanced development of the nation.

The management of environmental education in the secondary schools is fundamental for a large group of youths which is sinned to inculcate the awareness in the resource preservation and environment development in the learners by making them realize on resource and environment values and impacts of environmental changes; behave themselves to benefit the collective and participle in the environmental preservation; and utilize the resources economically and worthily. (National Education Council 2000: 23). This is to build the desirable environmental characteristics in the learners by integrating environmental education contents in the lower and upper secondary education curriculum (modified issues: 1990). They also entrust the teachers who are responsible in the subjects which entail the contents in the environment and environmental education to become "environmental education teachers", and are directed by the service assistant director of the school. There , the teachers bare special characteristics. They can organize the learning and teaching activities in diversity, e.g. as a separate subject; organizing the environmental education as on activity; or organizing of in an informal manner. From this scenario, The environmental education organization has a prominent weakness: It lacks unity in objectivity and processes without responsible persons; It lacks the evaluation for development systematically and continuously; and the administrators give different

importance to environmental education. It is this inevitable that connection and improvement must be made in the years of the education reform.

The fact that the operational evaluation is a framework to direct the implementation and an administration mechanism, a administrative return of the government sector - including the schools, has to undergo administrative changes to a new approach of public management, i.e. results based approaches. The operational (or implement) evaluation also has to be a new approach which has to be aimed to evaluate both at strategic level and operational level for continuing improvement and development. As part of the education reform, the schools also have to organize their education quality assurance, educational evaluation; and self evaluation as part of the administration. They also have to develop the learners characteristics of the secondary school level according to the basic education standards. For all have been mentioned above together with the weakness in environmental education, the researcher has been endorsed by Department of Environment Education, Faculty of Social Sciences and Humanity, Mahidol University; and Department of General Education and its 4 schools who joined the project as cooperative schools in evaluation development and Centers for Innovation Governmental Administration, Ministry of Education. Therefore, an evaluation model has been researched and developed in order to acquaint a self-evaluation of environment education of the secondary schools which is suitable, practical (in real use) and sustainable which will lead to the development of the organizing and evaluation of environmental education in line with the education reform which will be discussed later.

4.3.2 Development of DDS-PAR-385 Evaluation Model

The development of self-evaluation model for secondary school environmental education is aimed to correct the weaknesses of the organizing and evaluation of secondary schools environmental education, in the domains of unity, evaluation participation, application of the results in the continuing improvement and development, recognition and cooperation in the evaluation. Besides, The developed model must be congruent with actual situations and the quality assurance system which on-going presently. Its development is carried out by hinging on a number of concepts in strategic evaluation which stress the evaluation as one whole entity and efficiency of the evaluation according to the concepts in the result-based management (RBM) or achievement-oriented administration which is geared to evaluate the results which are concrete. The self-evaluation according to the education quality assurance (QA) which is aimed to evaluate and report the self-evaluation continuously. The administration and organization which use the schools as bases for implementation (School-Based Management: SBM) according to the education reform and participatory action research (PAR) which are used as framework for the participatory evaluation development between the researcher and the schools. The researcher has synthesized the model by hinging on the components of the participatory evaluation or evaluation which covers the evaluation objectives; the achievements of the environment education organizing which one to be evaluated. The steps, methods, tools and how to assess the evaluation (meta-evaluation) and application of the evaluation results are the weaknesses of the conventional evaluation

which the researcher informed as DDS- PAR-385 Model, that will discuss more in detail.

4.3.3 Definition of DDS-PAR-385 Model

DDS-PAR-385 is a self-evaluation model on environmental education of secondary schools. The researcher has developed from actual participation with the schools who participated in the evaluation development by basing the concept in the strategic and operational evaluation which is the new method of public performance evaluation. The aim is to correct the weaknesses of the present environmental education evaluation.

DDS-PAR-385 is an identification of the model by taking the principal components of the evaluation which are the objectives, critical success factors (CSFs) of the environmental education of the schools being evaluated, methodology and steps in evaluation, application of results for improvement and meta-evaluation as follows:

D = Double Objectives: This model has two principal objectives; to evaluate the successes at strategic level in the school's holistic results for administrative decision making and to evaluate at operational level in each CSF to improve environmental education procedures.

D = Double Evaluation: It is two evaluations in one, that is; self-evaluations for the development of environmental education, and meta-evaluation in order to evaluate and improve the self-evaluation.

S = Strategic Methods: It is a strategic evaluation. We hold the evaluation as it is reality or one entity to develop the environmental education and its evaluation to improve it. For strategic methods, it employs in the best methods, authentic and distinctive competency in the evaluation. It is the evaluation for the development by which continuity, participation, and self-evaluation are principal rationales.

PAR = PAR Process: It employs a methodology of participatory action research (PAR) which will eventually lead them to develop organizing, evaluating and environmental education continuously.

3 = 3 main steps: The implementation has 3 major steps; self-evaluation development; self-evaluation implementation; and self-evaluation results utilization for improvement.

8 = 8 evaluation procedures: From the 3 major steps, the operation breaks down into 8 cyclic procedures; (1) vision and mission review, (2) identification of critical success Factors(CSFs) and key performance indicators (KPIs), (3) identification of the targets, (4) identification of data, data collection and evaluation, (5) analysis of data, (6) evaluation reporting, (7) improvement of the environmental education and (8) meta-evaluation.

5 = 5 components: The evaluation is carried out in 5 major school components which facilitate and relate to each other: (1) students, (2) teachers and educational personal, (3) environmental education management, (4) Management of the school's environment and (5) services in the environmental education for the community.

The components involved specific factors for the success as:

- 1) The student have desirable environmental characteristics.
- 2) The teachers have knowledge, skills and participation in environmental education.
- 3) The school manages the environmental education in a new method and result-based management.
- 4) The school is nice to be in and a prototype of the environmental management.
- 5) The school is the center for community's environmental education.

DDS-PAR-385 Model is thus a self-evaluation model for secondary schools environmental education which operates at strategic and operational levels; evaluates the environmental education at the same time of meta-evaluation; uses the strategic methods and PAR as means of implementation; by executive the evaluation in 3 major steps and 8 procedures; and evaluates the concrete results of the environmental education as a whole system in 5 principal components.

DDS-PAR-385 is that the title of a model which is identified from its major characteristics of the evaluation which are summarized in figure 23.

3) It is a model which covers both self-auditing and self-evaluation in environmental education. It can evaluate and inform the school's success both at the school's holistic and strategic level and at the operational level, i.e. in missions and subject section which facilitate the improvement and development of environmental education continuously.

4) It is a model which stress self-development and self-evaluation. It is based on the process of participatory action research (PAR) and it has the people responsible for environmental education organization to participate in the evaluation and its application.

5) It is an evaluation model which is a part of the schools' management system. Besides, it is congruent with the school's quality assurance system.

6) It is a model which is easy to operate; convenient to use; with highly achievement, concrete results and burden-free

4.3.5 Components of DDS-PAR-385 Model

The principal components of DDS-PAR-385 Model are objectives (why to evaluate ?); the success of the environmental education management to be evaluated (what to evaluate and how ?); application of the evaluation results (how to apply the results ?); and evaluation of the evaluation (how do we know the success of the evaluation or meta-evaluation ?). The details are described below:

1) Principal Objectives

The principal objectives of the evaluation are identified as double objectives:

(1) To evaluate the successes of environmental education at the strategic level of the school holistically that whether the school has reached the targets and Standard specified. How? and Why?

(2) To evaluate the success of environmental education at the operational level that whether it has reached its targets and standards specified in order to bring results to improve and develop the environmental education organization continuously.

2) Environmental Education Success: CSF, KPI and Data

The success of the environmental education to be evaluated. Critical success factors (CSFs) of environmental education of secondary schools which are standards, related and connected to each other have been identified to be evaluated at the strategic level in 5 aspects (CSF₁) and at the operational mission level in 12 aspects (CSF₂) which are standards for the secondary schools. environmental education

Identification of strategic results: CSF₁

The success components of the school's environmental education are identified in 5 following aspects:

- (1) Desirable environmental characteristics of the students;
- (2) The teachers' knowledge and skills in environmental education;
- (3) Management of environmental education;

(4) Management of environment and the environment organizing in school;

(5) School services of environmental education for the community.

Critical Success Factors (CSFs)

Each aspect of the success identifies each strategic CSF level as:

CSF₁(1) The students have desirable environmental characteristics (having basic knowledge in environmental, awareness in environment preservation and desirable behaviors by specified criteria).

CSF₁(2) The teachers have knowledge and skills in the organization of environmental education (having basic knowledge, values and desirable behaviors in environmental; and having knowledge, skills and participation in the organization of environmental education by specified criteria).

CSF₁(3) New methods of environmental education organization and administration (by identifying the strategic plans, integrating the environmental education in the curriculum and teaching and new methods in organization and evaluating environmental education).

CSF₁(4) The school is nice to be in and can be a prototype in the management of environmental education (by administering and organizing it to be conducive and facilitate the environmental education including organizing the school to make it nice to be in and hygienic).

CSF₁(5) The school is the center for community's environmental education (by giving services in environmental education to the community and participating in the environmental preservation and development activities with the community).

Identification of Operational-results: CSF₂

The operational success (CSF₂) which are congruent with strategic-level CSF₁ have been identified as:

The Success Regarding the Learners (output)

CSF₁(1) The students have desirable environmental characteristics:

CSF₂(1) The students have desirable knowledge, awareness and behaviors in environmental.

CSF₂(2) The students have more knowledge, awareness and participation in preserving and developing the environmental.

The Success Regarding the Teachers and Educational Personnel

CSF₁(2) The teachers have knowledge and skills in organizing environmental education:

CSF₂(3) The teachers have desirable basic knowledge, values and behaviors in environment.

CSF₂(4) The teachers have knowledge and skills in organizing environmental education.

CSF₂(5) The teachers organize the leaning teaching participation in environment education.

The Success on School Management of Environmental Education.

CSF₁(3) The new methods in the management of environmental education:

CSF₂(6) Results – based management of environmental education.

CSF₂(7) Organization of the environmental education learning teacher according to the curriculum in unity.

The Success on school Environment Management.

CSF₁(4) The school is nice to be in and can be a prototype for the school environmental management:

CSF₂(8) The management of the environment in the school can be the prototype school.

CSF₂(9) The management of the school's environment is conducive to facilitate learning in environment.

The Success on environmental Education for the Community.

CSF₁(5) The school is the center for the community's environmental education:

CSF₂(10) The school gives academic services in environmental preservation and development in the community.

CSF₂(11) The school participates in environmental preservation and development activities in the community.

CSF₂(12) The community is satisfied with the school's environmental education management and participation in environmental activities.

The key performance indicators (KPIs). They are strategic-level indicators which are congruent to CSF, both 5 CSF₁ and 12 CSF₂ which can be more.

The Successes Regarding the Students: Output Indicators

KPI₁(1) Proportion of students having desirable environmental characteristics:

KPI₂(1) Proportion of students having desirable knowledge, awareness and behaviors in environment.

KPI₂(2) Levels of students' knowledge, understanding and developing environmental.

The Successes in Teachers and Educational Personnel Indicators.

KPI₁(2) proportion of teachers having knowledge and skills in environmental education as specified by chimera:

KPI₂(3) Proportion of teachers having desirable basic knowledge, values and behaviors in environment.

KPI₂(4) Proportion of teachers having knowledge and skills in organizing environmental education as specified by criteria.

KPI₂(5) Levels of learning /teaching organization and participation in the environmental education of the teachers are increasing.

Successes of Environmental Education Management Indicators.

KPI₁(3) Levels of successes of new management of environmental education ;

KPI₂(6) Levels of success of results-based management of environmental education.

KPI₂(7) Levels of successes in organizing the learning / teaching activities and the school's environmental education .

Successes in School's Environment Management Indicators.

KPI₁(4) Levels of successes in schools environment management to be conducive in and facilitate learning.

KPI₂(8) Levels of school's success in the school's environment organizing to facilitate the teaching and learning.

KPI₂(9) Levels of school's success in environmental management.

Indicators
Successes in Services in Environmental Education for the Community

KPI₁(5) levels of successes in giving services in environmental education of the school:

KPI₂(10) Levels of successes in giving services in environmental education for the community.

KPI₂(11) Levels of successes of success in the environment preservation and development activity participation.

KPI₂(12) Levels of satisfaction in organization environmental and participation in the community's environmental activities of the school.

Evaluation Data

The identification of data which are to be evaluated has been 25 data items according to the indicators (which are based on its indicators: and number of data varies according to the number of identified indicators) .They are:

KPI₁(1) KPI₂ (1-2)

D₁- Number of students who passed the exam of the environmental - content subject (c)

D₂ - Number of students who passed the specified criteria.

D₃ - Number of students who have desirable environmental behaviors (passed the minimum criteria)

D₄ - Number of students who participated in the environmental preservation and development as specified by criteria.

D₅ - Average score of the students' basic knowledge in environment .

D₆ - Average score of the students' in the participation in the environmental preservation and development.

KPI₁ (2) KPI₂ (3-5)

D₈ - Number of teachers having basic knowledge in environmental as specified by criteria.

D₉ - Numbers of teachers having environmental behaviors which can be a prototype.

D₁₀ - Numbers of teachers having knowledge and understanding in environmental education as specified by criteria.

D₁₁ - Number of teachers organizing learning activities and being participated in environmental education organization as specified by criteria

D₁₂ - Average score of achievements evaluation of the teachers in organizing learning activities and participate in the environmental education plans.

KPI₁(3) KPI₂(6-7)

D₁₃ - Average score of school achievement evaluation in planning evaluation and using environmental education plans .

D₁₄ - Average score of school evaluation of the identification and use of standards and indicators in the organizing of environmental education.

D₁₅ - Average score of the meta-evaluation in the new methods of environmental education organization.

D₁₆ - Average score of environmental education integration according to the new curriculum.

D₁₇ - Average score of success evaluation in the organizing of environmental education activities in the school.

KPI₁(4) KPI₂(8-9)

D₁₈ - Average score of environmental education management evaluation in the school

D₁₉ - Average score of school environment organizing evaluation in according to the hygienic rules.

D₂₀ - Average score of evaluation in the school's organization to make it nice to be in evaluation.

D₂₁ - Average score of evaluation in the school's organization of environment for environmental education.

KPI₁(4) KPI₂(8-9)

D₂₂ - Average score of evaluation in giving services in environmental education to the community.

D₂₃ - Average score of evaluation in the participation of environmental activities with the community.

D₂₄ - Average score of evaluation of the community's satisfaction evaluation in the school organization of environmental education and participation in the community's environmental activities.

D₂₅ - Average score of evaluation of the teachers and community's expectations in giving the academic services to and participation in the community's environmental activities of the school.

The strategic level's key performance indicators are related to the operational level and the evaluation data as illustrated in figure 24

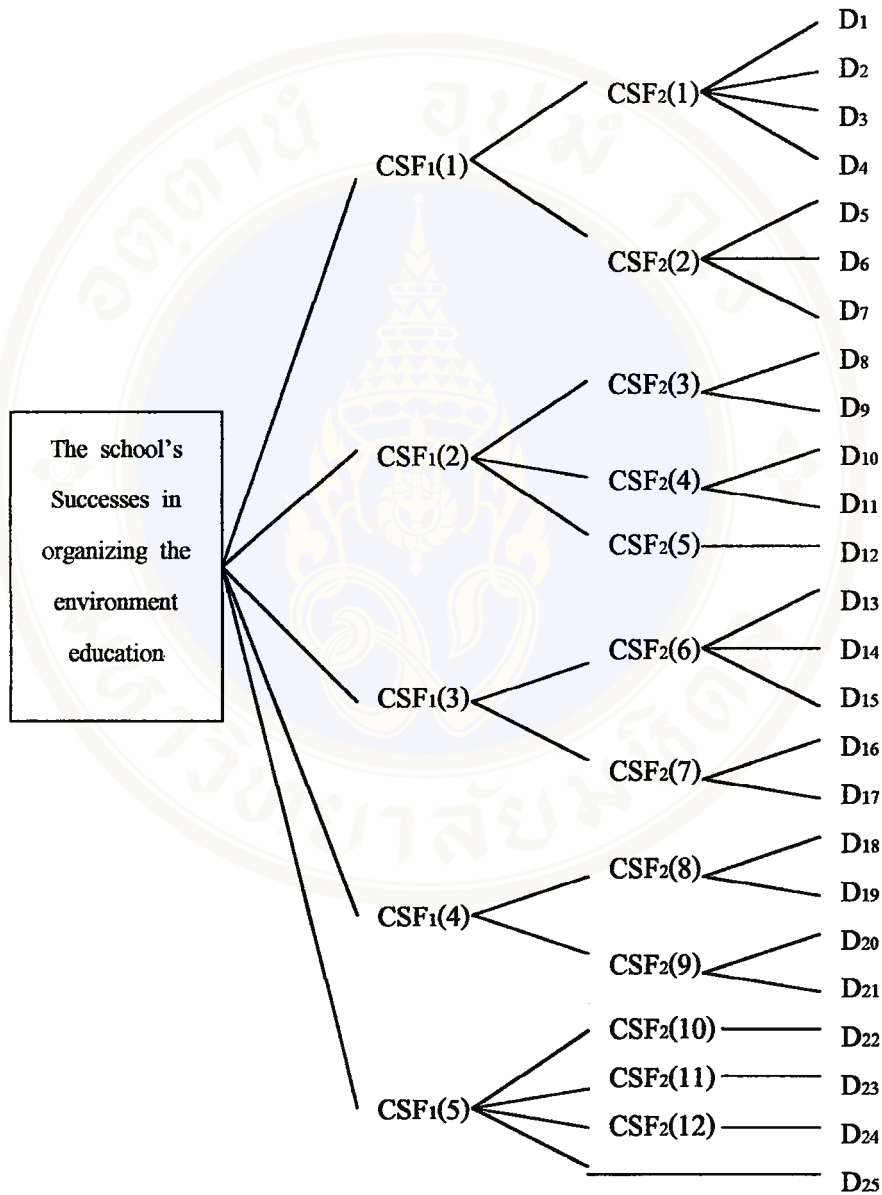


Figure 24. The Relationships Between the CSFs, KPIs and Data of School Environment Education.

3) Evaluation methodology

(1) **Strategies:** The evaluation uses a strategic method which a new method that embrace 6 principles;

Holistic Evaluation: It scales to evaluate the successes of the environmental education in a holistic view of the school which relates to all teachers and educational personal. Therefore it is whole-school approach.

Consistency and Concrete: The critical success factors (CSFs) and, key performance indicators, activities and the timing are congruent to each other, both at strategic and operational levels. The presentation is also concrete.

Authentic and Distinctive Competency: It sequels to evaluation the entity in each school's reality and evaluate it in the full potentials. Besides, the tool used is most suitable.

Participation: The approach evaluates and development its evaluation process according to the participatory action research (PAR), i.e. it encourages everyone in the school to participate in all steps of the evaluation.

Self-evaluation on Evaluation: The school chooses the successes (standards) to be evaluated; evaluation methods; undertaking (implementation) the evaluation; and applying the results and developing the evaluation by themselves.

Improvements Continuity: Focuses on evaluation results for continuous improvement.

(2) **Methodology:** It uses participatory action research (PAR).

(3) **Implementation Procedures:** It employs 3 major steps and 8 evaluation steps as:

DDS-PAR-385 Development: This is the stage where the idea is shaping up as to what to evaluate and how to measure the success of the thing being evaluated by:

Step 1 Reviewing the visions and missions of the school's environmental education.

Step 2 Choosing or identifying the critical success factors (CSFs) and key performance indicators (KPIs) of the organization environmental education in schools as standards and methods in evaluating this successes.

DDS-PAR-385 Implementation. It is the stage where it undergoes its self-evaluation efforts according to the CSFs or the identified standards:

Step 3 Participatory identification of targets. This is to use them as minimum criteria for the comparison of the evaluation results.

Step 4 Data identification and data collection. It is the stage where the data are identified from the specified KPIs; choose means to obtain the data; and proceed to evaluate and collect the data.

Step 5 Analysis of evaluation results. The obtained data are analyzed in order to formulate them as indicators which require to compiler them with the specified targets. Then they are judged whether they success is up to the target.

DDS-PAR-385 Improvement: It is the improvement stage of the environment education and evaluation that is a directive stage where the evaluation results are used to improve the environment education and the evaluation by:

Step 6 Reporting the evaluation results. The report deals with the school's success in the organizing of environment education in the holistic view and in each mission. To the concerned people and the public.

Step 7 Improvement of school environment education. This is to direct and manage to use the evaluation results in improving the organization of environment education continuously.

Step 8 Evaluation of evaluation (meta-evaluation). It is the step of evaluation verification. Self-Evaluation results and evaluation methods shall be confirmed.

4) The Evaluation Tools: It is seemed reasonable to have evaluation, data report and supplementary forms. It however, to open a way for improvement, the tools this are made in flexible forms as mash as possible. In undertaking the evaluation, the schools can choose to adjust the forms or newly develop the tools for they own use. It is, however, advisable that they must anther to the same CSFs and example of tools are shows in table 20.

Table 20. Research Tools, Means to Use and Regarded Data

Tools	Characteristics / means to use	Regarded Data	
		Codes	Data
SE 1	<ol style="list-style-type: none"> 1. A note form and check of data in all aspects before processing. 2. The school administrators or designated persons take notes and give orders it they want the data changed. 3. Use the data form SER 1 – SER 7 report forms. 	CSF s in all 2 levels. D1 – D25	Data evaluation for analysis every item of data
SER 1	<ol style="list-style-type: none"> 1. A report form on students data who passed all subjects without any halts 2. The registration chit reports by using the data of the past term. 	D, D1	Number of students who passed all subjects in the past term.
SE 2 And SER 2	<ol style="list-style-type: none"> 1. SE1 is the evaluation on desirable environmental characteristics of the students. It divides into 2 levels : SE 2/1 for lower secondary students SE 2/2 for upper secondary students. 2. SER 2 is a report form for evaluating the students' environment characteristics to use together with SE 2 Form 3. Class cluster leader responsible for the evaluation according to SE 2 and reports it by using SER 2 (1 copy of 1 class cluster) 	CSF ₁ (1) CSF ₂ (1),(2) D ₂ -D ₇	<ol style="list-style-type: none"> 1. Basic knowledge in environment related to school curriculum. 2. Environment. Awareness of students Desirable 3. Environ. Behaviors of students

Tools	Characteristics / means to use	Regarded Data	
		Codes	Data
SE 3 and SER 3 Form s	<ol style="list-style-type: none"> SE 3 Form is an evaluation form to assess the teacher' competency in environ. Ed. It is used together with SER3 Form which is a resulted report form. Section / Subject chiefs (Items) are responsible for the evaluation and reporting The reporting in SER3 in each subject has to indicate CSFs which fall lower then the targets. 	CSF1(2) CSF2 (3)-(5) D8-D12	<ol style="list-style-type: none"> Teachers' basic knowledge, attitudes and behaviors in environment. Teachers' knowledge, attitudes and participation in organization of environ. education.
SE 4 and SER 4	<ol style="list-style-type: none"> SE 4 Form is an evaluation form for the school's organization of environmental education. It is used with SER 4 Form which is a result report form. The academic assistant erector is responsible the evaluation and reports by using This form. 	CSF1(3) CSF2 (6),(7) D13-D17	<ol style="list-style-type: none"> New methods of environ. Education organization. of the environ. For environ education teaching. Success level in environ. Management and the organization of environ in school.
SE 5 and SER 5	<ol style="list-style-type: none"> SE 5 Form is for the evaluation of administration and organization of the school's environmental. It is used with SER 5 Form which is a report form for this purpose. The administrative or, service assistant director or a designated person is responsible to report by using the mentioned forms 	CSF1(5) CSF2 (18)-(21) D18- D21	<ol style="list-style-type: none"> Data on success in administration and organization of the environ. Education action teaching. Success level in environ. Management and the organization of environ in school.
SE 6 and SER 6	<ol style="list-style-type: none"> SE 6 Form for the service evaluation of environ. education and school's and community's participation in environment activities. It is used with SER 6 in reporting the results. The administrative assistant director is responsible for the report. 	CSF1(5) CSF2 (18)-(21) D22-D25	<ol style="list-style-type: none"> Data on services in environ education in community and school's and community's participation in the environ activities. School's and community's satisfaction and expectation
SE 7 And SER 7	<ol style="list-style-type: none"> It is a report form for the meat evaluation. It is used together with SER 7 which is used the evaluation data to improve the evaluation. The school administrator or the designated person is responsible for the evaluation and reporting. 		Efficiency of the components and specific characteristics of the evaluation model.

5) The Application of the Evaluation Results

We have discussed the evaluation components in some detail at the evaluation step. However, this evaluation model stresses the use of the evaluation results in improving the continuous organization of environment education. This stage, we will therefore implement in 4 important aspects:

(1) Provision of the environmental education self-evaluation report (ESER) to the concerned people and the public by the documents and the school's homepage.

(2) Provision of bulletin boards to propagate the evaluation results to the teachers, students and the people concerned. So they will have easy access to the information which is a stimulus, in a way, for continuous improvement.

(3) Notify the evaluation results, in the CSFs which are lower than specified in the targets to the responsible people in order to improve and report the results to the school administrator.

(4) Evaluation of the evaluation. It is the essential component of DDS-PAR-385 Model which stresses evaluation to improve the evaluation much in the same work as the improvement of the environment education which evaluates 15 key performance indicators by SE7 Form and reports the evaluation results by using SER 7 Form in order to improve the self-evaluation continuously: this becoming a double evaluation.

4.3.6 Implementation of DDS-PAR-385 Model in Schools

The usage of DDS-PAR-385 Model in evaluation the organizing of environmental education by means of self-evaluation can be adopted by using the tooling means:

1) Build-up the teachers' and educational personnel in the school who are concerned with the organization of enveloping the evaluation on problems and requisites education of enveloping the evaluation efforts in environmental education: the needs to develop it by themselves; and roles of the people concerned in the school evaluation. This is can be doer either by organizing a seminar or then study it by themselves.

2) Organize a working group to develop the evaluation to coordinate the development and the evaluation; and organize self-evaluation activities for the school by teams of teachers, students and concerned people in the matter.

3) The working group works with a self-evaluation network; implementing the self-evaluation according to the specified steps (3 major steps and 8 procedures) as the DDS-PAR-385 Model's steps and procedures.

4) Organize evaluation, checking; and report the evaluation results continuously at least once per term. The checking, records and data should constantly improved so as to wake them up-dated.

5) Organize direction and ordering so as to cause the improvement of environmental education; and The evaluation is improved every time there is an evaluation.

4.3.7 Usefulness of DDS-PAR-385 Model

Introduction of DDS-PAR-385 Model to a school will inevitable arouse its state and gives it a strength in the tolling domains:

1) The school can tell once there is a success in their organization of environmental education both in the holistic view and at the operational level concretely. The school's direction, checking and evaluation of the organization of environmental education will be ethicist and becomes part of the school's management which will be continuously developed.

2) The school will be able to organize environmental education in unity and with high quality, because it will have clear organization objectives; plunge into a forceful strive; and have a mechanism to check its development constantly.

3) The personnel will have opportunities to try their roles on real practice in developing academic take in a manner of an action research which skills: school-based research; and develops their academic tasks continuously.

4) The school can use DDS-PSR-385 to stern late, encourage and develop its working teams of the school as a whole.

5) The school's personnel and the stakeholders are satisfied and will certainly give their support to the school to organize the environmental education and participate in the school's and community's environment activities.

CHAPTER V DISCUSSION

The discussion on research methodology and findings of this research on the development of self-evaluation model for secondary school environmental education is presented as follows:

5.1 Research Methodology

1) The combined methods were employed to ensure the validity of both the quantitative and qualitative data and lessen the limitations of using either the quantitative or the present concept for development of research especially at the school level, and with the work culture or the way of doing work for human being. Thus, the employment of the combined methods is appropriate for research in social science.

2) The researcher chose the participatory action research (PAR) as the main research methodology instead of the experimental research that has been generally used. This is with the belief that every human being has the potential for development and can learn. Also, it is the nature of human being to continue learning all the time. The researcher chose the PAR because of his belief that if clear policies are provided as stimulation, the school and teachers will be ready to develop their own evaluation. Moreover, he also believes that PAR will lead to sustainable school - based environmental education and evaluation of environmental education. Also, PAR is appropriate for the problems facing development of secondary schools which are the present target group. It is appropriate for the state of environmental education in secondary schools which have lost their environmental education dimension as a result of curriculum integration. To conclude, the decision to choose PAR for development of self-evaluation model of environmental education for secondary schools is considered appropriate and necessary for the following reasons:

(1) At the theoretical level, PAR is based on the belief in human potential. Human is the most important component of development and PAR is the method for development of human potential that will lead to acceptable and sustainable development.

(2) At the practical level, PAR is appropriate for development of secondary schools at present. It is appropriate for the school function of development of environmental education in secondary schools. Also, PAR is in accordance with guidelines for development based on the concept of education reform at present. According to this concept, secondary schools have to take a lot of reform functions. Any development task must not create additional burdens to the school. The new curriculum has been integrated to the point that it has lost the environmental education dimension. Therefore, the development of environmental education and evaluation of environmental education must be based on the understanding, cooperation, and acceptant of teachers in the school. Moreover, PAR is in accordance with the education reform guidelines that emphasize

school-based development with more authority and freedom given to schools for their own management. Under this new concept of school management, PAR will provide a foundation for appropriate school-based development.

3) In applying PAR for development of this self-evaluation model on secondary school environmental education, the researcher has shifted the development concept from the one that is problem-based, or the problem solving approach. The PAR activities have been adapted to suit the real condition of each school. Also, additional techniques have been applied to enable the PAR process to function smoothly and more effectively. These additional techniques are the following:

(1) The AIC technique: (Appreciation, Integration, and Contribution) This is the technique for brainstorming of the personnel and working team members. It encourages members to express themselves, prevents domination of thought by any person, and enhances participation and acceptance in every step of PAR including the self-evaluation model that has been developed by the group. The technique focuses on awareness and appreciation of evaluation (teachers usually have negative attitudes toward evaluation), integration of thought (teachers usually refrain from expressing their own opinions and tend to comply to the administrator's viewpoints), and construction of new knowledge in development of the self-evaluation model.

(2) Rung-arurn Project Strategies: Strategies from Rung-arurn project have been adapted and applied in the research study. One strategy that has been adapted and applied is the strategy of participation in organizing education for conservation of energy and environment. This strategy emphasizes participation in the formation of ideas, planning, execution, evaluation, and getting benefits from the evaluation. Also adapted and applied are the integrating strategy and the learning strategy. These strategies are aimed at enabling the school personnel to participate and learn how to conduct self-evaluation for environmental education and create new knowledge in the PAR process.

(3) A New Technique of Evaluation: It aims for evaluation at both the strategic and the operational levels that will enable the school to identify both the achievement as a whole and the achievement at the operational level so that improvement could be made resulting in the developed model being truly responsive to problems of self-evaluation for school-based environmental education.

(4) An RBM Evaluation Technique: It is based on result-based management (RBM) with advance determination of critical success factors (CSF) and key performance indicators (KPI) of school-based environmental education. This is to encourage the school to determine in advance its vision and critical success factors (CSF), key performance indicators (KPI), and the target as the minimum criteria for comparison with evaluation results that are concrete and easy to comprehend. Besides, the result-based management procedure has been adopted which includes the following steps: determination of vision and mission; determination of critical success factors; determination of key performance indicators; determination of the target; determination of data, data sources and data collection; analysis; and reporting.

(5) The Self-reliance Development Technique: In the PAR process the researcher tries to minimize his own research coordinator roles and allows

(5) The Self-reliance Development Technique: In the PAR process the researcher tries to minimize his own research coordinator roles and allows the school teachers maximum roles. That is, the researcher developed a self-study handbook for teachers in school to study in advance. A workbook was also prepared and given to the school to do workshop activities in steps as agreed upon in advance. Thus, the administrator and the teacher can use the handbook and the workbook in development of self-evaluation for environmental education evaluation with minimum consultation with the researcher. This is an important way to expand the results of evaluation to greater extent and in accordance with the present situation.

4) The PAR has been adapted with the addition of pre and post-assessments of the school's capacity for self-evaluation.(model efficiency evaluation) This is to obtain concrete monitoring results to determine whether or not the teachers have developed new knowledge on evaluation of environmental education, and if the school has increased its capacity in evaluation of environmental education. Results of the comparison between the pre- and post-assessments will demonstrate the evident progress in addition to the evaluation results obtained within the PAR process and the model efficiency as well.

5) The use of strategic approach in the PAR process. The researcher adopted the strategic approach as the main approach in undertaking this research development. This is characterized by the emphasis on the whole system of organizing and evaluating environmental education; determination of CSF that are clear goals and set clear organization standards that cover the success in organizing the whole system of environmental education in the school and that are in accord with both the strategic and the practical levels; the use of the highest capability and the most suitable alternative for each school in carrying out the evaluation; and the systematic evaluation and continuous development including the emphasis on participation in every step of self-evaluation.

5.2 Research Results

This action research on the development of self-evaluation model for secondary school environmental education generated findings on both the process and the products that should be discussed upon as follows:

5.2.1 The Findings on the Research Process

1) The participatory action research on development of self-evaluation of schools' environmental education must make use of the strategic approach as the main approach in participation in order to be effective and acceptable. The participation process must include the following: (1) Determination of a clear mission of participation what matter the participation will be upon, what expected benefits to the school will be as a result of such participation, especially the benefits on development of environmental education including the benefits to parents and stakeholders of this project; (2) SWOT analysis of the organizing and evaluating environmental education in school in order to know

relevant to the real condition of the school; (4) Allowing all stakeholders to participate in self-evaluation; (5) Providing for continuous development of the evaluation.

