IMPLEMENTATION OF CURRICULUM:
ACTUAL USE COMPARED TO INTENDED USE OF
AN ENVIRONMENTAL EDUCATION PROGRAMME

By

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ABSTRACT

In education over the past decade there has been a growing awareness of the relationship between the implementation process and programme effectiveness. Studies have shown that this relationship is affected by teachers who often modify aspects of a programme during the implementation process. This study investigated the implementation by teachers of the environmental programme ENCORE.

Leithwood's model of 'Dimensions of Curriculum Innovations' allowed examination of aspects of the ENCORE programme considered necessary for effective implementation by the developer (as stated or implied in the ENCORE handbook). The dimensions explored were content, materials, teaching strategy, time allotment. A questionnaire was developed to examine the aspects of each dimension and was administered to teachers using ENCORE.

To determine the extent to which each dimension of the programme is being implemented a modified version of Leithwood's model including programme objectives and underlying programme assumptions was used. Leithwood's model was combined with a modified version of Hall & Loucks' model of 'Levels of Use' of an innovation. Four levels of use of the ENCORE programme dimensions were considered: becoming familiar with, attempting to apply, determining effectiveness of, and modifying the programme. Questionnaire items examined levels of teacher use.

The survey instrument was verified in terms of format validity, construct validity and integrity of response.

The findings indicated that for the respondents (N=44) in this study:

1. the general intent of the ENCORE programme had been preserved in use;
2. each aspect of each dimension of the ENCORE programme was being used by at least some respondents;
3. a significant number of respondents modified certain dimensions (content, materials, teaching strategy, time allotment) in the ENCORE programme;
4. a significant number of respondents did not modify or disagree with other dimensions (programme objectives, underlying programme assumptions).

This study confirms that many teachers modify various aspects of programmes they implement.

The methodology used in this study might be useful in future investigations of the curriculum implementation process.

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The respondents who shared their experiences using the ENCORE programme.

CHAPTER 1

EXPLANATION OF THE STUDY

1.1 General Problem

The general problem investigated in this study was to ascertain if the actual implementation of the environmental education programme, ENCORE, was occurring as was intended. ENCORE is an environmental education programme about natural ecosystems. It was developed by the Ministry of Environment, British Columbia, in 1975 primarily for use with children aged 9 to 14. Details of the programme are discussed in section 1.4, Background to the Problem.

Specifically, the purpose of the research was to identify where current use of the ENCORE programme compared with the intended use of the programme, as stated or implied by the developer in the ENCORE handbook. Further, the extent to which the current use of the ENCORE programme was being implemented was examined.

To determine these points Leithwood's (1981, p. 25) model (see appendix A) for outlining a curriculum innovation was used in concert with Hall & Loucks' (1975, p. 52) model (see appendix B). Hall and Loucks' model attempts to determine the levels of use of an innovation. These two particular models were chosen because they best address current understandings in the area of curriculum innovation implementation. Both models were modified to suit the unique circumstances of this study. This process is explained in detail in 1.4, Approach to the Specific Problems.

Research dealing with curriculum implementation per se is relatively new, dating back perhaps a little more than a decade (House, 1979, p. 4). Recently, research has focused upon the teacher/implementor as a significant factor affecting programme implementation and consequent programme effectiveness. This focus is a major shift away from a focus of using learner outcomes as a prime measure of programme effectiveness a focus which, in fact, assumed that the implementation strategies outlined by the developers were being strictly adhered to by all teachers. Stake, (1967, p. 5), as early as 1967, stated that "it is difficult to provide a realistic appraisal of the efficacy of a programme based solely on student outcome data". Hess & Rogers (1977, p. 1) more explicitly reviewed the problem.

> When the primary focus of evaluation is concerned with assessment of student outcomes relative to programme objectives, the interpretation of data appears to be relatively simple. This type of evaluation strategy, however, may lead one to draw erroneous conclusions since one assumes stability of treatment with negligible guidelines for programme useage.

Measuring programme effectiveness by simply interpreting student outcome data appears to be questionable. This is so because of what is now being discovered about how teachers' application of a programmes affects programme effectivenesss.

The extent of programme effectiveness is now thought to be a function of actual implementation of a new programme by each teacher. Teachers frequently vary to some degree from the intended implementation of a programme. This variation occurs because "discrepancies often seem to exist between the developer's perspectives of a new curriculum and those of the teachers who have to implement it" (Doyle & Ponder, 1977, p. 74).
Stallings' (1977) attempt to deal with teacher variation in programme implementation this required developers to specify 'key elements' of an

innovation, then limited the evaluation of student outcomes to classrooms in which the key elements actually were evidenced. Evidently few classrooms fitted his needs. However, the developer could therefore assume that the key elements were present in the classroom. The probability of student outcomes being a consequence of the innovation was increased. The programme could thereby be considered as effective or not effective in achieving its goals. Unfortunately Stallings' approach to the problem ignored the reality of a natural phenomenon in innovation implementation, namely that virtually every teacher modifies a new programme to some degree. Stallings was ignoring a vast resource of information about the complexities of innovation implementation.

Rogers (1977, p. 3) clearly delineates the study area in curriculum implementation when he comments:

> Curricula must be properly used, and it is the use patterns and varieties of implementation strategies that must be studied to determine how to best use the products that have been carefully developed at considerable expense.

Two important implications of Rogers' comment are that (1) variations in strategies can be advantageous even though they differ from the developer's preferred strategy and that (2) the better strategy should be assimilated into further formal implementation.

Leithwood also realized that isolating patterns in the way that teachers implemented innovations was important to the understanding of curriculum implementation. He suggested dividing a curriculum innovation into twelve components. Leithwood (1981, p. 25) discussed, in his paper, nine of these components or dimensions. He felt his dimensions were pervasive across all curricula whereas Stallings' key elements were programme specific.

Leithwood's model seemed a more universal method of isolating dimensions of a new curriculum in preparation to examine teacher use patterns of the innovation (see figure 1.1 p. 10). His model was judged to be applicable in this study. Developers could study implementation of a programme and be more specific about what aspects of the innovation were actually being implemented.

Some researchers have attempted to articulate the extent to which a new programme has been implemented. For example, does a teacher who is implementing a new programme use a teaching strategy which is developing towards a teaching strategy outlined by the developer? A question of degree enters. Researchers are presently exploring ways of evaluating the extent of programme implementation. Crowthers (1972) successfully evaluated the extent to which teachers were using an inquiry methodology in the Social Studies curriculum. Unfortunately his methodology was too programme specific to be applied universally.

Perhaps the most useful outline for evaluating the extent to which an innovation is being implemented is Hall & Loucks' model (1975, p. 52). Fullan & Pomfret (1977, p. 355) state that this model is "the most sophisticated and explicit conceptualization of the 'fidelity' orientation to assessing the degree of implementation". Hall & Loucks considered six levels of use through which teachers likely progress when using an innovation. Levels of interaction with an innovation include among others, no knowledge of the programme, familiarity with it, knowledge of its effectiveness, and modification of.

Knowledge of commonly implemented dimensions of a curriculum and knowledge about the extent to which these dimensions are implemented (could)

become the basis upon which developers could plan further implementation strategies. The strategies would focus upon those dimensions which are not being implemented or which are being modified. Therefore if each teacher is likely implementing a new programme in a modified way, then programme developers should expect to have to modify their original implementation strategies.

1.2 Specific Problem #1

In exploring the general problem, as stated at the beginning of this chapter, it was necessary to determine where the actual use of the ENCORE programme compared with the intended use of the programme. The question to be answered was: What aspects of each dimension of the ENCORE programme are teachers presently using?

The answer to the question is to be illuminated by creating an inventory of use of the aspects of the programme being used which were stated or implied by the developers in the ENCORE handbook.

Leithwood's model (1981, p. 25) for outlining a programme was used to examine four dimensions of ENCORE: teaching strategies, content, materials, and time allotment. Aspects of these dimensions were explored by using a survey technique and from that survey, an inventory of current uses of the programme was created. The results were descriptive in nature and reflected in a quantitative sense, agreement with the intended use of the programme.

1.3 Specific Problem #2

Once a description of the current use of the ENCORE programme was exacted a subsequent problem emerged. The problem is: To what extent is the ENCORE programme being implemented? To answer this question each aspect of the dimensions of ENCORE explored in specific problem #1 was not explored,

but rather, each dimension as a whole was examined. Thus, specific problem #2 was to determine the extent of implementation of each of Leithwood's six dimensions noted in ENCORE and described below.

