

Teacher Education for Environmental Education in the Republic of Korea¹⁾

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I. Introduction

A school system of the 6-3-3-4 type is currently in use in Korea as stipulated by the *Education Law*, promulgated in 1949. Each school, regardless of its level, has two semesters in one academic year. The first semester usually begins on March 1st and ends on August 31st. The second semester usually begins on September 1st and ends at the end of February of the following year.

The Education Law establishes the minimum number of school days for the completion of one academic year. Elementary, middle and high schools should have more than 220 school days and higher institutions such as university, college, teacher's college,

Korea National University of Education, college of education, and vocational junior college should have more than 32 weeks a year. In one academic year, all schools in Korea have summer vacation and winter vacation with different length, and about a week final break at the end of the academic year only for elementary and secondary schools.

The Education Law sets the goals and objectives of education for each school level. To ensure the standard quality of education, Education Law 155 prescribes the curriculum for each school level and criteria for the development of textbooks and instructional materials.

Curricula are revised on a periodical basis to meet the emerging needs of the changing society and frontiers of the disciplines. Since

1) This paper was reported at a NIER/APEID Regional Seminar on Learning for a Sustainable Environment: Teacher Education and Environmental Education in Asia and the Pacific, from 29 October to 13 November, 1996, NIER, Tokyo, Japan.

the Republic of Korea had been established, there have been six revisions of curriculum, the last revision was made in 1992. Principles set for the sixth revision were ① decentralization in deciding curriculum, ② diversification of curricular structure, ③ appropriate contents of curriculum and ④ efficiency in the operation of curriculum. In this curriculum, the well-educated person is defined as a person who is healthy, independent, creative and morally right. The 6th Curriculum was put into effect beginning with kindergarten in 1995. The application of the 6th Curriculum to elementary school started with 1st and 2nd graders in 1995, 3rd and 4th graders in 1996, and would be followed by 5th and 6th graders in 1997. In middle schools, it began to apply to 1st and 2nd graders in 1995 and in 1996 respectively, and will begin to apply to 3rd grader in 1997. In high schools, it began to apply to first grader in 1996, and to 2nd and 3rd graders in 1997 and in 1998 respectively.²⁾

The textbooks compiled according to the framework of these curricula are classified into three types. The first type of textbooks is ones whose copyrights are preserved by the Ministry of Education. The textbooks authorized by the Minister of Education pertain to the second type. The third type designates textbooks which are recognized by the Minister of Education or superintendents as relevant and usable ones.³⁾ The

improvement of the textbook authorization system to get openness and to change more textbooks of the first type into the second type is now under study and examination.

II. Development of Environmental Education in the Republic of Korea

Reflecting the world, environmental education has been recently involved in school education. There may be nothing but environmental education that has been developed so quickly in short time in the history of education. The terminology of "Environmental Education" was strange to Korean people and rarely used even 20 to 30 years ago. The history of development of school environmental education in Korea can be divided into 3 stages periodically - *the beginning period(before 1980)*, *the formative period(1981 - 1991)* and *the settlement period(after 1992)* - as follows(Nam, et al., 1994).

1. The Beginning Period(before 1980)

Environmental education had been stretched

2) The 7th revision of curriculum is now under development in 1996. According to the schedule, the 7th curricula will be promulgated in December 1997 and will begin to apply to elementary schools in 2000, middle schools in 2001 and high schools in 2002 respectively.

3) The middle school Environment textbook belongs to the second type and the high school Environmental Science textbooks belong to the third type.

out with environmental protection activities of many civilian environmental organizations such as *UNEP, Green Peace, Friends of the Earth International, Roman Club, Sierra Club*, etc. which had been formed in this period all over the world. Along this world wide movement, they started to mention environmental education in Korea because many problems of environmental disruption and pollution were occurred during this period in Korea, too, due to the *3rd Five Year Economic Development Plan* which had been promoted since the beginning of 1970s. In spite of the reality, environmental education in Korea couldn't go over the national publicity level without any discrimination with the protection movement of natural environment because Korean policy was focused on the economic development and the increase of income at that time.

In the midst of it, *Korean Educational Development Institute(KEDI)* contributed to inform the educational groups of the importance of environmental education, holding '*Workshop on Environmental Education*' and carrying out fundamental researches such as '*A Study on the Development of Unit Model in Environmental Education*'. In late 1977, the first major environmental statute, the *Environmental Preservation Act* was enacted, and in 1980, the *Environment Administration* was established.