As for the steps of evaluation, the following 8 steps must be undertaken: (1) Review of the vision and mission on environmental education management of the school; (2) Determination of critical success factors (CSF) or the standard of environmental education management of the school; (3) Determination of key performance indicators (KPI) for environmental education management based on the determined standard; (4) Determination of the goals for environmental education management based on the determined KPI; (5) Determination of data, data source, and method for data collection; (6) Data processing and analysis; (7) Reporting of evaluation results; and (8) Evaluation of evaluation results. The approach in both the participation process and the evaluation process is in accordance with the present approach on development, that is the strategic approach which is being applied on reform of the government and government bureaucracy at present. It is also in proposed by Tipawadee Meksawan and Andersen Consulting Company which is the consulting company for many government agencies in their efforts to transform their administrative into the result-based administration approach. Moreover, the approach is also in accordance with the strategic evaluation approach that has been practiced and in which the researcher has participated in development of evaluation system for promotion of efficiency in the government agencies at the Office of the Permanent Secretary, Ministry of Education.

2) The researcher discovered and made use of 5 strategies for participatory action research. These strategies are the following: (1) The strategy of cooperative schools project for development of self-evaluation on environmental education evaluation; (2) The strategy of operation based on the real condition of the school; (3) The strategy of participation which emphasize on the formation of common vision and values and participation in every step of operation; (4) The strategy of self - reliance that emphasizes the maximum roles of the school and minimize the roles of the research coordinator; and (5) The strategy of development of self-evaluation for the whole school and the whole system of environmental education management. All strategies that were utilized are in accordance with the concept of school-based management (SBM) as stipulated under education reform, the concept of self-reliance development, the operation based on the real condition according to the pilot principal of education reform, the concept of holistic evaluation and determination of clear indicators according to the result-based management of the office of civil service commission.

3) As a result of determining the development steps for participatory evaluation that allows for evaluation at both the strategic and operational levels, the school can adjust its operation in 10 steps as follows: review of the vision, examination of the mission, determination of critical success factors (standard), determination of key performance indicators, determination of goals, determination of data sources determination of methods for data collection, data processing and analysis, reporting of evaluation results, and evaluation of evaluation results.

data sources determination of methods for data collection, data processing and analysis, reporting of evaluation results, and evaluation of evaluation results. The adjustment is only for convenience while the concepts and principles remain the same. Besides, determination in advance of clear operational steps enables every person involved to provide better cooperation.

4) The arrangement for the assessment of capability for self-evaluation before and after the participation is the application of PAR in such a way that the achievement of participatory research can be assessed more clearly. As such, the development level of the school, namely, the construction of new knowledge, the knowledge and ability of teachers to conduct self-evaluation, the experience and participation of teacher in self-evaluation, and the school's needs for assistance in conducting self-evaluation. This is a more concrete application of PAR which is different from ordinary PAR that has been applied in general.

5) The participatory action research at the school level has clear target groups with data that are easily accessible. It must arrange for the school to help itself as much as it can so that the school can develop self-evaluation. Besides corresponding to the principle of decentralization and delegation of power to the schools as stipulated in the National Education Act of B.E.2542, it also corresponds to the school-based management (SBM) concept that aims for self governance of the school as cited by Dolprasit.S., (2542), Boonprasert.Utai.,2543), and Martliam. Tawin., (2542) It is also highly relevant to the present state for school development.

6) In development of the model, the first thing that must be considered is the component of the model. One must know what model to develop, its content, and the components of such content. Moreover, the developed model must be applicable in real situations, be well-accepted and truly useful. The development, therefore, must focus on participation and evaluation to make sure that the developed model is relevant and applicable to real situations. The main components to be included are the evaluation objectives (why to evaluate and for what purposes), the achievement of environmental education management (what to evaluate), the strategy and steps of evaluation (how to evaluate), the application of evaluation results (how to utilize evaluation results), and the meta-evaluation (how to evaluate of the evaluation results) to know whether or not the evaluation is valid. Besides, the model must be verified again to ensure that it is relevant and acceptable.

7) The determination of problems in the PAR process for the present development situation must be adapted and mainly based upon the visionary approach. Development that starts with identification of problem is hardly adequate in this area. Therefore, the problem identification must be changed to the determination of strategy and planning which corresponds to the concept of strategic development of the context analysis to determine the subsequent strategy.

5.2.2 The Findings on the Research Results

1) Four schools were selected as the cooperative schools in the Project, namely, Wat Makutkasat Secondary School, PPR Ratwittayalai school, Wat Kemapiratarom School, Sai Noi School. Besides, the consideration regarding the location and special environmental characteristics, the researcher also made selection decision based on their early responses to his invitation letter. Several other schools

large, medium, and small size schools among them. Also some schools were located in the inner area which others were located in the outer area of Bangkok.

2) In determination of problems and analysis of SWOT for school environmental education evaluation, it was found that the schools had some different specific problems regarding environmental education evaluation. However, every schools acknowledged similar main problems. These problems were: lack of clarity in objectives of environment education management, lack of evaluation in the dimension of environmental education, evaluation results were not truly acted upon for improvement efforts, the majority of teachers has negative attitudes toward evaluation and lacked understanding on the new evaluation approach. Also, all schools accepted the results of SWOT analysis of evaluation as reported in Chapter IV which required several steps in the consensus process. The results of determination of problems and evaluation SWOT were in accordance with the results that a group of school administrators analyzed in B.E. 2542, except on some issues that were the rules and regulations that were issued later in the education reform movement.

3) The six main strategies on development of environmental education evaluation of the operative schools were developed, namely, the new strategy for environmental education evaluation, the strategy for developing leaders and the network for evaluation, the strategy of evaluation for development, and the strategy of community environmental education service. All of these strategies were developed in the meetings on analysis of matrix SWOT and arrived at the consensus by each school. Later, the researcher coordinated and helped the four schools to arrive at the final consensus. This additional PAR activity enabled the evaluation planning to be appropriate and most feasible according to the strategic approach.

4) Every cooperative school determined clear evaluation goals in advance. The common goal is the new approach for environmental education evaluation which is efficient and effective, provides answers regarding environmental education management at both the strategic and the operational levels, is concrete and acceptable to every stakeholder. This goal is an important component of planning that was determined in the PAR process.

5) The approach and stages of evaluation development are also components of evaluation planning. The approach that was determined in this research was a special approach that the researcher and the cooperative schools developed together and used as the common guidelines for operation. Two main stages of evaluation development were identified: the stage of participatory research development, and the stage of school self-evaluation implementation. The first stage was developed based upon the steps in the research development process. The second stage was adapted from the steps of result -based management as previously mentioned.

6) Outcomes of the participatory action research in terms of vision, mission, critical successes factors (CSF), and key performance indicators (KPI) that were determined are presents as follows: As for the vision, although the vision for each individual school differed in some minor details, it's main points were similar and contain the following environmental education: To employ various methods for organizing environmental education program so that students acquire desirable characteristics pertaining to environment; To arrange livable environment which school that facilitates environment education management and enables the school to

actively participate in environment activities of the community. As for the mission, the school is to carry out the following 4 mission: (1) Organizing of instruction and activities on environmental education; (2) Management of environmental education, (3) Arrangement of with in school environment, and (4) Promotion of community environment. As for the CSF and the KPI, the schools identified the following: 5 CSFs at the strategic level and 12 CSFs at the operational level, 5 KPIs at the strategic level and 12 KPIs at the operational level, and evaluation data. For evaluation and reporting forms, it was agreed that every school use the forms SE 1-7 and SER 1-7 for Their first evaluation.

7) The evaluation and reporting forms (SE and SER) were developed jointly by the researcher and the cooperative schools for the first evaluation. The SE 2-7 forms consisted of the following 6 evaluation forms: the student evaluation form; the teacher evaluation form; the environmental education management form, the school environmental education form, the community environmental education services form, and the evaluation of evaluation outcomes form, respectively. These forms were tried out in Bangyai school, Nonthaburi Province, which is a similar school to the four cooperative schools. The test items that were a part of SE 2 and SE 3 were carefully selected and only those that appropriate difficulty index (.45) were included. Every form's reliability was at the acceptable level (the alpha coefficients were 0.76-0.95). However, the instruments are the adjustable component of the model and need to be developed further for improvement of their quality.

8) Evaluation results and reporting: Evaluation results were not compared among the cooperative schools but were compared with the predetermined goals. Considered as a whole, every school's operation was still below the predetermined goals. Evaluation results were informed to the personal concerned with each matter to take remedial actions. Reporting on evaluation results were carried out in 3 level: the preliminary report to the school administrators, the self assessment report (SAR) which was in accordance with insurance in education, and the report though quality other media to all teachers, stakeholders, and the public in order to stimulation their awareness of environmental education. However, the presentation of research results in this study did not focus on evaluation results at the school level but focused instead on the holistic development of the model which was the main objective of the study. Therefore, only a sample of research results at the school level was presented in this study.

9) The schools' capability for self-evaluation of environmental education management which is defined as model efficiency, was found to increase in every aspect after the participation. The pre-operation and post-operation means were significantly different indicating that the participatory action research helped increasing the schools' capability for self-evaluation including teachers being more involved in participation, teachers gaining more knowledge and understanding on the correct method of management and evaluation of environmental education, the schools having greater readiness for evaluation while having less needs for assistance in self-evaluation. Also, the per-operation and post-operation means for each every aspect of evaluation were significantly different. These findings were in accordance with the objectives of the project for school participation in evaluation development and the objectives of the participatory action research that aimed at enabling

participating teachers to discover new knowledge and develop their capabilities for self-evaluation on the topics that they were involved in the action research.

10) The indices of model performance congruence (IC), for the whole as well as for each component of the model were found to be .76, .81, .81, 1.0, .62 and .56 respectively, which were higher than the minimum predetermined criterion (IC must not be lower than .50). These findings indicated that the developed model corresponded to the real practice in the PAR process. Also, the strategy of allowing the practitioner to verify the developed model helped to ensure that the developed model possesses high content validity, and not being developed purely out of the researcher's own understanding and imagination. Moreover, this verification of the model by the practitioner is a new approach for model verification which is suitable for work system development, or any operational model at the school level that is usually not too complicated.

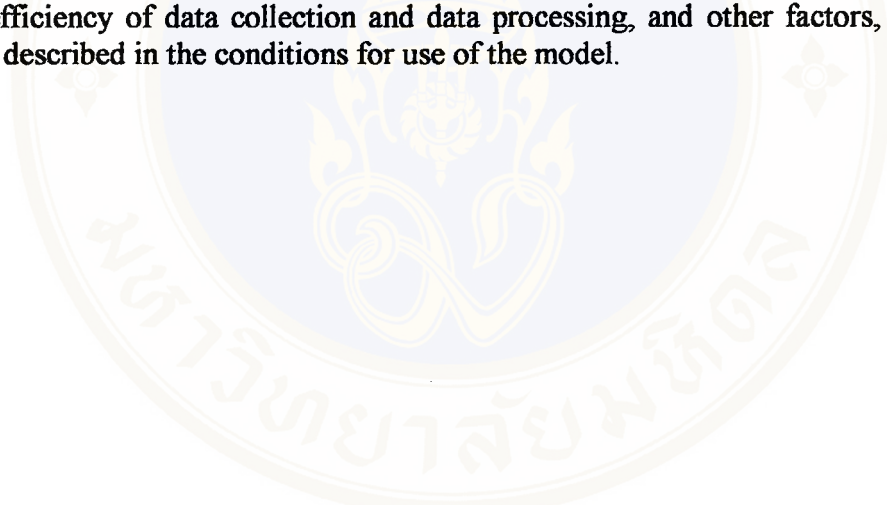
11) Evaluation of the model appropriateness: All groups of experts including the group of high level administrators in the Ministry of Education, the group of environmental education experts, the group of environmental education promoters, and the group of representatives for cooperative school teachers were of the opinions that the developed model was appropriate and feasible at the highest level. They also perceived the model's usefulness for the development and evaluation of environment education management at the highest level. The opinions of the four groups were in agreement, and their opinion rating means were not significantly different indicating that the developed model was academically feasible and corresponded to the needs of high level administrators in the Ministry of Education and those responsible for promotion of environmental education in educational institutions. The model could also be implemented in the real situation because it was well-accepted by practitioners. Therefore, the developed model is valuable for the reform of environmental education in this age of educational reform.

12) The developed DDS-PAR-385 Model is capable of remedying the weaknesses of environmental education evaluation in secondary schools. It can provide both holistic answers at the strategic level and specific answers at the operational level for subsequent improvement and remedial. It is the model that emphasizes two cycles of evaluation: the evaluation of environmental education management, and the evaluation of the evaluation outcomes. This two cycles of evaluation will lead to continuous improvement of evaluation, together with the development of environment education management. The strategic approach was used as the framework for evaluation, which is in accordance with the development concept at present. The evaluation process consisted of 3 steps and 8 evaluation activities that complete the evaluation cycle. The whole system of schools' management success to be evaluated, consisting of 5 components and 12 CSFs. This was the model that corresponded to the new evaluation approach of Suwanmala.C., (2539). The strategic evaluation based on the strategic approach were utilized. Evaluation steps were based on the result-based management concept of Andersen (1999) together with the evaluation of the whole system of environmental education management based on the CIPP model has been widely at present.

13) The five critical success components for school based on the DDS-PAR-385 Model are different from the components or the standards for school evaluation as set by the Office of Educational Evaluation and Accreditation which

identifies only 3 components of standard components: the input, the process, and the output. However, they are in accordance with the complete school concept of the Ministry of Education that adopts the CIPP Model as the framework for development and evaluation of school. They also correspond with the Dream School concept as proposed by the Ministry of Education's Dream School Committee in B.E.2537, and the department of general education's criteria for identification of distinguished environment school which also identify 5 components for evaluation.

14) The DDS-PAR-385 Model is not a complete model by itself. It has both the static and dynamic components. The static components are the components that contribute to the name of the model, those are: Double objectives; Double evaluation; Strategic method; PAR process; 3 steps and 8 activities of evaluation; 5 components of environmental education management to evaluate. The dynamic component, on the other hand, comprises the details of the success to evaluate in the main components, details of the instruments, and the evaluation procedure. Each school can use different methods but it must be able to obtain the needed data. The DDS-PAR-385 Model, therefore, is easy to use and allows each school to determine the focus of environmental education as it considers appropriate. However, the success of evaluation in the model still depends on cooperation of all involved parties, the efficiency of data collection and data processing, and other factors, which have been described in the conditions for use of the model.



CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

This research was conducted with the objective to develop a self-evaluation model for secondary school environmental education. Its 4 specific objectives were: (1) to develop and implement the self-evaluation model in the cooperative schools through the participatory action research; (2) to evaluate the model's efficiency by evaluating capability for self-evaluation on environmental education of cooperative schools; (3) to analyze and verify the validity of self-evaluation model for secondary school environmental education; and (4) to evaluate the appropriateness of self-evaluation model for secondary school environmental education. The combined methods were employed with the PAR qualitative method as the main approach in development, implementation, and synthesis of the model, together with the qualitative method in the evaluation of model's efficiency, examination of the validity of the model with the Index of Model-Performance Congruence (IC), and the evaluation of the self-evaluation model's appropriateness.

Five main steps of the research process with accompanying 24 research activities were undertaken: (1) the preparation step; (2) the self-evaluation model development step; (3) the model implementation step; (4) the analysis and verification of the model step, and (5) the model evaluation and presentation step. The PAR was employed in steps 2-4 the evaluation of model efficiency in steps 2 and 4, the examination of the model in step 4, and the model's appropriateness evaluation in step 5.

The researcher conducted the participatory action research (PAR) in the development, implementation, and synthesis of the self-evaluation model by purposively selecting four secondary schools under the Department of General Education as the target schools for participating in the project. The four schools were PPR Ratwittayalai School, Wat Makutkasat Secondary School, Wat Kemapiratararam school and Sai Noi School. A total number of 510 teachers and school personnel participated in the project. The participation took place in 8 step of PAR, namely, determination of the target group, creation of acquiescent atmosphere, determination of problems and evaluation targets, determination of evaluation plans, undertaking the evaluation, evaluation of evaluation results, creation of new knowledge, and withdrawal and dissemination of project results, respectively. Self-study instructional handbook and work sheets were employed as instruments.

The researcher conducted model's efficiency evaluation by the pre-test and post-test of school's capability to make sure that after participating in the development of self-evaluation, the schools have greater readiness for conducting self-evaluation on environmental education, the teachers and school personnel gain more knowledge and understanding and participate more in evaluation of environmental education in school. The sample for the pre-test and post-test consisted of 80 teachers purposively

selected. The employed evaluation instrument was the Self-evaluation Model's Efficiency Evaluation Questionnaire, developed by the researcher. The evaluation form was administered during the participatory action. Evaluation data were analyzed by using the SPSS PC program. statistical procedures for data analysis were the mean, standard deviation, and t-test.

The researcher verified the self-evaluation model to make sure that the synthesized model was in agreement with real practice. The verification was determined by the Index of Model-Performance Congruence (IC). The sample for model verification consisted of 16 purposively selected administrators, teachers, environmental education teachers, and representatives of the school committee. The employed verification instrument was the Model Validation Testing Questionnaire for Model-Performance Congruence that was developed by the researcher.

The researcher conducted the self-evaluation model's appropriateness to make sure that the developed model is appropriate, feasible, and beneficial to the development and evaluation of environmental education. He organized a seminar involving four groups of experts consisting of a groups of high level administrators from the Ministry of Education, a group of environmental education experts, a group of promoters of environmental education, and a group of teachers from cooperative school, with the total number of 134 persons. A Model's Appropriateness Evaluation Questionnaire, developed by the researcher was employed as the evaluation instrument. The data were collected during the model's seminar. The SPSS PC program was employed for data analysis, computing the mean, standard deviation, mode, median, and the inter quartile difference (Q.D.) to arrive at the consensus of evaluation.

6.1 Research Results' Conclusions

6.1.1 The Participatory Action Research on Model Development

The Participatory Action Research Process

1) Five main strategies were employed in the process of the participatory action research for development of self-evaluation model for secondary school environmental education: (1) The Strategy of Setting up the Cooperative School Evaluation Development Project in which the project served as the framework for participatory action; (2) The Authentic Evaluation Strategy, based on the problems, needs, and real condition of the school; (3) The Strategy of Participation, involving all sectors of school personnel in every step of the development process; The Strategy of Self-reliance, allowing the school to have maximum roles in development of self-evaluation; and (5) The Strategy of Whole School Development, involving the whole system of self-evaluation on environmental education with the emphasis on the visionary approach in participatory development activities such as participatory analysis of the context for the environmental education management and evaluation, and determination of development strategies for authentic evaluation in the school.

2) The four cooperative schools had problems and weaknesses regarding evaluation of environmental education. The problems were: the lack of clarity in the objectives of environmental education; lack of evaluation on environmental education as a whole; evaluation results being not utilized in development; the personnel's lack of knowledge and understanding on how to properly organize environmental education and the lack effective evaluation instruments. These problems corresponded to the weakness on evaluation that were identified, namely; the teachers' lack of knowledge and understanding on evaluation; the lack of unity and cohesiveness in evaluation; the teachers negative attitudes toward evaluation; evaluation results were not utilized in development; the lack of concrete results in evaluation reports, the lack of personnel responsible for evaluation, and the lack of specific budget for evaluation.

3) From the weaknesses and problems as mentioned in 2), it was determined that the four cooperative schools must adopt the following six strategies in development of the self-evaluation for environmental education evaluation: (1) The new approach strategy for evaluation of environmental education that emphasizes the holistic evaluation and can identify achievement at both the strategic and operational level; (2) The evaluation for quality assurance strategy that emphasizes self-evaluation in accordance with the quality assurance system of the school; (3) The strategy of participatory acknowledgement of evaluation results that emphasizes reinforce and praising the participators and used of evaluation results; (4) The strategy of creating the leaders and network for evaluation to promote understanding and positive attitudes toward evaluation through the personal network; (5) The strategy of evaluation for development that emphasizes continuous utilization of evaluation results for development; and (6) The strategy for community-based evaluation of environmental education that emphasizes bringing knowledge and awareness on environment to the community.

4) According to the guidelines for development of self-evaluation for secondary school environmental education, the school must undertake the following 8 actions: 1) Announcement of the policy on self-evaluation for environmental education as a part of the quality assurance system; (2) Appointment of the development committee consisting of representation of every section to be responsible for the development; (3) Urgently instilling the understanding for proper attitudes toward the management and evaluation of environmental education; (4) Development of the school evaluation system according to the new approach for evaluation; (5) Participation in all steps activities for the complete cycle of evaluation development; (6) Organization of a seminar for evaluation of evaluation results upon completion of the evaluation; (7) Supervision for utilization of evaluation results and reporting of development results; and (8) Formation of the system, improvement of the model, and promotion for acceptance of the model.

5) Six steps were taken in participatory development of evaluation, there were: (1) instilling understanding; (2) appointment of the evaluation development committee; (3) participation in the participatory evaluation development process; (4) implementation of evaluation; (5) utilization of evaluation results; and (6) evaluation of evaluation results.

6) Each school undertook the following 10 steps in the cycle of evaluation, there were: (1) examination of the vision for environmental education



management; (2) examination of the mission for environmental education management; (3) determination of the critical success factors, (4) determination of the key performance indicators; (5) determination of the goals for environmental education management; (6) determination of data collection, and evaluation instruments; (7) data processing and analysis; (8) reporting of self-evaluation; (9) utilization of evaluation results; and (10) evaluation of the evaluation.

Results of the Participatory Evaluation Development

1) Four missions for school environmental education management were determined: (1) instruction and organization of activities on environmental education; (2) management of environmental education; (3) management of school environment; and (4) promotion of community environmental education.

2) Four objectives for evaluation of school environmental education management were determined: (1) to obtain the outcomes of environmental education management at both the strategic and operational levels; (2) to identify the effectiveness and efficiency of environmental education management; (3) to identify the concrete achievement of the environmental education dimension of education management; and (4) to arrange for continuous utilization of evaluation results for improvement of environmental education management.

3) The following critical success factors (CSFs) and key performance indicators (KPIs) of school environmental education management were determined: 5 CSFs and 5 KPIs at the strategic level (results), and 12 CSFs and 12 KPIs at the operational level, totaling 25 key data.

4) Six evaluation forms were developed: the SE 2-7 Forms for evaluation of students, teachers, school environmental education management, school environment management, community environmental education services, and evaluation of evaluation results, respectively. For report forms, the SER 1-7 Forms were developed for systematic reporting of evaluation information.

5) As for self-evaluation report, each school made a self-evaluation report (SAR) on evaluation of environmental education management to present to concerned organizations and the public. The evaluation results at both the strategic and operational levels were presented in radar plotting, charts, and tables.

6) As for evaluation of the developed evaluation system, all involved parties and every cooperative school perceived that the developed evaluation system was appropriate and feasible at the high level.

6.1.2 Research Results Concerning Model Development

1) The evaluation of capability for self-evaluation of participating schools before and after the participation: The participating schools' capability for self-evaluation increased significantly in every aspect including the participation, knowledge and understanding on management and evaluation of environmental education and the schools' readiness for self-evaluation, while the needs for assistance in self-evaluation decreased significantly after the participating. The pre-test and post-test participating mean scores on capability evaluation and needs for assistance were significantly different.

2) The verification of the model: Participating in the self-evaluation model development were in agreement on their opinions that the developed model was congruent with real practice. The index of model-performance congruence (IC) of 0.76 was obtained.

3) The efficiency evaluation of the model: Results of the seminar to criticize the model and assess its appropriateness, feasibility, and usefulness showed that the four groups of experts were in agreement in their opinions that the developed model was appropriate, feasible, and useful at the very much level. The evaluation means of the four expert groups were not significantly different.

6.1.3 DDS-PAR-385 Model

1) The DDS-PAR-385 Model is a specially designed self-evaluation model for secondary school environmental education evaluation. It has 5 main comments: (1) evaluation objectives, (2) critical success factors (standard) of environmental education to be evaluation, (3) evaluation steps and method, (4) utilization of evaluation results, and (5) evaluation of evaluation results.

2) Details for each model component are as follows:

(1) Evaluation objectives are specified in two levels, that is, objectives at the strategic level and objectives at the operational level. This is to ensure that the evaluation is complete and evaluation results be continuously utilized for improvement environmental education management.

(2) The evaluation is to be undertaken in two evaluation cycles, that is, evaluation of environmental education management for improvement of the management, and evaluation of the evaluation results for improvement of the evaluation.

(3) The strategic approach is employed to correspond to the main objectives of evaluation, that is, holistic evaluation; determination in advance of critical success factors, or evaluation standard, that are clear and harmonious for every level; employing the most appropriate evaluation method for each situation; systematic evaluation and reporting; participatory evaluation; and continuous evaluation for development.

(4) The participatory action is used as the main research methodology for evaluation development.

(5) The evaluation is undertaken in three main stages: the evaluation development stage, the implementation stage, and the improvement of the results and the evaluation. The evaluation procedure consists of the following 8 steps: the review of the vision and mission, the determination critical success factors and key performance indicators, the determination of targets, the determination of data and data collection, the analysis of evaluation report, the improvement of environmental education management, and the evaluation of evaluation (meta-evaluation).

(6) The evaluation is to be conducted for the whole environmental evaluation management system of the school comprising 5 main components as critical success factors at the strategic level: desirable characteristics of students; knowledge, skills, and participation in environmental education management of teachers; the administration and management of environmental education; the

administration and management of school environment; and the environmental education services to the community. The total number of 12 CSFs at the operational level and 25 evaluation data have been identified. This is the evaluation of the whole system of environmental education management of the school.

3) Evaluation instruments are the flexible component of the model. The schools can adapter modify the evaluation instruments to be suitable for their determined critical success factors. As for this participatory action research every school used the SE 1-7 evaluation forms and the SER 1-7 reporting forms that had been jointly developed, all of which can be adapted later to suit the condition of each school.

4) The guidelines for implementing the DDS-PAR-385 Model in school are set for the follows: (1) The administrator must announce the policy or show the determination for development of self-evaluation of environmental education management; (2) He must instill the understanding and awareness of the need for development of the management and evaluation of environmental education; (3) He must organize the environmental education evaluation as a part of the educational quality assurance system, and as a part of the normal administration system so that it does not become an additional burden to teacher; (4) He must appoint a working committee for development that is a part of the working team for evaluation development of the school; (5) He must set up the leading core and the network for evaluation development for the whole school; (6) There must be supervision and monitoring for on-going utilization of evaluation results to improve upon environmental education management and evaluation development; (7) There must be reporting of evaluation.

5) Benefits of the DDS-PAR-385 Model. This model will stimulate and strengthen the school on the following: (1) Identification of tangible achievement of environmental education management; (2) Continuous development of environmental education management; (3) Development of environmental education management as a dimension of educational management and educational management in other areas; (4) Stimulation for development of working teams and academic strength of the school; and (5) Satisfaction and cooperation of teachers and concerned personal in environmental education management and educational development of the school.

6.2 Recommendations

6.2.1 Recommendations for Utilization of Research Results

1) For secondary schools that want to utilize the model:

(1) The school must instill the understanding of the model so that every involved personal accepts, realize the importance, and wants to undertake the development.

(2) The administrator must have the determination to carry out the development and he must take responsibility for coordinating the project or appointing a qualified person to be the project coordinator if necessary.

(3) The school must improve the evaluation instruments to make them appropriate for the real condition of the school. Also it should construct several evaluation forms that are comparable in quality that can be selected for use in different evaluation situations as considered appropriate.

(4) The school should adapt or select various evaluation model, especially for evaluation of behaviors. If it needs to use the same instrument, after instruments must be used to complement it so that the evaluation results become more authentic.

2) For the original 4 cooperative school, they should take action on the following:

(1) Immediate follow-up on utilization of evaluation results and arrangement for reporting of tangible improvement results.

(2) Adjustment or modification of evaluation instruments to make them more appropriated, together with the addition of more measurement methods to make the evaluation more authentic.

(3) Reporting of evaluation results to stakeholders and the public, and undertaking further action for continuous development of environmental education management and evaluation.

3) For administrators and work units responsible for promotion of environmental education, they should take the following actions:

(1) Presentation of the model to high level administrators of the ministry of education for their consideration, and dissemination of the model to concerned and interested people via various media.

(2) Presentation of the model in the meeting of educational administrators, school administrators, and those responsible for promotion and support of secondary school environmental educational.

(3) Integration of the evaluation model in the training secondary school administrators and teachers.

(4) Organization of the quality assurance system for secondary school environmental education together with the school's educational quality assurance system, and organization of the evaluation system of the school's environmental, education, including the self-evaluation, internal evaluation, and external evaluation

(5) Organization of development networks for management and evaluation of environmental education at the local, regional, and national levels.

6.2.2 Recommendations for Further Research

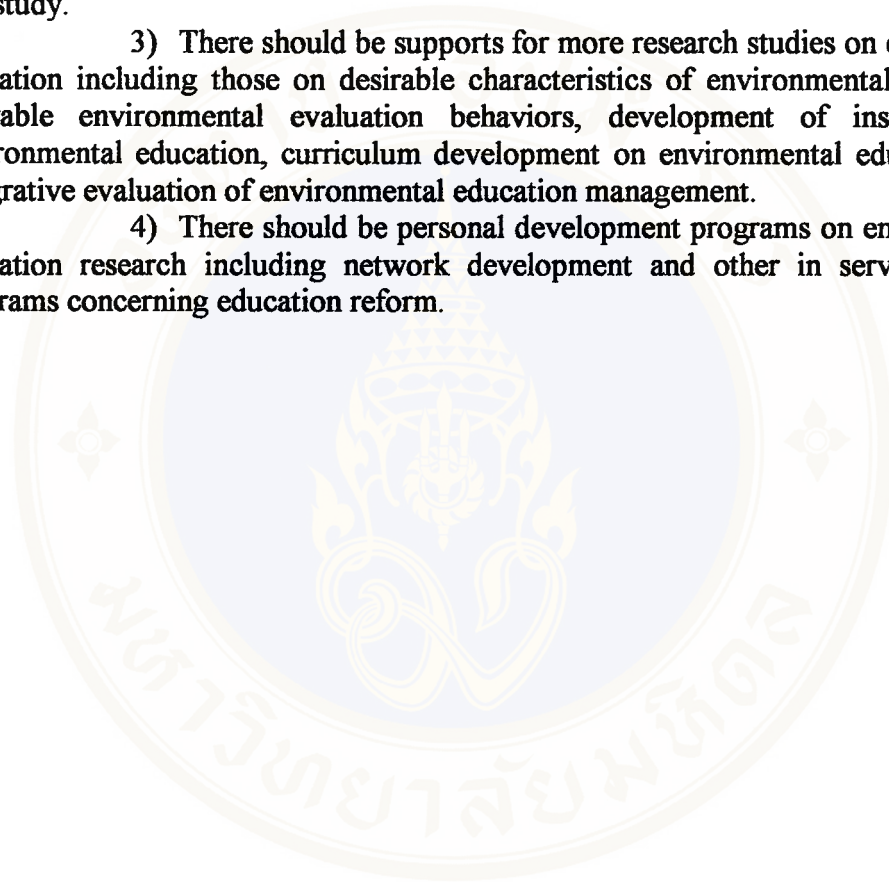
1) There should be further action research for development of the evaluation model on a continuous basis, especially the research on determination of critical success factors or the standard of environmental education for evaluation, development of evaluation instruments, examination of environmental education for evaluation, and the sustainability in the development of management and evaluation of environmental education such as conducting factor analysis to examine whether or not the determined factors are real critical success factors for secondary school environmental education. Also, there should be further action research to develop standardized tests on environment, to study the participation in evaluation of

environment education, and to study factors affecting the development of secondary school environment education management and evaluation.

2) The participatory action research method should be applied in development of management and evaluation of other dimensions of success that are of integrative characteristics similar to environment education, such as, development of Thai values, development of quality based on religions teachings, appropriate characteristics for Thai people, etc. The application of the PAR method should be based on the development and evaluation concepts that serve as the framework for this study.

3) There should be supports for more research studies on environment education including those on desirable characteristics of environmental evaluation, desirable environmental evaluation behaviors, development of instruction on environmental education, curriculum development on environmental education, and integrative evaluation of environmental education management.

4) There should be personal development programs on environmental education research including network development and other in service training programs concerning education reform.