The general intent of each dimension of the programme is stated or implied by the developer in the ENCORE handbook and was interpreted by the researcher. The developer might therefore expect the teacher to use each dimension in the following way(s).

dimension	use
content	- to use the content which concerns the natural environment, living and non-living and the interrelationships between and among them.
materials	- to use the set of cards which have activities about the natural environment.
time	- to be able to complete an entire card in approximately three hours.
teaching strategies	- to have students in frequent contact with the natural environment and have students asking questions and solving problems in and about this setting.
programme objectives	- to be helping students to develop in an active and personal way a greater understanding about natural environments in order to define their own environmental ethic
underlying programme assumptions	- to basically agree that the natural environment might be being pushed to the limits of its resilience and that people want to know more about the effect of man's effects on/in this environment. Learning about natural environments will help. - to feel that activity-oriented curriculum in the natural environment is a valuable way of learning about natural systems.

A modified version of Hall & Loucks' model of "Levels of Use' of an innovation (1975, p. 25) was used to examine the extent of implementation of

the six preceding dimensions. Four levels of use were considered:

1. whether ENCORE users were familiar with each of the six dimensions of the programme as outlined in this study;
2. whether ENCORE users were attempting to apply any of six dimensions in the classroom;
3. whether ENCORE users had been able to determine the effectiveness of any of the six dimensions;
4. whether ENCORE users had modified in whole or in part any of the six dimensions.

The above considerations imply a logical order through which a programme user might progress as he/she becomes more skilled in using the programme. This progression is the basic assumption underlying Hall & Loucks' model (1975).

Because ENCORE users evolve sequentially through levels of use 1 to 4, the extent to which the programme is being used by teachers can be articulated. The research hypothesis is stated as follows:

> An ENCORE user will align with one of four levels of use for each dimension according to the extent to which he/she is implementing each dimension.

The underlying purpose of the study was therefore to provide useable information for further formal implementation of the ENCORE programme. With this information the developer would be able to modify the programme and/or the process of implementation to better meet the needs of those for whom the programme was designed.

1.4 Approach to the Specific Problems

In addressing the specific problems it was necessary to delineate recognizable attributes of ENCORE. The profile of ENCORE would enable users

of the programme to relate to questions regarding their use of ENCORE. This profile also enabled the researcher, through interaction with the teacher, to identify the programme, in whole or in part, which was being implemented. Leithwood's (1981, p. 25) model of curriculum dimensions was used to create the profile. In addition, it was necessary to develop an instrument to measure the extent to which ENCORE was being implemented. The "Levels of Use" framework outlined by Hall & Loucks (1975, p. 52) was interpreted as capable of clarifying the extent to which any particular programme was being implemented.

Leithwood (1981, p. 25) comments on Hall & Loucks' model of "Levels of Use" stating that it was an important step to determining current practices relative to desired end-points of curriculum implementation. In order to indicate the extent to which ENCORE was being implemented, Hall & Loucks' (1975, p. 52) model was modified and then superimposed over each of Leithwood's curriculum dimensions appropriate to this study.

The development of a profile of the aspects of ENCORE required a careful scrutiny of Leithwood's (1981, p. 25) model as it applied to ENCORE. Leithwood (1981) suggests that there are twelve common attributes of curricula which he calls dimensions. To identify pervasive dimensions of all curriculum Leithwood considered five sources of information: recommendations to schools by official bodies; actual curriculum materials and their manifestation in classroom practice; curriculum theory; curriculum analysis schemes; and descriptions of, and/or prescriptions for, curriculum development. Leithwood (1981, p. 27) actually discussed in his article 9 of 12 dimensions which are briefly outlined as follows:

1. platform - implicit and explicit beliefs outlining content;
2. objectives - intended outcomes;
3. assessment tools and procedures - test form, test items;
4. student entry behavior - student competencies at the outset of a programme;
5. time - indicated patterns of emphasis;
6. content - specific facts, concepts, principles, generalizations and thought systems in the curriculum;
7. teaching strategies - patterns of teacher behavior designed to elicit student learning;
8. learner experiences - mental operations and physical activities engaged in by students;
9. instructional material - written, video, audio, or other material used by students.

Based on his findings Leithwood (1981, p. 34) outlined the relationships among the various dimensions that would be appropriate for "a highly rationalized model for curriculum decision making" (see figure 1.1). Note that in figure 1.1 he included the three additional dimensions which he did not discuss. No reason was given for their absence.

The twelve dimensions can be used then to outline specific curriculum. A detailed analysis of a programme is made possible in any, or all, of the twelve dimensions the developer might address in creating a programme.

In applying this framework to ENCORE the researcher illuminated six dimensions (see figure 1.2) which received particular emphasis in the ENCORE guidebook.

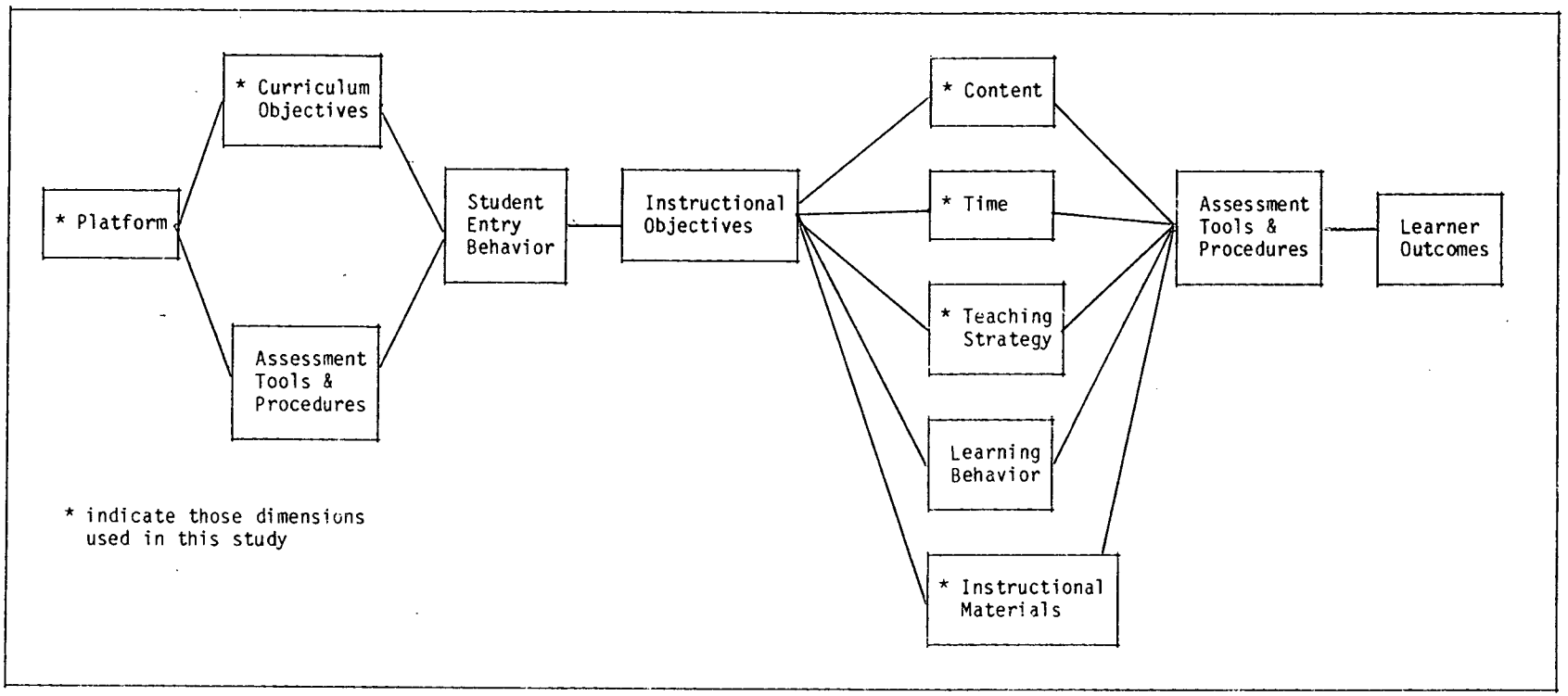

Figure 1.1 Dimensions of a Curriculum Innovation (Leithwood, 1981)