2. The Formative Period (1981-1991)

As the nation's economy grew massively during the 1980s and as people's awareness

of environmental protection grew with the democratic reforms of 1987, it became obvious that Korea's environmental laws and institutions needed a major reform. The result was the enactment of series of environmental statutes in 1990 and 1991, and the establishment of the *Ministry of Environment* replacing the *Environment Administration* in 1990. The Korean government has applied a number of principles and mechanisms to protect the environment and to realize sustainable development. Environmental impact assessment and various mechanisms based on the principle of "*Polluters Pay Principle*" are the major policy tools of the government to bring about sustainable development. The people of Korea are also contributing to the creation of an ecologically sound society through the voluntary participation and awareness movements. The future of Korean environment will largely depend on people's awareness and participation and the government's response strategies. In accordance with this awareness, people became to recognize the importance of environmental education in respect of education and emphasized environmental education explicitly in school curriculum. The phrase of "*.....recommend to operate environmental education in the overall educational activities.....*" was included in the '*Guidelines*' for the 4th Curriculum which was reformed in 1981 and contents and activities concerning with environmental education were started to be taught in science and social studies subjects. In addition to that, environmental education became more emphasized with stipulations of

"..... for all the people to occupy sound lots to enjoy happy lives in pleasant environment" and "..... respecting humans and valuing nature" in 'Orientation for Curricular Structure' of the 5th Curriculum which was reformed in 1987. Realizing the importance of environmental education for students, the Ministry of Environment designated *Environmental Conservation Model Schools* and has operated them with cooperation of regional boards of education nationwide since 1985. Eight schools including 2 in kindergartens, 3 in elementary schools and 3 in middle schools were designated as *Environmental Conservation Model Schools* and have been supported for 2 years.⁴⁾ The representative organizations which put efforts for the development of environmental education in Korea during this period were the *KEDI* and the *Korean Society for Environmental Education*. *KEDI* newly established the *Environmental Education Research Department* in January of 1991 and played an important role for ensuring substantiality of the school environmental education. Especially, the *Environmental Education Research Department* played a crucial role in establishing '*Environment*' subjects in middle school and high school systems as independent subjects under the

6th Curriculum carrying out "*Seminar on Environmental Education and Teacher Training in Korea and UK*"(July 30-31, 1991)(*KEDI*, 1991), "*Survey Research on the Awareness of the Elementary and Secondary Students and Teachers about Environmental Education*"(Choi, et al., 1991a), "*A Study for the Reinforcement of School Environmental Education to Meet the 6th Curriculum Reformation*"(Choi, et al., 1991b).⁵⁾

3. The Settlement Period (after 1992)

Many activities were developed and carried out in environmental education area in this period. Korean Government announced '*Nation's Statement for Environmental Conservation*' in commemoration of the 20th '*World Environmental Day*' on the 5th of June in 1992. And the environmental education and environmental education research became more activated by which '*Environment*' became an independent subject in the 6th Curriculum and organized in school educational system. Going a long way, '*School Discretion Hours*'(34 hours per year for each grade in 3-6) was established in elementary school, which could be used for environmental education, '*Environment*'

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- 4) The number of *Environmental Conservation Model School* will be increased to 15 from 1997 and to 60 until 2001 because reports showed the operation of *Environmental Conservation Model Schools* contributed to the activation of school environmental education greatly and lead residents to cultivate own regional environment to be delightful one.
- 5) I am currently a member of board of trustees and the executive director of the *Korean Society for Environmental Education*, and had been the director of *Environmental Education Research Department* from Jan. of 1991 to Dec. of 1992. The *Environmental Education Research Department* was disorganized in Jan. of 1995 when reorganization.

(34-68 hours per year for each grade in 1-3) and 'Environmental Science'(4 units, 1 unit as of 16 hours per semester) were newly established in middle and high school respectively according to the 6th Curriculum.⁶⁾ The formation of environment subject in this way is very significant in the meaning that environmental education which has been developed passing through the beginning and the formative periods became institutionalized to be executed firmly in stable conditions.