BIBLIOGRAPHY

- Abell, P. (1971). Model Building in Sociology. New York: Schocken Books.
- Andersen Consulting. (1999). The Progress of RBM in the Public Sector (Presentation paper)
- Boonprasert, Bandit. (1991). Social Science Activities for student Environment awareness in the perception of teacher (Thesis) Mahidol University.
- Buddakert, Juthatip. (1993). Management Social Curriculum for Environmental Education in Secondary School. Mahidol University.
- Calder, J. (1994). Programme Evaluation and Quality: A Comprehensive Guide for Setting up an Evaluation System. London: Kogan Page Limited.
- Chaingkul, Vitayakorn. (1998). Thai Education Report BE.2540. Bangkok: Amarin Printing and publishing Limited.
- Chaiteeranuwatsiri, Manee. (1998). A Participatory Action Research on students, Families, schools and Communities Development through Environmental Education. (Copy).
- . (1996). Behavioral Research. Bangkok: Mahidol University.
- Chankana, Jarunan. (1993). Problem on Population and Environment in Secondary School, Education Region 9. (copy).
- Chantarasorn, Waradete. (1997). Thai Public Sector Development. Bangkok: Graphic Format (Thailand).
- Chansupat, Jiraporn. (1991). Environmental Education Development in Thailand. Mahidol University.
- Chantawanich, Supang. (1996). Quality Research. Bangkok: Chulalongkorn University Publishing.
- Chankea, Kasem. (1993). Environmental Education. Bangkok: Aksornsayam Printing.
- Cronbach, L.J. (1963). Course Improvement through Evaluation. teachers' College Record.
- Department of Educational Technique. (1990). Elementary and Secondary School Curriculum (Modified issue 1990). Bangkok: Kurusapa Latprao Printing.
- . (1990). Lower and Upper Secondary School Curriculum (modified issue B.E. 2533). Bangkok: Kurusapa Latprao Printing.
- . (1992). Self-Evaluation for environment Management Development. Bangkok: Kurusapa Latprao Printing.
- . (1995). Education Quality Development. Bangkok: Kurusapa Latprao Printing.
- . (1996). Quality Assurance. Bangkok: Kurusapa Latprao Printing.
- . (1997). Learning Strategy. Bangkok: Kurusapa Latprao Printing.
- . (1997). Quality System Management. Bangkok: Kurusapa Latprao printing.
- . Environment in Lower and Upper Secondary School Curriculum (modified issue B.E. 2533). (copy)

- Department of Environment Quality Promotion. (1997). Environmental Education Operational Plan B.E. 2540 - 2544. (copy)
- _____. (2000). School Environmental Education. Bangkok: Ministry of science and Environment. (Copy)
- Department of General Education.(2000). School Assurance Handbook. Bangkok: Kuruspa Latprao Printing.
- _____. Secondary School Environment Management Standard. (copy)
- Dulakasem, Utai., et al. (1993). A Handbook on Quality Research for Development. Khon Kean: Research & Development Institute. Khon Kean University.
- Faculty of Social Sciences and Humanities. (1996). Environmental Education and training in Higher Education Academic Report: Roles and Opinions in Rapid Change Period. Bangkok: Mahidol University.
- Good, C.V. (1973) Dictionary of Education. New York: McGraw - Hill Book Company.
- Jhamwitayapong, Orasri. (1999). Basic Concepts of Rung-arum Project: New Educational strategy for Energy and Environment Preservation. Bangkok: Plan Printing company Limited.
- Kaenpitak, Bandit. (2000). School Quality Assurance in Department of General Education. Journal of Education Supervision, 1 (5),11.
- Kaewdaeng, Roong. (1997). Thai Governmental Office Re-engineering Part II. Bangkok : Pimdee Company Limited.
- Kanhasuwan, Ladawan. (1997). Environmental Education. Bangkok: Department of Environment Quality Promotion.
- Kaplan, S.R. & Norton, P.D. (1966). Translating Strategy into Action: The Balanced Scorecard. Boston Massachusetts U.S.A. Harward Business School Press.
- Keating, M. (1993). The Earth Summit's Agenda for Change. Geneva: SRO-Kurdig S.A.
- Keeve, J.P. (1988). Education Research, Methodology and Measurement : An International Handbook. Oxford: Pergaman Press.
- Lokseekeu Foundation. (1997). Thai Environment situation. B.E. 2539. Bangkok: Look Seedeu Foundation.
- Martlium, Tawin. (1999). School based Management. 1(8), 12.
- Maksawan, Tippawadee. (1998). Result-Based Management. (2nd Edition). Bangkok: Graphic Format company Limited.
- Meechaeng, Samran. (1997). Self-evaluation. Educational studies Journal. Naresuen University.
- Meetate, Supanee. (1996). The Development of Primary school Environment Activities. Bangkok: Kurusapar Latpro Printing.
- Mehrens, W.A. & Lehman I.J. (1984). Measurement and Evaluation in Education and Psychology. 3 rd. ed. Japan: Holt, Rinehart and Winstons. 5.
- Nakorntup, Amornwit. (1999). Kamphan kong pain din (Third edition). Bangkok: Tawanok Printing Company Limited.
- Ministry of foreign Affair. (1994). Agenda 21 for Sustainable Development. Bangkok: Amarin Printing and Publishing Limited.

- Ministry of Education. (1991). Environmental Education Project Master Plan B.E. 2535 - 2539 . (copy)
- . (1993). Education Statistic 1996. Bangkok: Kuruspa Latprao Printing.
- . (2001). An Adverstiment on School Quality Assurance B.E. 2544. (copy)
- . (2002). Ninth Period of Education, Religion and Cultur Plan B.E. 2545-2549. (copy)
- Office of Civil Governmental Officer Commission. Public Sector Management System Reform Plan B.E. 2542. Bangkok: Central Division Printing.
- Office of Education Religion and Culture Development, Region 11 (2000). The Relationship of Quality Assurance Policy and students' Satistaction, Doss action Report.
- Office of Educational Research and Improvement, U.S. Development of Education, (2000). "Monitoring School Quality: An Indicators Report", Statistical Analysis Report. December, 2000.
- Office of Industrial Products Standard. General Guideline on Environmental Management Accreditation. (copy)
- Office of National Economic and Social Development. (1997). Eighth Period of National Economic and Social Development Plan B.E.2540-2544. (copy)
- Office of National Education Commission. (2000). Education Standard for External Evaluation: Basic Education (copy).
- . (2000). Learning Reform. Bangkok: Pimdee company Limited.
- . (2000). Learning Reform, Learner center. 4th edition. Bangkok: Kurusapa Ladprao Printing.
- . (2000). National Education Act 1999. Bangkok: Prig Won Graphic Co.,Ltd.
- . (2000). School Assurance Guidelime : External Evaluation. 2rd edition. Bangkok: Pimdee Company Limited.
- Office of National Eeementary Education Commission. (1996) Administrators' Guideline: Elementary School Environmental Education Learning and Activities Development. Bangkok: Kurusapa Printing.
- Office of Permanent Secretary, Ministry of Education . (1999) Secondary School Administrator's Training Report B.E. 2542. (copy)
- . (2000). Mass Education Evaluation Report B.E.2543. Bangkok: Kansatsana Printing.
- . (2000). National Education Act. Bangkok: Kurusapa Latprao Printing.
- . (2001). Strategic Performance Evaluation in School and Education Office. Bangkok: Kansatsana Printing.
- Office of Rung-arurn Project, Office of National Energy Policy Committee and Thai Environment Institute. (1999). Whole school Development for Energy and Environment Preservation. Bangkok: The Emperor P. Group Limited.
- . (2001). Curriculum on Energy and Environment Preservation. Bangkok: The Emperor P. Group Limited.
- . (2001). Learning Management for Energy and Environment Preservation. Bangkok: The emperor P. Group Limited.
- . (2001). Rung-arurn Project Success Indicators. Bangkok: The Emperor P. Group Limited.

- Office of Rung-arun Project, Office of National Energy Policy Committee and Thai Environment Institute. (2001). Whole School Management. Bangkok: The emperor P. Group Limited.
- Office of Special Commission for the Royal Projects. (1997). Royal Methods of Development. Bangkok: 21 Century Company Limited.
- Piampongson, Preecha. (1997). Environment and Development. (2nd edition) Bangkok: Chulalongkorn University Printing.
- Promjui, Somkit. (1992). Non-formal Education Center Self-Evaluation. Thesis on Ph.D. in Education Evaluation. Chulalongkorn University.
- Puchareon, Warapat. (1998). School Quality Evaluation Guideline. Bangkok: Pimdee Company Limited.
- Miller, R.L. & Sahn, D.E. "Built-in Evaluation Systems for Supplementary Feeding Programmes Why and How," [Online]. Available: <http://www.unupbooks/80473e/Eop.htm>. 1/10/1999.
- Ramsuit, Pantip. (1997). Participatory Action Research. Bangkok: T.A. Living Company Limited.
- Rangchaikul Wiboonsri, Yaovadee. (1999). Project Evaluation Concepts and Practice. Bangkok: Chulalongkorn University Printing.
- Scriven, M.S. (1969). An Introduction to Meta-Evaluation. Education Product Report. February.
- Sawatdipanit, Ko. (1986). Project Evaluation. Bangkok: Kuruspa Latpro Printing.
- Senarith, Prapatpong. (1999). Education reform. Education Reform Journal. 1 (8),11.
- Sirichokchaikul, Tewin. (1999). ISO 14000 Environment Management System. Bangkok: Korncreation Company Limited.
- Srisupan, Varaporn. (1996). Environmental Education. (2nd edition). Bangkok: O.S.Printing House.
- Stoner. A.M. & Wankel. C. (1986). Management. New Delhi: Prentice Hall Privated Limited.
- Stufflebeam, D.L., et al. (1971). Educational Evaluation and Decision Making Itasca, Illinois: Peacock.
- Stufflebeam, D.L. (2001). Evaluation Model. San Francisco: Jossey - Bass.
- Suwanmala, Charat. (1996). Performance Audit: Public Sector Reform Strategy. Bangkok : Graphic Format (Thailand) Limited.
- Suwannan, Veerapon. (1988). Plan and Project Evaluation. Bangkok: Rayoovong Company.
- Sudprasert, Kamol. (1997). Participatory Action Research. (second edition) Bangkok: J.M.T. Company Limited.
- _____. (1998). Education Quality and Standard Evaluation: Basic Education. Bangkok: V.T.C. Communication Company Limited.
- Taotong, Vatana. (1991). Teaching Environmental education in Primary School. Curriculum development Journal 10 (104).
- Thailand Development Research Institute (TDRI). (1998). Environment Quality Report, B.E.2540. (copy)
- Thailand Environment Institute. (1992). Thailand National Report to the United Nations Conference on Environment and Development (UNCED).
- Thai Globalization Education Project. (1998). Kwam Ching Kong Pan Din. Bangkok: Tawanok Printing.

- Traimonkolkul, Pongpan. & Chatraporn, Supab. (2000). Research Design (2nd edition). Bangkok: Kasetsart University Printing.
- UNESCO. (1991). Qualitative Aspects of Educational Planning Paris: United Nations, 1991.
- _____. (1996). Learning for Sustainable Development: An Agenda for Teachers. Education in Asia and the Pacific. Bangkok: UNESCO.
- United Nations Environment Programme (UNEP). (1999). Overview Global Environment Outlook 2000 (GEO-2000). <http://www.unep.org>.
- U.S Department of Education. (2000). Monitoring School Quality: An Indicator Report. United States Department of Education Pubs.
- _____. (2000). Research and Development On School Internal Evaluation.
- Vongvanich, Suwimon., et al. (1996). Thai Environmental Education Research Synthesis. Journal of Research Academic. 8 (2).
Bangkok: V.T.C Communication. (Dessertation Report)
- Weerawatananon, Winai. (1994). Human and their Environment. Bangkok: Ruenkaekapim Printing.
- _____. (1996). Environment and Development. Bangkok: Ruenkackanpim Printing.
- _____. (1997). Environment crisis : Development Ending. (2nd edition)
Bangkok: Songsayam Printing.
- _____. (1998). Environment and Development. (3rd edition). Bangkok: Asian public Health Institute.
- Weerawatananon, Winas & Sripanpong, Banchuen. (1994). Environment studies. Bangkok: Odian stores.
- _____. (1996). Environmental Education : Education for sustainable Development. Bangkok: RuenkacKanpim.
- Weerawaananon, Winai., et al. (1997). Environmental education in Asian - Indochaira. Dessertation Report. Mahido University.
- World Commission on Environment and Development. (1987). Our Common Future. Oxford, Great Britian: Oxford University Press.
- Worthen, B.R. & Sandess, T.R. (1973). Educational Evaluation: Theory and Practice. Ohio: Charles and Joanes.



Appendix A
Research Instruments

1. Model Efficiency Evaluation Questionnaire
2. Model Validation Testing Questionnaire
3. Model Appropriateness Evaluation Questionnaire
4. A Self-evaluation Worksheet

I

**MODEL EFFICIENCY EVALUATION
QUESTIONNAIRE**

**Cooperating School for Self-evaluation
Development Project**

Model Efficiency Evaluation Questionnaire

Instruction:

1. This questionnaire is the tool to evaluate DDS-PAR-385 Model' efficiency in 3 main aspects: evaluation participation; a self-evaluation readiness; and teachers' knowledge on environmental education a self-evaluation.

2. Informant are teachers and school personal who have involved in school environmental education a self-evaluation development, including: administrators; evaluation development committee; teachers and educational personnel who are in charge of schools' environmental education.

3. This questionnaire is divided into four parts:

Part I Informant status

Part II Rating scale questionnaire, to evaluate levels of teachers' participation and experience on environmental education a self-evaluation.

Part III Rating scale questionnaire, to evaluate levels of teachers' readiness and needs on environmental education a self-evaluation.

Part IV Multiple choice test, to test teachers' knowledge on environmental education and environmental education a self-evaluation.

4. Please read the direction in each part understandingly before answering this questionnaire.

PART I Informants' status

Direction: Please put X in that's your status on school a self-evaluation development.

school teacher & personnel a self-evaluation committee

administrator

PART II

Participation & Experience on Environmental Education and A Self-evaluation

Direction: Please consider the environmental education and environmental education activities below and find out levels of your participation and experience in each activity then write down ✓ in the space. Experience and participation are divided into 5 degrees below:

- 0 defined as least experience
- 1 defined as little experience
- 2 defined as medium level of experience
- 3 defined as much experience
- 4 defined as most experience

Environmental Education & Evaluation Activities	Degree of experience				
	1	2	3	4	5
1) School 's vision on environmental education					
2) Strategic and operational plan on environmental education					
3) School's environmental education mission					
4) School's environmental education critical success factors (CSF)					
5) School's environmental education standard					
6) School's environmental education objective					
7) Integrating environmental education in curriculum & other subjects					
8) School's key performance indicator (KPI)					
9) Integrating environmental education in your own subject					
10) School's environmental education target setting					
11) Choosing environmental education evaluation device					
12) School's environmental education data and source of data					
13) School's environmental education tools of evaluation construction					
14) School's environmental education a self-evaluation					
15) School environmental education collection					
16) A self-evaluation on environmental education report					
17) School's environmental education review					
18) Setting out a computer program for seminar					
19) Improving Environmental education in your own subject					
20) Comparing environmental education in school levels against the needed data					

PART III

School's Readiness & Need on Environmental Education Evaluation

Direction: Please consider lists of school readiness and needs then write down ✓ on the right space that's the actual aspects of your school. Readiness and needs are divided into 5 degrees below:

- 1 defined as very low level of readiness & need
- 2 defined as low level of readiness & need
- 3 defined as medium level of readiness & need
- 4 defined as high level of readiness & need
- 5 defined as highest level of readiness & need

Lists of school a self-evaluation activities	Degree of Readiness				
	1	2	3	4	5
1) Providing a clear and shared vision on environmental education.					
2) Providing school specific plan and operation plan on environmental education					
3) Fixing CSFs and KPIs on environmental education					
4) School's consistency of vision, mission, CSFs and KPIs					
5) Setting sufficient school's environmental education MIS and tools					
6) Setting a computer programe for environmental education					
7) School environmental education evaluation					
8) School personnel involving in school environmental activities					
9) A self-evaluation reporting on environmental education (SER)					
10) Providing community continuous information on environment and school environmental education					

Lists of School a self-evaluation Activities	Degree of need				
	1	2	3	4	5
1) Providing environmental education vision					
2) Strategic planning on environmental education					
3) Fixing the CSFs and KPIs on environmental education					
4) Constructing the tools for environmental education evaluation					
5) Constructing the programe for evaluation					
6) School environmental education a self-reporting.					
7) Providing consistence CSFs and KPIs					
8) Environmental education new management					
9) Developing school environmental education standard					
10) Environmental education teachers & personnel					

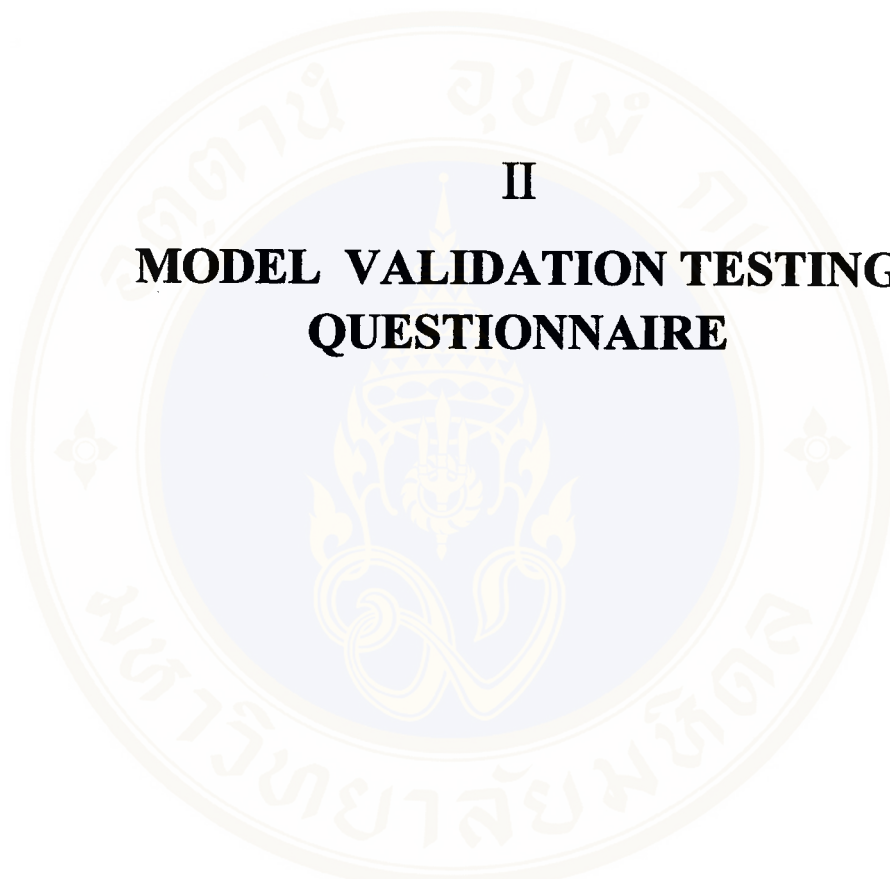
Part IV

Test of Environmental Education

Please put **×** on a b c d or e which is the best correct answer.

- 1) Which is not a vision components ?
 - a. mission
 - b. results
 - c. value
 - d. benchmarking
 - e. key performance indicators
- 2) What kind of an environmental education strategic Plan?
 - a. annual plan
 - b. operation plan
 - c. Policy plan
 - d. macro plan
 - e. short - range plan
- 3) What is a strategic analysis?
 - a. SWOT
 - b. Portfolio analysis
 - c. Need analysis
 - d. stakeholder analysis
 - e. financial analysis
- 4) Which is the appropriate plan for school environmental education?
 - a. Strategic plan
 - b. Operation plan
 - c. Development plan
 - d. a and b
 - e. a , b and c
- 5) Which part of strategic plan that most related to strategic evaluation?
 - a. vision
 - b. mission
 - c. objective
 - d. CSF and KPI
 - e. a , b , c and d
- 6) For the management reform, what management's style that schools have to perform?
 - a. Child centered activities
 - b. Lifelong Learning management
 - c. Decentralized management
 - d. Result-based & decentralized management
 - e. Performance based budgeting
- 7) What's the highlight aspect of new public management?
 - a. result-based and concrete results
 - b. privatization
 - c. decentralization
 - d. transparency and accountability
 - e. new performance evaluation
- 8) What's the first step of environmental education management?
 - a. core vision and value providing
 - b. mission providing
 - c. environmental education plan
 - d. environmental education curriculum
 - e. environmental education standards
- 9) Which type of budgeting that's the result of result-based management?
 - a. PPBS
 - b. PBB
 - c. Line item budgeting
 - d. Zero-based budgeting
 - e. a , b , c and d
- 10) Which school aspects is the best indicator of school's result based management?
 - a. Vision and Value
 - b. School improvement plan
 - c. Strategic management
 - d. teachers' participation
 - e. work standard

- 11) Which is the first activity of new performance evaluation?
- vision & value providing
 - CSF Providing
 - KPI Providing
 - Work standard
 - Objective of work
- 12) What's the highlight of new performance evaluation?
- evaluators
 - evaluation objectives
 - tools
 - time k for evaluation
 - results & indicators
- 13) What's the difference of self-evaluation and internal evaluation?
- evaluator
 - objective of evaluation
 - tools
 - time for evaluation
 - results and indicators
- 14) What's the new device of evaluation in basic education curriculum?
- Objective based evaluation
 - Standard based evaluation
 - Class - range evaluation
 - Subject - based evaluation
 - a - d
- 15) Arrange these evaluation activities in order
- | | |
|------------------------------|----------------------|
| 1. Vision & mission analysis | 4. Fixing the KPI |
| 2. Fixing the target | 5. Data collecting |
| 3. Fixing the CSF | 6. Evaluation report |
- 1 2 3 4 5 6
 - 1 3 4 5 6 2
 - 1 3 4 2 5 6
 - 1 4 3 2 5 6
 - 1 3 4 5 2 6
- 16) What is the most appropriate device on school environmental education evaluation?
- whole school evaluation
 - subject - based evaluation
 - integrated evaluation
 - a and b
 - a b and c
- 17) Which is not the main objective of school environmental education?
- providing environmental education activities
 - performing environment management
 - providing environmental education resources
 - community environment participation
 - develop environment management to ISO 14000
- 18) What's the main cause of environment crisis?
- Disappropriate believe and value of human being
 - Lack of environmental understanding
 - Lack of environmental awareness
 - Lack of participation
 - Lack of monitoring and evaluation
- 19) Who is in charge of school's environmental education instruction?
- environmental education teacher
 - All teachers in each school
 - Administrator
 - Teachers and school personal
 - School committee
- 20) Who is in charge of environmental education self-evaluation?
- All teachers in each school
 - All teachers and personal in each school
 - School's upper unit
 - a and b
 - a, b and c



II
MODEL VALIDATION TESTING
QUESTIONNAIRE

**Cooperating School for Self-evaluation
Development Project**

Model Validation Testing Questionnaire

Instruction:

1. This questionnaire is the tool for testing validation of the self-evaluation model for secondary school environmental education. (DDS-PAR-385 Model) It is a model-performance congruence testing. The informants are school teachers and personnel who actually have taken a part in self-evaluation model development process.

2. This questionnaire is divided into two parts:

Part I Expert background information:

Please mark on that's your information.

Part II Scoring the congruence: Please read the direction before scoring.

3. Please read each statement that describes the aspects of DDS-PAR-385 Model, then consider that it is congruent or not between the model aspects and the actual self-evaluation you have participated and express your opinion by scoring as followed:

+ 1 If provided aspects and actual aspects are congruent.

5 If You are not sure that they are congruent or not.

- 1 If provided aspects and actual aspects are not congruent.

PART I

Expert background Information

1. Sex male
 female

2. Education Bachelor's degree
 Master's degree
 Doctor's degree

3. Experiences in school's environmental Education
 - 1 - 10 years
 - 11 - 20 years
 - more than 20 years

PART II

Scoring the Congruence

Model aspects (characteristic)	Score
1. Double objectives of evaluation to consider school total success and operational success to be improved.	
2. Five components of school environmental education being evaluated.	
3. Three main steps, 8 evaluation steps and strategic methods are utilized in evaluation procedures.	
4. Focus on using of evaluation results.	
5. Meta - evaluation is utilized to evaluate evaluation.	

III

**MODEL APPROPRIATENESS
EVALUATION QUESTIONNAIRE**

**Cooperating School for A Self-evaluation
Development Project**

Model Appropriateness Evaluation Questionnaire

Instruction:

1. This questionnaire is the tool to evaluate the appropriateness of DDS-PAR-385 Model: The model for a self-evaluation on environmental education in secondary school.
2. This questionnaire is divided into 4 parts:
 - Part I** Informants' status
 - Part II** Model's appropriateness evaluation
 - Part III** Model's profit evaluation
 - Part IV** Experts opinion on DDS-PAR-385 model
3. The informants are experts who involve in DDS-PAR-385 and cooperative school on a self-evaluation development project seminar.
4. Your information is highly profitable for this model building. Please read the specific direction in each part before performing the questionnaire and very much thank for your kindness and responding.

PART I Informants' Status

Put on that's your personal data.

1. Sex male female
2. Education Bachelor's degree'
 Master's degree'
 Doctor's degree
3. Years of environmental education experiences
 - Less than 5 years
 - 5 - 10 Years
 - More than 10 years
4. Status of evaluation experts participated in environmental education a self-evaluation.
 - High level of MOE administrators
 - Experts on environmental education
 - Supporter on environmental education
 - Personnel involving DDS-PAR-385 development

PART II

Model Appropriateness Evaluation

Direction: Please consider the appropriateness of each aspects of DDS-PAR-385 Model, then find out degree of appropriateness in each aspects that's divided into 5 degrees as below:

- 5 defined as most appropriate
- 4 defined as much appropriate
- 3 defined as moderate appropriate
- 2 defined as little appropriate
- 1 defined as least appropriate

DDS - PAR - 385 aspects to be evaluated	Degree of appropriateness				
	5	4	3	2	1
1) Double objectives: to evaluate both in strategic results and operational results for improvement					
2) To evaluate in whole school approach					
3) Providing clearly and consistence CSF and KPI to be measured					
4) Fixing the targets which is the lower criterion of environmental education success					
5) Selecting methods of collecting data that suitable for data					
6) To evaluate by all school teachers participation					
7) Continuous improvement by evaluation results					
8) To develop school environmental education and evaluation by PAR process					
9) Providing clear and conclusive evaluation activities involve 3 main steps and 8 evaluative activities as evaluation cycle					
10) Monitoring an evaluation results utilization					
11) Providing meta - evaluation					
12) Fixing 5 components 12 CSF and 25 indicators of school environmental education's success to be measured.					
13) Providing school to choose evaluation methods and tools freely.					
14) Developing environmental education evaluation through the Cooperative School for Self-evaluation Development Project					
15) Evaluating the model by providing the project seminar					

PART III

Model Profit Evaluation

Direction: Please consider the DDS-PAR-385 Model aspects below, then find out degrees of model's profit for environmental education development and environmental education evaluation development degrees of profit are divided:

- 5 defined as most profitable
- 4 defined as much profitable
- 3 defined as moderate profitable
- 2 defined as little profitable
- 1 defined as least profitable

DDS - PAR - 385 aspects to be evaluated	Degree of profitable				
	5	4	3	2	1
1) Providing double objectives: to strategic level and operation level.					
2) Providing double evaluation:; performance evaluation and meta-evaluation					
3) To develop self-evaluation by mean of PAR.					
4) To focus on strategic process on evaluation					
5) Fixing clear evaluation process					
6) Whole school evaluation 5 component 12 CSF and 25 indicators to be measured					
7) To evaluation and develop continuously					
8) Providing a concrete evaluation report					
9) Constructing environmental education unity					
10) Influencing school's teamwork.					
11) Influencing school teachers' academic development.					
12) Influencing school's management efficiency					
13) Leading to school quality assurance					
14) Leading to environment preservation and development					
15) Influencing school academic and innovation development					

PART IV

Experts' Opinions Suggestion

1. Consider and give your opinion on DDS-PAR-385 Model

Opinion on model	Suggestion

2. General Suggestion

IV

**A SELF-EVALUATION DEVELOPMENT
WORKSHEET ON SECONDARY SCHOOL
ENVIRONMENTAL EDUCATION**

**Cooperating School for A Self-evaluation
Development Project.**

INTRODUCTION

1. The purpose of this worksheet is to be the tool to develop a self-evaluation on environmental education in secondary schools those involve in cooperating school for self-evaluation development project.
2. The evaluation of secondary school environmental education have to be in systematically performed. Evaluation result should be enough to explain the school's success on environmental education.
3. This worksheet is divided into 10 steps: (1) Vision Review; (2) Mission Confirmation; (3) Providing School Environmental Education CSF; (4) Providing School Environmental Education KPI; (5) Setting Target; (6) Collecting Data; (7) Data Collation; (8) Self-evaluation Reporting; (9) Result Utilization; and (10) Meta-evaluation (Self-evaluation development team)
4. School working group, by participative activities, do this worksheet step by step and review the direction in each step. The discussion results and consensus are to be put in the worksheet space.
5. When the worksheet is finished, working group members have to check the appropriateness, consistency and understanding of the terms, That should answer this following questions in the following steps below:

Step I	What's our school success on environmental education?
Step II	What's our mission to attain those success?
Step III	What do we have to do to succeed in each mission?
Step IV	How do we measure our success?
Step V	What's out target for each success indicator?
Step VI	What's the needed data to assess and how to collect the data?
Step VII	How to analysis and collate the data?
Step VIII	How to report the environmental education success triangularly?
Step IX	How do we use the evaluation result to improve our school environmental education?
Step X	How do we measure the success of our evaluation?

6. When complete step 1-5, the results have to be approved by school administrator and school committee.
7. Being aware of participation, efficiency effectiveness and the acceptance of school personnel.

Step I

School Environmental Education

Instruction: 1. Write down your school environmental education vision on Form 1/1 and make discussion about the vision whether it is your expected success on environmental education or not and what's to be improve?

From 1/1 School Environmental Education Vision Review

<p>Our school Environmental Education Vision</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
--

Explanation on Form 1/1

1) *School environmental education vision is schools' performance and culture which is school scenario and target that school teachers want to land.*

2) *At least 4 components shall be shown to provide clear and appropriate vision: what will we do (mission) for environmental education; what goals and results do we want to achieve? (target and outcomes); what must we do supremely well? (distinctive competency) and what principles will guide our approach? (shared value)*

3) *School environmental education should be core vision and being accepted by all school teachers.*

4) *Vision review, not only to check vision's components but also its' clearness, specification, actionable and stimulatory.*

2. Try to analysis school environmental education vision and find out: what's mission; what's goals & results; what's distinctive competency; and what's school environmental education value, as in activity 1/2

Act. 1/2 School Environmental Education Vision's Analysis

V I S I O N	Mission	
	Distinctive Competency	
	Goals & Results	Outputs Outcomes Ultimate outcomes
	Core value	

Explanation Form 1/2

Mission is what school have to do on environmental education eg.

- Learning management on environmental education
- Performing environmental education activities
- Environment management
- Environmental education management

Distinctive Competency is what's the school can do supremely well, being compared with bench making and best practice.

Goals and result is what's the goals of school environmental education that being provided that's closely related.

Outputs are sudden results. ***Outcomes*** are the real and actual results of environment education activities but ***Ultimate outcomes*** are the actual results eg.

- Outputs*** → School students understand about environment education
- Outcomes*** → School students perform dependently
- Ultimate outcomes*** → Environment is being preserved and developed.
The main principle, concepts and believes that
- Core valve*** → guide working performance.

Outputs + outcomes = Results

STEP II

Confirming School's Environmental Education Mission

Direction: Its' purpose is to make sure that what the schools has to do is appropriate to attain school vision. School evaluation team have to consider and divided into main mission and minor mission as in activity II

Act. II . School Environmental Education’s Mission Review

V I S I O N	Mission	Main Activities
	Totalmission main activities

Explanation Form II

1. *Mission is the critical activities to be done to attain the vision. It can be provided in type of mission and main activities. The amount of mission is up to scope of vision and organization authorities.*

2. *Mission and main activities awe to be provided consistency eg.*

Mission —▶ *Environmental education Learning management*

Main activities

1. *Curriculum integration*
2. *Providing environmental education standard*
3. *Learning activity Planning*
4. *Instruction media development*
5. *Learning & Instruction*
6. *Evaluation*

(There are about 3 - 7 mission on environmental education in each school and about 15 - 20 main activities, in general.)



STEP III

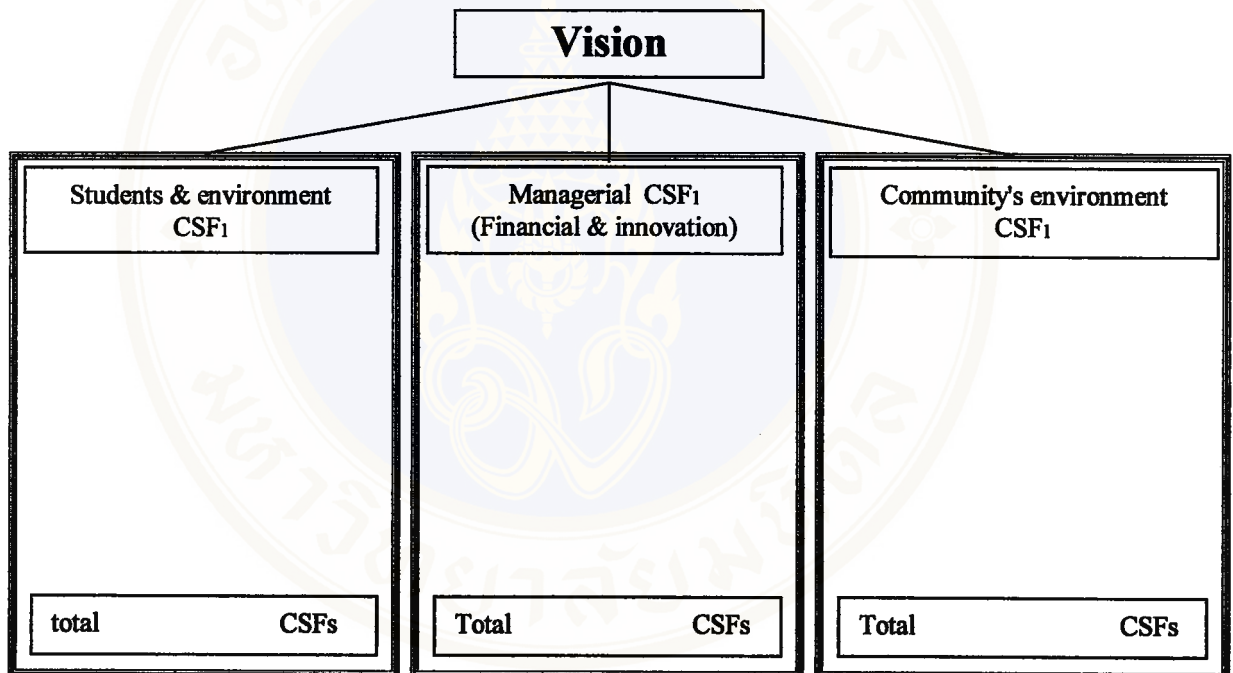
Building Critical Success Factors (CSFs)

Direction: Provide school environmental education critical success factors (CSFs) from vision and mission at least 2 level of CSFs:

CSF₁ = whole school success (strategic results)

CSF₂ = mission success (mission results or operational results)

ACT 3/1 Strategic Level CSFs



Act. 3/1 Explanation

1. Critical success factors are the success on environmental education that schools have to do to be succeed and to attain school vision.

2. School CSFs can be divided in at least 3 levels school level , mission level and subject level.

3. School environmental education CSF1 is a part of School Standard.

4. School environmental education should be divided into 3 main perspectives:

internal perspective —> *students and internal environment*

Managerial perspective —> *financial & innovation*

External perspective —> *community's environment*

5. Example of CSF₁ in each perspective:

- CSF₁ student - Students aware of environment Preservation and development, together with social mind*
- CSF₁ management - Set out school environment to instruct environmental education*
- CSF₁ community - School take a part in community environment activities.*

Act. 3/2 Operational CSF₂

Mission	CSF ₁	CSF ₂

Act 3/2 Explanation

1. *CSF₂ is mission level success and being provided in accord of CSF₁. CSF₃ is subject level success being provided in accord of CSF₂ and CSF₁*
2. *Perform Act 3/2 form by each step:*
 - 2.1 *Write down school mission in first space.*
 - 2.2 *Put CSF₁ in CSF₁ Space in accordance with each mission,*
 - 2.3 *Put CSF₂, in accordance with CSF₁ in orderly.*
 - 2.4 *The CSF relation should be shown as in the figure below*



Perform as 2 for all mission

3. *CSF₂, can be provided by each mission and subject group separately first, then mix together as a whole.*
4. *CSF₃ should be defined as data.*
5. *CSF should be developed to be school environmental education standard.*

Step IV

Providing Key Performance Indicators (for school environmental education)

Direction: Provide KPI₁ and KPI₂ in accord k of CSF₁ and CSF₂ by order.