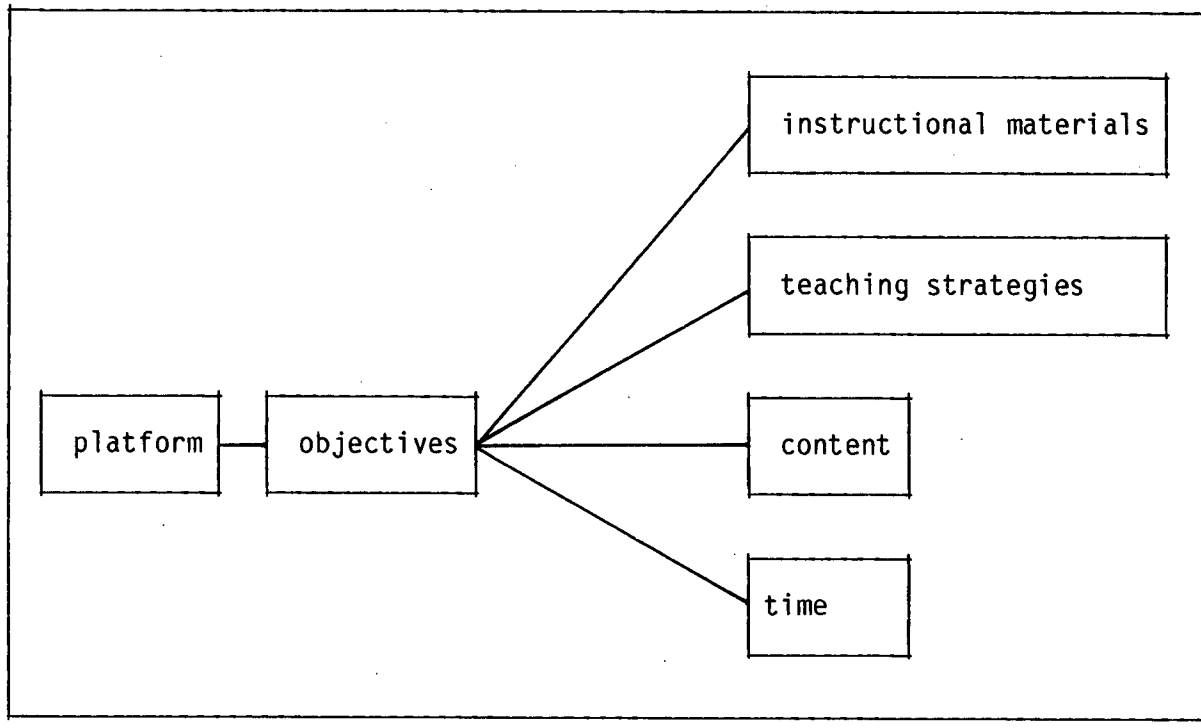

Figure 1.2 Dimensions of the ENCORE Curricular Materials

Any information in the guidebook which fit the description for a particular dimension was collected (see Appendix C). This information was considered by the researcher to reflect the developer's intended use of the programme in the sense that it outlined pertinent information required by the teacher to effectively use the programme.

The additional six dimensions outlined by Leithwood were not included for two reasons. First, the six additional dimensions were not mentioned or implied in the ENCORE guidebook-therefore, it was concluded that they likely would not significantly affect the implementation of ENCORE. Second, using only the highlighted dimensions enabled the data collection instrument, to remain relatively uncumbersome for potential respondents.

Once relevant information from the guidebook was grouped according to the six dimensions, a set of questions was developed for each dimension. In the questionnaire (see appendix D) each section for a dimension contained a set of questions in which each question examined a specific aspect of that dimension.[1] Teachers' answers to questions provided the insight into the current use of ENCORE as compared to the intended use of the programme. Accumulated data are outlined in Chapter 4.

A general profile of each dimension of ENCORE (see p. 6) provided the details to address the second specific problem here restated as "the extent to which each dimension of ENCORE is being implemented". For this purpose Hall & Loucks' "Level of Use" model (1975, p. 52) was engaged (see figure 1.3, p. 15). Leithwood (1981, p. 35) suggested that such an approach might be plausible.

"The Level of Use" model categorizes seven general areas of concern that teachers have when they implement an innovation: knowledge, acquiring information, sharing, assessing, planning, status reporting, and performing. Hall & Loucks suggested that, as teachers make decisions based on answers to their questions, they move through various levels of use in each category and become more effective users of the innovation.

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(1) For the dimension 'materials' questions 1,3,7,8,9,10 should be interpreted opposite to the way they are phrased to correctly reflect the aspect of the dimension in question.

They state that:

> Although the concept of Levels of Use represents a developmental continuum, there are key decision points that distinguish each of the eight Levels of Use. By checking out these decision points, it is possible to quickly assign an overall Level of Use to a given individual (1975, p. 53).

Level 0 is a non-user, level 1 is orientation to the curriculum, and the levels continue up to level 6 which is renewing the curriculum with other significant innovations. Changes in the behavior of an implementor occur as he/she becomes more effective in programme use. Typical behavior in each cell of the matrix was outlined by Hall & Loucks (1975, p. 54) (see appendix B). By observing and/or questioning implementors within the context of the matrix as it relates to a specific innovation, one can ascertain the level of use in each dimension for each user and for the users as a whole.

Hall & Loucks (1975, p. 52) noted that "a fuller complexity of what the user is doing can be assessed by probing further in each of the categories of concern". This study considered the categories of concern, knowledge, and assessing as most relevant in determining a general understanding of user use of ENCORE. These categories were synthesized by using the significant elements from each and combining them into one focus of teacher concern. Two reasons are given for this method:

1. The preliminary nature of the study did not warrant further specialization;
2. Using more than this one general category encumbered the instrument (questionnaire).

Levels of use 0, 1, 2, 3 and 4a and 4b were considered indicative of typical observable implementor behavior at significant levels of ENCORE implementation. Descriptions of each level of use given below are paraphrased from Hall & Loucks' model (1975). Level of use 0 was used to exemplify the behavior of teachers who indicated they were not familiar with the ENCORE programme. Levels of use 1 and 2 of Hall & Loucks (1975, p. 53) model were combined to indicate level in this study and to signify the behavior of ENCORE users who are familiar with the programme. This level of user was finding out about the programme by soliciting information and reading general descriptions. This exploration might also include attending workshops to examine the materials, procedures, etc. about the programme.

Level of use 3 of Hall & Loucks indicated level 2 in this study and encompassed the behavior of those who were attempting to apply the ENCORE programme with their classes. This level of user continues to try and master the tasks required to use the innovation. The focus is on short term effects.

Level of use 4a of Hall & Loucks indicated level 3 in this study and included the behavior of those who have mastered the tasks to use the innovation. Few, if any changes in the programme are being made. Some attention is being paid to findings for the purpose of changing use.

Level 4b of Hall & Loucks indicated level 4 in this study and involved the behavior of those who are modifying the programme to various degrees. This level of user is making changes in the use of the innovation based upon cognitive and affective effects on children. Materials and procedures are varied either as a whole or in reference to the individual child.

Categories

	This study	Hall & Loucks	#Knowledge	Acquiring information	Sharing	#Assessing	Planning	Status reporting	Performing
LEVELS		Level 0 non-use							
	1	Level 1 orientation							
		Level 2 preparation							
	2	Level 3 mechanical use							
	3	Level 4a routine							
	4	Level 4b refinement							
		Level 5 integration							
		Level 6 renewal							
	# For this study: Categories which were considered								

Figure 1.3 Framework for Analysis of Levels of Adoption
(For details of behavioral descriptions in each cell see Appendix B)

Levels of use 5 and 6 were deleted. The literature suggests that implementation at level 6 often takes more than three cycles of innovation use. The majority of ENCORE users in the accessible population had the programme for less than 3 years, according to the mailing list supplied by the B.C. Ministry of Environment. More than 3 cycles of use seemed unlikely. Under these considerations the condensing process aided in the development of a manageable questionnaire.

Each level in the synthesized category was individually applied to the six curriculum dimensions of ENCORE and a set of teacher behaviors for each dimension was articulated. A matrix combining the four levels of use and the six dimensions of the programme provided the framework (see figure 1.4, p. 17) within which teacher behavior was outlined for each cell (Appendix E). It was then possible to identify at what level an ENCORE user was implementing each dimension of the programme by phrasing each statement as a question to the user.

1.5 Significance of the Problem

A multitude of environmental education programmes can be found throughout North America (Smith, 1970: p. 104). The intent of many environmental education programmes is to establish attitudes among participants which might lead to action in preserving the integrity of the human and natural environment. The studies of Jaus (1978, p. 79) confirm this allegation. He found that many articles written about environmental education programmes by science educators and environmental educators advocate the acquisition of knowledge about and the development of positive attitudes towards the human and natural environments. However, widespread implementation of such

		Levels of Use			
		1	2	3	4
		familiar with	attempting to apply	able to determine effectiveness of	modifying
D I M E N S I O N S	platform				
	objectives				
	instructional materials				
	teaching strategy				
	content				
	time				

Figure 1.4 Matrix for ENCORE implementation behavior

programmes in schools is still a need. Alaimo et al (1978, p. 132) found that in the northeastern United States student manifestation of positive attitudes towards and appreciation of the natural environment was lacking, particularly among science oriented pupils.

Current research is finding the school to be an appropriate setting in which positive environmental attitudes can be cultivated (Alaimo, S. and Doran, 1978, p. 129; Fensham & May, 1979, p. 15; Fleetwood and Hounshell, 1976; Hart and McLaren, 1978, p. 497, Jaus, 1978, p. 79). Further, Knapp (1972, p. 26) indicates that the majority of articles about environmental education in schools recommend that instruction on the topic of environmental education take place in the elementary and middle schools.