III. Case Studies on Teacher Education for Environmental Education in Korea

I have ever made an alternative plan of in-service teacher training and teacher educational program for teachers who would commit to environment subject when I presented the research result of "*Teacher Education and Training for the Substantiation of School Environmental Education*"(Choi, et al., 1992). The alternative plan was based on results from survey researches on the awareness and needs of environmental education of elementary and secondary school students, teachers and educational experts which made twice nationwide in 1991(40 schools, 1338 persons) and 1992(1300 schools, 178 regional boards of

education, 1658 persons). Followings describe briefly only the result related to teacher education and in-service training program.

1. Summary of the Research Result Relating to Teacher Training for Environmental Education

* There were no regional boards of education which put general training about 60 hours long for environmental education for one year recently, and just some boards of education(5.5%) put special presentations 1-2 hours long.

* 90.4% responded the training for certificates(180 hours or long) and the general training(about 60 hours or more) executed by authorized institutions were more appropriate as an in-service teacher training method for environmental education than self training or each school training.

* 82.9% responded concentrated training during vacation was more appropriate.

* 26.9% for the Ministry of Environment and the related institutions pertaining to teacher training programs and 25.9% for regional boards of education responded as suitable institutions to host/manage training courses.

* 51.6% for researchers concerning environmental education and 39.4% for professors of the department of environmental science responded as appropriate lecturers for teacher training programs.

6) 50(1.8%) and 74(8.8%) schools among middles and humanistic high schools respectively select and teach Environment subjects as of 1996.

* 38.5% for science teachers, 20.7% for social studies teachers, 15.3% for industry/domestic economics teachers in middle school and 24.5% for earth science teachers, 19.3% for biology teachers in high school responded as appropriate teachers to be in charge of environment subject at schools.

* Only 6.3% of respondents took environmental education training course 1-2 hour long within recent 5 years, and 22.4% of them evaluated it as useful and 22.9% as very useful.

* 26.3%, 18.3%, and 29.2% pointed out insufficiency of program contents and materials, shortage of training time, and lecture-centered strategy respectively as weak points in the training programs.

* Most of respondents, 98.2%, were willing to participate in environmental education training if provided.

* Over fifty, 68.5%, of respondents wanted the consciousness /sense of value/attitude of the environmental conservation to be emphasized in program contents.

* 59.5% wanted field trip/material collection type as a training method.

2. Summary of Research Result Relating to Teacher Education for Environmental Education

* None of universities in charge of teacher education set courses concerning environmental education as requirements in the educational curricula.

* Almost all of respondents, 94.9%, thought the establishment of courses concerning environmental education were

necessary in the curricula of teachers colleges and colleges of education.

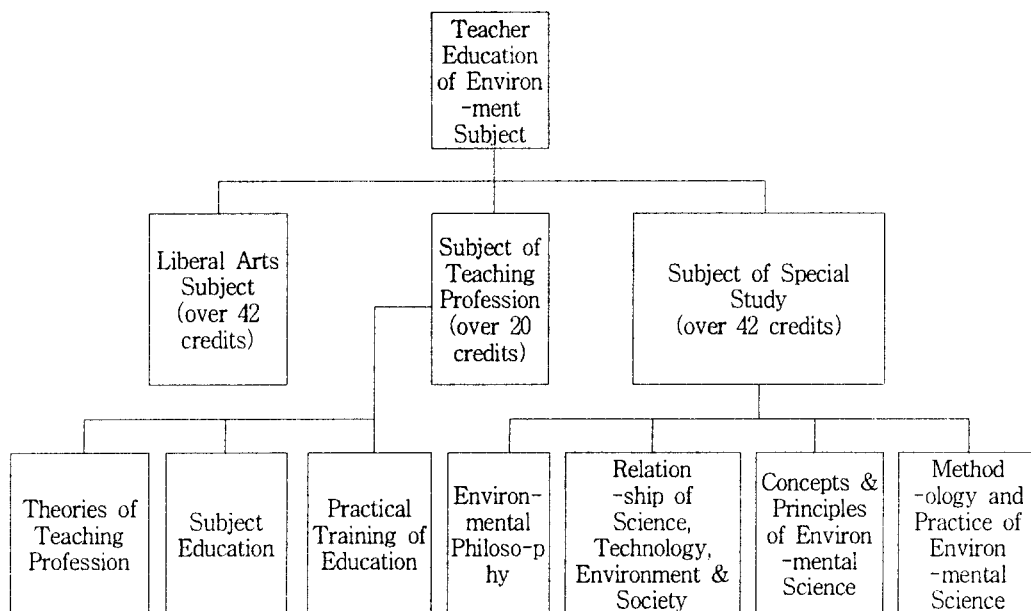
* 57.7% and 27.4% thought courses concerning environmental education should be set as required and elective ones respectively in universities in charge of teacher education for all the students.