Act. 4/2 Provide KPI₁ (Strategic results KPI)

No.	CSF ₁	No.	KPI ₁
	Total CSFs		Total KPIs

Act. 4/2 Explanation

1. Key performance indicators (KPIs) are defined as "How to measure or indicate the success that can be provided as performance, number and indices. Being Provided in 3 level as for the CSF.

2. KPI₁ and KPI₂ are generally provided in indices eg. Mean (\bar{X}) percentage (%) rate & ratio and index but for KPI₃, it's usually provided in activity lists frequency and amount of activities.

3. Example of KPIs

CSF₁ - Index of students equality to be involve in environment education activities

CSF₂ - Proportion of students that involved in environmental education activities

CSF₃ - Number of students that involved in environmental education action activities

4. KPI in each level should be show by putting number 1, 2, 3 for each KPI.

Act 4/2 Providing KPI₂

Mission.....

CSF ₁ No.	KPI ₁	CSF ₂ No.	KPI ₂

Mission

CSF ₁ No.	KPI ₁	CSF ₂ No.	KPI ₂

Mission

CSF ₁ No.	KPI ₁	CSF ₂ No.	KPI ₂

Act. 4.2 Explanation

1. Act. 4/2 form is to perform CSF₂ by mission
2. CSF₁ and CSF₂ Should be in consistency

STEP V

Setting Environment Education Targets

- Direction:**
1. Target is the level of success that's fix to be lower criterion in operation. Targets lave to be accepted by all school personnel.
 2. KPIs are usually provided in strategic and mission levels KPIs in operation level must be the data.

ACT. 5 Environmental Education Setting Target (only target on CSF₁ and CSF₂)

No.	KPI ₁ KPI	Target	No.	KPI ₁ KPI	Target

STEP VI

Data, Tools and Data Collecting

Direction : Evaluation foam set out success data of school environmental education in accordance with KPI₁ and KPI₂ in order as in act. 6/1 - 6/3

ACT.6/1 Providing Environmental Education Success Data to be Measured

KPI ₁ (No.)	KPI ₂ (No.)	KPI ₃	Data	Code of data

Act. 6/1 Explanation

1. KPI₁ , KPI₂ write down only KPI number (No).
2. Provide data in accordance with KPI₃
3. Check the accuracy, understanding of the term of data
4. Put the code of data

ACT 6/2 Source of data

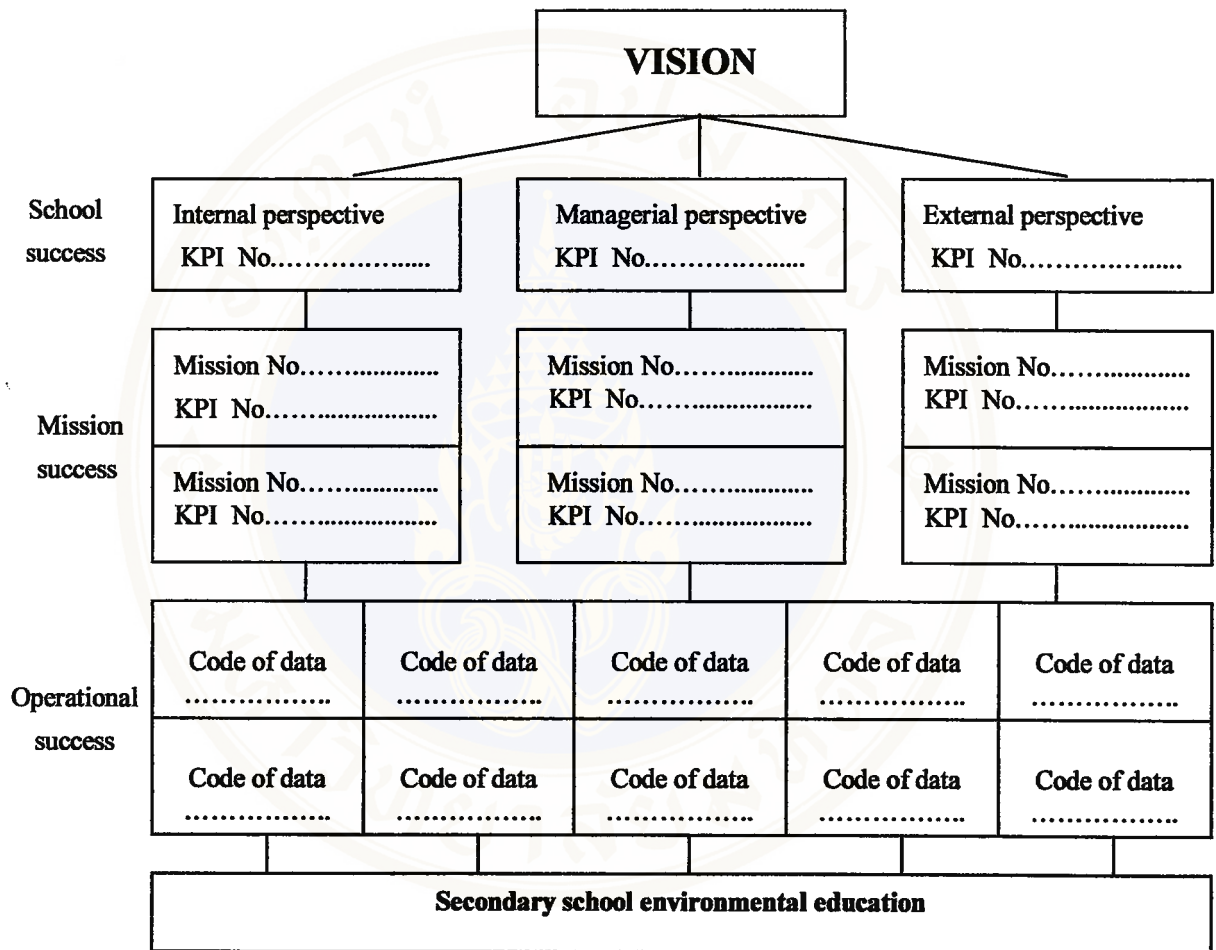
Code of data	Source	How to collect	Tools

ACT 6/3 Tools & Data Collector

Tools	Data to be collected	Frequency	collector

STEP VII Data collation

Direction : Collate collected data and how to analyze by each mission and KPI as in the below figure.



2. Set how to calculate the collected data for each KPI as act.7

Act. 7 Calculating the KPIs

KPI1/ KPI2	DATA No.	Formulation

Write down all KPI1 / KPI2 but only necessary data

STEP VIII Evaluation Reporting

- Direction :**
1. Formulate concrete report concepts that's convention and easy to perform.
 2. Formulate self-evaluation out ling

Act. 8/1 Report Concepts

Type of report	Aspects	Methods

Act. 8/2 Report Outline

Report component	Part/Lesson	Topics
Introduction		
Content		
Conclusion		

STEP IX

Meta-evaluation

Direction: Provide the CSF and KPI of evaluation to evaluate the evaluation

Act. 9 Evaluation CSF and KPI

CSF	KPI	DATA

Act. 9 explanation

1. CSF and KPI are evaluated should cover the concept of new performance evaluation.
2. Evaluate after the evaluation finish.
3. Meta - evaluation results have to be reported to improve school environmental education evaluation.

STEP X

Results Utilization

Direction: Formulate appropriate methods for evaluation result dissemination and improvement eg.

Act. 10/1 Result for Improvement Activity

Degree of success	Results	Suggestion for improvement	Division
Excellent & higher than standard			
Moderation			
Lower than standard			

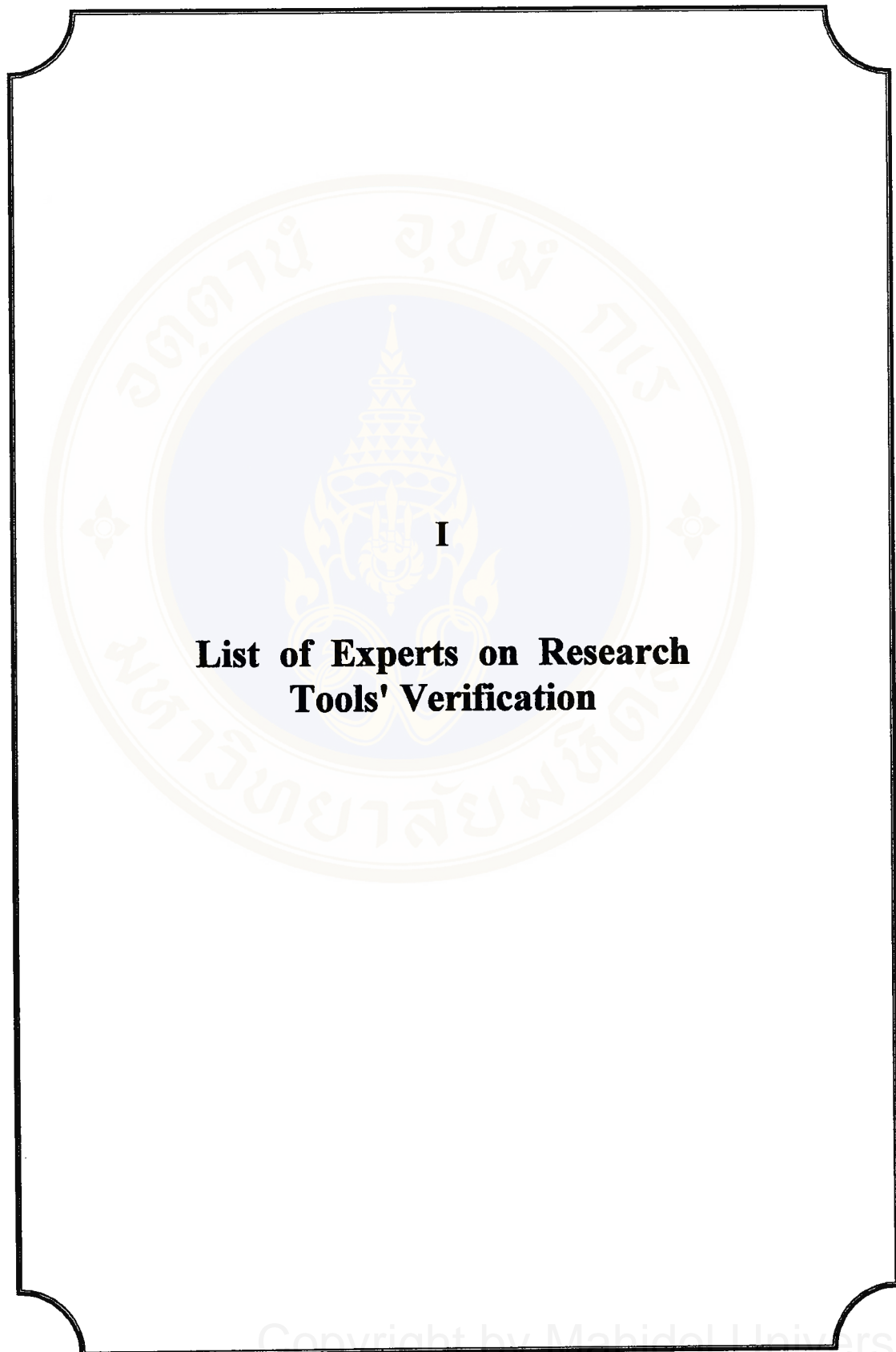
Act. 10/2 Reporting Form for Improvement

Degree of success	Results	How to improve	Division
Excellent & higher than standard			
Moderation			
Lower than standard			



Appendix B
LISTS OF EXPERTS

1. List of Experts on Research Tools' Verification
2. List of Experts who Involved in Model Seminar & Evaluation
3. List of Schools' Committee (Working Groups) on Self-Evaluation Development



I
**List of Experts on Research
Tools' Verification**

**Experts on
Model's validation testing
Questionnaire Validity Testing**

1. Dr. Chackapart Vata. Ed. D.
Assistant Secretary of national teacher council.
2. Dr. Somsak Dolprasit Ph. D.
Training officer. Office of Permanent Secretary. Ministry of Education.
3. Dr. Arnnop Cheenawat Ph. D.
Supervisor. Department of General Education.

**Experts on
Model's Efficiency Evaluation
Questionnaire Validity Testing**

1. Dr. Chamlong Nakfon Ph. D.
Sukkothai Thammatirat University.
2. Dr. Chackapart Vata Ed. D.
Assistant secretary of National Teacher Council.
3. Mr. Teerapong Niyomtong
Director of Mathayom Watmakutkasat Secondary School.

**Experts on
Model Appropriateness Evaluation
Questionnaire Validity Testing**

1. Dr. Chamlong Nakfon Ph. D.
Sukkothai Thammatirat University.
2. Dr. Chackapart Vata Ed. D.
Assistant secretary of National Teacher Council.
3. Mr. Teerapong Niyomtong
Director of Mathayom Watmakutkasat Secondary School.



II

List of Experts Who Involved in Model Seminar & Evaluation

March 7th 2002

Kuruspa Meeting Hall, Bangkok

A Ministry of Education High Level Administrators

Name	Position/Academic Character	Years of environmental education involvement.
1. Dr. Boonlue Tong-yoo	Deputy Permanent Secretaries, Ministry of Education	40
2. Dr. Kasama vorawan na yuthya	Director General , Department of General Education	
3. Mr. Prapatpong senarith	Director General, Department of Education Technique	35
4. Mr. Derek Pornsima	Ministry of Education's Adviser	35
5. Mr. Prasit Tangrom	Inspectors General, Ministry of Education	30
6. Mr. Boonrat Wong yai	Inspectors General, Ministry of Education	30
7. Mr. Chartchatri Yosida	Inspectors General, Ministry of Education	30
8. Mr. Chertsiri Keokao	Deputy Directors General, Department of General Education	30
9. Dr. Pramote Janekart	Assistant Permanent Secretary, Ministry of Education	30
10. Dr. Chamlong Nukforn	Senior Expert in Training, Ministry of Education	30
11. Dr. Somkiat Chopphol	Director Bureau of Policy and Planning	30
12. Mrs. Chnya Sawananon	Director Finance Division	20
13. Mr. Silapachai homsap	Director Legal Division	20
14. Mr. Anant Mungnoi	Director Inspection and Report Division	20
15. Dr. sukum Moolmuang	Director Evaluation Division, Bureau of Policy and Planning	20
16. Mr. Tamrong Amaro	Deputy Director General, Religion Department	20

Environmental Education Experts

Name	Position/Academic Character	Years of environmental education involvement.
1. Dr. Uee Ravang	Doctor's degree on environmental education	10
2. Dr. Chackapart Vata	Doctor's degree on educational administration	30
3. Mr. Prasern Ratanarat	Specialist on policy and planning, Office of Permanent Secretary. Ministry of Education (MOE)	30
4. Mrs. Boonsri Panachit	Specialist on religion, Department of Religion, MOE.	30
5. Mr. Vipark Rotchanapact	Specialist on instruction, Department of general education, MOE.	20
6. Miss Arawan Soonthonchai	Specialist on planning office of Private Education committee., MOE.	30
7. Dr. Somsak Dolprasit	Policy and planing officer Bureau of Policy and Plan, MOE.	15
8. Dr. Prarop Keaset	Doctor's degree on environmental education.	30
9. Dr. Arnnop Chinawat	Supervisor, Department of General Education, MOE.	20
10. Mr. Anarn Ranjabtook	Director of Provincial Office of General Education.	20

Name	Position/Academic Character	Years of environmental education involvement.
11. Maj. Prachum Mathuramon	Doctoral Candidate, Environmental Education	30
12. Mrs. Chintanapa sophon	Office of National Research Council	20
13. Mr. Panya Mankept	Agricultural Administrator Development Institute. Ministry of Agriculture	20
14. Miss Prapaporn Chuleelang	Ministry of Labor and	20
15. Mr. Boonchan Buahong	Director of planning Division, Bureau of Policy and Planning, MOE.	33
16. Mr. Veerasak Pecbua	Office of Minister Secretary, MOE.	40
17. Mr. Apichai Kookha	Office of Special Affair, MOE.	40
18. Mr. BoonLuang Tonya	Director of Bureau of Education, Religion and Culture development, Region I	40
19. Mr. Lamai Changnivm	Nontaburee province assistant superintendence.	40
20. Miss Pinsuda sirithrangsri	Office of the National Education Commission	20
21. Ass. Prof. Suree Tongwichian	Mahidol University	35
22. Mr. Sanguan Srisook	Surathani Province Super intendence	25
23. Mr. Wiman Wankam	Bureau of education, religion and Culture. Development Region 11	35
24. Dr. Burapatid Ploysvwan	Ratchapat Institute, Ayuthaya	20
25. Miss Piyanut Tanchareon	Office of Permanent Secretary, MOE.	20

Environmental Education Supervisors and Supporters

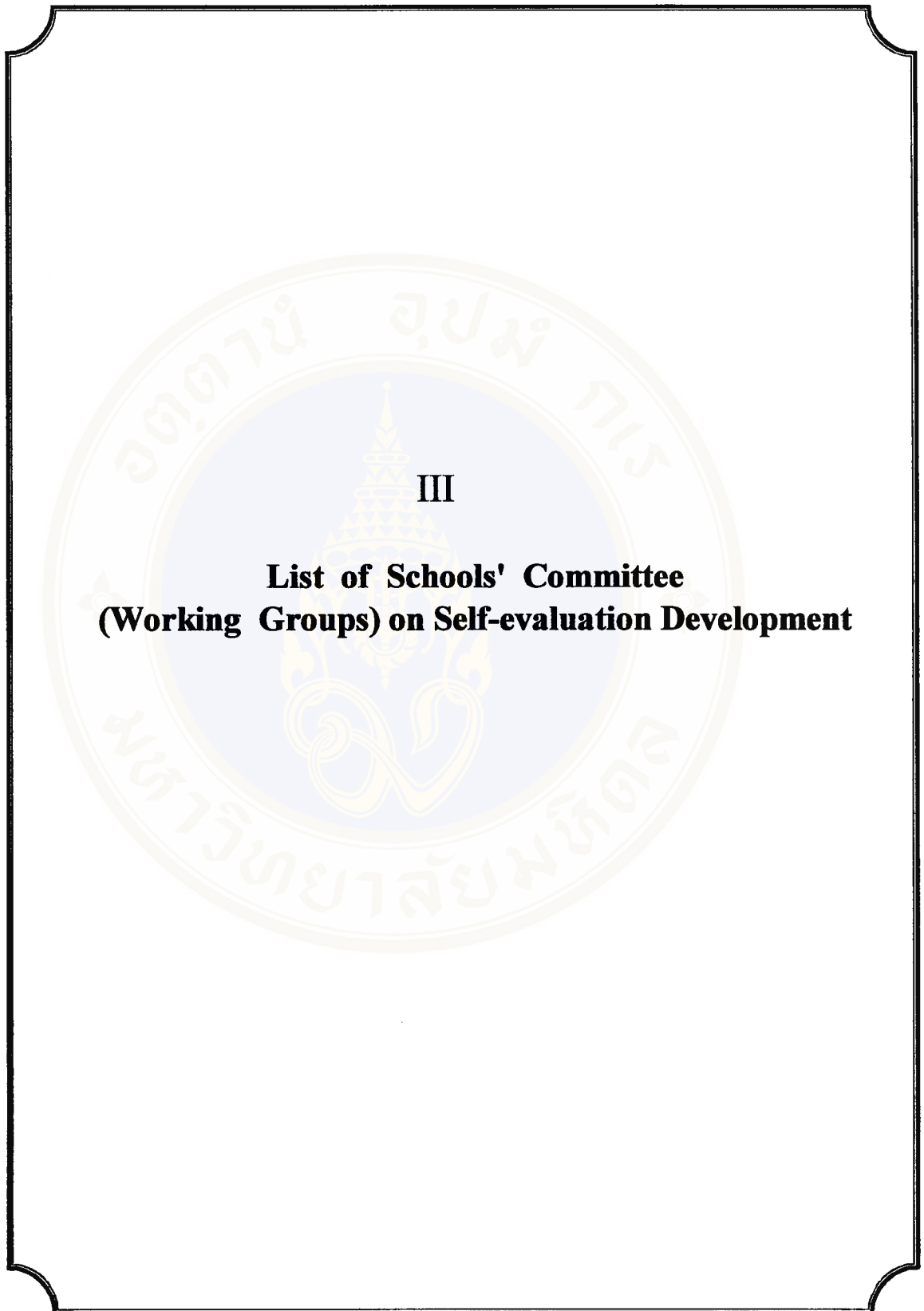
Name	Position/Academic Character	Years of environmental education involvement.
1. Miss Areewan aiumsa-ard	Supervisor, Office of Private School Commission	25
2. Mrs. Wantanee Mongkolnaowarat	Supervisor, Office of Private School Commission	20
3. Mr. Chan Noparat	Supervisor, Department of Non-formal Education, MOE	35
4. Mr. Buruit Jhamchit	Education Academic Officer. Office of Permanent Secretary, MOE.	35
5. Mrs. Napapan Chitkachang	Education Academic Officer, Office of Permanent Secretary, MOE.	25
6. Mr. Sonthirak Tepranoo	Training Officer, Education Administrator Development Institute, MOE.	35
7. Mr. Ueerachai Chivachat	Training Officer, Education Administrator Development Institute, MOE.	35
8. Mr. Damrong Polpoth	Education Academic Officer, Office of Permanent Secretary, MOE.	25
9. Mrs. Sunida Supaaksorn	Training Officer Office of Permanent Secretary, MOE.	30

Name	Position/Academic Character	Years of environmental education involvement.
10. Mr. Subthorn Meetong	Education Academic Officer of Permanent Secretary, MOE.	30
11. Mr. Pomma Pajham	Education Academic Officer, Office of Permanent Secretary, MOE.	35
12. Mrs. Patehareeporn Bangkeo	Education academic Officer. Office of Permanent secretary, MOE.	20
13. Miss Darakorn Panyatip	Education Academic Officer, Office of Permanent Secretary, MOE.	10
14. Mr. Natakit Kitidamrongkul	Education Academic Officer, Office of Permanent Secretary, MOE.	6
15. Miss Chanchana Dontong	Education Academic Officer, Office of Permanent Secretary, MOE.	10
16. Mrs Sumetra Platapientong	Education Academic Officer, Office of Permanent Secretary, MOE.	20
17. Mr. Somchai Tapsuwan	Education Academic Officer, Office of Permanent Secretary, MOE.	30
18. Mr. Chaichana Sratongta	Education Academic Officer, Office of Permanent Secretary, MOE.	30
19. Mr. Decha Puangngam	Nokornnayok , Assistant Superintendence.	30
20. Miss Pensre suksawat	Education Academic Officer, Office of Permanent Secretary. MOE.	30
21. Miss Kull Prapat Plaijham	Education Academic Officer. Office of Permanent Secretary. MOE.	30
22. Mr. Surachai tongwichian	Education Academic Officer. Office of Permanent Secretary. MOE.	35
23. Mrs. Piangchan tongpan	Education Academic Officer. Office of Permanent Secretary. MOE.	15
24. Miss Sunan Pivaliri	Education Academic Officer. Office of Permanent Secretary. MOE.	25
25. Mr. Banjob Kimkethanom	Education Academic Officer. Office of Permanent Secretary. MOE.	30
26. Mr. Panom Saengin	Education Academic Officer. Office of Permanent Secretary. MOE.	30
27. Mrs. Nanta anaman	Education Academic Officer. Office of Permanent Secretary. MOE.	25
28. Mrs. Natawan Wanadee	Education Academic Officer. Office of Permanent Secretary. MOE.	20
29. Mrs. Katchakorn tetpitak	Education Academic Officer. Office of Permanent Secretary. MOE.	20

Name	Position/Academic Character	Years of environmental education involvement.
30. Mrs. Nuchanat tattong	Education Academic Officer, Office of Permanent secretary, MOE.	20
31. Mrs. Yachai Srisoonthon	Education Academic Officer, Office of Permanent secretary, MOE.	35
32. Mr. Charoon Permpoon	Education Academic Officer, Office of Permanent secretary, MOE.	30
33. Mr. Wichai Riewluang	Education Academic Officer, Office of Permanent Secretary, MOE.	25
34. Miss LaHawan Sakulstapat	Education Academic Officer, Office of Permanent Secretary, MOE.	40
35. Miss somkit sakulstapat	Education Academic Officer, Office of Permanent Secretary, MOE.	30
36. Miss Nattida Deangyai	Education Academic Officer, Office of Permanent Secretary, MOE.	25

Involving School Teachers

Name	Position/Academic Character	Years of environmental education involvement.
1. Mr. Theerapon Niyomtong	Director of Mathayom Watmakutkasart Secondary School	30
2. Mrs. Chanettee Bachanarat	School working group	15
3. Mr. Channarong Kealek	School working group	15
4. Mr. Surin Banreungsanao	School working group	15
5. Miss Benchaporn Pawongpon	School working group	10
6. Mr. Yothin Chaichuen	School working group	10
7. Mr. Sataporn Somratanapory	School working group	10
8. Mrs. Prapaporn Chareonpol	School working group	10
9. Miss Kuantia Pavaputo	School working group	10
10. Miss Monta awontawecchai	School working group	10
11. Mr. Chuan Naichareon	School working group	35
12. Mr. Sompong Tritepa	School working group	15
13. Mr. Sajhuan Oipen	School working group	35
14. Mrs. Sopee Sukontaprapan	School working group	20
15. Mr. Pairat Ruangklin	School working group	20
16. Mr. Sopit Puagsopa	School working group	15
17. Miss Sumalin Seangtien	School working group	20
18. Miss Penkae wisitpan	School working group	20



III
**List of Schools' Committee
(Working Groups) on Self-evaluation Development**

PPR RATWITTAYALAI SELF EVALUATION DEVELOPMENT TEAM

(According to School's Promotion

Commandment No.23/2002

Date Feb.13th , 2002)

Steering Committee

1. Mr.Suthisak	Phuengkasem	Director
2. Mr.Teerausut	Chantaka	Member
3. Mr.Wichan Charukan		Member
4. Mr.Weerakpon Yingcharoen		Member
5. Mr.Somsak Hasitpanitkul		Member

Self-evaluation team

1.Mrs.Putchanee Boonnark	Chair
2. Mrs. Wanna Ochapong	Member
3. Miss Chareerat Naowachamnien	Member
4. Miss Ratchatawan Insa-ad	Member
5. Mrs.Arnharee Ratanasaeng	Member
6. MissWanarat Chaichankul	Member
7. MissNaowarat Srisuthikul	Member
8. Mr.Lersak Somboonporn	Member
9. Mr.Mooladet Sema	Member
10. Mrs.Tangtip Wacharoenpan	Member
11. Mrs.Somchai Mee-eim	Member
12. Mrs.Songporn Kaitkomol	Member
13. Miss Wanlee Bootnuim	Member
14. MissNuanpachong Poopongpan	Member
15. Mrs.Nisanat Son Sa-addit	Member & Secretary

Authorities

1. Provision school's vision and mission
2. Setting school's critical success factors (CSF) and environmental education objectives
3. Setting school's key performance indicators (KPI) and school environmental education targets
4. Performing environmental education plan
5. Providing data, data Source and constructing evaluation tools
6. Performing school's environmental education
7. Reporting school self – evaluation on environmental education
8. Developing program for computation
9. Others duties as admitted

WAT – MAKUTKASAT SCONDARY SCHOOL SELF-EVALUATION TEAM

(According to School's Promotion)

Commandment No.016/2002

Date Jan.28th 2002)

Steering Committee

1. Mr. Teerakpong Niyomton	Director
2. Mr. Sompong Tritapa	Member
3. Mrs. Chanettri Watchanarat	Member
4. Mr. Samran Piendee	Member
5. Mr. Chanarpmg Kaelek	Member

Self-evaluation team

1. Miss Nattita Kusoom	Chair
2. Mr. Surin Banroensanoa	Member
3. Mrs. Chamaporn Bhaowachot	Member
4. Miss Benchapon Pawongpon	Member
5. Mrs. Sumitra Koat-Asa	Member
6. Mr. Yothin Chaichuen	Member
7. Miss Aramsri Yamkli	Member
8. Mr. Staporn Somratpong	Member
9. Mr. Nopadol Chamnongrak	Member
10. Mrs. Prapa Charoenkpon	Member
11. Mrs. Wilawan Saengtoop	Member
12. Miss Kansuda Prawapooto	Member
13. Mrs. Wanpen Tipsirowet	Member
14. Miss Monta Amornaweechai	Member
15. Mrs. Krit Tipwisan	Member & Secretary

Authorities

1. Provision school's vision and mission
2. Setting school's critical success factors (CSF) and environmental education objectives
3. Setting school's key performance indicators (KPI) and school environmental education targets
4. Performing environmental education plan
5. Providing data, data Source and constructing evaluation tools
6. Performing school's environmental education
7. Reporting school self – evaluation on environmental education
8. Developing program for computation
9. Others duties as admitted

WAT – KEMAPIRATARAM SCHOOL SELF – EVALUATION TEAM

(According to School's Promotion)

Commandment No.01/2002

Date Jan.3rd 2002)

Steering Committee

1. Mr.Cjicjart Chaiburin	Director
2. Mr.Sajhuan Oi-pen	Member
3. Mr. Rrasot laitongkam	Member
4. Mrs.Sawanee Sawarghort	Member
5. Mr.Sirichai puanglai	Member

Self-evaluation Team

1. Academic Vice Director	Chair
2. Governanec Vice Kirector	Member
3. Service Vice Director	Member
4. Planning Vice Director	Member
5. Supporting Vice Director	Member
6. All the Subject – Group's Chieves	Member
7. Mr. Witcharet Nilkae	Member
8. Mrs.Pitsana Pactrakul	Member
9. Mrs.Pitton Chaitaingtum	Member
10. Mrs.Sopee Sukolprapat	Member
11. Mr.Chaamnong Mee-you-tem	Member & Secretary

Authorities

1. Provision school's vision and mission
2. Setting school's critical success factors (CSF) and environmental education objectives
3. Setting school's key performance indicators (KPI) and school environmental education targets
4. Performing environmental education plan
5. Providing data, data Source and constructing evaluation tools
6. Performing school's environmental education
7. Reporting school self – evaluation on environmental education
8. Developing program for computation
9. Others duties as admitted

**SAI-NOI SCHOOL
SELF-EVALUATION TEAM
(According to School's Promotion)
Commandment No. 09/2002
Date Jan.31th 2002)**

Steering Committee

1. Mr.Chawarat Ratpralom	Director
2. Mr.Sontaya Sukpiti	Member
3. Miss Ampor Chawakan	Member
4. Mr.Rranot Chatupot	Member
5. Mr.Pairat Ruengklin	Member
6. Miss Sumalin Saengtein	Member
7. Miss Penkae Wisitkpan	Member

Self-evaluation Team

1. Miss Sumalin Saengtein	Chair
2. Mr. Pairat Ruengkin	Member
3. Mrs. Chantra Kitsaengtong	Member
4. Mrs.Nataya Bunchongchit	Member
5. Mrs.Nantinat Uearanchot	Member
6. Mrs.Chanita Sirilek	Member
7. Mr. Paisan Chuechoonu	Member
8. Mr.Taweesak Kongkapan	Member
9. Mrs.Suteera Puengkuan	Member
10. Mrs.Nuenchanok Booranon	Member
11. Mrs.Pratueng Wiboonsak	Member
12. Miss Penkae Wisitkpan	Member & Secretary
13. Mr.Sorot Puegsopa	Member & assistant Secretary

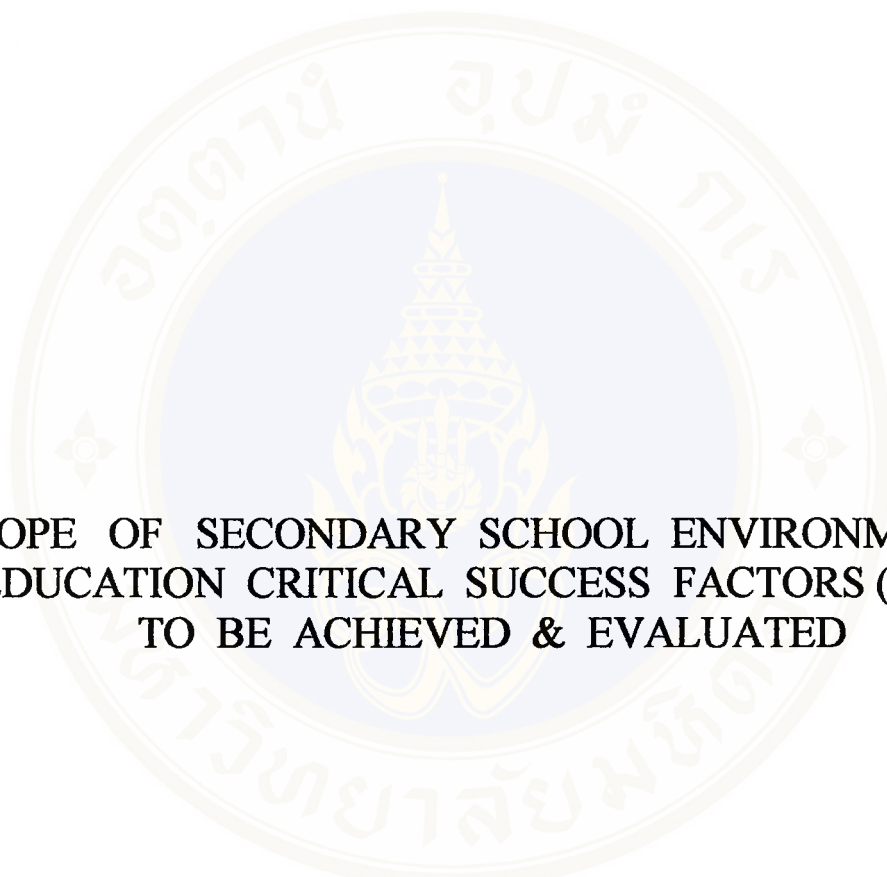
Authorities

1. Provision school's vision and mission
2. Setting school's critical success factors (CSF) and environmental education objectives
3. Setting school's key performance indicators (KPI) and school environmental education targets
4. Performing environmental education plan
5. Providing data, data Source and constructing evaluation tools
6. Performing school's environmental education
7. Reporting school self- evaluation on environmental education
8. Developing program for computation
9. Others duties as admitted

The background features a large, faint watermark of the Mahidol University logo. It is a circular emblem with Thai script around the perimeter and a central design of a tiered stupa or pagoda.