Some environmental education programmes have been introduced to the public schools to help students learn to deal more effectively with the man-made and natural environments (Fleetwood and Hounshell, 1976, p. 29). Alaimo (1978, p. 129) states that "An effective environmental education programme designed to reach students at all grade levels may be one important part of the solution to our environmental dilemna". It appears that some environmental education programmes are being implemented in the public school system. The question is: How successfully are they being implemented?

1.6 Background to the Problem

Educational programmes adopted by our school systems should be analyzed periodically to determine the effectiveness of the implementation process in producing desired learner outcomes. This evaluation of the effectiveness of the implementation process is becoming recognized as one necessary measure of programme effectiveness in achieving desired student outcomes. The environmental education programme, ENCORE, has been informally introduced to the B.C. public school system, but a measure of the acceptance of the programme, particularly in relation to the developer's intended design, has not been undertaken.

Recently the ENCORE programme was among the first environmental education curricular materials prescribed by the Ministry of Education for use throughout the province of British Columbia (September, 1982). The programme was included in the Elementary Science Curriculum Guide, Grades 1 to 7, (1981, p. 77) as one of many prescribed materials which make up the intermediate grade Materials Based option. When curricular materials become prescribed by the Ministry of Education for the Materials Based Option in Elementary Science Education in British Columbia it indicates that those materials have been judged suitable as part of the science programme and therefore they are strongly encouraged as materials to be used.

The Materials Based option allows a teacher to choose from a variety of prescribed materials, including ENCORE, in order to create his/her own science programme for the year. Not all prescribed materials are necessarily used by any given teacher. Further, some materials chosen as a resource might not be used in entirety. Therefore, a teacher might or might not choose ENCORE as a resource and even if it is chosen, the teacher might use only parts of the programme. An analysis of the actual implementation of the programme to date would be useful in directing the formal implementation of the programme.

The ENCORE programme is one of many which has been, or continues to be, developed by individuals, groups, or organizations who wish to maintain the well-being of natural environments. Examples of similar programmes are: Examining Your Environment (E.Y.E., 1971), Outdoor Biology Instructional Strategies (O.B.I.S.), Western Educational Development Group/Ministry of

Environment (W.E.D.G.E., 1981). These programmes can best be described, in the broadest sense, as environmental education programmes.

ENCORE was developed in 1975 by the Ministry of Environment, Government of British Columbia. Two particular reasons for its development are regarded considerably noteworthy by the author. First, the Ministry indicated that people believed that civilization seems determined to push natural environments to the limits of their resilience and this "push to the limit" called into question the continued existence of those environments (ENCORE, 1974, p. 2). Second, the Ministry perceived that more and more of the general public wanted to know the consequences of proposed actions by people in natural environments before such actions were initiated (ENCORE: 1975, p. 2). Therefore the Ministry believed that a programme should be developed to help people, particularly the young, become familiar with, and sensitive to, natural environments in order that they would better be able to make rational decisions about proposed actions which would affect environments. Whether or not the objectives have been achieved has not yet been determined.

The ENCORE programme was developed by educational theorists and educational practitioners under the guidance of a representative from the Ministry of Environment. Educators from the University of British Columbia, Simon Fraser University and practising teachers were consulted. In addition, advice was sought from knowledgeable people in specific disciplines such as biology, physics, art, and language arts. Two hundred and fifty-six activity cards, such as those illustrated in Appendix F were created. Each card introduces the user to a particular aspect of a given environment within various frameworks (see Appendix G). Activity cards address both the

affective and the cognitive domains. Students are encouraged to continue study beyond the scope of the activity on the card.

Through information circulars in 1975 the Ministry of Enviromnent introduced the programme to organizations involved in educating children about the natural environment. An ENCORE kit was sent to each school district resource centre in British Columbia. Public school system and kits were available for individual teachers to purchase through the Ministry of Environment. In the school system, ENCORE was intended to be used at the elementary and junior secondary levels by teachers. The Ministry of Education did not formally suggest use of the materials in curriculum guides until 1982.

The following strategies were developed to encourage the use of ENCORE in the public school system:

1. workshops--the basic intent of the workshops is to familiarize teachers with the materials in the kit and to outline various strategies for using the programme. These workshops were conducted by the Ministry of Environment for teacher groups throughout the province of B.C.;
2. publications by the Ministry of Environment
   (a) Environmental Education Handbook--contains general information about the subject of environmental education such as planning field trips and ensuring safety precautions;
   (b) Ecology Definition Booklet--provides brief descriptions of several terms used in the ENCORE materials.

(c) Environmental Education Resource Book--lists a multitude of publications related to the topic of environmental education which are useful to teachers.

Assumptions were made about the value of ENCORE as curricular material by the Ministry of Education. It is assumed that information from teachers about the actual use of the ENCORE programme in the classroom would provide information to the Ministry of Education, as formal implementation procedures were being undertaken at this time (1983) by the Ministry of Education.

1.7 Basic Assumptions of the Study

When a study is undertaken there are always basic assumptions upon which the research is based. In this study the following assumptions have been made:

1. the classroom behavior of teachers can be considered an indication of programme implementation, and
2. the statements by teachers about their classroom behavior reflect their actual behavior and those statements can therefore be considered as general indicators of programme implementation.

1.8 Description of Terms

Curricular materials--all or part of one or more programme(s) which might facilitate learner achievement of educational objectives specified by the Ministry of Education, Government of British Columbia.

Curriculum or programme effectiveness--The net change observed in students' behavior after exposure to a programme or curriculum.

Curriculum implementation or innovation implementation--The process of using an innovation in the schools. Traditionally this process was outlined by the developer in a prescriptive manner.

Curriculum innovation or innovation--A new programme developed for use by students and teachers in the school setting.

Evaluation of curriculum implementation process--Implementation evaluation.

Implementation evaluation--Determining the ways an innovation is being used relative to the intended uses of the programme. This determination may involve in-class evaluations or it may involve evaluating the whole structure, such as a school district, which is behind large scale introduction of an innovation.

Implementation strategies--Various methods designed to affect the way in which an innovation is used.

Programme--a set of educational materials which has been developed upon certain underlying assumptions which might facilitate learner achievement of educational objectives specified by the developer.

CHAPTER 2

THE NATURE AND CONCEPTUALIZATION OF THE IMPLEMENTATION PROCESS

2.1 Introduction

Chapter 2 is a review of the literature related to the implementation process which is primarily concerned with the introduction of new curricular programmes in the formal education system. The implementation process is a recently recognized phenomenon and is at best, only basically understood. The discussion in this chapter clarifies and analyzes current perspectives of the implementation process. Emergent in this chapter is the position that implementation can be considered as the process of developing, operationalizing, evaluating, and modifying (not necessarily sequential) a curricular programme to meet a perceived need within the formal education system.

This Chapter considers the multitude of variables inherent in the implementation process of new programmes within the education system. The set of variables is outlined in three main clusters: socio-context, principal change agents, and new programmes or innovations.

A critique of various conceptualizations (models) of the implementation process follows and is directed by reference to the above clusters of variables. Individual models are outlined, noting where particular conceptualizations emphasize the socio-context variables.

Finally the foci of several evaluation models of implementation are considered. The discussion centres upon the effectiveness with which each

model addresses some or all of the clusters of implementation variables identified early in the text of this chapter.

2.2 Variables in Implementation

A common and continuing problem of implementing a new programme (innovation) is the discrepancy between what a curriculum proposal means to its developer and how it is perceived by the teachers who are being asked to implement it (Doyle & Ponder, 1977, p. 74). McLaughlin (1976, p. 339) and Frey (1979, p. 209) feel that mutual adaptation between developer and implementator is advantageous as they grapple with the varying perspectives described by Doyle and Ponder (1977, p. 74). The variance in perspectives can be better understood by examining the variables inherent in the implementation process. As Hess & Rogers (1977, p. 3) point out, "There is a desperate need for information on variables related to implementation, both positive and negative."

The three main clusters of variables that will be dealt with here. One cluster of variables is the socio-context cluster and is related to the social context into which the innovation is introduced.

The second cluster of variables is the principal change agent cluster and is related to the ways in which implementing a new programme can effect probable changes in the personal domain of a teacher. Since people tend to resist making change (Hall et al., 1975, p. 52) the teacher, or principal change agent, is considered to have the greatest potential effect upon the successful implementation of a new programme. The third cluster of variables is termed the innovation cluster. New programmes constitute a prime stimulator for change within the education system.