* 76.8% thought environmental conservation consciousness/ sense of value/attitude should be emphasized as contents of the course.

3. Summary of Proposal of Teacher Education and In-service Training for Insuring Substantiality of School Environmental Education

First, teachers to be in charge of '*Environment*' newly established in middle school(See Appendix A) and '*Environmental Science*' in high school(See appendix B) should be cultivated systematically. Ideally, environment teachers should be cultivated and produced in stability from departments of environmental education in universities in charge of cultivating secondary school teachers, and courses for minoring in environmental education should be established and operated at the same time. Model program of '*Environmental Education Department*' proposed in this study is showed as follows:

Secondly, the general training or the qualifying training course during the vacation should be offered to science teachers and social studies teachers for certifying qualification of minor-ship in environment subjects, *Environment* and *Environmental*



[FIGURE] Structure of Teacher Education Program of Environmental Education Department

Science, newly established in the aspect of teacher supply in short term period. And the quality of the training principally focusing upon that of training type, method and trainer selection should be improved and numbers of training courses and subjects should be increased which are restricted at present.

Thirdly, elements concerning environmental education such as the necessity of environmental education and the subject contents should be included and taught in all of the teacher training programs.

Fourth, the establishment of standard curriculum of environment teacher education and the development and dissemination of qualified teaching materials to be used for environment teacher education should be promoted. Especially visualized teaching -

learning materials and the equipment for experiments and practices should be supplied and kept regionally in local boards of education to be used easily for teachers.

Lastly, supervisory work concerning environmental education should be done systematically with institutional devices to improve professionalism of teaching professional vocation at the level of each local board of education. Stipulations concerning environmental education should be inserted explicitly into the guide of supervisory work. In accordance with it, if with appropriate supervisory work, the effect of environmental education will be increased overcoming difficulties of the present.

TABLE 1. Current Status of Training for Certificates Qualifying Minor-ship in Environment

unit: number of persons

University	Trainees for each year				Remarks
	1994	1995	1996	1997(planned)	
Ewha Womans University	100	120	150		Targeting for all teachers nationwide
Pusan National University			120		Targeting for local teachers in Pusan
Kangwon National University		40			Targeting for teachers in Kangwon-do
Choongbuk National University		50	50	50	Targeting for teachers in Choongbuk-do
Chonnam National University			50		Targeting for teachers in Chonnam-do
Total	100	210	370	50	

IV. Current Status of Teacher Training and Education for Environmental Education in Korea

The following describes current status of teacher education for environmental education in Korea since NIER seminar held at Tokyo in 1993.

First, 'Environment' was added to the indicative subjects on teacher's license for secondary school teachers since 1994. Accordingly, institutional establishment of Departments of Environmental Education became possible to produce environment

teachers from universities in charge of teacher education or to put in-service teacher training course.

Secondly, the training for environment teachers with special certificates for the present who would be in charge of *Environment* in middle school and *Environmental Science* in high school in the 6th Curriculum which would be enforced from 1995 has been started since 1994 summer vacation and 680 teachers will be produced in this way with qualification of minor-ship in environment subject until as of the end of 1996 (See TABLE⁷⁾ Superintendent of education in each regional board of education made up the plan of teacher training and applied for the Ministry

7) By article 4 of 'Teacher Qualification Approval Decree', minor-ship subjects can be indicated on the teachers' certificate of the currently teachers completing specified courses with over 21 credits at specified educational institutions recognized by the Minister of Education.