APPENDIX C

**SCOPE OF SECONDARY SCHOOL ENVIRONMENTAL
EDUCATION CRITICAL SUCCESS FACTORS (CSFs),
TO BE ACHIEVED & EVALUATED**



**SCOPE OF SECONDARY SCHOOL ENVIRONMENTAL
EDUCATION CRITICAL SUCCESS FACTORS (CSFs),
TO BE ACHIEVED & EVALUATED**

Student CSF - Students have needed environmental characteristic

CSF3 (1) (2) (5) Students have fundamental knowledge on environment.

Lower secondary school	Upper secondary school
<p>SC 1 General Knowledge of environment. Students are able to:</p> <p>SC 1.1 provide correct definition, character, Type and necessity of resources and Environment,</p> <p>SC 1.2 provide the correct relationship and Necessity Correct definition, character, Type and necessity between human Being and environ;</p> <p>SC 1.3 understand the environmental crisis, Able to tell the problem, impacts and Causes of the problem;</p> <p>SC 1.4 provide the correct principle and Methods of resource and environment Preservation and conservation;</p> <p>SC 1.5 understand and tell about the public Policy and Low about environment.</p>	<p>SC 1 General Knowledge environment. Students are able to:</p> <p>SC 1.1 convulse the correct definition Character, type and necessity of resources and environment;</p> <p>SC 1.2 classify and convulse the relationship and necessity to make equal Living between human and environment ;</p> <p>SC 1.3 analyze the cause of the problem correctly ;</p> <p>SC 1.4 use the principle and methods in environment Preservation and development;</p> <p>SC 1.5 use the suitable principle, Policy and Low in all situation.</p>

SC = Student Cognitive Aspects.

Lower secondary school	Upper secondary school
<p>SC 2 General Knowledge on curriculum Environment. Students are able to:</p> <p>SC 2.1 provide the definition, scope, problems and how to solve the problems about population and quality of life;</p> <p>SC 2.2 scope the energy and resources Problems in the family and how to Solve the problems ;</p> <p>SC 2.3 tell about the situation, problem and how to solve the problem of nutrition and environmental health;</p> <p>SC 2.4 tell about the situation, problem and how to solve the problem related to art and cultural environment;</p> <p>SC 2.5 define the relation and necessity of Curriculum content in the dimension of human and environment;</p>	<p>SC 2 General Knowledge on curriculum Environment. Students are able to:</p> <p>SC 2.1 identify the Problem and cause of the problem about population and how to sustain the equality of nature;</p> <p>SC 2.2 choose the best and appropriate principles and methods to solve the family and community environmental problems;</p> <p>SC 2.3 apply the appropriate principle and methods to preserve the environment and how to take care of family and community health;</p> <p>SC 2.4 identify the problem and problem solving on art and culture environment appropriately;</p> <p>SC 2.5 identify the relationship of all curriculum subject in the dimension of human being and their environment.</p>

CSF3 (3) (6) - Students' awareness & attitude (SA)

Lower secondary school	Upper secondary school
<p>Students are able to:</p> <p>SA 1 receive and make respond to the events that impact natural source and environment;</p> <p>SA 2 accept natural rule on equality of Environment;</p>	<p>Students are able to:</p> <p>SA 1 receive and make respond to the events that impact natural source and environment;</p> <p>SA 2 accept natural rule on equality of environment;</p>

Lower secondary school	Upper secondary school
SA 3 absorb natural beauty;	SA 3 be absorb of natural beauty;
SA 4 value natural resource and Environment;	SA 4 valve natural resource and Environment;
SA 5 aware of responsibility, to preserve energy and natural resource;	SA 5 aware of responsibility, to preserve Energy and natural resource;
SA 6 aware and be involved in environment development;	SA 6 aware and be involved in Environment development;
SA 7 be in a habit of continuous receiving new in formation of environment;	SA 7 be in a habit of continuous receiving New in formation of environment;
SA 8 be in a habit of energy and resource preservation;	SA 8 be in a habit of energy and resource Preservation;
SA 9 believe and be on appropriate Conduction environment conservation;	SA 9 believe and be on appropriate Conduction environment conservation;
SA 10 be characterized on environment Conservation.	SA 10 be characterized on environment Conservation.

CSFs (4) (7) Students have needed environment behavior, being involved in environment preservation and conservation. (Student Psychomotor: SP)

Lower secondary school	Upper secondary school
Students are able to:	Students are able to:
SP 1 observe and experiment to solve Environment problems;	SP 1 survey and experiment to preserve natural resource energy and environment;
SP 2 be involved in natural resource energy and environment preservation;	SP 2 choose the best methods to preserve energy natural resource and environment;
SP 3 solve natural resource, energy and Environment problems;	SP 3 select and use economic electric instrument and not disturb environment;

Lower secondary school	Upper secondary school
SP 4 select and use economic and Environment undisturb struments;	SP 4 evaluate and identify environment problems;
SP 5 select the appropriate alternatives to preserve energy and environment;	SP 5 initiate to preserve energy and environment problem solving;
SP 6 participate in community and country energy and environment preservation;	SP 6 plan and manage natural resource energy and environment;
SP 7 take a role in energy, natural resource and environment preservation and conservation;	SP 7 participate in activities on environmental preservation;
SP 8 change self con sum behavior for Environment preservation;	SP 8 present his own opinion on environment in community local and national level;
SP 9 evaluate the alternatives to treat the Environment;	SP 9 solve the problem and make decision on environment;
SP 10 tract environment creatively.	SP 10 persuade community to salve the problems SP 11 change consuming behavior to conservative behaviors.



Teacher CSF - Teachers have enough knowledge and skill on environmental education

CSFs (8) (9) teachers' appropriate knowledge, Value and appropriate behavior on environment.(TE)

Lower secondary school	Upper secondary school
<p>School teachers are ble to:</p> <p>TE 1.1 define the definition type aspects and Reccesity of natural resoure and environment;</p> <p>TE 1.2 explain the relation ship and necessity to live sustainably ;</p> <p>TE 1.3 identify the environmental crisis, the cause and human in pacts;</p> <p>TE 1.4 understand and able to preserve natural resource and environment;</p> <p>TE 1.5 describe government policy to and laws on environments</p>	<p>School teachers are:</p> <p>TE 2.1 accept low of natural equality;</p> <p>TE 2.2 Love and aware of natural beauty ;</p> <p>TE 2.3 aware of energy and natural resource value;</p> <p>TE 2.4 aware of self role and responsibility on energy and environment conserty vation;</p> <p>TE 2.5 aware and participate in natural resource development.</p> <p>TE 2.6 interested, and be continuous receiving continuous nformation;</p> <p>TE 2.7 in habit of energy and resource preservation ;</p> <p>TE 2.8 being get an holdin thai life Style "Kinpodee Youpordee"</p> <p>TE 2.9 being set a hold in environmental Ethics;</p> <p>TE 2.10 Being get a hold in participation Environment preservation.</p>

CSF3 (10)(11)(12) - Teachers' basic Knowledge and Participation

TEE 1 - Cognitive	TEE2 - Value & participation
<p>Teachers are able to:</p> <p>TEE 1.1 tell the definition, scope purpose and principle of environmental education;</p> <p>TEE 1.2 explain correctly on the necessity of Environmental education;</p> <p>TEE 1.3 define correctly the environment Psychology;</p> <p>TEE 1.4 tell correctly the way to perform Environmental education;</p> <p>TEE 1.5 explain how to perform Environmental education curriculum;</p> <p>TEE 1.6 tell the method to learn on Environmental education instruction Appropriately;</p> <p>TEE 1.7 tell correctly how to perform school environmental education;</p> <p>TEE 1.8 tell the principle and methods to evaluate environmental education;</p> <p>TEE 1.9 tell correctly roles of school personal;</p> <p>TEE 1.10 tell correctly how to perform learning process.</p>	<p>Teachers are:</p> <p>TEE 2.1 accepted that environmental Problems are mostly caused by unlimited need of human being;</p> <p>TEE 2.2 accepted that human behavior can be changed by education process;</p> <p>TEE 2.3 aware of the necessity of environmental education;</p> <p>TEE 2.4 aware of self role on environmental development;</p> <p>TEE 2.5 involved in environment problem solving;</p> <p>TEE 2.6 hasten to study to develop environmental education;</p> <p>TEE 2.7 aware an integrate environmental education in their own subject and learning activity.</p> <p>TEE 2.8 involved in school environmental education activities;</p> <p>TEE 2.9 aware of participation value on environmental education;</p> <p>TEE 2.10 being get a hold in participating on environmental education.</p>

CSF3 (13) Environmental education planning

School by school teachers are able to:

- SEEM 1 provide clear and shared vision con environmental education;
- SEEM 2 provide special complete and quality environmental education plan.
- SEEM 3 provide systematic operational plan.
- SEEM 4 implement environmental education plan as tools to reform, monitor and evaluate the success.

CSF3 (14) School CSF and KPI on environmental education

School have to provide:

- SEEM 5 fixed and clear CSF on environmental education;
- SEEM 6 measurable KPI in accord with CSF;
- SEEM 7 accepted CSF and KPI

CSF3 (15) School new performance evaluation

School have to provide:

- SEEM 9 CSF and KPI both on strategic and operation level.
- SEEM 10 Choose the appropriate methods and tools to evaluate.
- SEEM 11 Continuous report on environment education
- SEEM 12 Evaluate environmental education as a part of management and quality assurance.

CSF3 (16) Integration environmental education

School have to provide:

- SEEM 13 Objective, standard of environmental education for all class - range
- SEEM 14 Subject environmental education integration;
- SEEM 15 Seminar, training and other activities to in crease teacher capacity on environmental education;
- SEEM 16 integrated curriculum on environmental education.

CSF3 (17) Perform authentic process on environmental education

School have to provide:

- SEEM 17 Child - centered environmental education activities;
- SEEM 18 Participative activities;
- SEEM 19 authentic and diverse activities;
- SEEM 20 whole school environmental education activities.

Environment Management CSF - School Environment Management (SEM)

CSF3 (18) School environment management

School have to:

- SEM 1 advertise environmental management;
- SEM 2 provide mission, CSF and KPI of MES;
- SEM 3 provide plan, project on environment;
- SEM 4 provide school manual on environmental management;
- SEM 5 perform and control the management;
- SEM 6 prepare for an urgent situation;
- SEM 7 control and evaluate the management;
- SEM 8 record management results;
- SEM 9 evaluate and review for continuous improvement.

CSF3 (19) Healthy school

School have to :

- SEM 10 provide healthy school model;
- SEM 11 set internal environment in clean and tidy;
- SEM 12 Set healthy classroom and building;
- SEM 13 set out controlling system on healthy environment.

CSF3 (20) Living School

- SEM 14 Arranging the school field and building in tidy clean and beautiful.
- SEM 15 Arranging flower garden, school forest, pond and other natural school components in natural and lively.
- SEM 16 Providing learning activities and operative activities to perform learning school and living school.

CSF3 (21) Setting environment for environmental education

- SEM 17 Setting the appropriate and sufficient sport field, classroom and other environments
- SEM 18 Setting all types of lifelong learning resources in school.
- SEM 19 Setting out the environment activities for environmental education.
- SEM 20 Setting out other activities to perform learning a bout environment.

School service CSF - School environmental Education Service**CSF3 (2) Community environmental education service**

EES 1 Providing community environment information

EES 2 Advising community how to prevent and protect environment problems.

EES 3 Advertising excellent environment activities and excellent environment management.

EES 4 School teachers are to be involved in community training on environment.

EES 5 Inviting community expert and local wisdom to be the school lecturers.

EES 6 Performing community studies.

CSF3 (23) School - Community participation on environment envelopment.

EES 7 Setting out cooperative project on environment conservation.

EES 8 Accrediting community excellent environment personal and activities.

EES 9 Supporting community to found environmental organization.

EES 10 Reporting and advertise cooperative results on environment.

EES 11 Setting out cooperative environmental education projects.

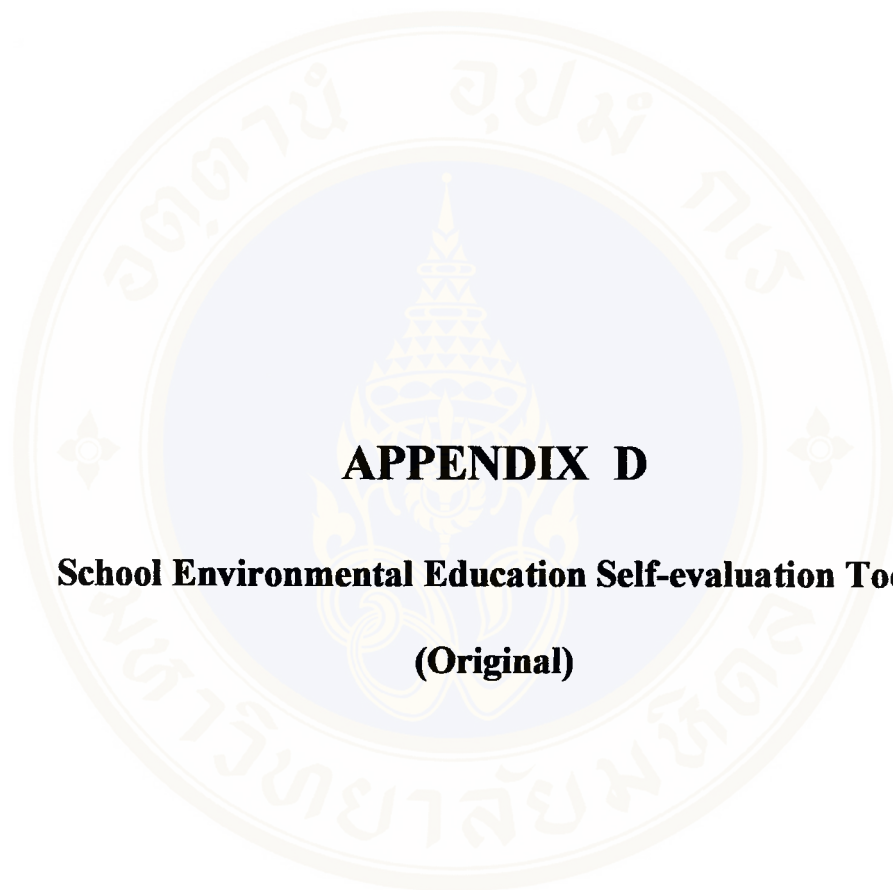
EES 12 Creating school environment by local wisdom.

EES 13 Community support school to perform environmental education.

CSF3 (24) (25) Community satisfaction on school environmental education

EES 14 Level of community satisfaction on school environmental education.

EES 15 Level of community and school satisfaction on cooperate environment activities.



APPENDIX D

School Environmental Education Self-evaluation Tools

(Original)

แบบประเมินตนเอง

แบบ ปด 1 (SE 1)

แบบบันทึกและตรวจสอบข้อมูลการประเมินผลการจัดสิ่งแวดล้อมศึกษาด้วยตนเอง
Evaluation Data Recording & checking Form

โรงเรียน.....

คำชี้แจง แบบ ปด 1 นี้ เป็นแบบบันทึกข้อมูลผลการประเมิน เพื่อให้ง่ายต่อการตรวจสอบ และการวิเคราะห์ ให้หัวหน้าคณะทำงานประเมินเป็นผู้บันทึกข้อมูลนี้ พร้อมกับเสนอให้ผู้บริหารสถานศึกษาหรือผู้ที่ได้รับมอบหมายตรวจสอบและลงนามรับรองข้อมูลก่อนการบันทึกข้อมูลในเครื่องคอมพิวเตอร์

1. จำนวนนักเรียนทั้งโรงเรียน

คน

จำนวนนักเรียน จำแนกเป็นรายละเอียด					
ม.1	ม.2	ม.3	ม.4	ม.5	ม.6

2. จำนวนครูและบุคลากรทางการศึกษาในโรงเรียน

คน

จำนวนครูฯ จำแนกตามกลุ่มวิชา								
ภาษาไทย	คณิตฯ	วิทย์ฯ	สังคมฯ	พลานามัย	ศิลปะ	การงานฯ	ภาษาต่างประเทศ	อื่นๆ

3. จำนวนนักเรียนที่สอบผ่านรายวิชาที่มีเนื้อหาสิ่งแวดล้อมทุกวิชา

คน

จำนวนนักเรียนที่สอบผ่าน จำแนกเป็นรายละเอียด					
ม.1	ม.2	ม.3	ม.4	ม.5	ม.6

4. จำนวนนักเรียนที่ผลการสอบพื้นฐานสิ่งแวดล้อมผ่านเกณฑ์

คน

จำนวนนักเรียนที่ผลการสอบผ่านเกณฑ์ จำแนกเป็นรายละเอียด					
ม.1	ม.2	ม.3	ม.4	ม.5	ม.6

รหัสข้อมูล	ผู้ให้ข้อมูล
D	ฝ่ายทะเบียน
DD	ฝ่ายทะเบียน
D ₁	ฝ่ายทะเบียน
D ₂	หัวหน้าระดับชั้น

รายการข้อมูล	รหัสข้อมูล	ผู้ให้ข้อมูล																								
<p>5. จำนวนนักเรียนที่มีพฤติกรรมทางสิ่งแวดล้อมที่พึงประสงค์ <input type="text"/> คน</p> <table border="1"> <tr> <th colspan="6">จำนวนนักเรียนที่มีพฤติกรรมฯ ที่พึงประสงค์ จำนวนเป็นรายระดับชั้น</th> </tr> <tr> <th>ม.1</th> <th>ม.2</th> <th>ม.3</th> <th>ม.4</th> <th>ม.5</th> <th>ม.6</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	จำนวนนักเรียนที่มีพฤติกรรมฯ ที่พึงประสงค์ จำนวนเป็นรายระดับชั้น						ม.1	ม.2	ม.3	ม.4	ม.5	ม.6							D ₃	หัวหน้าระดับชั้น						
จำนวนนักเรียนที่มีพฤติกรรมฯ ที่พึงประสงค์ จำนวนเป็นรายระดับชั้น																										
ม.1	ม.2	ม.3	ม.4	ม.5	ม.6																					
<p>6. จำนวนนักเรียนที่มีส่วนร่วมในการอนุรักษ์และพัฒนาสิ่งแวดล้อม <input type="text"/> คน</p> <table border="1"> <tr> <th colspan="6">จำนวนนักเรียนที่มีส่วนร่วมฯ จำนวนเป็นรายระดับชั้น</th> </tr> <tr> <th>ม.1</th> <th>ม.2</th> <th>ม.3</th> <th>ม.4</th> <th>ม.5</th> <th>ม.6</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	จำนวนนักเรียนที่มีส่วนร่วมฯ จำนวนเป็นรายระดับชั้น						ม.1	ม.2	ม.3	ม.4	ม.5	ม.6							D ₄	หัวหน้าระดับชั้น						
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<p>7. คะแนนเฉลี่ยผลการทดสอบพื้นฐานสิ่งแวดล้อมของนักเรียน <input type="text"/></p> <table border="1"> <tr> <th colspan="6">คะแนนเฉลี่ยผลการทดสอบพื้นฐานฯ จำนวนเป็นรายระดับชั้น</th> </tr> <tr> <th>ม.1</th> <th>ม.2</th> <th>ม.3</th> <th>ม.4</th> <th>ม.5</th> <th>ม.6</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	คะแนนเฉลี่ยผลการทดสอบพื้นฐานฯ จำนวนเป็นรายระดับชั้น						ม.1	ม.2	ม.3	ม.4	ม.5	ม.6							D ₅	หัวหน้าระดับชั้น						
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<p>8. คะแนนเฉลี่ยผลการประเมินพฤติกรรมทางสิ่งแวดล้อมของนักเรียน <input type="text"/></p> <table border="1"> <tr> <th colspan="6">คะแนนเฉลี่ยผลการประเมินพฤติกรรมฯ จำนวนเป็นรายระดับชั้น</th> </tr> <tr> <th>ม.1</th> <th>ม.2</th> <th>ม.3</th> <th>ม.4</th> <th>ม.5</th> <th>ม.6</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	คะแนนเฉลี่ยผลการประเมินพฤติกรรมฯ จำนวนเป็นรายระดับชั้น						ม.1	ม.2	ม.3	ม.4	ม.5	ม.6							D ₆	หัวหน้าระดับชั้น						
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<p>9. คะแนนเฉลี่ยผลการประเมินการมีส่วนร่วมในการอนุรักษ์และพัฒนาสิ่งแวดล้อมของผู้เรียน <input type="text"/></p> <table border="1"> <tr> <th colspan="6">คะแนนเฉลี่ยผลการประเมินการมีส่วนร่วมฯ จำนวนเป็นรายระดับชั้น</th> </tr> <tr> <th>ม.1</th> <th>ม.2</th> <th>ม.3</th> <th>ม.4</th> <th>ม.5</th> <th>ม.6</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	คะแนนเฉลี่ยผลการประเมินการมีส่วนร่วมฯ จำนวนเป็นรายระดับชั้น						ม.1	ม.2	ม.3	ม.4	ม.5	ม.6							D ₇	หัวหน้าระดับชั้น						
คะแนนเฉลี่ยผลการประเมินการมีส่วนร่วมฯ จำนวนเป็นรายระดับชั้น																										
ม.1	ม.2	ม.3	ม.4	ม.5	ม.6																					
<p>10. จำนวนครูที่มีความรู้พื้นฐานทางสิ่งแวดล้อมตามเกณฑ์ที่กำหนด <input type="text"/> คน</p> <table border="1"> <tr> <th colspan="6">จำนวนครูที่มีความรู้ตามเกณฑ์ จำนวนตามกลุ่มวิชา</th> </tr> <tr> <th>ภาษาไทย</th> <th> </th> <th>สังคมฯ</th> <th> </th> <th>การงานฯ</th> <th> </th> </tr> <tr> <td>คณิตฯ</td> <td> </td> <td>พลานามัย</td> <td> </td> <td>ต่างประเทศ</td> <td> </td> </tr> <tr> <td>วิทย์ฯ</td> <td> </td> <td>ศิลปะ</td> <td> </td> <td>อื่น ๆ</td> <td> </td> </tr> </table>	จำนวนครูที่มีความรู้ตามเกณฑ์ จำนวนตามกลุ่มวิชา						ภาษาไทย		สังคมฯ		การงานฯ		คณิตฯ		พลานามัย		ต่างประเทศ		วิทย์ฯ		ศิลปะ		อื่น ๆ		D ₈	หัวหน้าหมวด/ กลุ่มวิชา
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รายการ ข้อมูล	รหัส ข้อมูล	ผู้ให้ข้อมูล																								
<p>11.จำนวนครูที่มีค่านิยมที่ถูกต้องเกี่ยวกับสิ่งแวดล้อมและ การจัดสิ่งแวดล้อมศึกษา <input type="text"/></p> <table border="1"> <thead> <tr> <th colspan="6">จำนวนครูที่มีค่านิยมทางสิ่งแวดล้อมศึกษาดมเกณฑ์ จำแนกตามกลุ่มวิชา</th> </tr> </thead> <tbody> <tr> <td>ภาษาไทย</td> <td></td> <td>สังคมฯ</td> <td></td> <td>การงานฯ</td> <td></td> </tr> <tr> <td>คณิตฯ</td> <td></td> <td>พลานามัย</td> <td></td> <td>ต่างประเทศ</td> <td></td> </tr> <tr> <td>วิทย์ฯ</td> <td></td> <td>ศิลปะ</td> <td></td> <td>อื่น ๆ</td> <td></td> </tr> </tbody> </table>	จำนวนครูที่มีค่านิยมทางสิ่งแวดล้อมศึกษาดมเกณฑ์ จำแนกตามกลุ่มวิชา						ภาษาไทย		สังคมฯ		การงานฯ		คณิตฯ		พลานามัย		ต่างประเทศ		วิทย์ฯ		ศิลปะ		อื่น ๆ		D ₉	หัวหน้าหมวด/ กลุ่มวิชา
จำนวนครูที่มีค่านิยมทางสิ่งแวดล้อมศึกษาดมเกณฑ์ จำแนกตามกลุ่มวิชา																										
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<p>12.จำนวนครูที่มีความรู้ความเข้าใจพื้นฐานการจัดสิ่งแวดล้อมศึกษา ตามเกณฑ์ที่กำหนด <input type="text"/></p> <table border="1"> <thead> <tr> <th colspan="6">จำนวนครูที่มีความรู้ความเข้าใจพื้นฐานฯ ตามเกณฑ์ จำแนกตามกลุ่มวิชา</th> </tr> </thead> <tbody> <tr> <td>ภาษาไทย</td> <td></td> <td>สังคมฯ</td> <td></td> <td>การงานฯ</td> <td></td> </tr> <tr> <td>คณิตฯ</td> <td></td> <td>พลานามัย</td> <td></td> <td>ต่างประเทศ</td> <td></td> </tr> <tr> <td>วิทย์ฯ</td> <td></td> <td>ศิลปะ</td> <td></td> <td>อื่น ๆ</td> <td></td> </tr> </tbody> </table>	จำนวนครูที่มีความรู้ความเข้าใจพื้นฐานฯ ตามเกณฑ์ จำแนกตามกลุ่มวิชา						ภาษาไทย		สังคมฯ		การงานฯ		คณิตฯ		พลานามัย		ต่างประเทศ		วิทย์ฯ		ศิลปะ		อื่น ๆ		D ₁₀	หัวหน้าหมวด/ กลุ่มวิชา
จำนวนครูที่มีความรู้ความเข้าใจพื้นฐานฯ ตามเกณฑ์ จำแนกตามกลุ่มวิชา																										
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<p>13.จำนวนครูที่จัดกิจกรรมการเรียนรู้และมีส่วนร่วมในการจัด กิจกรรมสิ่งแวดล้อมศึกษาตามเกณฑ์ที่กำหนด <input type="text"/></p> <table border="1"> <thead> <tr> <th colspan="6">จำนวนครูที่มีส่วนร่วมฯ จำแนกตามกลุ่มวิชา</th> </tr> </thead> <tbody> <tr> <td>ภาษาไทย</td> <td></td> <td>สังคมฯ</td> <td></td> <td>การงานฯ</td> <td></td> </tr> <tr> <td>คณิตฯ</td> <td></td> <td>พลานามัย</td> <td></td> <td>ต่างประเทศ</td> <td></td> </tr> <tr> <td>วิทย์ฯ</td> <td></td> <td>ศิลปะ</td> <td></td> <td>อื่น ๆ</td> <td></td> </tr> </tbody> </table>	จำนวนครูที่มีส่วนร่วมฯ จำแนกตามกลุ่มวิชา						ภาษาไทย		สังคมฯ		การงานฯ		คณิตฯ		พลานามัย		ต่างประเทศ		วิทย์ฯ		ศิลปะ		อื่น ๆ		D ₁₁	หัวหน้าหมวด/ กลุ่มวิชา
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<p>14.คะแนนเฉลี่ยผลการประเมินระดับความสำเร็จของการจัดกิจกรรม การเรียนรู้และการมีส่วนร่วมของครูในการจัดสิ่งแวดล้อมศึกษา <input type="text"/></p> <table border="1"> <thead> <tr> <th colspan="6">คะแนนเฉลี่ยผลการประเมินระดับความสำเร็จของกิจกรรมฯ จำแนกตามกลุ่มวิชา</th> </tr> </thead> <tbody> <tr> <td>ภาษาไทย</td> <td></td> <td>สังคมฯ</td> <td></td> <td>การงานฯ</td> <td></td> </tr> <tr> <td>คณิตฯ</td> <td></td> <td>พลานามัย</td> <td></td> <td>ต่างประเทศ</td> <td></td> </tr> <tr> <td>วิทย์ฯ</td> <td></td> <td>ศิลปะ</td> <td></td> <td>อื่น ๆ</td> <td></td> </tr> </tbody> </table>	คะแนนเฉลี่ยผลการประเมินระดับความสำเร็จของกิจกรรมฯ จำแนกตามกลุ่มวิชา						ภาษาไทย		สังคมฯ		การงานฯ		คณิตฯ		พลานามัย		ต่างประเทศ		วิทย์ฯ		ศิลปะ		อื่น ๆ		D ₁₂	หัวหน้าหมวด/ กลุ่มวิชา
คะแนนเฉลี่ยผลการประเมินระดับความสำเร็จของกิจกรรมฯ จำแนกตามกลุ่มวิชา																										
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<p>15. คะแนนเฉลี่ยผลการประเมินการจัดทำและการใช้แผน สิ่งแวดล้อมศึกษาของโรงเรียน <input type="text"/></p>	D ₁₃	หัวหน้าวิชาการ																								
<p>16. คะแนนเฉลี่ยการประเมินผลการกำหนดและใช้ CSF, KPI ในการจัดสิ่งแวดล้อม <input type="text"/></p>	D ₁₄	หัวหน้าวิชาการ																								
<p>17. คะแนนเฉลี่ยผลการประเมินผลการจัดสิ่งแวดล้อมศึกษาแนวใหม่ <input type="text"/></p>	D ₁₅	หัวหน้าวิชาการ																								
<p>18. คะแนนเฉลี่ยผลการประเมินการบูรณาการสิ่งแวดล้อมศึกษา ของการจัดกิจกรรมสิ่งแวดล้อมศึกษาของโรงเรียน <input type="text"/></p>	D ₁₅	หัวหน้าวิชาการ																								

รายงานข้อมูล	รหัส ข้อมูล	ผู้ให้ข้อมูล
19. คะแนนเฉลี่ยผลการประเมินระดับผลสำเร็จของการจัด กิจกรรมสิ่งแวดล้อมศึกษาของโรงเรียน <input type="text"/>	D ₁₇	หัวหน้าวิชาการ
20. คะแนนเฉลี่ยผลการประเมินการบริหารจัดการสิ่งแวดล้อม เป็นต้นแบบ <input type="text"/>	D ₁₈	หัวหน้าวิชาการ
21. คะแนนเฉลี่ยผลการประเมินการจัดสภาพแวดล้อม ในโรงเรียนให้ถูกสุขลักษณะ <input type="text"/>	D ₁₉	หัวหน้าบริการ
22. คะแนนเฉลี่ยผลการประเมินการจัดโรงเรียนน่าอยู่ <input type="text"/>	D ₂₀	หัวหน้าบริการ
23. คะแนนเฉลี่ยผลการประเมินการจัดสภาพแวดล้อมและ การจัดการสิ่งแวดล้อมเพื่อการจัดการสิ่งแวดล้อมศึกษา <input type="text"/>	D ₂₁	หัวหน้าบริการ
24. คะแนนเฉลี่ยผลการประเมินการจัดบริการทางวิชาการ ทางด้านสิ่งแวดล้อมแก่ชุมชน <input type="text"/>	D ₂₂	หัวหน้าบริการ
25. คะแนนเฉลี่ยผลการประเมินการร่วมกิจกรรม สิ่งแวดล้อมในชุมชนของโรงเรียน <input type="text"/>	D ₂₃	หัวหน้าคณะ ประเมิน
26. คะแนนเฉลี่ยผลการประเมินความพึงพอใจ ในการจัดสิ่งแวดล้อมศึกษาและการร่วมกิจกรรม การอนุรักษ์ สิ่งแวดล้อมในชุมชนของโรงเรียน <input type="text"/>	D ₂₄	หัวหน้าคณะ ประเมิน
27. คะแนนเฉลี่ยความคาดหวังการจัดสิ่งแวดล้อมศึกษา และการร่วมกิจกรรม สิ่งแวดล้อมในชุมชน <input type="text"/>	D ₂₅	หัวหน้าคณะ ประเมิน
<p style="text-align: center;">ลงชื่อผู้รับรองข้อมูล (.....) ตำแหน่ง..... วัน เดือน ปี บันทึกข้อมูล/...../.....</p>		

แบบประเมินตนเอง

ปต 2/1 (SE 2/1)

แบบประเมินคุณลักษณะทางสิ่งแวดล้อมของนักเรียน ระดับ ม.ต้น
Environment Characteristics Evaluation Form for Lower-Secondary School's Students

(ห้ามขีดเขียนข้อความใด ๆ ลงในแบบนี้)

คำชี้แจง

1. แบบ ปต 2/1 เป็นแบบประเมินตนเอง สำหรับประเมินคุณลักษณะทางสิ่งแวดล้อมที่พึงประสงค์ของนักเรียนระดับมัธยมตอนต้น ตามโครงการที่พัฒนาประเมินผลการจัดสิ่งแวดล้อมศึกษาด้วยตนเองของโรงเรียนมัธยมศึกษา
2. แบบ ปต 2/1 ประกอบด้วยแบบทดสอบและแบบประเมิน 3 ตอน ดังนี้
 - ตอนที่ 1 แบบทดสอบความรู้พื้นฐานทางสิ่งแวดล้อม เป็นข้อสอบ (Test) แบบเลือกตอบ จำนวน 20 ข้อ
 - ตอนที่ 2 แบบวัดจิตสำนึกในการอนุรักษ์สิ่งแวดล้อม เป็นแบบสอบถามแบบมาตราส่วนประเมินค่า (Rating Scale) จำนวน 10 ข้อ
 - ตอนที่ 3 แบบประเมินพฤติกรรมและการมีส่วนร่วมในการอนุรักษ์สิ่งแวดล้อม เป็นแบบสอบถามแบบมาตราส่วนประเมินค่า (Rating Scale) จำนวน 10 ข้อ
3. ให้อ่านคำชี้แจงเพิ่มเติมในแต่ละตอนก่อนทำข้อสอบและตอบแบบสอบถามนี้