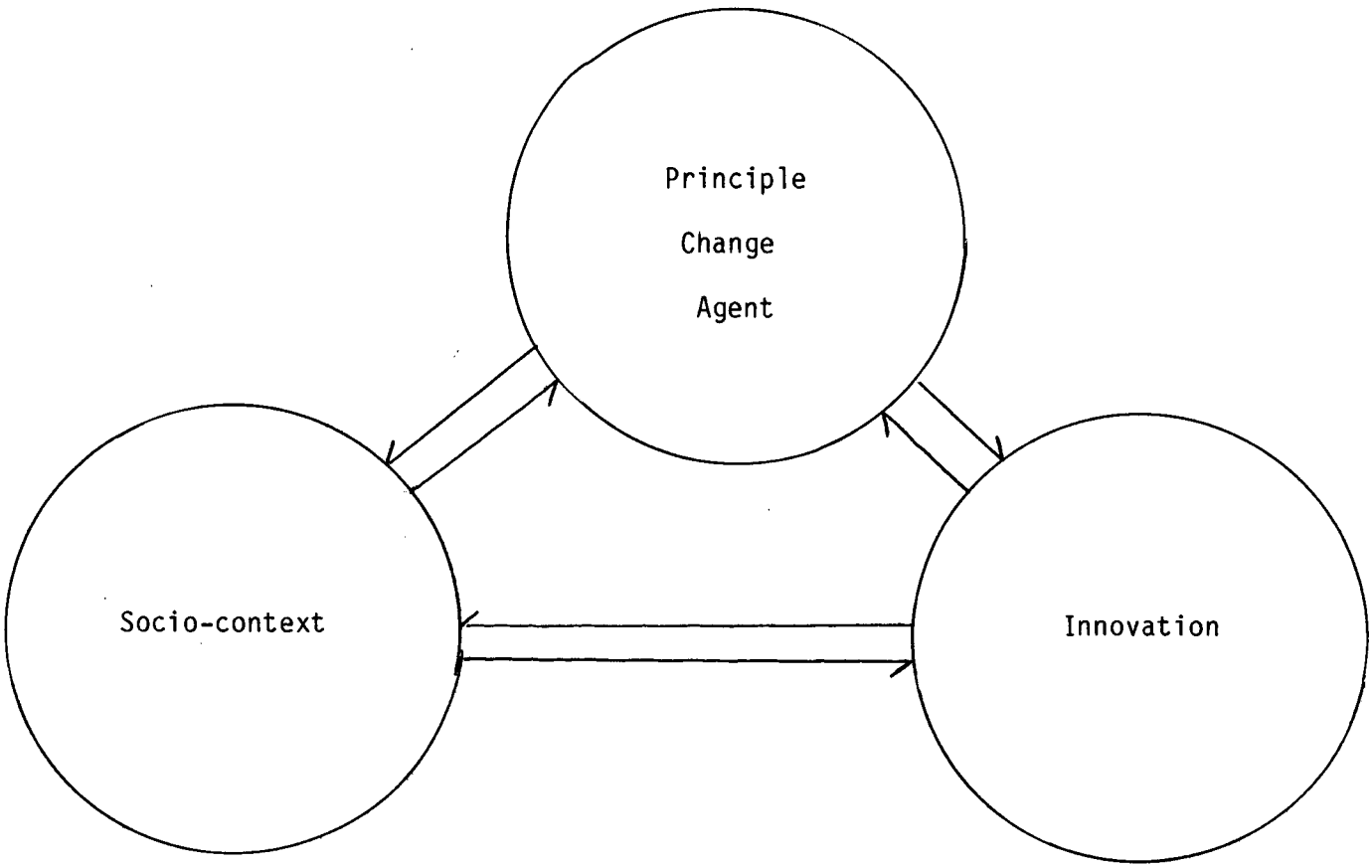


Figure 2.1 Interaction of Major Variable Clusters Affecting the Implementation Process

Thus, the implementation process is affected by three main clusters of variables which are inextricably interrelated in the actual implementation of change. Segregation here simply provides a theoretical yet functional focus for discussion.

2.2.1 Socio-context

The significance of the socio-context (internal and external to the classroom) is discussed in several studies (Fullan & Park, 1981, p. 14; Pincus & William, 1979, p. 731; Reid, 1975, p. 240). Leithwood & Russell (1973, p. 201) state that:

> . . . the context of change (cultural milieu) is a major determinant of the problem areas likely to be identified and the nature of their solution (i.e. accountability)

The separation of the socio-context into the internal and external class environments is predicated on the assumption that the internal class environment is the personal teaching domain of the principal change agent and that the outside of the classroom is not. Since change is considered a highly personal experience this differentiation seems particularly appropriate.

External Classroom Socio-context: The socio-context external to the classroom is primarily concerned with the management of implementation. The methods of those involved in management (e.g. district staff, principal) varies, affecting dissemination of information and materials which relate to the implementation of an innovation. The purpose of this management activity is to purposefully support implementation in the classroom environment. Variability of the managerial aspects is a result of the external classroom environment's socio-political nature (Datta, 1981, p. 8) in the education

system. Implementation strategies in this context function from a power, manipulative, or rational basis (Stephens, 1980).

Incentives for administrators to implement programmes often include rules, regulations or personal satisfaction. Personal satisfaction might result from the potential for job advancement. These incentives might or might not have a positive effect upon innovation implementation which occurs in the classroom. Incentives aside, management leadership is crucial to successful implementation (Kritek, 1976, p. 95). Principals, next to staff members, are closest to teachers' personal teaching domain and subsequently their influences often determine whether teachers evolve past their own managerial concerns of implementation (Loucks & Pratts, 1979, p. 215).

Internal Classroom Socio-context: Within the classroom, implementation is primarily a function of social dynamics. The physical environment also plays a role albeit minor. Huberman's (1979, p. 4) study conducted in Geneva articulated teachers' description of a classroom as having multidimensionality, simultaneity, and unpredictability. This study determined a poignant description of the dynamic reality in the classroom. Huberman notes another study (Doyle, Jackson, & Dreeben, n.d.) that describes the classroom in similar terms.

The above classroom conditions lead a teacher to operate spontaneously and concretely to solve occurring problems. He suggests that those conditions tend to make teachers uncomfortable with rational procedures for solving problems. It might be that there is often not enough time to act/react in a premediated way. Further, this reaction of teachers seems likely to lead away from new teaching methodologies, stated or implied in an

innovation, which influence effective implementation of the new programme. Therefore, the impact of an innovation upon the sociodynamic situation in the classroom, as perceived by the teacher, must have a critical effect on implementation (Churchman, 1979, p. 25; Leithwood & McDonald, 1981, p. 103; Loucks & Hall, 1977, p. 18; Reid, 1975, p. 249; Waring, 1979, p. 262). Few studies address this reality.

2.2.2 Principal Change Agents. The second variable cluster centres around the teacher as the principal change agent. As well as having concerns about classroom sociodynamics, teachers who are asked to implement a new programme have to deal with the characteristics of the innovation and its implications for change in their own disposition. Often teachers encounter personal difficulties implementing programmes.

Perceived Complexity by Teachers: The complexity of the innovation affects teachers' ability to implement programmes (Allan, 1978, p. 335; Farrow, 1980, Fowler, 1980, p. 10). Holland (1980) found that teachers have a great many questions about the complexities of the innovation. For example, teachers ask about costs, context, demands upon themselves, instructional materials, curriculum value base, attention to domains, goals and objectives, evaluation procedures, scope and sequence of content and activities, information about publishers, student reaction to curriculum, and suitability for different students in different settings. Though Holland's methodology was sound it does seem unrealistic that any single teacher would be so determined as to seek answers to all those questions. However, it can be appreciated that if a new innovation requires a plethora of changes such as role shifts, use of voluminous new materials, and unrealistic time

consumed in planning and extensive new evaluation procedures, teachers will very likely react negatively, and at best implement only some parts of the innovation.

Perceived Clarity by Teachers: Implementation of a new programme could become even more difficult if the programme goals and the ways to achieve them are written in vague and abstract terms (Gross et al, 1971; Kritek, 1976, p. 88). A decision to use a programme may be difficult because the programme remains susceptible to various interpretations for practical implementation. Interestingly, Huberman (1979, p. 4) suggests that "a lack of clarity could be purposeful since it serves to lower resistance of teachers to use it and further it makes accountability evaluation very difficult to carry out". Circumstances surrounding the implementation of a new programme might dictate which is the appropriate view.

Philosophy, Values of Teachers: Teachers acceptance/rejection of the value base or philosophy of an innovation is of particular interest to researchers since it has been found to be the main cause of resistance to change (Fullan & Park, 1981; Leithwood & Russell, 1973; Reid, 1975; Werner, 1980). Benham (1977, p. 205) states:

> I have come to suspect the failure of educational reforms of the 1960s and early 1970s was due, at least in part, to a lack of understanding that there existed a fundamental philosophical difference between the reforms being proposed and the institution of public schooling of America for which they were being proposed.

It seems teachers were told to find ways of implementing new programmes grounded on philosophical assumptions that they found greatly at variance with their own beliefs.