TABLE 2. Curriculum of the Department of Environmental Education

Classification		Course(credit-lecture-practice)	Credits		
			Sub total	Total	
Liberal arts course	Required		20	45	
	Elective		25		
Professional	Education realm		14	14	
	Subject education realm	Required	Environmental education theory(3-3-0) Teaching material research for environment subject (3-3-0)	6	9
		Elective	Teaching method for environment subject(3-3-0) Environment subject research(3-3-0)	3	
Subject realm	Required	Introduction of environmental science(3-3-0) Environmental meteorology(3-3-0) Environmental ecology(3-3-0) Environmental biology and experiment(3-3-0) Environmental chemistry and experiment(3-3-0) Water resources and environment(3-3-0) Soil and environment(3-3-0) Environment system(3-3-0) Environmental geology(3-3-0) Environment philosophy(3-3-0)	30	65	
	Elective	Air analysis and experiment(3-2-2) Resources and environment(3-3-0) Water analysis and experiment(3-2-2) Waste material management(3-3-0) Soil analysis and experiment(3-2-2) Ocean and environment(3-3-0) Agricultural district environment(3-3-0) Geographical features and Environment(3-3-0) Environmental impact evaluation(3-3-0) Development and environment(3-3-0) Topological method(3-3-0) Environment and technology(3-3-0) Environmental biology(3-3-0) Civilization and environment(3-3-0) Environmental information system(3-3-0) Environmental statistics(3-3-0) Environmental disaster(3-3-0) environmental law and policy(3-3-0) Environment utilization(3-3-0) Environmental health science(3-3-0)	35		
Practice course			4	4	
Freely elective			13	13	
Total			150	150	

of Education to be recognized. Teacher training courses can be operated after the recognition of the Ministry of Education during summer and winter vacations with total 180 hours each.

Thirdly, Departments of Environmental Education were established in 3 universities,

Korea National University of Education, Kongjoo University, and Sooncheon University, for educating teachers who would be in charge of environment subjects in secondary schools and 20 students entered each universities in 1996. They will be able to teach Environment subjects in secondary

TABLE 3. Curriculum for Conferring Minor-ship of Environment

Course	Credits	Hours (lecture- practice)	Contents
Environmental philosophy	3	48-0	Dealing with environmental ethics, regulations of environmental protection, administrative adjustment on environmental pollution, environmental movement
General environmental science	2	32-0	Discussion of environmental problem from population increase and economic growth, dealing with social changes consequently raised
Environmental ecology	3	48-0	Understanding the relationship between inorganic environment and living things or humans, dealing with principles of energy and materials flow, inter-regulation activities of living things, and developmental process of ecosystem
Introduction to environmental science I	3	48-0	Dealing with environment and human environment, the cause and counter-plan of environmental problem, environment and society through the introduction of whole field of environment and environmental problem on introductory level of <i>Environmental Science</i>
Introduction to environmental science II	3	48-0	Dealing basic knowledge in physics, chemistry, atmosphere, climate, topology and geology related with environmental science as preliminary concepts for understanding <i>Environmental Science</i>
Environmental pollution and the counter-plan	3	48-0	Understanding the cause and disaster and the prevention and treatment of problems in the atmosphere / water / soil pollution, wastes, noise / vibration and radioactivity
Environmental science experiment	1	0-32	Learning contents of experiment, process of experiment, use of experimental equipment, method of writing report with selected topics good for secondary students in school
Teaching methodology of environment	3	48-0	Making of teaching manual, having presentation and discussion with own selected topic in contents of environmental teaching in secondary school, acquiring teaching ability, getting to know case studies and teaching materials in <i>Environmental</i> subject teaching
Total	21	320-32	

schools with teachers' certificate of Environment subject after completing undergraduate courses with over 42 credits of special studies concerning environmental education.

Fourth, chief teachers of environment subject in all the schools nationwide nominated since 1995 have been leading environmental education in Korea to be actually practical for students and disseminating the importance of environmental education to general teachers.

Fifthly, minor-ship of environment subject was put in force since 1996. The stipulation prescribes that teaching certificate of major-ship and minor-ship can be granted to students who take over 42 credits among subjects of special studies and over 21 of sub-special studies while in school respectively. In accordance with it, students who took over 21 credits of subjects concerning environmental education can get teaching certificate of minor-ship in environment.

Lastly, a number of 'Research Association of Environment Teachers' were organized in local scale, which were naturally come out, and are doing many activities such as training of its own for environmental education, development and dissemination of teaching materials for environmental education, giving camping and field-trip experiences for environmental education.