ตอนที่ 1

แบบทดสอบความรู้พื้นฐานทางสิ่งแวดล้อม

ให้กาเครื่องหมาย X ทับอักษร ก ข ค ง หรือ จ ที่เป็นคำตอบที่ถูกต้องที่สุดเพียงข้อเดียว (ในแต่ละข้อคำถาม) โดยกาลงในกระดาษคำตอบที่แจกให้

1. “สิ่งแวดล้อมหมายถึงสิ่งต่างๆ ที่อยู่รอบตัวเรา” เป็นการให้ความหมายของสิ่งแวดล้อมในลักษณะใด
 - ก. มนุษย์เป็นศูนย์กลาง
 - ข. ธรรมชาติเป็นศูนย์กลาง
 - ค. สิ่งแวดล้อมเป็นศูนย์กลาง
 - ง. การให้ความสำคัญทั้งมนุษย์และสิ่งแวดล้อม
 - จ. การให้ความสำคัญทั้งมนุษย์และธรรมชาติ

2. ข้อใดเป็นการจำแนกประเภทของสิ่งแวดล้อมที่ถูกต้อง
 - ก. สิ่งแวดล้อมทางธรรมชาติและสิ่งแวดล้อมที่มนุษย์สร้างขึ้น
 - ข. สิ่งแวดล้อมทางกายภาพและสิ่งแวดล้อมทางสังคม
 - ค. สิ่งแวดล้อมทางกายภาพและสิ่งแวดล้อมทางชีวภาพ
 - ง. สิ่งแวดล้อมทางธรรมชาติกับสิ่งแวดล้อมชีวภาพ
 - จ. สิ่งแวดล้อมกายภาพและสิ่งแวดล้อมที่มีประโยชน์
3. กลุ่มของสิ่งที่มีชีวิตและสิ่งไม่มีชีวิตที่มีองค์ประกอบต่าง ๆ กันประกอบกันขึ้นเพื่อทำหน้าที่ร่วมกันและพึ่งพาศักดิ์ซึ่งกันและกันเรียกว่าอะไร
 - ก. ระบบสิ่งแวดล้อม
 - ข. ระบบการอยู่ร่วมกันของสิ่งที่มีชีวิต
 - ค. ระบบนิเวศ
 - ง. ระบบการพึ่งพา
 - จ. ระบบการย่อยสลาย
4. มนุษย์มีบทบาทอย่างไรในระบบนิเวศ
 - ก. เป็นผู้ผลิต
 - ข. เป็นผู้บริโภคน
 - ค. เป็นผู้ย่อยสลาย
 - ง. เป็นผู้ผลิตและผู้บริโภค
 - จ. เป็นผู้บริโภคและผู้ย่อยสลาย
5. วิกฤตการณ์ด้านใดที่เป็นต้นตอทางปัญหาสิ่งแวดล้อม
 - ก. วิกฤตการณ์ธรรมชาติ
 - ข. วิกฤตการณ์พลังงาน
 - ค. วิกฤตการณ์มนุษย์
 - ง. วิกฤตการณ์สิ่งแวดล้อม
 - จ. วิกฤตการณ์ธรรมชาติและสิ่งแวดล้อม
6. ปรากฏการณ์เรือนกระจก (Greenhouse Effect) เกิดจากสาเหตุสำคัญข้อใด
 - ก. การเผาไหม้ที่ทำให้เกิดก๊าซคาร์บอน ไดออกไซด์
 - ข. การเผาไหม้ในโรงงานอุตสาหกรรม
 - ค. การเผาไหม้ที่ทำให้เกิดก๊าซเรือนกระจกทุกชนิด
 - ง. การตัดไม้ทำลายป่าทำลายวัฏจักรของก๊าซคาร์บอน ไดออกไซด์
 - จ. การตัดไม้ทำลายป่าและความแห้งแล้ง
7. การแก้ปัญหาสิ่งแวดล้อมต้องแก้ไขเรื่องใดเป็นอันดับแรก
 - ก. เปลี่ยนความเชื่อให้มนุษย์เชื่อว่าตนเองเป็นส่วนหนึ่งของธรรมชาติและต้องดำรงชีวิตอย่างกลมกลืนกับธรรมชาติ
 - ข. เปลี่ยนทัศนคติเกี่ยวกับความสุขของมนุษย์
 - ค. เปลี่ยนค่านิยมการเป็นบริโภคนิยมของมนุษย์
 - ง. สร้างองค์ความรู้ให้มนุษย์มีความรู้แบบองค์รวม
 - จ. สร้างการมีส่วนร่วมของผู้เกี่ยวข้องกับปัญหาสิ่งแวดล้อม

8. นักเรียนสามารถช่วยแก้ปัญหาน้ำในแม่น้ำลำคลองเน่าเสียได้โดยวิธีการใดเป็นอันดับแรก
- ไม่ทิ้งขยะมูลฝอยหรือสิ่งปฏิกูลลงในแม่น้ำลำคลอง
 - มีส่วนร่วมในการเฝ้าระวังคุณภาพน้ำในแม่น้ำลำคลอง
 - รายงานหรือแจ้งเจ้าหน้าที่ผู้รับผิดชอบเมื่อพบผู้มีพฤติกรรมทำให้น้ำเน่าเสีย
 - ให้คำปรึกษาแนะนำการป้องกันน้ำเน่าเสียแก่ผู้อยู่อาศัยในบริเวณแม่น้ำลำคลอง
 - ศึกษาค้นคว้าเกี่ยวกับสถานการณ์น้ำเน่าเสียที่ตนเองสนใจ
9. กฎหมายหลักที่ใช้ในการอนุรักษ์ทรัพยากรธรรมชาติและสิ่งแวดล้อมปัจจุบันคือกฎหมายใด
- พ.ร.บ. ส่งเสริมและรักษาคุณภาพสิ่งแวดล้อม พ.ศ. 2518
 - พ.ร.บ. ส่งเสริมและรักษาคุณภาพสิ่งแวดล้อม พ.ศ. 2535
 - พ.ร.บ. โรงงาน พ.ศ. 2535
 - พ.ร.บ. สาธารณสุข พ.ศ. 2535
 - พ.ร.บ. รักษาความสะอาดและความเป็นระเบียบเรียบร้อยของบ้านเมือง พ.ศ. 2535
10. ข้อใดไม่ใช่หน้าที่ของประชาชนในการมีส่วนร่วมในการอนุรักษ์สิ่งแวดล้อมตามที่กฎหมายกำหนด
- หน้าที่ให้ความร่วมมือช่วยเหลือ
 - หน้าที่ต้องปฏิบัติตามกฎหมาย
 - หน้าที่ต้องจ่ายค่าบำบัดมลพิษ
 - หน้าที่ร้องเรียนกล่าวโทษ
 - หน้าที่ต้องจ่ายค่าเสียหายแก่รัฐ
11. ปัจจุบันประชากรของประเทศไทยมีจำนวนประมาณเท่าใด
- 58 ล้านคน
 - 60 ล้านคน
 - 62 ล้านคน
 - 64 ล้านคน
 - 66 ล้านคน
12. แผนพัฒนาเศรษฐกิจและสังคมแห่งชาติ ฉบับที่ 9 (พ.ศ.2545 – 2549) กำหนดเป้าหมายลดสัดส่วนของคนจนของประเทศให้อยู่ในระดับใด
- ไม่เกินร้อยละ 8
 - ไม่เกินร้อยละ 10
 - ไม่เกินร้อยละ 12
 - ไม่เกินร้อยละ 15
 - ไม่เกินร้อยละ 20
13. พลังงานเชิงพาณิชย์ที่ประเทศไทยผลิตได้มากที่สุดคือพลังงานประเภทใด
- ก๊าซธรรมชาติ
 - น้ำมันดิบ
 - ก๊าซเหลว
 - ลิกไนต์
 - พลังงานน้ำ
14. ประเทศไทยมีความต้องการใช้พลังงานประเภทใดมากที่สุด
- พลังงานไฟฟ้า
 - น้ำมันสำเร็จรูป
 - ก๊าซธรรมชาติ
 - น้ำมันดิบ
 - พลังงานแปรรูป

15. ข้อใดต่อไปนี้ที่ไม่ใช่ผลเสียต่อสุขภาพอนามัยอันเนื่องจากการที่คุณภาพสิ่งแวดล้อมเสื่อมโทรม
- ก. เกิดโรคภัยไข้เจ็บ
ข. ได้รับสารพิษเป็นอันตรายต่อร่างกาย
ค. ภูมิต้านทานโรคลดลง
ง. เกิดโรคที่มีผลต่อการเปลี่ยนแปลงทางพันธุกรรม
จ. สูญเสียความสมดุลในร่างกาย
16. ร่างกายมนุษย์ต้องการน้ำในอัตราเฉลี่ยวันละเท่าใด
- ก. 1,000 กรัม/วัน
ข. 1,500 กรัม/วัน
ค. 2,200 กรัม/วัน
ง. 2,500 กรัม/วัน
จ. 3,000 กรัม/วัน
17. ถึงขณะสีแดงใช้สำหรับทั้งขยะประเภทใด
- ก. ขยะแห้ง
ข. ขยะเปียก
ค. ขยะมีพิษ
ง. ขยะที่ย่อยสลายง่าย
จ. ขยะที่ย่อยสลายยาก
18. ข้อใดต่อไปนี้ข้อใดจัดเป็นสิ่งแวดล้อมทางศิลปกรรม
- ก. อุทยานประวัติศาสตร์อยุธยา
ข. หุ่นใหญ่นครสวรรค์
ค. ศูนย์ศึกษาเขานินชอน
ง. พระโต๊ะแดง
จ. วนอุทยานแห่งชาติเขาเขียว
19. วิธีการตามข้อใดที่ไม่ใช่การรักษาสิ่งแวดล้อมทางวัฒนธรรม
- ก. จัดบรรยากาศในโรงเรียนเป็นประชาธิปไตย
ข. บุคลากรในโรงเรียนยกมือไหว้ทักทายกันในตอนเช้า
ค. การสืบสานภูมิปัญญาไทย
ง. การดูแลอาคารสถานที่ให้ถูกสุขลักษณะสวยงาม
จ. การจัดตั้งชมรมทางสิ่งแวดล้อมในโรงเรียน
20. รายวิชาต่าง ๆ ตามหลักสูตรระดับมัธยมศึกษาตอนต้น เนื้อหาส่วนใดที่เป็นเนื้อหา สิ่งแวดล้อมศึกษา
- ก. ส่วนที่เกี่ยวข้องกับมนุษย์และสิ่งแวดล้อม
ข. ส่วนที่เกี่ยวกับรายวิชาอื่นตามหลักสูตร
ค. ส่วนที่เป็นองค์ความรู้รายวิชานั้น ๆ
ง. ส่วนที่เป็นวัตถุประสงค์และหลักการ
จ. ทุกส่วนของทุกรายวิชา

ตอนที่ 2

แบบวัดมีจิตสำนึกในการอนุรักษ์สิ่งแวดล้อม (ม. ต้น)

ให้นักเรียนพิจารณารายการความคิดและการปฏิบัติต่อสิ่งแวดล้อมทางซ้ายมือว่า แต่ละรายการตรงกับความเห็นหรือการปฏิบัติของนักเรียนมากน้อยเพียงใด แล้วกาเครื่องหมาย ✓ ในช่องที่ตรงกับระดับความเห็นของนักเรียน โดยกลางในกระดาษคำตอบที่แจกให้ ระดับความเห็นและการปฏิบัติมี 5 ระดับ ดังนี้

- 5 หมายถึง เห็นด้วยอย่างยิ่ง/ปฏิบัติมากที่สุด
- 4 หมายถึง เห็นด้วย/ปฏิบัติมาก
- 3 หมายถึง เฉย ๆ / ไม่แน่ใจ
- 2 หมายถึง ไม่เห็นด้วย/ปฏิบัติน้อย
- 1 หมายถึง ไม่เห็นด้วยอย่างยิ่ง/ไม่ได้ปฏิบัติ

รายการความคิดเห็น/การปฏิบัติ	ระดับความคิด/การปฏิบัติ				
	5	4	3	2	1
ความคิดเห็น					
1 รับรู้และร่วมกิจกรรมการอนุรักษ์สิ่งแวดล้อมในโรงเรียนและชุมชนด้วยความเต็มใจ					
2 ขอมรับว่ามนุษย์เป็นส่วนหนึ่งของสิ่งแวดล้อม จึงต้องรักและติดต่อกับสิ่งแวดล้อมเสมือนการปฏิบัติต่อตนเอง					
3 สิ่งแวดล้อมมีความงดงามในตัวของมันเองโดยธรรมชาติ มนุษย์จะต้องไม่ทำลายความงดงามนั้น					
4 แม่น้ำลำคลองหล่อเลี้ยงชีวิตคนไทย น้ำในแม่น้ำลำคลอง น่าเสียดายทำให้คนและสิ่งมีชีวิตอื่นในน้ำดำรงอยู่ไม่ได้ เราจึงควรละเว้นการทิ้งขยะมูลฝอยหรือสิ่งปฏิกูลลงน้ำที่จะทำให้ให้น้ำเน่าเสีย					
5 โรงเรียนเป็นของทุกคน ทุกคนจึงมีหน้าที่ความรับผิดชอบร่วมกันในการทำโรงเรียนให้น่าอยู่เป็นโรงเรียนในฝัน					
การปฏิบัติ					
6 ด้วยประเทศไทยไม่ใช่เศรษฐกิจน้ำมัน ข้าพเจ้าจึงเลือกที่จะเดินทางมาโรงเรียนโดยรถประจำทางแทนการใช้รถยนต์ส่วนตัวหรือผู้ปกครองมาส่ง					
7 ข้าพเจ้าสนใจศึกษาและรับฟังข่าวสารเกี่ยวกับการอนุรักษ์ พลังงานและสิ่งแวดล้อมอยู่เป็นนิจ					
8 ข้าพเจ้าแยกขยะทุกครั้งก่อนทิ้ง					
9 ข้าพเจ้าเชื่อในทางสายกลางในการดำรงชีวิตและยึดปฏิบัติ แบบกินพอคืออยู่พอดี					
10. ข้าพเจ้าคิดและปฏิบัติตามรายการที่ 1 – 9 มาอย่างต่อเนื่องและเป็นเวลานาน					

ตอนที่ 3

แบบประเมินพฤติกรรมและการมีส่วนร่วมในการอนุรักษ์สิ่งแวดล้อม (ม.ต้น)

ให้นักเรียนพิจารณารายการพฤติกรรมทางสิ่งแวดล้อมทางซ้ายมือว่า แต่ละรายการนักเรียนได้ปฏิบัติและได้ผลดีมากน้อยเพียงใด แล้วกาเครื่องหมาย ✓ ในช่องที่ตรงกับระดับการปฏิบัติของนักเรียน โดยกาลงในกระดาษคำตอบที่แจกให้ ระดับความเห็นและการปฏิบัติมี 5 ระดับ ดังนี้

5	หมายถึง	ปฏิบัติมากที่สุด/ได้ผลดีมากที่สุด
4	หมายถึง	ปฏิบัติมาก/ได้ผลดีมาก
3	หมายถึง	ปฏิบัติปานกลาง / ได้ผลปานกลาง
2	หมายถึง	ปฏิบัติค่อนข้างน้อย/ได้ผลน้อย
1	หมายถึง	ปฏิบัติน้อย/ไม่ได้ปฏิบัติ

รายการความคิดเห็น/การปฏิบัติ	ระดับความคิด/การปฏิบัติ				
	5	4	3	2	1
1. แสวงหาความรู้เรื่องทรัพยากรธรรมชาติพลังงาน และการอนุรักษ์พัฒนาสิ่งแวดล้อมอยู่เสมอ					
2. เลือกวิธีการในการอนุรักษ์ทรัพยากรธรรมชาติ พลังและสิ่งแวดล้อมได้อย่างเหมาะสม					
3. เลือกวิธีการในการแก้ปัญหาทรัพยากรธรรมชาติ พลังงานและสิ่งแวดล้อมได้ถูกต้อง					
4. เลือกซื้อและใช้สิ่งของที่ประหยัดพลังงานและไม่ทำลายสิ่งแวดล้อม					
5. มีบทบาทในการเลือกแนวปฏิบัติในการอนุรักษ์ทรัพยากร พลังงานและสิ่งแวดล้อมในครอบครัว โรงเรียนหรือชุมชน					
6. มีส่วนร่วมในการอนุรักษ์ทรัพยากรธรรมชาติพลังงานและสิ่งแวดล้อมในครอบครัว โรงเรียนและชุมชน					
7. มีบทบาทสำคัญในการอนุรักษ์และพัฒนาสิ่งแวดล้อมที่จะนำไปสู่การพัฒนาที่ยั่งยืน					
8. เปลี่ยนพฤติกรรมกรบริโภค และการดำรงชีวิตเป็นแบบ เรียบง่าย โดยยึดทางสายกลาง					
9. จัดให้มีการวิเคราะห์และประเมินทางเลือกและร่วมเลือกทางเลือกในการอนุรักษ์สิ่งแวดล้อม					

รายการความคิดเห็น/การปฏิบัติ	ระดับความคิด/การปฏิบัติ				
	5	4	3	2	1
10 ปฏิบัติต่อสิ่งแวดล้อมอย่างสร้างสรรค์ โดยปฏิบัติ ดังนี้					
10.1 เลือกซื้อ บริโภคผัก ผลไม้ และอาหารปลอดสารพิษ					
10.2 ไม่บริโภคอาหารที่ส่งเสริมการทำลายสิ่งแวดล้อม					
10.3 ดักอาหารพดอิม และกินให้หมดจาน					
10.4 เลือกซื้อสินค้าโดยคำนึงถึงประโยชน์มากกว่ารูปลักษณ์					
10.5 มีนิสัยการใช้ไฟฟ้า ประปาโดยประหยัด					
10.6 นิยมใช้ขนส่งสาธารณะ					
10.7 คัดแปลงวัตถุใช้แล้วกลับมาใช้ใหม่					
10.8 ใช้โทรศัพท์เท่าที่จำเป็น					
10.9 ไม่สร้างสิ่งปฏิญูลและมลภาวะ					
10.10 แยกขยะและทิ้งขยะเป็นที่					
10.11 หลีกเลี่ยงการใช้วัตถุย่อยสลายยาก					
10.12 รักสะอาด ความเป็นระเบียบเรียบร้อยและสวยงาม					
10.13 รักษาสภาพและความสวยงามของสิ่งแวดล้อมธรรมชาติ					
10.14 รักษาธรรมชาติสมบัติให้คงสภาพและใช้ได้ยาวนาน					
10.15 สร้างบรรยากาศที่ดีในครอบครัว โรงเรียน และชุมชน					

แบบประเมินตนเอง

ปต 2/2 (SE 2/2)

แบบประเมินคุณลักษณะของสิ่งแวดล้อมของผู้เรียน ระดับ ม. ปลาย
Environment Characteristics Evaluation Form for Upper-Secondary
School's Students

(ห้ามขีดเขียนข้อความลงในแบบนี้)

คำชี้แจง

1. แบบ ปต 2/2 เป็นแบบประเมินตนเอง ใช้สำหรับประเมินคุณลักษณะทางสิ่งแวดล้อมที่พึงประสงค์ของผู้เรียนระดับมัธยมศึกษาตอนปลาย ตามโครงการพัฒนาการประเมินผลการจัดสิ่งแวดล้อมศึกษาด้วยตนเองของโรงเรียนมัธยมศึกษา
2. แบบ ปต 2/2 ประกอบด้วยแบบทดสอบและแบบประเมิน 3 ตอน ดังนี้
 - ตอนที่ 1 แบบทดสอบความรู้พื้นฐานทางสิ่งแวดล้อมของผู้เรียน เป็นข้อสอบ (Test) แบบเลือกตอบ จำนวน 20 ข้อ
 - ตอนที่ 2 แบบวัดจิตสำนึกในการอนุรักษ์สิ่งแวดล้อม เป็นแบบสอบถามแบบมาตราส่วนประเมินค่า (Rating Scale) จำนวน 10 ข้อ
 - ตอนที่ 3 แบบประเมินพฤติกรรมและการมีส่วนร่วมในการอนุรักษ์สิ่งแวดล้อมเป็นแบบสอบถามแบบมาตราส่วนประเมินค่า (Rating Scale) จำนวน 10 ข้อ
3. ให้อ่านคำชี้แจงเพิ่มเติมในแต่ละตอนก่อนทำข้อสอบและตอบแบบสอบถามนี้

ตอนที่ 1

แบบทดสอบความรู้พื้นฐานทางสิ่งแวดล้อม

ให้กาเครื่องหมาย X ทับอักษร ก ข ค ง หรือ จ ที่เป็นคำตอบที่ถูกต้องที่สุด เพียงข้อเดียว (ในแต่ละข้อคำถาม) ลงในกระดาษคำตอบที่แจกให้

1. มนุษย์ใช้เกณฑ์ตามข้อใดในการจำแนกว่าสิ่งใดเป็น “สิ่งแวดล้อม”

ก. ทุกสิ่งทุกอย่างบนโลก	ง. สิ่งที่เกิดเองตามธรรมชาติ
ข. สิ่งที่เกี่ยวข้องกับมนุษย์	จ. สิ่งที่มีมนุษย์สร้างขึ้น
ค. สิ่งที่เป็นปัญหากับมนุษย์	
2. ข้อใด ไม่ใช่ ลักษณะของสิ่งแวดล้อม

ก. มีลักษณะเฉพาะ	ง. เปลี่ยนแปลงเสมอ
ข. ไม่อยู่โดดเดี่ยวในธรรมชาติ	จ. มีความแข็งแกร่งเท่าเทียมกัน
ค. อยู่กับสิ่งแวดล้อมอื่นเสมอ	

9. รัฐธรรมนูญแห่งราชอาณาจักรไทย พ.ศ. 2540 บัญญัติ...เกี่ยวกับหน้าที่ของชนชาวไทย
เกี่ยวกับสิ่งแวดล้อมไว้อย่างไร

- ก. พื้ทักษ์ ปกป้องสิ่งแวดล้อม
 - ข. พื้ทักษ์ ปกป้อง และสืบสานศิลปวัฒนธรรมและสิ่งแวดล้อม
 - ค. อนุรักษ์ทรัพยากรตามธรรมชาติและสิ่งแวดล้อมตามที่กฎหมายบัญญัติ
 - ง. มีส่วนร่วมในการจัดการบำรุงรักษาและใช้ประโยชน์ทรัพยากรธรรมชาติและสิ่งแวดล้อม
 - จ. มีส่วนร่วมในการคุ้มครอง ส่งเสริมและรักษาคุณภาพสิ่งแวดล้อม
10. พระราชบัญญัติให้ส่งเสริมและรักษาคุณภาพสิ่งแวดล้อม พ.ศ.2535 กำหนดให้ผูใดมีหน้าที่ออกประกาศ
กำหนดมาตรฐานควบคุมมลพิษจากแหล่งกำเนิดออกสู่สิ่งแวดล้อมเพื่อรักษาคุณภาพสิ่งแวดล้อม
- ก. รัฐมนตรีกระทรวงวิทยาศาสตร์และเทคโนโลยี
 - ข. คณะกรรมการสิ่งแวดล้อมแห่งชาติ
 - ค. รัฐมนตรีว่าการกระทรวงสาธารณสุข
 - ง. รัฐมนตรีว่าการกระทรวงอุตสาหกรรม
 - จ. รัฐมนตรีว่าการกระทรวงศึกษาธิการ
11. นักประชากรศาสตร์เชื่อว่าประชากรโลกจะถึงจุดสมดุล เมื่อโลกมีประชากร 10,000 คน
หมายความว่าอย่างไร
- ก. อัตราการเกิด – การตายของประชากรโลกจะเท่ากันเมื่อมีประชากร 10,000 ล้านคน
 - ข. อัตราการเพิ่มของประชากรจะเท่ากับศูนย์เมื่อประชากรมี 10,000 ล้านคน
 - ค. ทรัพยากรของโลกสามารถรองรับประชากรของโลกได้จำนวนประมาณ 10,000 ล้านคน
 - ง. ทรัพยากรของโลกจะหมดสิ้นไปเมื่อโลกมีประชากร 10,000 ล้านคน
 - จ. อัตราการเพิ่มของประชากรและสิ่งแวดล้อมจะเท่ากันเมื่อประชากรโลกครบ 10,000 ล้านคน
12. ปรัชญา “เศรษฐกิจพอเพียง” ของพระบาทสมเด็จพระเจ้าอยู่หัวรัชกาลปัจจุบัน เป็นแนวการพัฒนา
เศรษฐกิจของไทยในทุกระดับมีลักษณะตามข้อใด
- ก. พัฒนาอย่างมีคุณภาพและยั่งยืน
 - ข. พัฒนาโดยยึด “คน” เป็นศูนย์กลาง
 - ค. ยึดหลักการพึ่งตนเอง และ ขยันหมั่นเพียร
 - ง. ยึดหลักความอดทน ความเพียร และความรอบคอบ
 - จ. ยึดทางสายกลาง ความพอดี พอประมาณและมีเหตุผล
13. ปัจจุบันประเทศไทยต้องซื้อพลังงานจากต่างประเทศมาใช้เครื่องวันละประมาณเท่าไร
- ก. 224,265 บาร์เรลน้ำมันดิบ
 - ข. 280,335 บาร์เรลน้ำมันดิบ
 - ค. 525,728 บาร์เรลน้ำมันดิบ
 - ง. 725,129 บาร์เรลน้ำมันดิบ
 - จ. 1,175,084 บาร์เรลน้ำมันดิบ
14. แนวทางตามข้อใดที่เป็นการแก้ปัญหาด้านพลังงานกับสิ่งแวดล้อมได้ดีที่สุด
- ก. จัดหาและใช้พลังงานสะอาด
 - ข. ใช้พลังงานทดแทน
 - ค. สนับสนุนการอนุรักษ์พลังงาน
 - ง. สร้างจิตสำนึกการใช้พลังงานอย่างประหยัด
 - จ. จัดหาและใช้พลังงานสะอาดอย่างประหยัด

15. การวิเคราะห์ ผลกระทบสิ่งแวดล้อม (Environmental Impact Assessment : EIA) มีประโยชน์อย่างไร
- แก้ปัญหาสิ่งแวดล้อม
 - ควบคุมป้องกันปัญหาสิ่งแวดล้อมที่รุนแรง
 - ควบคุมป้องกันปัญหาสิ่งแวดล้อมก่อนเริ่มโครงการ
 - วางแผนควบคุมป้องกันปัญหาสิ่งแวดล้อมก่อนเริ่มโครงการ
 - ควบคุมป้องกันปัญหาสิ่งแวดล้อมทั้งก่อนและระหว่างการดำเนินโครงการ
16. พลาสติกประเภทใดที่สามารถนำกลับมาผลิตใช้ใหม่หรือรีไซเคิลได้
- Thermoplastics
 - Thermosetting
 - Biodegradable
 - Photodegradable
 - Auto – oxidant
17. ข้อใดเป็นโลหะหนักที่ปนเปื้อนในอาหารและเป็นอันตรายต่อสุขภาพ
- ปรอท ตะกั่ว ทองแดง สังกะสี สารหนู
 - ดีบุก เหล็ก แมงกานีส คาร์บอน ไฮโดรเจน
 - ปรอท ตะกั่ว ทองแดง คาร์บอน ไฮโดรเจน
 - ตะกั่ว มีเทน อะเซทิลีน คาร์บอนมอนอกไซด์ ไฮโดรเจน
 - นิกเกิล ยูเรเนียม โคเรียม ตะกั่ว อลูมิเนียม
18. สิ่งแวดล้อมธรรมชาติตามข้อใดที่ยังไม่มีกฎหมายในการอนุรักษ์
- ป่าไม้, ทุ่งหญ้า
 - สัตว์ป่า, สัตว์น้ำ
 - ป่าไม้, น้ำตก
 - น้ำตก, หาดทราย
 - สัตว์น้ำ, ภูเขา
19. ข้อใด ไม่ใช่ มรดกโลกทางวัฒนธรรม
- อุทยานประวัติศาสตร์ สุโขทัย – ศรีสัชนาลัย – กำแพงเพชร
 - อุทยานประวัติศาสตร์พระนครศรีอยุธยา
 - แหล่งโบราณคดีบ้านเชียง
 - เขตรักษาพันธุ์สัตว์ป่าทุ่งใหญ่นเรศวร
 - วนอุทยานแห่งชาติเขาใหญ่
20. วิชาต่าง ๆ ตามหลักสูตรมัธยมศึกษาตอนปลาย เนื้อหาส่วนใดที่เป็นเนื้อหาสิ่งแวดล้อมศึกษา
- ส่วนที่เกี่ยวข้องกับมนุษย์และสิ่งแวดล้อม
 - ส่วนที่สัมพันธ์กับรายวิชาอื่น
 - ส่วนที่เป็นองค์ความรู้ของรายวิชา
 - ส่วนที่เป็นวัตถุประสงค์และหลักการ
 - ทุกส่วนของทุกวิชาเป็นสิ่งแวดล้อม

ตอนที่ 2

แบบมีจิตสำนึกในการอนุรักษ์สิ่งแวดล้อม (ม. ปลาย)

ให้นักเรียนพิจารณารายการความคิดและการปฏิบัติต่อสิ่งแวดล้อมทางซ้ายมือว่าแต่ละรายการตรงกับความเห็นหรือการปฏิบัติของนักเรียนมากน้อยเพียงใด แล้วกาเครื่องหมาย ✓ ในช่องที่ตรงกับระดับความเห็นของนักเรียน โดยกาลงในกระดาษคำตอบที่แจกให้ ระดับความเห็นและการปฏิบัติมี 5 ระดับ ดังนี้

- 5 หมายถึง เห็นด้วยอย่างยิ่ง/ปฏิบัติมากที่สุด
- 4 หมายถึง เห็นด้วย/ปฏิบัติมาก
- 3 หมายถึง เฉย ๆ / ไม่แน่ใจ
- 2 หมายถึง ไม่เห็นด้วย/ปฏิบัติน้อย
- 1 หมายถึง ไม่เห็นด้วยอย่างยิ่ง/ไม่ได้ปฏิบัติ

รายการความคิดเห็น/การปฏิบัติ	ระดับความคิด/การปฏิบัติ				
	5	4	3	2	1
ความคิดเห็น					
1. สนใจรับรู้และร่วมกิจกรรมการอนุรักษ์สิ่งแวดล้อมใน โรงเรียนและชุมชนด้วยความเต็มใจ					
2. ยอมรับว่ามนุษย์เป็นส่วนหนึ่งของธรรมชาติและจะต้องดำรงชีวิตอยู่อย่างผสมกลมกลืนกับระบบความสัมพันธ์ทั้งหมดของธรรมชาติหรือระบบนิเวศ					
3. สิ่งแวดล้อมทั้งหมดมีความงดงามในตัวของมันเองโดยธรรมชาติมนุษย์จึงต้องปกป้องและรักษาไว้ซึ่งความงามนั้น					
4. ผลงานและทรัพยากรธรรมชาติทุกชนิดแท้จริงแล้วเป็นสมบัติร่วมกันของคนทั้งโลก การใช้ผลงานและทรัพยากรธรรมชาติ จึงต้องอนุรักษ์ให้สามารถใช้ให้ไว้นานที่สุด					
5. ทรัพยากรธรรมชาติและสิ่งแวดล้อมทุกชนิดสัมพันธ์เกี่ยวข้องกับชีวิตมนุษย์ทุกคน จึงต้องมีบทบาทหน้าที่และรับผิดชอบต่อสิ่งแวดล้อมร่วมกับการปฏิบัติ					
6. ด้วยเป็นที่แน่ชัดว่าวิถีชีวิตแบบใหม่ที่มีค่านิยม บริโภคนิยมเป็นการทำลายธรรมชาติและทำลายความสัมพันธ์ระหว่างมนุษย์ข้าพเจ้าจึงเลือกที่จะมีวิถีชีวิตแบบเดิมที่เน้นทั้งความสุขทางกาย ทางใจ และไม่เบียดเบียนสิ่งแวดล้อม					
7. ข้าพเจ้าสนใจศึกษาค้นคว้า และรับฟังข่าวสารเกี่ยวกับสิ่งแวดล้อมจากสื่อต่าง ๆ อยู่เป็นประจำ					
8. ข้าพเจ้าปฏิบัติตามแนวการรักษาสิ่งแวดล้อมและแนวการอนุรักษ์พลังงานและทรัพยากรธรรมชาติตามที่โรงเรียนและ ชุมชนกำหนดอย่างสม่ำเสมอ					

รายการความคิดเห็น/การปฏิบัติ	ระดับความคิด/การปฏิบัติ				
	5	4	3	2	1
9. ข้าพเจ้าศรัทธา เชื่อมั่นและเลือกดำรงชีวิตแบบเรียบง่าย ปฏิบัติตามทางสายกลาง ตามแนวเศรษฐกิจพอเพียงขององค์พระบาทสมเด็จพระเจ้าอยู่หัว					
10. ข้าพเจ้าเชื่อมั่น ปฏิบัติตนอย่างเหมาะสมในการรักษาสิ่งแวดล้อมอนุรักษ์พลังงาน และทรัพยากรธรรมชาติ และจะปฏิบัติต่อสิ่งแวดล้อมในทางสร้างสรรค์อย่างมีความสุข					

ตอนที่ 3

แบบประเมินพฤติกรรมและการมีส่วนร่วมในการอนุรักษ์สิ่งแวดล้อม (ม.ปลาย)

ให้นักเรียนพิจารณารายการพฤติกรรมทางสิ่งแวดล้อมทางซ้ายมือว่า แต่ละรายการนักเรียนได้ปฏิบัติและได้ผลดีมากน้อยเพียงใด แล้วกาเครื่องหมาย ✓ ในช่องที่ตรงกับระดับการปฏิบัติของนักเรียน โดยกาลงในกระดาษคำตอบที่แจกให้ ระดับความเห็นและการปฏิบัติมี 5 ระดับ ดังนี้