According to Kritek (1976, p. 88), the philosophic rudiments of user

roles need to be clearly defined and cannot be drastically different from traditional roles or "role overload" can occur leading to major innovation modifications. Downey et al. (1975) found role overload with the introduction of the new Social Studies curriculum in Alberta, Canada. After five years only 20% of the teachers used the principal strategy of having a valuing and inquiry orientation.

When teachers do not agree with the programme philosophy or when role overload occurs, modifications to the programme are often typified by an emphasis on maintaining conventional practices and a de-emphasis of the elements of the programme which challenge the existing order (socio-political structure of school) (Berman & McLaughlin, 1976, p. 352; Carpenter-Huffman et al., 1974; Goodlad & Klein, 1970; Reynolds, 1973; Smith & Keith, 1971). Teachers appear to be searching for compatibility between the changes which are inherent in the programme and the status quo.

It has been noted that the socio-context and the principal change agent clusters significantly affect the process of implementation. Each teacher (principal change agent) uniquely interprets the set of innovation characteristics. Therefore, actual implementation of a new programme must and does vary tremendously from teacher to teacher and especially between the teacher's programme implementation and the developer's original design. This difference is further accentuated by the influence of the socio-context which often provides the incentive for teachers to implement new programmes (Evans et al., 1975, p. 108; Farrar et al., 1979; Hall et al., 1975, p. 52; Lane, 1980; Waring, 1979, p. 257). Variations in the implementation of an innovation may be ineradicable, and as Evans and Sheffler (1975, p. 114) and

Lane (1980) suggest, they should be legitimized. The most fruitful focus for further research, by implication, must be the teacher in the physical setting of the classroom.

2.2.3 Innovations. The third cluster of variables affecting implementation relates to the characteristics of the innovation. A pattern emerges from literature which distinguishes two general ways in which innovations are characteristically viewed. The more common view of an innovation is associated with design (i.e. the planned change). Another view of an innovation relates to its function.

Design: Innovations may be viewed by the developer or the teacher as an outline of planned change. Rogers & Shoemaker (1972) and Fullan & Park (1981, p. 14) examined an innovation from the users' (teachers') perspective. Innovation characteristics could include a response to a need of the user, clarity/complexity of response manifesting in curriculum, and quality/availability of materials to carry out the response (Fullan & Park, 1981, p. 14). The characteristics, independently and collectively, when evaluated by the user usually determine the extent to which the response (i.e new programme) will be implemented. Fullan & Park's outline might be oversimplified for practical application in implementation evaluation.

Rogers & Shoemaker (1972) also outline an innovation from the users' perspective. They believe that the 'user' considers five attributes of an innovation: relative advantage, compatibility, complexity, trialability, observability. Churchman (1978) had some misgivings about this model and agreed that its development external to the formal education system made it less applicable. Note also that although these attributes appreciate the

users' perspective, they are really articulated by the researcher, in isolation of the practitioner.

The "developers" perspective is discussed by Evans & Sheffler, (1976), Hall & Loucks, (1975), Leithwood (1981), Nauman-Etomme (1976), and Stallings (1977). This perspective of an innovation is the basis upon which most innovations are developed. Coincidentally, most 'evaluations' of innovation implementations are aligned with the developer's perspective. Stallings required the developer to specify "key elements" or significant parts of an innovation. For example, the teaching strategy of "using the outdoors as a source of scientific data" can be a key element. A researcher, by observing a teacher implementing a programme could note the use/non-use of a (single or multiple) key element(s) of a specific programme as evidence of implementation. The difficulty with this approach is that the key elements would differ for each innovation according to the needs of the educational situation for which the programme was developed. A consistent set of key elements across all programmes would facilitate uniform examination of innovations and would lead to a more consistent basis for not only evaluation by the user but also for innovation implementation.

Leithwood (1981, p. 26) specified all innovations as having some, or all of a common set of characteristics he calls "dimensions". These dimensions included: platform/images, curriculum objectives, assessment tools and procedures, student entry behaviors, instructional objectives, time, content, teaching strategies, learning experiences, instructional material, and student outcomes. Leithwood's model of an innovation appears to provide several advantages. First it seems detailed enough to provide a compre-

hensive overview of an innovation. Second, the dimensions are applicable across any innovation. Third, it can be used by receiving organizations (e.g. schools) as well as developers. If a developer were to outline an innovation in this manner the receiving organization could follow the outline and analyze the innovation from its perspective, thus ascertaining the appropriateness of the innovation to the specific needs of the receiving organization. The receiving organization could then prepare suitable strategies for the use of the new programme.

Whether developing, using, or evaluating the use of a new programme or innovation those parts or characteristics become the focus. Note that what are considered to be important parts or characteristics of an innovation vary according to the perspective from which the innovation is viewed. A difficulty in implementing a new programme occurs as a result of the incompatibility between perspectives of that innovation. For example, what the developer considers to be an important part of a new programme, the user may not see as particularly relevant.

Function: The second general view of an innovation is related to the function of the innovation. Two ideas are discussed here. When considered collectively, there is the implication that rather than the currently held understanding a more holistic understanding of the implementation process is necessary. Common (1979, p. 1) suggested that "curriculum innovations are only proposals for change". The proposals for change are outlines for facilitating desired change (Churchman, 1979). 'Implementation process' must involve both proposing changes and enacting those changes (i.e. developing

the programme and then using it). The emerging concept of implementation seriously considers this idea.

However, the implementation process may even go beyond this notion. If change is being encouraged there should be some way to determine whether change is actually occurring or has occurred (extent of change). Leithwood (1981, p. 56) and Fullan & Pomfret (1977, p. 346) among others, have pointed out the dilemma of evaluation vis-a-vis the problem of specifying exactly what the innovation is before measuring the extent to which an innovation has been implemented. Leithwood's (1981, p. 33) dimensions of a curriculum could be particularly relevant and useful to the problem. Part of the implementation process then, could be considered the documentation of the occurrence of change. The implementation process understood in a more holistic sense, appears to include outlining the desired change, the enacting the change, and observing the change.

Three clusters of variables have been identified as directly affecting the way in which change occurs: socio-context, principal change agent, innovation. Though each cluster has been outlined as being principally responsible for specific effects upon the implementation of change, all three sets of variables are not mutually exclusive but are rather mutually dependent in the sense that they are all part of the same story. The socio-context is the setting in which the story unfolds. The principal change agent is the main character. And the innovation is the main problem to be dealt with in the story. Similar to a story, the results of the interaction of these three parts is never clear until the end. Change is ongoing.

While realizing that the main clusters of variables describe the components of implementation it remains difficult to recognize and understand the complex set of interrelationships among them. Recognizing and understanding these interrelationships is a necessary step to establishing causes of frequently occurring modifications in innovations. The following section explores the conceptualization of implementation.

2.3 Implementation Conceptualized

Conceptualization of the implementation process continues to evolve. Those currently studying the process have recognized that there is a much broader sphere of influence that was previously thought to exist surrounding the use of a new programme. Resulting from this is a more comprehensive understanding of the multitudes of variables now thought to affect the implementation of innovations. Further, there is a better understanding of the interactions among those variables related to the implementation of new programmes in the formal education system. Models of implementation can better be appreciated by reflecting upon the nature of implementation and by noting some of the problems which currently exist in conceptualizing the implementation process.

2.3.1 Nature of Implementation.

Implementation is "effecting change over time" and therefore is a "process not an event" (Evans and Sheffler, 1975, p. 108; Gross et al., 1971; Hall et al., 1975, p. 52). "Specifically it is the changing of practice; emphasis on actual use rather than assumed use" (Fullan & Park, 1981, p. 6). As Werner (1980, p. 57) points out "implementation is not simply introducing something to be used in the classroom but is a changing of the whole pattern of expectations

operative in the classroom". Werner's comments could, or perhaps should include the external classroom context as was outlined earlier.

In the past, literature about change has focused on diffusion and adoption of innovations to the exclusion of a process which encompasses them: implementation. Some researchers are now saying implementation is not simply an extension of the planning and adoption process, rather it is a phenomenon in its own right (Common, 1979, p. 13; Fullan, 1977, p. 336). Leithwood and Russell (1973, p.1) note that:

> . . . while implementation and development are mutually supportive processes within the context of present educational problems, implementation is of a higher order, encompassing rather than serving development.

This statement, in the opinion of the writer, is a significant statement and agrees with the comments stated under 'innovation function'. However, as Chakagondua, (1982, p. 7) points out, "the problem in curriculum innovation now is not the recognition of the process but rather its conceptualization for research and practice". Note that the term curriculum innovation used by Chakagondua is understood here to mean curriculum implementation. If one is aware of the nature of implementation then one can better appreciate the difficulty in conceptualizing the process for research purposes.