V. Concluding Remarks

The most urgent matters to accomplish

intended educational purpose for the settlement of environmental education as one of school systems are those of the teacher education and the in-service teacher training. It is because the quality of schooling can hardly go beyond that of teacher. In reflection of it, liberal arts subjects, subjects of teaching profession and subjects of special studies, which are necessary to the teachers in charge of environment as teaching professionals, should be organized in balance in the programs of teacher education and training for environmental education. In detail, there should be included in contents of curricula such abilities as basic knowledge in ecology and the ability to investigate and evaluate environmental problems in the aspect of contents of environmental education as well as the background knowledge of educational philosophy and educational psychology, basic abilities of teaching - learning methodology and the development/selection/utilization of teaching materials. In Korea, it is anticipated that many teachers with teaching certificate of major-ship in *Environment* subjects from March of 2000 will be produced from formal universities and they will contribute greatly to the enhancement of the quality of environmental education at school level in Korea.

I am going to propose below some matters on which people relating to the teacher education for environmental education should put efforts continually.

First, in-service teacher training program for environmental education should be open to any teachers who are willing to participate.

Secondly, in-service teacher training for environmental education should be relevant to the locality where the teachers are currently involved.

Thirdly, the development and dissemination of ideas and teaching materials which are relevant to teacher training for environmental education should be done with intimate cooperation in national and international scales.

Fourth, it should be recommended that the curricula of before- and after-teacher education include courses concerning environmental education and the administrative and financial support go to the institutions which put it in practice.

Lastly, the most urgent thing for environmental education is highly qualified trainers of teachers should be trained and secured first of all, and collective endeavor is needed for this.

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Appendix A.

"Environment" Subject in Middle School Curriculum

I. Characteristics

The "*Environment*" subject is newly established in the 6th Curriculum elective as one of ones. It intends to bring together all the educational contents related to environment that have been dealt with dispersedly in different subjects, and integrate them systematically into one separate subject.

The basic purpose of "*Environment*" subject is to educate the students to become citizens who are willing to prevent environmental pollution and have the ability to build a pleasant living environment for everyone. Acquiring a correct understanding about the environment, which is the basic ground of our lives, is considered as a key to serve such a purpose.

"*Environment*" subject has a lot to do with the contents and methods of other disciplines concerned with environmental issues. "*Environment*" subject intends to put those interdisciplinary contents and methods together and present them in an integrated manner.

"Environment" subject emphasizes the followings. Students ought to understand correctly the definition of environment and

the nature of the environmental problems. On the basis of this knowledge, they ought to be able to make valid judgments about environment and apply the results to the reality through experiences of practicing relevant behavior.

Because of this practice-centered nature of "*Environment*" subject, a greater attention should be given to such teaching - learning methods as field study, experiment, survey, discussion, or participation in nature conservation activities, rather than to taking or giving lectures. It is also important for the students to be offered a project assignment concerning a particular environmental problem of which completion requires the students to do investigation, analysis and thereby to find a solution.

Also, "Environment" subject should be linked to the entire spectrum of school education, adult education as well as to the "*Environmental Science*" in high school curriculum.

II. Goals and Objectives

On the basis of a comprehensive understanding of the environment, the basic ground of our lives, students should develop correct value systems and attitudes toward

environmental problems. They should also actively participate in various activities to create pleasant living environment, and put the same effort at the personal level.

1. The comprehensive understanding of the definition of environment, the relationship between the human beings and the environment, and the environmental problems should be fostered.

2. Environmental awareness should be promoted through various methods such as the students' investigations and observations of environmental problems. Basic skills and

abilities necessary to solve environmental problems should be acquired.

3. The correct value system acknowledging the need of environmental conservation should be cultivated. The attitude to participate in activities attempting to create a pleasant living environment and to put the same effort in personal life should be also encouraged.

III. Contents

Area	Contents	
Definition of Environment	1. Environment around us	(1)Composition of environment (2)Natural environment (3)Human & social environment
	2. Change of environment	(1)Environment in the past & the present (2)Causes of environmental changes (3)Change in perspective on environment
Environmental Problems	1. Environmental pollution problem	(1)Water pollution (2)Air pollution (3)Soil pollution (4)Others
	2. Resources problem	(1)Types of resources (2)Resources & man (3)Use of resources & environmental problem
	3. Depletion of resource & countermeasure	(1)Depletion of resources (2)Development of substitute resources
Environmental Countermeasures	1. Environmental conservation & pleasant environment for living	(1)Pleasant environment & health (2)Pleasant environment & improvement of quality of life (3)Rights & responsibilities for environment
	2. Environmental conservation activities	(1)Personal practice (2)Cooperate & organizational effort (3)Governmental role (4)International cooperation

IV. Method and Evaluation

1. Method

* Environment and environmental problems are taught in an integrative and holistic perspective. Cognitive, affective and psycho-motor objectives are given a due emphasis.