- | | | |
|---|---------|-----------------------------------|
| 5 | หมายถึง | ปฏิบัติมากที่สุด/ได้ผลดีมากที่สุด |
| 4 | หมายถึง | ปฏิบัติมาก/ได้ผลดีมาก |
| 3 | หมายถึง | ปฏิบัติปานกลาง / ได้ผลปานกลาง |
| 2 | หมายถึง | ปฏิบัติค่อนข้างน้อย/ได้ผลน้อย |
| 1 | หมายถึง | ปฏิบัติน้อย/ไม่ได้ปฏิบัติ |

รายการพฤติกรรมทางสิ่งแวดล้อม	ระดับการปฏิบัติ/ ผลการการปฏิบัติ				
	5	4	3	2	1
1. ริเริ่ม ศึกษาค้นคว้า ทดลอง เพื่อการอนุรักษ์ทรัพยากรธรรมชาติ หลังงานและสิ่งแวดล้อม					
2. เลือกวิธีในการปฏิบัติ เพื่อแก้ปัญหาสิ่งแวดล้อมได้อย่างเหมาะสมและได้ผลดี					
3. เลือกซื้อและใช้ผลิตภัณฑ์ที่ใช้พลังงานอย่างประหยัดและไม่ทำลายสิ่งแวดล้อม					
4. ประเมินผลกระทบ และคำนึงถึงผลที่จะเกิดกับสิ่งแวดล้อมก่อนดำเนินการใด					
5. ริเริ่มในการอนุรักษ์ทรัพยากร การประหยัดพลังงานและการแก้ปัญหาสิ่งแวดล้อมในโรงเรียนและชุมชน					
6. มีส่วนร่วมในการวางแผนสิ่งแวดล้อมในโรงเรียนและชุมชน					
7. มีส่วนรวมในโครงการหรือกิจกรรมเพื่อการอนุรักษ์ทรัพยากรหลังงานและสิ่งแวดล้อมใน โรงเรียนและชุมชน					

รายการพฤติกรรมทางสิ่งแวดล้อม	ระดับการปฏิบัติ/ ผลการการปฏิบัติ				
	5	4	3	2	1
8. มีบทบาทและมีส่วนร่วมในการเสนอความคิดเห็นเกี่ยวกับการอนุรักษ์สิ่งแวดล้อมในโรงเรียนและชุมชน					
9. มีส่วนร่วมในการตัดสินใจ และการแก้ปัญหาสิ่งแวดล้อมในโรงเรียนและชุมชน					
10. มีส่วนร่วมในการรณรงค์ให้ชุมชนร่วมมือในการอนุรักษ์สิ่งแวดล้อม					
11. ปรับเปลี่ยนพฤติกรรมกรบริโภคและการดำรงชีวิตเป็นแบบเรียบง่าย กินง่าย อยู่ง่าย					
12. ปฏิบัติต่อสิ่งแวดล้อมอย่างสร้างสรรค์ โดยปฏิบัติ ดังนี้					
12.1 เลือกซื้อบริโภคผักผลไม้ และอาหารปลอดสารพิษ					
12.2 ไม่บริโภคอาหารที่ส่งเสริมการทำลายสิ่งแวดล้อม					
12.3 ตักอาหารพออิ่ม และกินให้หมดจาน					
12.4 เลือกซื้อสินค้าโดยคำนึงถึงประโยชน์มากกว่ารูปลักษณ์					
12.5 มีนิสัยการใช้ไฟฟ้า ประปาโดยประหยัด					
12.6 นิยมใช้ขนส่งสาธารณะ					
12.7 คัดแปลงวัสดุใช้แล้วกลับมาใช้ใหม่					
12.8 ใช้โทรศัพท์โดยเท่าที่จำเป็น					
12.9 ไม่สร้างสิ่งปฏิญูล และมลภาวะ					
12.10 แยกขยะ และทิ้งขยะเป็นที่					
12.11 เลี่ยงการใช้วัสดุย่อยสลายยาก					
12.12 รักษาอากาศ ความเป็นระเบียบ เรียบร้อย สวยงาม					
12.13 รักษาสภาพและความสวยงามของสิ่งแวดล้อมธรรมชาติ					
12.14 ซ่อมรักษาสาธารณสมบัติให้คงสภาพและใช้ได้ ทนทาน					
12.15 สร้างบรรยากาศที่ดีในครอบครัว โรงเรียนและชุมชน					

แบบประเมินตนเอง

แบบ ปต 3 (SE 3)

แบบประเมินความรู้ความเข้าใจและการมีส่วนร่วมในการจัดสิ่งแวดล้อมศึกษาของครู
Teacher's Knowledge and Participation in Environmental Education Evaluation Form

คำชี้แจง

1. แบบ ปต 3 นี้ เป็นแบบประเมินความรู้ความเข้าใจและการมีส่วนร่วมในการจัดสิ่งแวดล้อมศึกษาของครูในโรงเรียน ตามโครงการพัฒนาการประเมินผลการจัดสิ่งแวดล้อมศึกษาด้วยตนเองของโรงเรียนมัธยมศึกษา
2. แบบประเมินนี้แบ่งเป็น 4 ตอน
 - ตอนที่ 1 แบบทดสอบความรู้พื้นฐานทางสิ่งแวดล้อมของครู เป็นข้อสอบ (Test) แบบเลือกตอบ จำนวน 10 ข้อ
 - ตอนที่ 2 แบบประเมินค่านิยม และพฤติกรรมทางสิ่งแวดล้อมของครู เป็นแบบสอบถาม แบบมาตราส่วนประเมินค่า (Rating Scale) จำนวน 10 ข้อ
 - ตอนที่ 3 แบบทดสอบความรู้พื้นฐานทางสิ่งแวดล้อมศึกษาของครู เป็นข้อสอบ (Test) แบบเลือกตอบ จำนวน 10 ข้อ
 - ตอนที่ 4 แบบประเมินพฤติกรรมทางสิ่งแวดล้อมศึกษาของครู เป็นแบบทดสอบตามแบบมาตราส่วนประเมินค่า 10 ข้อ
- 3.ให้อ่านคำชี้แจงเพิ่มเติมในแต่ละตอนให้เข้าใจก่อนทำการประเมินตนเอง ตามแบบประเมินนี้

ตอนที่ 1

แบบทดสอบความรู้พื้นฐานทางสิ่งแวดล้อมของครู

ให้กาเครื่องหมาย X ทับอักษร ก ข ค ง หรือ จ ที่เป็นคำตอบที่ถูกต้องที่สุดเพียงข้อเดียว
 โดยกาเครื่องหมาย X ลงในกระดาษคำตอบที่แจกให้

1. การให้ความหมายของสิ่งแวดล้อมในระดับปฏิบัติการ มีขอบข่ายตามข้อใด

ก. สิ่งต่าง ๆ ที่อยู่รอบตัวเรา (มนุษย์)	ง. สิ่งต่าง ๆ ที่อยู่รอบตัวเราและก่อ
ข. ทุกสิ่งทุกอย่างที่มีความเกี่ยวข้องกับมนุษย์	ปัญหาให้กับมนุษย์
ค. ทุกสิ่งทุกอย่างที่เป็นปัญหาสำหรับมนุษย์	จ. ทุกสิ่งทุกอย่างที่ให้โทษต่อมนุษย์
2. ข้อใดที่จัดเป็นสิ่งแวดล้อมประเภทเดียวกันทั้งหมด

ก. ป่าไม้ น้ำตก ถนน วัด	ง. ความเชื่อ ประเพณี ศิลปวัตถุ
ข. ดิน หิน บ้าน พรรคการเมือง	การแต่งกาย
ค. บ้าน ถนน เสื้อผ้า การเมือง	จ. ป่าไม้ ดิน บ้าน โบสถ์

3. สิ่งแวดล้อมเสื่อมโทรมหรือการเสียสมดุลในระบบนิเวศเกิดจากสาเหตุตามข้อใด
 - ก. คุณสมบัติเฉพาะตัวของสิ่งแวดล้อมเปลี่ยนไป
 - ข. ระบบความสัมพันธ์ของสิ่งแวดล้อมตามธรรมชาติเปลี่ยนไป
 - ค. โครงสร้างและหน้าที่ของสิ่งแวดล้อมเปลี่ยนไป
 - ง. ปริมาณสิ่งแวดล้อมเพิ่มขึ้นหรือลดลง
 - จ. เป็นคุณสมบัติเฉพาะของสิ่งแวดล้อมที่ต้องเปลี่ยนแปลงอยู่เสมอ
4. ความเชื่อ ตามข้อใดที่ไม่ก่อให้เกิดปัญหาทางสิ่งแวดล้อม
 - ก. มนุษย์เป็นส่วนหนึ่งของธรรมชาติ ต้องดำรงอยู่อย่างผสมกลมกลืนกับระบบความสัมพันธ์ทั้งหมดของธรรมชาติ
 - ข. วิทยาศาสตร์ช่วยให้มนุษย์สามารถจัดการสรรพสิ่งทั้งหลายที่อยู่นอกเหนือการจัดการของมนุษย์ได้
 - ค. มนุษย์มีอำนาจจัดการชีวิตของตนเองได้โดยไม่ต้องตกอยู่ภายใต้ข้อจำกัดของธรรมชาติ
 - ง. ธรรมชาติเป็นสมบัติของมนุษย์ มนุษย์เป็นผู้กำหนดว่าธรรมชาติใดมีหรือไม่มีคุณค่า
 - จ. ความสุขของมนุษย์อยู่ที่การได้ตอบสนองความต้องการหรือบรรลุเป้าหมายชีวิตของมนุษย์เอง
5. ปัญหาสิ่งแวดล้อมที่นักวิทยาศาสตร์ทั่วโลกห่วงใยมากที่สุดในปัจจุบันคือปัญหาใด

ก. การเปลี่ยนแปลงและแปรปรวนของภูมิอากาศโลก	ค. การขาดแคลนน้ำสะอาด
ข. การตัดไม้ทำลายป่า และความแห้งแล้ง	ง. ความยากจน
จ. การเพิ่มขึ้นของประชากรโลก	
6. อะไรรที่เป็นต้นตอหรือสาเหตุหลักที่แท้จริงของปัญหาสิ่งแวดล้อม
 - ก. ประชากรโลกเพิ่มขึ้น – ทรัพยากรลดลง
 - ข. ทักษะของมนุษย์ต่อสิ่งแวดล้อมเปลี่ยนไป – ความต้องการที่ไม่รู้จักพอของมนุษย์
 - ค. ความเห็นแก่ตัวของมนุษย์ – สร้างสิ่งปฏิญญาเพิ่มขึ้น
 - ง. ประชากรโลกเพิ่มขึ้น – สร้างสิ่งปฏิญญามากขึ้น
 - จ. ทรัพยากรธรรมชาติมีจำกัด – ประชากรโลกเพิ่มขึ้น
7. วิธีการหลักในการจัดการทรัพยากรธรรมชาติให้สามารถดำรงอยู่ร่วมกันอย่างสมดุลได้ คือวิธีการตามข้อใด

ก. การสงวน การพัฒนา การใช้	ง. การอนุรักษ์ การพัฒนา การใช้
ข. การสงวน การอนุรักษ์ การใช้	จ. การอนุรักษ์ และการพัฒนา
ค. การสงวน การอนุรักษ์ การพัฒนา	
8. ข้อใดเป็นวิธีการแก้ปัญหาสิ่งแวดล้อมได้ถึงรากเหง้าของปัญหา

ก. ลดอัตราการเกิดของมนุษย์	ง. เปลี่ยนความเชื่อและพฤติกรรมทางสิ่งแวดล้อมของมนุษย์
ข. ใช้ทรัพยากรธรรมชาติให้น้อยลง	จ. ใช้หลักผู้สร้างมลพิษเป็นผู้จ่าย (PPP)
ค. ไม่สร้างมลภาวะ	

9. สิทธิการมีส่วนร่วมของประชาชนในการพิทักษ์สิ่งแวดล้อมตามที่กฎหมายกำหนด ได้แก่สิทธิการมีส่วนร่วมตามข้อใด
 - ก. รับรู้ข่าวสาร – จ่ายค่าบำบัดมลพิษ – ฟ้องร้องกล่าวโทษ
 - ข. รับรู้ข่าวสาร – จ่ายค่าเสียหายแก่รัฐ – ร้องเรียนกล่าวโทษ
 - ค. รับรู้ข่าวสาร – ร่วมประชาพิจารณ์ – ได้รับการชดเชย
 - ง. รับรู้ข่าวสาร – ร่วมประชาพิจารณ์ – จ่ายค่าบำบัดมลพิษ
 - จ. รับรู้ข่าวสาร – ได้รับชดใช้ค่าเสียหาย – ร้องเรียนกล่าวโทษ
10. รัฐธรรมนูญแห่งราชอาณาจักรไทย พ.ศ. 2540 กำหนดหน้าที่ของชนชาวไทย เกี่ยวกับสิ่งแวดล้อมไว้ได้อย่างไร
 - ก. พิทักษ์ ปกป้องสิ่งแวดล้อมตามที่กฎหมายกำหนด
 - ข. อนุรักษ์ทรัพยากรธรรมชาติและสิ่งแวดล้อมตามที่กฎหมายกำหนด
 - ค. มีส่วนร่วมในการจัดการบำรุงรักษาและการใช้ประโยชน์จากทรัพยากรธรรมชาติและสิ่งแวดล้อม
 - ง. ร่วมประชาพิจารณ์เกี่ยวกับสิ่งแวดล้อม
 - จ. ร่วมบำรุงรักษา และได้รับประโยชน์จากทรัพยากรธรรมชาติและสิ่งแวดล้อม

ตอนที่ 2

แบบประเมินค่านิยมและพฤติกรรมทางสิ่งแวดล้อมของครู

ให้ท่านพิจารณาแนวคิดและพฤติกรรมทางสิ่งแวดล้อมทางซ้ายมือ ว่าแต่ละรายการท่านเห็นด้วยหรือได้ปฏิบัติมากน้อยเพียงใดแล้วกาเครื่องหมาย ✓ ในช่องที่ตรงกับระดับความคิดเห็นและการปฏิบัติของท่าน โดยกาเครื่องหมายลงในกระดาษคำตอบที่แจกให้ ระดับความเห็นและการปฏิบัติแบ่งเป็น 5 ระดับ ดังนี้

- | | | |
|---|---------|--------------------------------------|
| 5 | หมายถึง | เห็นด้วยมากที่สุด / ปฏิบัติมากที่สุด |
| 4 | หมายถึง | เห็นด้วยอย่างมาก / ปฏิบัติมาก |
| 3 | หมายถึง | เห็นด้วยปานกลาง / ปฏิบัติปานกลาง |
| 2 | หมายถึง | เห็นด้วยค่อนข้างน้อย / ปฏิบัติน้อย |
| 1 | หมายถึง | ไม่เห็นด้วย / ไม่ได้ปฏิบัติ |

รายการแนวคิดและพฤติกรรมทางสิ่งแวดล้อม	ระดับความเห็น / การปฏิบัติ				
	5	4	3	2	1
ความคิด / ค่านิยมทางสิ่งแวดล้อม					
1. มนุษย์เป็นส่วนหนึ่งของสิ่งแวดล้อม จึงต้องดำรงอยู่ร่วมกับสิ่งแวดล้อมตามพันธหน้าที่อย่างกลมกลืน					
2. สิ่งแวดล้อมธรรมชาติมีคุณค่าและความงดงามในตัวของมันเอง จึงจำเป็นต้องรักษาคุณค่าและความงามนั้น					

รายการแนวคิดและพฤติกรรมทางสิ่งแวดล้อม	ระดับความเห็น / การปฏิบัติ				
	5	4	3	2	1
3. ทรัพยากรธรรมชาติมีอยู่อย่างจำกัด จึงจำเป็นต้องใช้ทรัพยากรให้เกิดประโยชน์สูงสุดและยาวนานมากที่สุด					
4. สิ่งแวดล้อมเกี่ยวข้องกับมนุษย์ทุกคน ทุกคนจึงมีหน้าที่ในการรักษาสิ่งแวดล้อม					
5. การแก้ปัญหาสิ่งแวดล้อม จะทำให้สำเร็จ โดยถ้าฟังได้ยาก ข้าพเจ้าจึงเลือกที่จะมีส่วนร่วมในการแก้ปัญหาสิ่งแวดล้อม ให้มากที่สุดที่จะทำได้					
พฤติกรรมทางสิ่งแวดล้อม					
6. สนใจศึกษาหาความรู้ และรับรู้ข่าวสารเกี่ยวกับการอนุรักษ์ทรัพยากรธรรมชาติและสิ่งแวดล้อมอยู่เสมอ					
7. ปฏิบัติตนตามแนวทางการประหยัดพลังงานและการรักษาสิ่งแวดล้อมอย่างสม่ำเสมอ					
8. เชื่อในทางสายกลางและยึดมั่นปฏิบัติตนให้เป็นผู้อยู่ง่าย กินง่าย					
9. ปฏิบัติตนเป็นแบบอย่าง และได้รับการยกย่องว่าเป็นแบบอย่างในการอนุรักษ์ทรัพยากรธรรมชาติและสิ่งแวดล้อม					
10. สนใจ ให้ความสำคัญ มีส่วนร่วมและมีบทบาทสำคัญในการอนุรักษ์ทรัพยากรธรรมชาติและสิ่งแวดล้อมในครอบครัว โรงเรียน ชุมชนและประเทศชาติ					

ตอนที่ 3

แบบทดสอบความรู้พื้นฐานทางสิ่งแวดล้อมศึกษาของครู

ให้กาเครื่องหมาย X ทับอักษร ก ข ค ง หรือ จ ที่เป็นคำตอบที่ถูกต้องที่สุดเพียงข้อเดียว (ในแต่ละข้อคำถาม) โดยกาเครื่องหมาย X ลงในกระดาษคำตอบที่แจกให้

- การจัดสิ่งแวดล้อมศึกษามีวัตถุประสงค์เฉพาะนอกเหนือจากการจัดการศึกษาทั่วไปในเรื่องใด
 - การสร้างความรู้ความเข้าใจ
 - การมีส่วนร่วมในการอนุรักษ์ สิ่งแวดล้อม
 - การสร้างตระหนักรู้ เห็นคุณค่า
 - การสร้างจริยธรรม
 - การสร้างและปรับเปลี่ยนพฤติกรรม
- ด้วยเหตุผลและความจำเป็นตามข้อใดที่สำคัญที่สุด ที่ต้องจัดสิ่งแวดล้อมศึกษา
 - กระแสสิ่งแวดล้อมของโลก
 - วิกฤตการณ์ทางการศึกษา
 - วิกฤตการณ์ทางสิ่งแวดล้อม
 - วิกฤตการณ์มนุษย์
 - วิกฤตการณ์ความคิดและความเชื่อของมนุษย์

3. ข้อใดเป็นความเชื่อพื้นฐานของสิ่งแวดล้อมศึกษา
 - ก. ความต้องการมีชีวิตอยู่เป็นเป้าหมายสูงสุดของทุกชีวิต
 - ข. ปัญหาสิ่งแวดล้อมเกิดจากพฤติกรรมของมนุษย์
 - ค. ความเชื่อ ค่านิยม และเจตคติ สามารถเปลี่ยนแปลงได้โดยกระบวนการทางการศึกษา
 - ง. ความเชื่อ ค่านิยม และพฤติกรรมทางสิ่งแวดล้อมของมนุษย์แตกต่างจากความเชื่อและพฤติกรรมด้านอื่น
 - จ. การแก้ปัญหาสิ่งแวดล้อมต้องแก้ที่พฤติกรรมของมนุษย์
4. ข้อใดเป็นยุทธศาสตร์หลักในการจัดสิ่งแวดล้อมศึกษา
 - ก. การมีส่วนร่วม – การบูรณาการเป็นองค์รวม – การเรียนรู้ที่หลากหลาย
 - ข. การเรียนรู้ตลอดชีวิต – การสร้างจริยธรรม - การบูรณาการ
 - ค. การยึดผู้เรียนเป็นสำคัญ – การบูรณาการ - การสร้างจริยธรรม
 - ง. การมีส่วนร่วม – การยึดผู้เรียนเป็นสำคัญ - การสร้างจริยธรรม
 - จ. การเรียนรู้ตามสภาพจริง – การยึดผู้เรียนเป็นสำคัญ
5. การจัดหลักสูตรสิ่งแวดล้อมศึกษาในระดับมัธยมศึกษาควรจัดในลักษณะใด
 - ก. แยกเป็นรายวิชาสิ่งแวดล้อมศึกษาเป็นการเฉพาะ
 - ข. บูรณาการในรายวิชาอื่นทั้งหลักสูตร ทั้งวัตถุประสงค์ เนื้อหา และการจัดกิจกรรมการเรียนรู้
 - ค. แยกเนื้อหาสิ่งแวดล้อมศึกษาในรายวิชาต่าง ๆ อย่างชัดเจน
 - ง. กำหนดวัตถุประสงค์การเรียนรู้ตามลำดับขั้น
 - จ. จัดแยกเป็นรายวิชาในทุกระดับชั้น
6. การจัดการเรียนรู้สิ่งแวดล้อมศึกษาใน โรงเรียนมัธยมศึกษาที่จะให้เกิดผลดีสูงสุด ควรจัดในลักษณะใด
 - ก. จัดบนพื้นฐานเนื้อหาสิ่งแวดล้อมที่หลากหลาย
 - ข. ใช้วิธีการเรียนรู้ที่หลากหลาย
 - ค. ใช้ฐานการเรียนรู้ที่หลากหลาย
 - ง. ใช้เนื้อหา กระบวนการ และฐานการเรียนรู้ที่หลากหลาย
 - จ. จัดตามข้อ ง. และบูรณาการสู่เป้าหมายอย่างมีเอกภาพ
7. การจัดกิจกรรมสิ่งแวดล้อมศึกษา ควรดำเนินการร่วมกันตามขั้นตอนในข้อใด
 - ก. วางแผน – ลงมือทำ – ติดตามผล – รับประโยชน์
 - ข. คิด – วางแผน – ลงมือทำ – ติดตามผล – รับประโยชน์
 - ค. วางแผน – ปฏิบัติตามแผน – ตรวจสอบติดตาม – ปรับปรุงแก้ไข
 - ง. วางแผน – ปฏิบัติตามแผน - ติดตามประเมินผล
 - จ. วางแผน – ปฏิบัติตามแผน – ติดตามประเมินผล – ปรับปรุงแก้ไข

8. การประเมินผลการจัดการเรียนรู้สิ่งแวดล้อมศึกษา ควรประเมินอย่างไรจึงจะได้ผลดีสูงสุด
- ประเมินโดยเน้นผลลัพธ์
 - ประเมินตามสภาพจริง
 - ประเมินโดยวิธีการที่หลากหลาย
 - ประเมินตาม ก - ค ทั้งภาพรวมของโรงเรียนและรายระดับชั้น
 - ประเมินตาม ง. และผลไปปรับปรุงการจัดอย่างต่อเนื่อง
9. ผู้มีบทบาทและรับผิดชอบในการจัดสิ่งแวดล้อมศึกษาในโรงเรียนมัธยมศึกษา คือผู้ใด
- ครูที่ได้รับมอบหมายให้เป็นครูสิ่งแวดล้อมศึกษา
 - ครูที่สอนรายวิชาที่มีเนื้อหาสิ่งแวดล้อมศึกษา
 - ครูฝ่ายวิชาการ
 - ครูฝ่ายบริการ
 - ครูทุกคนในโรงเรียน
10. ต่อไปนี้ ข้อใดเป็นแนวทางจัดการเรียนรู้ตามหลักสูตรการศึกษาขั้นพื้นฐาน
- การบูรณาการแบบผู้สอนคนเดียว
 - การบูรณาการแบบคู่ขนาน
 - การบูรณาการแบบสหวิทยาการ
 - การบูรณาการแบบโครงการ
 - ถูกทุกข้อ

ตอนที่ 4

แบบประเมินค่านิยมและพฤติกรรมทางสิ่งแวดล้อมศึกษาของครู

ให้ท่านพิจารณาแนวคิดและพฤติกรรมทางสิ่งแวดล้อมศึกษาแต่ละรายการทางซ้ายมือว่าแต่ละรายการท่านเห็นด้วยหรือได้ปฏิบัติมากน้อยเพียงใด แล้วกาเครื่องหมาย ✓ ในช่องที่ตรงกับระดับความเห็นและการปฏิบัติของท่าน โดยกาเครื่องหมายลงในกระดาษคำตอบที่แจกให้ ระดับความคิดเห็นและการปฏิบัติมี 5 ระดับ ดังนี้

5	หมายถึง	เห็นด้วยมากที่สุดหรือปฏิบัติมากที่สุด
4	หมายถึง	เห็นด้วยค่อนข้างมากหรือปฏิบัติมาก
3	หมายถึง	เห็นด้วยปานกลางหรือปฏิบัติในระดับปานกลาง
2	หมายถึง	เห็นด้วยค่อนข้างน้อยหรือปฏิบัติน้อย
1	หมายถึง	ไม่เห็นด้วยหรือไม่ได้ปฏิบัติ

รายการแนวคิดและพฤติกรรมที่ประเมิน	ระดับความเห็น / การปฏิบัติ				
	5	4	3	2	1
ความคิด / ค่านิยมทางสิ่งแวดล้อมศึกษา					
1. ปัญหาสิ่งแวดล้อมทั้งหมดเกิดจากพฤติกรรมของความต้องการที่ไม่มีขีดจำกัดของมนุษย์					
2. ความเชื่อ ค่านิยม และพฤติกรรม สามารถเปลี่ยนแปลงได้โดยกระบวนการทางการศึกษา					
3. การปรับเปลี่ยนความเชื่อ ค่านิยม และพฤติกรรมทางสิ่งแวดล้อมมีลักษณะแตกต่างจากการปรับเปลี่ยนโดยทั่วไป จึงจำเป็นต้องจัดสิ่งแวดล้อมศึกษา ให้เป็นยุทธศาสตร์จำเพาะให้บรรลุเป้าหมายของสิ่งแวดล้อมศึกษา					
4. การจัดสิ่งแวดล้อมศึกษาต้องจัดโดยการมีส่วนร่วม การบูรณาการและการใช้ฐานการเรียนรู้ที่หลากหลาย ครูทุกคนในโรงเรียนจึงมีบทบาทหน้าที่เป็นครูสิ่งแวดล้อมศึกษา					
5. ความสำเร็จของการจัดสิ่งแวดล้อมศึกษาที่ผู้หนึ่งผู้ใดในโรงเรียนจะทำสำเร็จได้ โดยลำพัง ผู้ตอบจึงเลือกที่จะมีส่วนร่วมในทุกกิจกรรมสิ่งแวดล้อมศึกษาที่โรงเรียนจัดขึ้น					
พฤติกรรม / การมีส่วนร่วมในการจัดสิ่งแวดล้อมศึกษา					
6. สนใจ ศึกษา และรับทราบข่าวสารข้อมูลเกี่ยวกับสิ่งแวดล้อมศึกษาอยู่เสมอ					
7. สอนหรือสอดแทรกสาระสิ่งแวดล้อมศึกษาในการจัดกระบวนการเรียนรายวิชาที่ตนรับผิดชอบอยู่เสมอ					
8. ร่วมและมีบทบาทสำคัญในการจัดกิจกรรมสิ่งแวดล้อมและสิ่งแวดล้อมศึกษาที่จัดขึ้น					
9. ร่วมกิจกรรมสิ่งแวดล้อมของโรงเรียนและชุมชนด้วยความพึงพอใจและมีความสุข					
10. ชี้แนะปฏิบัติตนเป็นต้นแบบในการจัดและการมีส่วนร่วมในการจัดสิ่งแวดล้อมศึกษา					

แบบประเมินตนเอง

แบบ ปต 4 (SE 4)

แบบประเมินผลการบริหารจัดการสิ่งแวดล้อมศึกษาของโรงเรียน
School's Environmental Education Management Evaluation Form

(ห้ามขีดเขียนข้อความใด ๆ ลงในแบบนี้)

คำชี้แจง

1. แบบ ปต 4 เป็นแบบประเมินผลการบริหารจัดการสิ่งแวดล้อมศึกษาด้วยตนเองของโรงเรียน ให้คณะผู้ประเมินที่ได้รับมอบหมายเป็นผู้ประเมินตามแบบนี้
2. ให้ผู้ประเมินพิจารณารายการการบริหารจัดการสิ่งแวดล้อมศึกษาที่กำหนดว่า โรงเรียนได้จัดให้มีการปฏิบัติ หรือประสบความสำเร็จมากน้อยเพียงใด แล้วกาเครื่องหมาย ✓ ในช่องที่ตรงกับรายการการปฏิบัติของโรงเรียน โดยกาลงในกระดาษคำตอบที่แจกให้
3. ระดับการปฏิบัติหรือความสำเร็จแบ่งเป็น 5 ระดับ ดังนี้
 - 5 หมายถึง ปฏิบัติมากที่สุดหรือสำเร็จมากที่สุด
 - 4 หมายถึง ปฏิบัติมากหรือ ได้ผลมาก
 - 3 หมายถึง ปฏิบัติปานกลางหรือ ได้ผลปานกลาง
 - 2 หมายถึง ปฏิบัติค่อนข้างน้อย หรือ ได้ผลน้อย
 - 1 หมายถึง ปฏิบัติน้อยที่สุดหรือไม่ ได้ปฏิบัติ

รายการการบริหารจัดการที่ประเมิน	ระดับการปฏิบัติ/ความสำเร็จ				
	5	4	3	2	1
<p style="text-align: center;">การวางแผนสิ่งแวดล้อมศึกษา</p> <ol style="list-style-type: none"> 1. กำหนดวิสัยทัศน์การจัดสิ่งแวดล้อมศึกษาของโรงเรียนไว้อย่างชัดเจน เป็นวิสัยทัศน์ร่วมและเป็นที่ยอมรับของครูในโรงเรียน (MEES 1) 2. จัดทำแผนยุทธศาสตร์การจัดสิ่งแวดล้อมศึกษาของโรงเรียนที่มีกำหนดเป้าประสงค์และกลยุทธ์การจัดอย่างชัดเจนมีเอกภาพและสอดคล้องกันแผนพัฒนาคุณภาพการศึกษาของโรงเรียน (MEES 2) 3. จัดทำโครงการและแผนปฏิบัติการทางสิ่งแวดล้อมศึกษาที่ชัดเจน นำแผนไปสู่การปฏิบัติอย่างเป็นระบบ (MEES 3) 4. ใช้แผนปฏิบัติการสิ่งแวดล้อมศึกษาเป็นเครื่องมือในการกำกับ ตรวจสอบและประเมินผลการจัดสิ่งแวดล้อมศึกษา (MEES 4) 					

รายการการบริหารจัดการที่ประเมิน	ระดับการปฏิบัติ/ความสำเร็จ				
	5	4	3	2	1
การประเมินผลสิ่งแวดล้อมศึกษา					
5. กำหนดปัจจัยหลักความสำเร็จ (Critical Success Factor : CSF) ของการจัดสิ่งแวดล้อมศึกษาของโรงเรียนไว้ล่วงหน้า สอดรับกับวิสัยทัศน์ สอดคล้องกันทั้งระดับโรงเรียน และระดับปฏิบัติการ รวมทั้งกำหนดเป็นมาตรฐานการจัดสิ่งแวดล้อมศึกษาของโรงเรียนไว้ล่วงหน้าและเป็นที่ยอมรับของผู้เกี่ยวข้องทุกฝ่าย (MEES 5)					
6. กำหนดดัชนีชี้วัดความสำเร็จ (Key Performance Indicator : KPI) ของการจัดสิ่งแวดล้อมศึกษาไว้ล่วงหน้า สอดรับกับ CSF เป็นที่ยอมรับและใช้เป็นตัวชี้วัดในการประเมินผล (MEES 6)					
7. จัดให้มีการประชุมหารือหรือหาฉันทามติร่วมกันของครูทั้งโรงเรียนเกี่ยวกับ CSF และ KPI การจัดสิ่งแวดล้อมศึกษาและนำเสนอให้คณะกรรมการบริหารโรงเรียนให้ความเห็นชอบ (MEES 7)					
8. กำหนด CSF และ KPI การจัดสิ่งแวดล้อมศึกษาของโรงเรียนสอดคล้องกันทุกระดับ สามารถบอกความสำเร็จได้ทั้งในภาพรวมของโรงเรียนและผลในแต่ละระดับชั้น (MEES 8)					
9. จัดให้มีการกำหนดเป้าหมาย (Target) ที่เป็นเกณฑ์ขั้นต่ำของแต่ละชั้นเพื่อเป็นเป้าหมายการจัดสิ่งแวดล้อมศึกษาของผู้เกี่ยวข้องและเป็นเกณฑ์เปรียบเทียบในการประเมินผล (MEES 9)					
10. จัดให้มีการกำหนดข้อมูลที่จะจัดเก็บหรือประเมินตามดัชนีชี้วัด วิเคราะห์สภาพแวดล้อมและเลือกวิธีการประเมินหรือรวบรวมข้อมูลที่ง่าย สะดวก และมีประสิทธิภาพ (MEES 10)					
11. จัดให้มีการรายงานการประเมินผลการจัดสิ่งแวดล้อมศึกษาของโรงเรียนให้ผู้เกี่ยวข้องและสาธารณชนทราบ รวมทั้งนำผลการประเมินไปใช้ปรับปรุงการจัดสิ่งแวดล้อมศึกษาอย่างเป็นระบบ และต่อเนื่อง (MEES11)					
12. จัดให้การประเมินผลการจัดสิ่งแวดล้อมศึกษาเป็นส่วนหนึ่งของระบบบริหารการจัดการศึกษาของโรงเรียนและสอดคล้องกับระบบการประกันคุณภาพการศึกษา (MEES 12)					