2.3.2 Problems in Conceptualizing Implementation. Until recently a clear, logical, and practical approach to the implementation of change did not exist (Loucks & Pratt, 1979, p. 212). To conceptualize implementation researchers observed the dynamics of introducing programmes into the school systems. Programme implementation was found to be significantly more complex than was initially assumed (Leithwood & Russell, 1973). Evans and Sheffler,

(1974, p. 108) and Fullan and Pomfret, (1977) further suggest that, because of the complexity of the phenomenon, there is a potentially large number of variables that affect the implementation process.

"The conceptualization of the implementation process required adequate identification and description of the specific implementation variables" (Chakagondua, 1982, p. 7). This requirement, in part, explains the reason for the difficulty of conceptualizing implementation. Researchers have indeed sought to isolate the variables involved in implementating a new programme. The preceding discussion has clarified some of the more significant clusters of variables. Fullan and Park, (1981), Fullan and Pomfret, (1977), Pincur and Williams, (1979), Leithwood, (1981), Leinhardt, (1977) are examples of those who have been involved in the task. It is the author's opinion that recognizing the three main clusters of variables will aid in creating a conceptual framework of implementation.

2.3.3 Conceptualizations (Models) of Implementation. The conceptualizations (models) of implementation cluster according to the principal environmental context in which the implementation occurs. Certain implementation models focus primarily on the classroom context (Ashley & Butts, 1970; 1970; Crowther, 1972; Leinhardt, 1973; Stallings, 1977). The interaction between the principal change agent and the innovation creates the main implementation variables in that setting. It could easily be argued that this is the most crucial point in the process (i.e. actual use of the curriculum). Other models consider the external classroom context (e.g. provincial, local school system) as the main variable cluster and give little emphasis to the principal change agent variable cluster (Downey et al., 1975;

Pincus & Williams, 1979, p. 729). It is significant that the models of implementation presented here choose to emphasize one variable cluster over others when, in fact, we are learning that each variable cluster is nondescript without understanding the significance of the others.

The skeletal outline of various conceptualizations is shown in Figure 6. The first three models were not developed to outline implementation per se, but were used to measure the success with which the programme coincidentally and only partially reflected the implementation process. Development of a universally applicable model of implementation does not seem possible yet nor, because of the complex nature of implementation, might it ever be possible. It is not the intent of the author to detail these models here. Some general observations regarding these models are valuable to this discussion.

2.3.4 General Observations About Models. The following comments and observations about the implementation process and implementation models (see Figure 2.2) might help in providing an insight into the appropriateness of these models regarding the conceptualization of the implementation process.

1. The majority of implementation models require observation of overt behaviors to ascertain the reality of implementation (Ashley and Butts, 1970; Gross et al., 1971). An assumption here is that overt behavior explicitly exemplifies all aspects of the implementation process.

2. Uniqueness of local circumstances, in many cases, can best be served by some modifications to implementation (Kritek, 1976, p. 95). If this is so, then any implementation model would have to be flexible enough to suit the local context when a unique programme is to be implemented.

°Stake	°Stufflemeam	°Lindvall & Cox	*Ashley & Butts	*Evans & Sheffler (programme specific)	#Kritek	*Leinhardt	#Pincus/Williams	#Fullan/Pomfret	#Butt/Wideen (program specific
- antecedents	- context	- goal definition	- teacher/ student interaction	- organizational e.g. materials scheduling	- programme goals	- context	- zone of protective tolerance	- characteristics of innovations	- inservice education
- transactions	- input	- plans	- teacher strategies & behaviors	- instructional e.g. classroom planning session pretest/postest	- planning	- allocation of time	- leadership component	- strategies for using innovations	- knowledge, acceptance agreement with beliefs
- outcomes	- process	- operation	- teacher personal traits	* used a cross-teacher comparison mechanism in determining implementation status	- resources	- allocation of space	- appropriate planning, delivery system	- characteristics of adopting unit	- self-perception of teaching ability for the innovation
	- product	- assessment	- physical aspects of classroom environment		- user roles	- assignment procedures	- benefits	- characteristics of macro-sociopolitical units	-factors such as equipment, Board support
					- administration	- student independence	- stability		- specific teaching and evaluation practice
					- other category				

° though not a model of implementation, they have been used for programme evaluation.

* Focus on classroom context
# Focus on out of classroom context

The skeletal outline is intended to illustrate the main concerns of each model.

Figure 2.2 Conceptualizations of Implementation

3. There is great variation among teachers using an innovation therefore implementation studies should concentrate at the individual classroom level (Evans & Sheffler, 1976, p. 115; Leithwood, 1981, p. 25). In addition one could "approach the problems of implementation in the context of an exchange of information that is tailored to the interest level of 'eventual users'" (Leithwood & Russell, 1973, p. 3). Implementation according to Leithwood and McDonald (1981, p. 103) could be conceptualized as influencing the decisions teachers make about their classroom instruction.

4. In virtually all cases, implementation models do not account for the character of the student body (socially or academically). The character of the student body can dictate, to some extent, what can or cannot be implemented. Further, "since teachers rely heavily upon student evaluation of methods and content through enthusiastic responses, it stands to reason that planning and implementation bear those concerns in mind" (Leithwood & McDonald, 1981, p. 110).

5. Research clearly indicates a major concern regarding the effects on implementation resulting from the discrepancies between the user's philosophy/value/beliefs and those inherent in the innovation. Several models take this into account. However, the typical observation is made on whether or not the teacher exhibits behavior indicative of the innovation's philosophy, values, and beliefs basis. It would be invaluable to know what the teacher's original philosophy/value/beliefs basis was and, therefore, how much of a shift the user was required to make to arrive at the observed behavior. The type and quantity of shift behavior would provide greater insight into the essence of user resistance.

6. The majority of implementation studies have been conducted at the Elementary School level (Fullan et al, 1977). Implementation of programmes at the Secondary School level may offer a different perspective.
These comments and observations should be carefully considered in developing a better understanding of the implementation process.

2.4 Approach to Evaluation

"The literature relating to implementation has tended to document the need for implementation studies but has not been very useful in describing, in practical terms, how one may go about the process of assessing implementation" (Evans and Sheffler, 1976, p. 106).

During the sixties and early seventies, curriculum evaluation was traditionally directed at measuring learner outcomes (B.S.C.S., 1970; Benham, 1977, p. 206; Hess & Rogers, 1977, p. 1). The degree to which learner outcomes were compatible with curriculum goals was considered a measure of curriculum effectiveness (Hess & Rogers, 1977, p. 1). Kritek (1976, p. 90) emphatically stated that "evaluators miss the point if they insist on assessing a programme's accomplishments against its early statement of objectives". Kritek's comments indicate that this particular approach to the evaluation of the effectiveness of a new programme followed a comparative goals-achievement model. This evaluation method simply rendered it impossible to ascertain exactly why actual learner outcomes deviated from intended learner outcomes.

It is clear that innovations are seldom used precisely according to the developer's intentions, and that considerable variation occurs (Connelly, 1972; Fullan, 1972; Gallagher, 1966; Gross et al., 1971; Herron, 1971; Hess,

1974; McKenzie, 1970; Mahon, 1972; Rosenshine, 1970; Soloman et al., 1972). Recognizing this variation, Okpalobi's (1979, p. 1) comment is indicative of a shift occuring in evaluation emphasis:

> An evaluator who seeks to document effects of an educational system must first ascertain if the innovation was used and how it was used by the change agents.

Fullan and Pomfret (1977) call this the fidelity approach to implementation evaluation: comparing actual use of the innovation to its intended use.

Many studies using this approach appear to have a methodological problem. Nicodemus (1976) would agree with the following statement by Hall et al (1975, p. 56).

> One of the key reasons, we think, that so many evaluation reports conclude with no significant differences between experimental innovation efforts and comparison efforts is attributable to the level of use. In most studies, the summative (outcome) data are collected during the first cycle of use of the innovation, when most of the users are probably at level three and not yet using the innovation effectively.

Level 3 referred to in this quote is considered to be synonomous with level 2 in the author's defication of Hall & Louck's model.

In essence, Hall et al. (1975, p.56) are suggesting that evaluation has occurred when users were still dealing with the logistics of operationalizing the innovation. They were not yet at the 'instructional' level where the innovation can seriously be considered as affecting learner outcomes. Studies by Evans and Sheffler (1976) and Heather (1972) demonstrate this quite clearly. The awareness of premature evaluation is leading researchers to consider that continuous evaluation is necessary to properly analyze and assess the implementation process (Atkin, 1969; Frey, 1979: p. 209; Kritek, 1976, p. 99).

From the developer's point of view (the focus in this study) continuous evaluation would need to take a vignette approach (i.e. opting into the context periodically to analyze and assess implementation). Acquired data could illuminate difficulties of implementation within specific characteristics of the innovation. Strategies could be developed to modify the programme to better meet the contextual needs or to further reinforce the desired implementational behavior in order to increase the probability of achieving the original programme objectives.