* An attempt is made to link the new "Environment" subject to other various subjects in which the contents of environmental education have been taught dispersedly, and thereby teach the subject, "Environment", in a systematic and comprehensive manner.

* Selection of learning materials should be made in such a way that they are related to the students' own experiences. Starting from the student's immediate environment, the sequence of the presentation of materials can proceed from the local community to the nation and the outside international world.

* The learning contents and materials can be re-organized and instructed in the way to meet the specific needs of individual schools and communities. Also, the environmental problems occurred in the students' own community can serve an excellent impetus to teaching and learning environmental problems.

* Cases and conflict situations involving environmental problems in daily lives can be exemplified to help students internalize valid value systems concerning environmental problems so that they can act properly on the basis of a valid judgment.

* Activities that require student's active participation and involvement such as field

investigation, field observation, case study and project assignment should be provided to students. Instructional formats that require students to find a solution to a given problem should also be highly recommended. Visits to environmental organizations and use of environmental facilities should be positively supported. Individual or group project assignments for which the students construct a project on the environment of their local community, and conduct a research (e. g., investigating the problem, collecting and analyzing data, and summarizing the results) are also recommendable.

* Besides textbooks, other instructional materials such as photographs, maps, statistical data, reference books, actual specimen, and videotapes shall be used.

* The standard instruction time allotted to the "Environment" subject is 34-68 hours per year (1 or 2 hours per week), and the organization of the subject content is based on this base-line time allotment. When a longer time-allotment can be spared, it shall be used for a project assignment dealing with environmental problems occurred in the particular community. In doing so, the objectives and contents prescribed in the curriculum should be taken into a consideration.

2. Evaluation

* Evaluation of "Environment" subject should be focused on measuring the accomplishment of major educational objectives. In doing so, an attention should be given to the evaluation of the ability to

apply basic concepts, the change in attitude and the habit for environment, and the problem solving ability more than that of simple memory of bits of information.

* Main focuses in evaluating the "*Environment*" subject are as follows: the understanding and application of basic concepts or principles of environment, the extent of environmental awareness, the ability to solve and make judgment on environmental problems, the establishment of value systems concerning environment, and the attitudes to participate in environmental conservation activities.

* Actual methods of evaluation should include ones such as pencil-and-paper examination, assessment of assignment, observation of attitudes shown during experiments and practices, and participation in nature conservation activities.

* The evaluation results should be reported in a narrative form, with a focus placed on the description of student's correct understanding of environment and on the record of participations in environmental conservation activities. In doing so, necessary measures should be taken to keep a balance with the evaluation results of other subjects.

Appendix A.

Appendix B. "Environmental Science" Subject in High School Curriculum

I. Goals

To help students understand the relationship between human beings and environment comprehensively, retain the attitudes and values which are necessary for preserving environment and therefore form desirable sense of environment to improve its quality.

II. Contents

1. The concepts of environment

a. natural environment: earth environment, the structure and function of ecosystem

b. the activity of human beings and the environment: the interactions between environment and human beings, the change of the sense of environment, the occurrence of environmental problems

2. Environmental problems and the counter-plan

a. water: the circulation of water and its use, the cause of water pollution, the real state of water pollution and its effect, the prevention and counter-plan of water pollution, the prevention and counter-plan of ocean pollution

b. air: the constituent of the air, the cause of air pollution, the actual state of air pollution

and its effect, the prevention and counter-plan of air pollution

c. soil: the constituent of soil, the cause of soil pollution, the real state of soil pollution and its effect, the prevention and counter-plan of soil pollution

d. wastes: the occurrence of general waste materials and waste products, the problem and counter-plan of general waste materials and waste products

e. noise · vibration: the occurrence of noise · vibration, the effect of noise · vibration, the prevention and counter-plan of noise · vibration

f. radioactive rays: the occurrence of radioactive rays, the effect of radioactive rays, the prevention and counter-plan of radioactive rays