รายการการบริหารจัดการที่ประเมิน	ระดับการปฏิบัติ/ความสำเร็จ				
	5	4	3	2	1
<p>การบูรณาการการสอนสิ่งแวดล้อมศึกษา</p> <p>13. กำหนดวัตถุประสงค์การจัดสิ่งแวดล้อมศึกษาไว้ในหลักสูตรของโรงเรียน อย่างมีเอกภาพตั้งแต่ระดับวิชา กลุ่ม (หมวด) วิชา ระดับหลักสูตรและระดับโรงเรียน สอดคล้องกับวิสัยทัศน์ และ CSF การจัดสิ่งแวดล้อมศึกษาของโรงเรียน (MEES 13)</p> <p>14. บูรณาการสิ่งแวดล้อมศึกษาในกระบวนการจัดการเรียนรู้ของโรงเรียน ทั้งการบูรณาการเนื้อหา บูรณาการกระบวนการเรียนรู้และบูรณาการฐานการเรียนรู้ ให้เกิดการจัดการจัดกระบวนการเรียนรู้ในองค์รวม (MEES14)</p> <p>15. จัดให้มีกิจกรรมการอบรม สัมมนา หรือการศึกษาด้วยตนเองให้ครูทุกคน ได้พัฒนาตนเองด้านการจัดสิ่งแวดล้อมศึกษา (MEES 15)</p> <p>16. ครูทุกคนได้สอดแทรกสิ่งแวดล้อมศึกษาในการจัดกระบวนการเรียนรู้ รายวิชาที่ตนเองรับผิดชอบและส่งเสริมครู-นักเรียนต้นแบบการจัดสิ่งแวดล้อมศึกษา (MEES 16)</p> <p>17. โรงเรียนกำหนดและจัดกิจกรรมสิ่งแวดล้อมศึกษาโดยคำนึงถึง ความสนใจและความต้องการและความพร้อมของผู้เรียนเป็นสำคัญ (MEES 17)</p> <p>18. จัดกิจกรรมสิ่งแวดล้อมศึกษาให้นักเรียนและครูมีส่วนร่วม โดย ร่วมคิด ร่วมวางแผน และร่วมรับประโยชน์ สร้างความสมานฉันท์ความเสมอภาคและความเอื้ออาทรต่อกัน (MEES 18)</p> <p>19. จัดกิจกรรมสิ่งแวดล้อมศึกษาที่หลากหลายและสอดคล้องกับสภาพ แวดล้อมของโรงเรียนและชุมชน (MEES 19)</p> <p>20. เปิดโอกาสให้นักเรียนและครูผู้สอนทุกคนได้มีส่วนร่วมในการจัดกิจกรรมสิ่งแวดล้อมศึกษาทั้งในโรงเรียนและชุมชน (MEES 20)</p>					

แบบประเมินตนเอง

แบบ ปต 5 (SE 5)

**แบบประเมินการจัดสภาพแวดล้อมและการบริหาร
การจัดตั้งแวดล้อมของโรงเรียน
School's Environment Management Evaluation Form**

(ห้ามขีดเขียนข้อความใด ๆ ลงในแบบฯ นี้)

คำชี้แจง

1. แบบ ปต 5 นี้ เป็นแบบประเมินการจัดสรรสิ่งแวดล้อมและการบริหารจัดการสิ่งแวดล้อมด้วยตนเองของโรงเรียน ให้คณะผู้ประเมินที่ได้รับมอบหมายเป็นผู้ประเมินตามแบบ ฯ นี้
2. ให้ผู้ประเมินพิจารณารายการกิจกรรมการบริหารจัดการสิ่งแวดล้อมของโรงเรียนว่าแต่ละรายการ โรงเรียนได้จัดให้มีการปฏิบัติหรือประสบความสำเร็จมากน้อยเพียงใด แล้วกาเครื่องหมาย ✓ ในช่องขวามือที่ตรงกับระดับการปฏิบัติที่โรงเรียนได้ดำเนินการในกระดาษคำตอบที่แจกให้
3. ระดับการปฏิบัติหรือระดับความสำเร็จ แบ่งเป็น 5 ระดับ ดังนี้
 - 5 หมายถึง ปฏิบัติมากที่สุดหรือสำเร็จมากที่สุด
 - 4 หมายถึง ปฏิบัติมากหรือได้ผลมาก
 - 3 หมายถึง ปฏิบัติปานกลางหรือได้ผลปานกลาง
 - 2 หมายถึง ปฏิบัติค่อนข้างน้อย หรือได้ผลน้อย
 - 1 หมายถึง ปฏิบัติน้อยที่สุดหรือไม่ได้ปฏิบัติ

รายการการจัดสภาพแวดล้อมที่ประเมิน	ระดับการปฏิบัติ/ความสำเร็จ				
	5	4	3	2	1
การบริหารจัดการสิ่งแวดล้อม					
1. กำหนดและประกาศนโยบายและเป้าหมายการบริหารจัดการสิ่งแวดล้อมของโรงเรียนอย่างชัดเจน ทั้งด้านความปลอดภัย สุขลักษณะ การจัดการและการใช้ประโยชน์ในการจัดสิ่งแวดล้อมศึกษา (MES 1)					
2. กำหนดพันธกิจ บังคับหลักความสำเร็จ (มาตรฐาน) และตัวชี้วัดความสำเร็จของการบริหารจัดการสิ่งแวดล้อมของโรงเรียนไว้ล่วงหน้า และเป็นที่ยอมรับของผู้เกี่ยวข้องทุกฝ่าย(MES 2)					
3. กำหนดแผน/โครงการหรือกิจกรรมการบริหารจัดการสิ่งแวดล้อมในโรงเรียนครบถ้วนทุกพันธกิจและเป็นที่ยอมรับร่วมกัน (MES 3)					

รายการการจัดสภาพแวดล้อมที่ประเมิน	ระดับการปฏิบัติ/ความสำเร็จ				
	5	4	3	2	1
<p>4. กำหนดคู่มือการบริหารจัดการสิ่งแวดล้อมของโรงเรียนกำหนดให้มีผู้รับผิดชอบและจัดอบรมบุคลากรผู้เกี่ยวข้องทุกฝ่ายเพื่อสร้างความเข้าใจร่วมกัน (MES 4)</p> <p>5. กำกับ ควบคุมให้มีการดำเนินการตามแผนและโครงการที่กำหนด (MES5)</p> <p>6. จัดให้มีการเตรียมความพร้อมเพื่อรองรับสถานการณ์ที่มีผลกระทบต่อสิ่งแวดล้อมเมื่อเกิดเหตุฉุกเฉิน</p> <p>7. ตรวจสอบติดตามการดำเนินการควบคุมสภาพผลการจัดที่ไม่เป็นไปตามเป้าหมายที่กำหนด รวมทั้งปรับปรุงแก้ไข (MES 7)</p> <p>8. จัดให้มีการบันทึกผลการดำเนินงาน/โครงการอย่างเป็นระบบ (MES 8)</p> <p>9. จัดให้มีการตรวจสอบ ประเมินผลและรายงานผลการจัดการอย่างเป็นระบบและต่อเนื่อง (MES 9)</p> <p style="text-align: center;">การจัดสภาพแวดล้อมในโรงเรียนให้ถูกสุขลักษณะ</p> <p>10. จัดให้มีผังการจัดบริเวณโรงเรียน และแผนการปรับปรุงสภาพแวดล้อมในโรงเรียน และเป็นส่วนหนึ่งของแผนการบริหารจัดการสิ่งแวดล้อม (MES 10)</p> <p>11. จัดบริเวณ สนามหญ้า สนามกีฬา ถนนภายในโรงเรียนรวมทั้งทางเดินระหว่างอาคารอย่างเหมาะสมถูกสุขลักษณะและสะดวก สบาย (MES 11)</p> <p>12. จัดอาคารเรียน ห้องเรียน ห้องประชุม ห้องสมุด ห้องพยาบาล ตลอดจนอาคารประกอบต่าง ๆ ถูกสุขลักษณะ มั่นคงปลอดภัยและ อยู่ในสภาพใช้การได้ (MES 12)</p> <p>13. จัดระบบและควบคุมการสุขาภิบาลในโรงเรียน ทั้งแสง เสียง น้ำ อุณหภูมิอากาศ การกำจัดขยะ สิ่งปฏิกูลและมลภาวะต่าง ๆ ในโรงเรียน (MES 13)</p> <p style="text-align: center;">การจัดโรงเรียนให้น่าอยู่</p> <p>14. จัดบริเวณอาคารสถานที่อย่างกลมกลืน สวยงาม สะอาด เป็นระเบียบเรียบร้อยและร่มรื่น (MES 14)</p> <p>15. จัดให้มีสวนหย่อม สวนป่า แปลงเกษตร เรือนเพาะชำ สระน้ำ หรือแหล่งน้ำธรรมชาติอื่น ๆ ที่ร่มรื่น สวยงาม เพื่อให้เป็นบริเวณสำหรับพักผ่อนและจัดกิจกรรม (MES 15)</p> <p>16. จัดกิจกรรมต่าง ๆ เพื่อสร้างบรรยากาศในโรงเรียน ทั้งกิจกรรมประชาธิปไตย กิจกรรมพัฒนาองค์การและอื่น ๆ เพื่อสร้างบรรยากาศการอยู่ร่วมกันในโรงเรียนอย่างมีความสุข (MES 16)</p>					

รายการการจัดสภาพแวดล้อมที่ประเมิน	ระดับการปฏิบัติ/ความสำเร็จ				
	5	4	3	2	1
<p>การจัดโรงเรียนเป็นแหล่งการเรียนรู้</p> <p>17. จัดบริเวณ สนามกีฬา อาคารเรียนและอาคารประกอบต่าง ๆ ให้เพียงพอ เหมาะสมกับจำนวนนักเรียนและเหมาะสมกับสภาพร่างกายของนักเรียน (MES 17)</p> <p>18. จัดสภาพแวดล้อมภายในโรงเรียนให้อื้อและสามารถใช้เป็นสื่อในการจัด กระบวนการเรียนรู้สิ่งแวดล้อมศึกษา(MES 18)</p>					
<p>19. กำหนดให้กิจกรรมหรือ โครงการเกี่ยวกับการจัดสภาพแวดล้อมและการ จัดการสิ่งแวดล้อมของโรงเรียนมีวัตถุประสงค์เพื่อจัดสิ่งแวดล้อมศึกษา</p> <p>20. จัดให้กิจกรรมหรือ โครงการเกี่ยวกับการจัดสภาพสิ่งแวดล้อมและ การจัดการสิ่งแวดล้อมของโรงเรียนเป็นกิจกรรมหรือ โครงการทาง สิ่งแวดล้อมศึกษา</p>					

แบบประเมินตนเอง

แบบ ปต 6 (SE 6)

แบบประเมินการส่งเสริมสิ่งแวดล้อมศึกษาในชุมชนของโรงเรียน
School's Extension of Environment Education in the Community
Evaluation Form

คำชี้แจง

1. แบบ ปต 6 เป็นแบบประเมินตนเองด้านการส่งเสริมสิ่งแวดล้อมศึกษาในชุมชนของโรงเรียน ให้คณะผู้ประเมินที่ได้รับมอบหมายและผู้แทนชุมชนเป็นผู้ประเมินตามแบบฯ นี้
2. ให้ผู้ประเมินพิจารณารายการกิจกรรมการส่งเสริมสิ่งแวดล้อมศึกษาของโรงเรียนทางซ้ายมือ ว่าแต่ละกิจกรรมตนเองคาดหวังหรือต้องการให้โรงเรียนดำเนินการ ในระดับใด และ ปัจจุบันโรงเรียนสามารถดำเนินการได้ในระดับใด แล้วกาเครื่องหมาย ✓ ในช่องที่ตรงกับ ความคาดหวังและการปฏิบัติจริงของโรงเรียน
3. ระดับความคาดหวังที่จะให้โรงเรียนปฏิบัติ และระดับการปฏิบัติจริงของโรงเรียน มี 5 ระดับ ดังนี้

ความคาดหวัง		การปฏิบัติจริง	
5 หมายถึง	คาดหวังให้ปฏิบัติมากที่สุด	5 หมายถึง	ปฏิบัติมากที่สุด
4 หมายถึง	คาดหวังให้ปฏิบัติมาก	4 หมายถึง	ปฏิบัติมาก
3 หมายถึง	คาดหวังให้ปฏิบัติในระดับปานกลาง	3 หมายถึง	ปฏิบัติปานกลาง
2 หมายถึง	คาดหวังให้ปฏิบัติน้อย	2 หมายถึง	ปฏิบัติน้อย
1 หมายถึง	คาดหวังให้ปฏิบัติน้อยที่สุดหรือไม่ต้องปฏิบัติ	1 หมายถึง	ปฏิบัติน้อยที่สุดหรือไม่ได้ปฏิบัติ

กิจกรรมการส่งเสริมสิ่งแวดล้อมศึกษาของโรงเรียน	ระดับความคาดหวัง					ระดับปฏิบัติจริง				
	5	4	3	2	1	5	4	3	2	1
การบริการทางวิชาการ 1. โรงเรียนบริการข่าวสาร ข้อมูล ความรู้และความเคลื่อนไหวเกี่ยวกับสิ่งแวดล้อมแก่ชุมชน (EES 1) 2. โรงเรียนให้คำปรึกษาหารือในการป้องกันและแก้ปัญหาสิ่งแวดล้อมแก่ชุมชน (EES 2) 3. เผยแพร่ผลงานดีเด่นด้านสิ่งแวดล้อมของโรงเรียนเพื่อเป็นตัวอย่างแก่ชุมชน (EES 3)										

กิจกรรมการส่งเสริมสิ่งแวดล้อมศึกษาของโรงเรียน	ระดับความคาดหวัง					ระดับปฏิบัติจริง				
	5	4	3	2	1	5	4	3	2	1
4. จัดให้ครู – อาจารย์ ใน โรงเรียน ไปเป็นวิทยากรในการให้ความรู้ด้านสิ่งแวดล้อมแก่ประชาชนในชุมชน (EES 4)										
5. โรงเรียนเชิญวิทยากรซึ่งเป็นภูมิปัญญาชาวบ้านและผู้ทรงคุณวุฒิด้านสิ่งแวดล้อมในชุมชนมาให้ความรู้แก่นักเรียน (EES 5)										
6. ชุมชนให้ความร่วมมือกับทางโรงเรียนในการศึกษาคูณานหรือการศึกษานอกสถานที่เกี่ยวกับสิ่งแวดล้อมในชุมชนของนักเรียน (EES 6)										
การร่วมกิจกรรมทางสิ่งแวดล้อม										
7. โรงเรียนจัดกิจกรรมการป้องกันและแก้ปัญหาเกี่ยวกับสิ่งแวดล้อมร่วมกับชุมชน (EES 7)										
8. โรงเรียนจัดให้มีกิจกรรมยกย่อง ประกาศเกียรติคุณบุคคลในชุมชนที่มีผลงานดีเด่นเกี่ยวกับสิ่งแวดล้อม และสิ่งแวดล้อมศึกษา (EES 8)										
9. โรงเรียนให้การสนับสนุนชุมชน ในการจัดตั้งองค์กรเกี่ยวกับสิ่งแวดล้อม (EES 9)										
10. จัดให้มีเอกสารรายงานผลงานด้านสิ่งแวดล้อมของโรงเรียนร่วมกับชุมชน (EES 10)										
11. จัดให้มีโครงการเกี่ยวกับสิ่งแวดล้อมของโรงเรียนร่วมกับชุมชน (EES 11)										
12. เชิญวิทยากรที่เป็นภูมิปัญญาชาวบ้านและผู้ทรงคุณวุฒิในท้องถิ่นมาร่วมสร้างสรรค์งานสิ่งแวดล้อมในโรงเรียน (EES 12)										
13. โรงเรียนได้รับการสนับสนุนจากชุมชนในการดำเนินงานเกี่ยวกับสิ่งแวดล้อมในโรงเรียน										
14. ความพึงพอใจของโรงเรียนและชุมชน ในการจัดสิ่งแวดล้อมศึกษาของโรงเรียน										
15. ความพึงพอใจของโรงเรียนและชุมชน ในการร่วมกิจกรรมการป้องกันและแก้ปัญหาสิ่งแวดล้อมในชุมชนของโรงเรียน										

แบบประเมินตนเอง

ปด 7 (SE 7)

**แบบประเมินผลการประเมินผลการจัดตั้งแวดล้อมศึกษาด้วยตนเอง
ของโรงเรียนมัธยมศึกษา
Secondary School Self-evaluation Meta-evaluation**

คำชี้แจง

1. แบบประเมินนี้ใช้สำหรับให้โรงเรียนมัธยมศึกษาทำการประเมินผลการประเมินผลการจัดตั้งแวดล้อมศึกษาด้วยตนเองของโรงเรียน
2. ให้ผู้บริหาร ครูที่รับผิดชอบการจัดตั้งแวดล้อมศึกษาและผู้เกี่ยวข้องกับการจัดตั้งแวดล้อมศึกษาของโรงเรียนเป็นผู้ตรวจสอบตามนี้
3. ให้กา ✓ ในช่องที่ตรงกับระดับการดำเนินการเกี่ยวกับการประเมินผลการจัดตั้งแวดล้อมศึกษาด้วยตนเองของโรงเรียน
4. แบ่งระดับการประเมินเป็น 5 ระดับ ดังนี้
 - 5 = ดำเนินการในระดับมากที่สุด
 - 4 = ดำเนินการมาก
 - 3 = ดำเนินการปานกลาง
 - 2 = ดำเนินการน้อย
 - 1 = ดำเนินการน้อยที่สุดไม่ได้ดำเนินการ

รายการประเมินตนเองที่ประเมิน	ระดับการประเมิน				
	1	2	3	4	5
1. กำหนดวัตถุประสงค์ของการประเมินไว้ชัดเจน					
2. ผลการประเมินบ่งบอกความสำเร็จของการจัดตั้งแวดล้อมศึกษาของโรงเรียนในองค์รวม					
3. นำผลการประเมินไปใช้ปรับปรุงการจัดตั้งแวดล้อมศึกษาของโรงเรียน					
4. ผลการประเมินบ่งบอกความสำเร็จของการจัดตั้งแวดล้อมศึกษาอย่างเป็นรูปธรรม					
5. ขั้นตอนการประเมินชัดเจน ง่ายต่อการปฏิบัติการประเมิน					
6. บุคลากรในโรงเรียนมีส่วนร่วมในการประเมิน					
7. ปัจจัยหลักความสำเร็จของการจัดตั้งแวดล้อมศึกษาที่จะทำการประเมินมีความชัดเจน					
8. เครื่องมือการประเมินง่ายและชัดเจน					
9. การประเมินสอดคล้องกับระบบการประกันคุณภาพการศึกษาของโรงเรียน					
10. การประเมินผลการจัดตั้งแวดล้อมศึกษาด้วยตนเองเป็นส่วนหนึ่งของการบริหารจัดการของโรงเรียน					
11. การรายงานข้อมูลการประเมินง่ายและเป็นรูปธรรม					
12. ชี้บ่งความสำเร็จการจัดตั้งแวดล้อมศึกษาในภาพรวมของโรงเรียน					
13. สร้างศักยภาพการประเมินตนเองให้กับบุคลากร					
14. ประเมินศักยภาพทางวิชาการของบุคลากรในโรงเรียน					
15. นำไปสู่การประเมินผลการปฏิบัติงานและการพัฒนาอย่างต่อเนื่อง					

แบบรายงานข้อมูลการประเมินตนเอง

รูปต 1 (SER 1)

**แบบรายงานข้อมูลนักเรียนและผลการเรียนของนักเรียน
เพื่อการประเมินผลการจัดสิ่งแวดล้อมศึกษาด้วยตนเอง
Students and Student's Learning Results Report Form**

โรงเรียน.....	รูปต 1
คำชี้แจง แบบ รูปต 1 เป็นแบบรายงานข้อมูลนักเรียนและผลการเรียนของนักเรียนประกอบการประเมินผลการจัดสิ่งแวดล้อมศึกษาด้วยตนเอง ให้หัวหน้าฝ่ายทะเบียนเป็นผู้รายงานตามแบบนี้ภาคเรียนละ 1 ครั้ง	

จำนวนนักเรียนในชั้นและจำนวนนักเรียนที่สอบผ่านรายวิชาที่มีเนื้อหาสิ่งแวดล้อมทุกวิชา

(รายงานเฉพาะข้อมูลผลการเรียนภาคเรียนที่ผ่านมา)

ม.1			ม.2			ม.3		
ห้อง	จำนวน		ห้อง	จำนวน		ห้อง	จำนวน	
	นักเรียน	สอบผ่าน		นักเรียน	สอบผ่าน		นักเรียน	สอบผ่าน
รวม			รวม			รวม		

* นักเรียนที่สอบผ่านคือนักเรียนที่ไม่มีระดับผลการเรียน 0 ร มส และ มผ

ม.1			ม.2			ม.3		
ห้อง	จำนวน		ห้อง	จำนวน		ห้อง	จำนวน	
	นักเรียน	สอบผ่าน		นักเรียน	สอบผ่าน		นักเรียน	สอบผ่าน
รวม			รวม			รวม		

ลงชื่อผู้กรอกข้อมูล

ลงชื่อผู้รับรองและรายงานข้อมูล

(.....)

(.....)

ตำแหน่ง.....

ตำแหน่ง.....

แบบรายงานข้อมูลการประเมินตนเอง

รปต 2 (SER 2)

แบบรายงานข้อมูลการประเมินคุณลักษณะทางสิ่งแวดล้อมของผู้เรียน
Environmental Characteristics of students Report Form

โรงเรียน.....ระดับชั้น.....	
<p>คำชี้แจง แบบ รปต 2 เป็นแบบรายงานข้อมูลผลการประเมินคุณลักษณะทางสิ่งแวดล้อมของผู้เรียนที่ได้จากการประเมินตามแบบ รปต 2 ให้ผู้ที่ได้รับมอบหมายกรอกข้อมูล และ หัวหน้าระดับชั้นเป็นผู้รายงานและลงนามรับรองข้อมูล</p>	

1. จำนวนนักเรียน นักเรียนที่ผลการประเมินผ่านเกณฑ์ และค่าเฉลี่ยผลการประเมิน

ห้องที่	ชั้น	จำนวนนักเรียน (คน) คะแนนผลการประเมิน (เฉลี่ย)										รวม/เฉลี่ย	
		1	2	3	4	5	6	7	8	9	10		
รายการประเมิน													
D1	จำนวนนักเรียนในชั้นห้อง												
D2	จำนวนนักเรียนที่ผลการสอบพื้นฐานสิ่งแวดล้อมผ่านเกณฑ์												
D3	จำนวนนักเรียนที่มีพฤติกรรมทางสิ่งแวดล้อมที่พึงประสงค์												
D4	จำนวนนักเรียนที่มีส่วนร่วมในการอนุรักษ์พัฒนาสิ่งแวดล้อม												
D5	คะแนนเฉลี่ยผลการสอบพื้นฐานสิ่งแวดล้อม												
D6	คะแนนเฉลี่ยผลการประเมินพฤติกรรมทางสิ่งแวดล้อมของผู้เรียน												
D7	คะแนนเฉลี่ยผลการประเมินการมีส่วนร่วมในการอนุรักษ์สิ่งแวดล้อมของผู้เรียน												

* จำนวน - จำนวนนักเรียนในชั้น / ห้อง * คะแนน - ใช้คะแนนเฉลี่ย

2. พื้นฐานสิ่งแวดล้อมที่คะแนน พฤติกรรมทางสิ่งแวดล้อมของผู้เรียนและลักษณะการมีส่วนร่วมของผู้เรียนที่คะแนนเฉลี่ยผลการประเมินต่ำกว่าเป้าหมาย (ระบุเฉพาะรหัส CSF)

ห้อง	พื้นฐานสิ่งแวดล้อมที่คะแนนต่ำกว่าเป้าหมาย	พฤติกรรมทางสิ่งแวดล้อมที่คะแนนต่ำกว่าเป้าหมาย	ลักษณะการมีส่วนร่วมที่คะแนนต่ำกว่าเป้าหมาย
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

ลงชื่อผู้กรอกข้อมูล

(.....)

ตำแหน่ง.....

ลงชื่อผู้รับรองและ

รายงานข้อมูล

(.....)

ตำแหน่ง.....

วัน เดือน ปี...../...../.....

แบบรายงานข้อมูลการประเมินตนเอง

รูปที่ 3 (SER 3)

**แบบรายงานข้อมูลการประเมินความรู้และทักษะในการ
จัดตั้งแวดล้อมศึกษาของครู (จำแนกเป็นรายหมวด / กลุ่มวิชา)
Knowledge, behavior and participation in Environmental
Education of Teachers Report Form**

โรงเรียน.....หมวด / กลุ่มวิชา.....		รูปที่ 3	
คำชี้แจง แบบ รูปที่ 3 เป็นแบบรายงานข้อมูลการประเมินความรู้และทักษะในการจัดตั้งแวดล้อมศึกษาของครู ให้หัวหน้าหมวด / กลุ่มวิชาเป็นผู้รายงาน โดยใช้ข้อมูลจากการประเมินตามแบบ รูปที่ 3 ประกอบ (รายงานทุกหมวดวิชา)			
รหัส ข้อมูล	รายการตรวจสอบ / ประเมิน	จำนวน / คะแนน	พื้นฐานที่คะแนนเป้าหมาย (ระบุรหัส CSF)
DD	จำนวนครูในหมวด / กลุ่มวิชา		พื้นฐานสิ่งแวดล้อม
D8	จำนวนครูที่มีความรู้พื้นฐานทางสิ่งแวดล้อมตามเกณฑ์		
D9	จำนวนครูที่มีค่านิยมที่ถูกต้องเกี่ยวกับสิ่งแวดล้อมและสิ่งแวดล้อมศึกษา		
D10	จำนวนครูที่มีความรู้พื้นฐานการจัดตั้งสิ่งแวดล้อมศึกษาตามเกณฑ์		
D11	จำนวนครูที่จัดกิจกรรมการเรียนรู้และมีส่วนร่วมในกิจกรรมสิ่งแวดล้อมศึกษา		พื้นฐานสิ่งแวดล้อมศึกษา
D12	คะแนนเฉลี่ยระดับความสำเร็จในการจัดกิจกรรมการเรียนรู้และกิจกรรมสิ่งแวดล้อมศึกษาของครู		
-	จำนวนครูที่มีวุฒิทางสิ่งแวดล้อมศึกษา - จำนวนครูที่ผ่านการอบรมด้านสิ่งแวดล้อมศึกษา - จำนวนครูที่ได้รับมอบหมายให้รับผิดชอบสิ่งแวดล้อมศึกษา		

ลงชื่อผู้กรอกข้อมูล

ลงชื่อผู้รับรองและรายงานข้อมูล

(.....)

(.....)

ตำแหน่ง.....

ตำแหน่ง.....

วันเดือนปี...../...../.....

* ผู้บริหาร ผู้ช่วยผู้บริหารและครูไม่สังกัดหมวดวิชา ให้รวมไว้ในหมวดอื่น ๆ

* คะแนนใช้คะแนนเฉลี่ย

แบบรายงานข้อมูลการประเมินตนเอง

รูปต 5 (SER 5)

**แบบรายงานข้อมูลการประเมินผลการจัดสภาพแวดล้อม
และการบริหารจัดการสิ่งแวดล้อมศึกษาในโรงเรียน
Evaluation Data of the school Environment Report Form**

โรงเรียน.....			รูปต 5
คำชี้แจง แบบ รูปต 5 เป็นแบบรายงานข้อมูลผลการประเมินการจัดสภาพแวดล้อมและ การบริหาร จัดการสิ่งแวดล้อมของโรงเรียนตามแบบ ตป 5 ให้หัวหน้าฝ่ายบริการ หรือผู้ที่ได้รับมอบ หมายเป็นผู้รับรองข้อมูลและรายงาน			
รหัส ข้อมูล	รายการข้อมูล	คะแนน เฉลี่ย	รายการบริหารจัดการที่ผล การประเมินต่ำกว่าเป้าหมาย
D18	คะแนนผลการประเมินการจัดสภาพแวดล้อมใน โรงเรียน		(ระบุเฉพาะรหัส CSF ที่ผลการ ประเมินเฉลี่ยต่ำกว่าเป้าหมาย คือ < 4)
D19	คะแนนผลการประเมินการจัดโรงเรียนน่าอยู่		
D20	คะแนนผลการประเมินการบริหารจัดการสิ่งแวดล้อม ในโรงเรียน		
D21	คะแนนผลการประเมินการจัดสภาพแวดล้อมและ การบริหารจัดการสิ่งแวดล้อมเพื่อการจัดสิ่งแวดล้อม ศึกษา		

ลงชื่อผู้กรอกข้อมูล ลงชื่อผู้รับรองและรายงานข้อมูล

(.....)

(.....)

ตำแหน่ง.....

ตำแหน่ง.....

วัน เดือน ปี...../...../.....

แบบรายงานข้อมูลการประเมินตนเอง

รูปต 6 (SER 6)

แบบรายงานข้อมูลการประเมินผลการส่งเสริมสิ่งแวดล้อมศึกษาในชุมชน
Evaluation Data of the school Environmental Education Extension in
The Community Report Form

โรงเรียน.....			รูปต 6
คำชี้แจง แบบ รูปต 6 เป็นแบบรายงานข้อมูลการประเมินผลการส่งเสริมสิ่งแวดล้อมในชุมชนตามแบบ ตป 6 ให้หัวหน้าคณะทำงานพัฒนาการประเมินฯ หรือผู้ที่ได้รับมอบหมายเป็นผู้รับรองข้อมูลและรายงาน			
รหัสข้อมูล	รายการข้อมูล	คะแนนเฉลี่ย	รายการบริหารจัดการที่ผลการประเมินต่ำกว่าเป้าหมาย
D22	คะแนนผลการประเมินการจัดการบริการทางวิชาการด้านสิ่งแวดล้อมแก่ชุมชน		(ระบุเฉพาะรหัส CSF ที่ผลการประเมินเฉลี่ย ต่ำกว่าเป้าหมาย คือ > 4)
D23	คะแนนผลการประเมินการร่วมกิจกรรมสิ่งแวดล้อมในชุมชนของโรงเรียน		
D24	คะแนนผลการประเมินความพึงพอใจของชุมชนในการจัดสิ่งแวดล้อมศึกษาและการส่งเสริมสิ่งแวดล้อมในชุมชนของโรงเรียน		
D25	คะแนนผลการสำรวจระดับความคาดหวังของครูและชุมชนในการให้บริการทางวิชาการและการร่วมกิจกรรมสิ่งแวดล้อมในชุมชนของโรงเรียน		

ลงชื่อผู้กรอกข้อมูล
 (.....)

ลงชื่อผู้รับรองและรายงานข้อมูล
 (.....)

ตำแหน่ง.....

ตำแหน่ง.....

วัน เดือน ปี...../...../.....

แบบรายงานการประเมินตนเอง

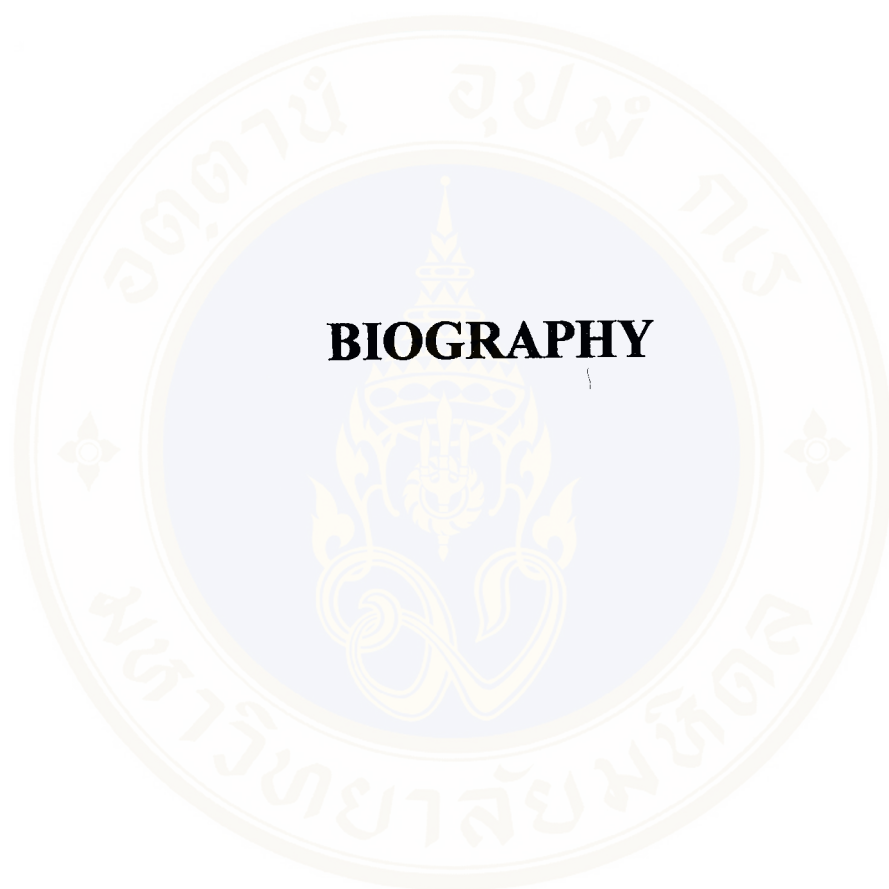
รูปที่ 7 (SER 7)

**แบบรายงานผลการประเมินผลการประเมินตนเอง
ในการจัดสิ่งแวดล้อมศึกษาของโรงเรียน
Secondary School Self-evaluation Meta-evaluation Report Form**

คำชี้แจง : ให้หัวหน้าหมวดวิชา รวบรวมผลการประเมินการประเมินผลการประเมินตนเองของครูใน หมวดวิชา
ที่ได้รับมอบหมายให้เป็นผู้ประเมินแล้วส่งคืนหัวหน้าคณะกรรมการประเมินผลการจัดสิ่งแวดล้อม
ศึกษาของโรงเรียน

คะแนนเฉลี่ยผลการประเมิน

รายการประเมิน (ข้อ)	คะแนนเฉลี่ยควรประเมิน	หมายเหตุ



BIOGRAPHY



NAME	Mr. Pairat Thidpad
DATE OF BIRTH	13 April 1950
PLACE OF BIRTH	Kalasin, Thailand
INSTITUTION ATTENDED	<p>Srinakarinwirot University. 1975-1978 Bachelor of education (English Language)</p> <p>Chulalongkorn University. 1983-1986 Master of Education (Education Administration)</p> <p>Mahidol University. 1997-2002 Doctor of Education (Environmental Education)</p>
POSITION & OFFICE	Director of Innovation Government Administration Center (IGA Center), Ministry of Education