3. The conservation of the environment

a. the conservation of the environment on the level of individual and family: environment and health, disease due to environmental pollution, occupational disease, consumption life, public health

b. the conservation of the environment on the level of region: large city, industrial area, farming and fishing area, tourist resort area

c. the conservation of the environment on the level of nation: the conservation of the environment, clean-up of the environment,

improvement of the quality of the environment, the formation of pleasant environment, national endeavor and international cooperation for the prevention and solution of the environmental problems

III. Considerations

1. Considering "Environmental Science" is a multidisciplinary subject which utilizes its knowledge getting from various disciplines to realize and solve environmental problems, teachers should help students have comprehensive understanding of the environment.

2. Teachers should emphasize educational objectives of cognitive, affective, and psycho-motor domain in balance so that students can realize the environmental problems and develop sense of values and attitudes as well as their knowledge about the environment and problem solving ability.

3. Teachers should regulate the emphasis of objectives, the scope and level of contents and the teaching time considering the connection of "Environment" subject in middle school with other subjects in which contents concerning

environmental education are dispersed.

4. Teachers should help students realize environmental problems correctly in their school lives and daily lives by providing practice.

5. Teachers should provide opportunities and motives for students to do problem solving activities and practice their willingness for preserving environment through activities and problem centered teaching strategies as field investigation, spot visiting for study, case study, task learning, etc.

6. Teachers should help students to keep concerning on environmental problems by utilizing issues of environmental problems reported on newspaper articles, TV, etc, as supplementary teaching materials frequently.

7. Teachers should evaluate student's attainments of knowledge about the environment and also the change of awareness and habits, the development of values, and the problem solving abilities in balance.

8. Teachers should evaluate students' accomplishment with various methods as pencil-and-paper test, story telling of personal experience, conference and discussion, interview, performance, social activity, etc.

〈국문 요약〉

한국에서의 환경교육을 위한 교사교육

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본 논문에서는 우리 나라 학교환경교육의 발전 과정을 태동기(1980년 이전), 성립기(1981-1991년), 정착기(1992년 이후)로 구분하여 간략히 개관한 다음, 전국 수준의 초·중등학교 학생, 교사, 교육전문직을 대상으로 한 환경교육에 관한 의식과 요구 사항 등에 대한 조사 연구 결과 및 이를 바탕으로 한 환경과 담당 교사의 현직연수와 양성교육에 관한 정책 대안을 제시하였다.

또, 1993년 이후 우리 나라에서 이루어지고 있는 환경교육을 위한 교사교육의 변화 및 발전 현황을 다음과 같이 요약하였다. 첫째, 중등학교의 교사자격증 표시과목으로 '환경'과가 1994년부터 추가됨으로써 현직교사 연수 및 교사양성대학에 환경교육과의 설치가 제도적으로 가능해졌다. 둘째, 제6차 교육과정(1995년부터 적용)에 신설된 중학교 환경 및 고등학교 환경과학 담당 교사 확보를 위한 자격연수(총 180시간)가 1994년 여름방학부터 시작되었으며, 이를 통하여 1996년말까지 환경과 부전공 자격 소지자를 680명 배출하게 되었다. 셋째, 중등학교에서 환경과를 담당할 교사를 양성하기 위한 환경교육과가 전국 3개 대학(한국교원대학교, 공주대학교, 순천대학교)에 설치되었다. 넷째, 1995년부터 전국의 각급 학교에 환경주임교사를 배치하여 학생의 체험적 환경교육을 유도하고, 일반교사에게 환경교육의 중요성을 전파하는 역할을 담당하게 하고 있다. 다섯째, 환경과 부전공 제도가 1996년부터 시작되었다. 대학재학 중에 전공과목에 대하여는 42학점 이상, 환경교육 관련 과목을 21학점 이상 이수한 학생은 환경과 부전공 교사 자격증을 얻을 수 있게 되었다. 여섯째, 교사의 자생단체로 지역별 '환경교사연구회'가 구성되어 환경교육 자체연수, 교재개발과 보급, 환경캠프와 답사 등의 활동을 전개하고 있다. 끝으로 환경교육을 위한 교사교육에서 계속 노력해야 할 사항을 제시하였다.