So, the evaluation of the implementation process has gradually changed its focus. Originally the goals-achievement evaluation approach to determining the success of a new programme, in terms of learner outcomes, was thought to be appropriate. Uncertainty about the way in which a new programme was actually being used and how that might affect eventual student behavioral outcomes after exposure to the innvovation, led researchers to create evaluation techniques which would take this uncertainty into account. A comparison between intended and actual use of innovations model of evaluation became more sensitive to this concern. However, some researchers such as Hall et al (1975, p. 56) indicate that when using this method of evaluating the success of implementation, timing is critical. The principal change agent must have time to move from simply operationalizing a new programme to an instructional competence with the innovation. The writer is suggesting that the vignette approach to implementation evaluation is entirely appropriate. This approach allows a sequential view of the implementation process as it evolves, in the opinion of Hall et al. (1975,

p. 52) from an operational level to an instructional level of use with the innovation.

2.5. Implementation Evaluation Models

Implementation Evaluation Models (I.E.M.) use, as the basis for analysis, one or more of the three variable clusters. Those I.E.M.'s which use innovation characteristics as their basis are usually intent upon analyzing and assessing the use of an innovation compared to the original intent. Other models use the context, or the principal change agent as the basis and are usually intent upon analyzing and assessing the dynamics of the implementation process. To isolate empirical data, I.E.M.s used observation techniques for evaluating the behavior of implementors using the innovation. Using this approach one can then determine whether or not the observed behavior is indicative of intended use of the innovation or of certain implementation variables operant (Atkin, 1969; Evans & Sheffler, 1976, p. 109; Gross et al., 1971; Hess & Rogers, 1977, p. 4; Nauman et al., 1974; Soloman, n.d.).

Several models attempt to assess the degree of implementation. A scale of typical implementor behavior at various stages between initial use and sophisticated use of an innovation has been outlined by developers, and/or researchers (Crowther, 1972; Leithwood, 1981, p. 25). 'Assessment' of implementor behavior determines the level of implementation of that teacher. Generally, it can be said that 'analysis' of behavior by direct observation or by questioning the implementor, (Crowther, 1972; Hall et al., 1975) can also determine the parts of the innovation in use or the implementation variables operant.

Some models use observations of behavior, noted in the 'external context' while most use observations of behavior in the internal context to determine the degree of implementation.

For example, Evans et al. (1976, p. 109), measuring degrees of implementation of a programme concluded that organizational behavior of teachers was evident but instructional behavior was not. Okpalobi (1979, p. 1) as well as Loucks (1976, p. 56) found that when evaluating implementation of an innovation most teachers were also at this level of implementation. One might conclude that either (1) all three studies measured the degree of implementation of three different programmes which, when measured, happened to be at that particular level of implementation, or (2) going beyond the operational level of implementation is a difficult task. Whatever the interpretation, it does seem evident that the classroom is the context from which valuable insights into the implementation process can be gained. A significant comment was made by Evans et al., (1976, p. 15):

> We have come to realize implementation varies considerably from teacher to teacher within the same school, and that the appropriate unit for implementation studies should be the individual classroom.

If one assumes, as several studies imply, that the 'classroom is the relevant focus for implementation research, then the approaches to the problem of implementation evaluation taken by Ashley and Butts (1970); Crowther, (1972); Gross et al. (1971); Hess et al. (1974); Leithwood (1981); Soloman et al. (n.d.); and in particular, Hall et al. (1975) seem most appropriate. Hess and Beckholdt (1974) outlined behavior which was expected of a teacher within various roles specific to innovation use. The degree of implementation was limited to a cross-school or cross-district comparison.

Ashley and Butts (1970) and Soloman et al. (n.d.) also outlined various roles. The degree of implementation consisted of a comparison among various roles which a teacher had to exemplify, rather than a comparison among teachers per se. No attempt was made to isolate the extent of implementation within each role of the innovation. The focus was simply whether or not the role was observed.

Studies which did a more thorough examination of role implementation were by Gross et al. (1971) and Crowther (1972). Gross et al. actually attempted to quantify behavior within specific sets of role enactment. This quantification was done on a five point scale (i.e. from "not at all" to "completely"). Behavior within each set was further quantified by frequency of occurrence). The scales, it would seem, were open to liberal interpretation. Crowther (1972) developed an inventory of items of significant innovation attributes and asked teachers to rate the degree of emphasis they gave to each on a five point scale. The items focused primarily upon teaching strategies and as such, appear limiting in the scope of innovation characteristics. Interestingly Crowther used the questionnaire as the main instrument to seek teachers' interpretations of their personal use of the innovation. Despite concerns in the literature about the credibility of using teachers' perceptions of their own use, Crowther was able to document instrument validity.

Hall & Loucks (1975) were much more definitive in the assessment of curriculum implementation (see Appendix B). Fullan and Pomfret (1977, p. 355) states that "the most sophisticated and explicit conceptualization of the fidelity orientation to assessing degree of implementation has been

developed by Hall and Loucks (1976)". Hall and Loucks (1975) felt that for any innovation teachers had seven categories of concern about the innovation: knowledge, acquiring information, sharing ideas, assessing, planning, status reporting and performing. For each of these categories, Hall and Loucks outlined eight incremental changes in behavior as the teachers' use of the programme became more familiar or more defined. Decisions by the teacher were assumed necessary to facilitate moving from one level to another. This model allowed the developer or teacher to examine more thoroughly the extent, or degree to which implementation had occurred. The difficulty Hall and Loucks discovered was a need to determine levels of use within various dimensions of the innovation. They noted a further difficulty when various innovations were combined to make a single innovation. They referred to combined innovations as "innovation bundles."

Leithwood (1981, p. 25) suggested using the dimensions of a curriculum that he outlined, with stages or levels of use. The nexus of Leithwood's (1981) model of an innovation with Hall et al. (1975) appears to overcome one major deficiency in most implementation evaluations, that is that the outline of teacher behavior when implementing an innovation is too general and vague to be particularly useful. Using a combined Leithwood & Hall et al. model outlining teacher behavior when implementing an innovation could provide more detail by including typical behavior when using each dimension. Crowther (1972), for example, concerned himself primarily with teaching strategies. The present study used Leithwood's dimensions (which were found significant in ENCORE) and attempted to measure levels of use of ENCORE within the general framework of the model developed by Hall et al.

2.6 Summary

The implementation process is fraught with variables and complex interrelationships among/between those variables. Chapter 2 began by isolating three main variable clusters (socio-context, principal change agent, innovation) and by discussing some of the more prevalent variables within each cluster.

Various models of implementation were considered in order to determine their appropriateness with respect to the three variable clusters. Models such as Ashley & Butts (1970), Crowthers (1972), Leinhardt (1973) and Stallings (1977), Hall and Loucks (1975) seem particularly relevant based upon the understanding of implementation supported by studies discussed in this chapter.

Evaluating the implementation process for an innovation is now regarded as necessary in determining the effectiveness of the new programme. A comparison of actual compared to intended use of the new programme is one method (Fullan & Pomfret, 1977, p. 340). Hall et al (1975, p. 52) indicate that a teacher moves through several levels of use of an innovation over time. Therefore continuous evaluation of the implementation is necessary.

Two general questions remain post-evaluation of any point in the implementation process of an innovation: (1) do developers continue to develop strategies, as a programme is being modified in use, to direct the implementor to a predetermined use of the innovation, or (2) should modifications by the implementor be accepted as they occur, by leaving the implementor to his own interpretation of the applicability of the innovation

according to his personal and professional disposition, as they relate to the classroom context?

Most models of the implementation process and of implementation evaluation support the idea of developing strategies to help teachers towards "correct use" of the innovation. It appears that this idea will remain the focus in the near future. In this sense teachers as implementors remain at best advisors to the process of implementation as opposed to co-deciders.

The developers' perspective of implementation evaluation will continue to dominate in the foreseeable future. This perspective of evaluation seems best served by articulating the curriculum dimension of an innovation (Leithwood, 1981, p. 26) and measuring the degree of implementation (Hall & Loucks, 1975, p. 26). In this way strategies can be developed to address subsets of problems within the main tasks of implementing the innovation.

The recognition of and consequent phlegmatic attitude about implementation has clearly shifted to a greater understanding of the implementation process. Research is beginning to support the idea that innovation development, use and evaluation cannot be considered as mutually exclusive. Rather they must be viewed as mutually interdependent, a totality which comprises the process of implementation.

CHAPTER 3

PROCESS OF DATA GATHERING

3.1 Introduction

ENCORE is among the first environmental education programmes to be "prescribed" curriculum in British Columbia (Elementary Science Guide, 1981). An analysis of the current situation regarding the implementation of ENCORE was felt necessary to provide direction to the Ministry of Education in developing formal implementation strategies for the programme. A questionnaire was developed to gather pertinent information which would aid in developing those strategies.

3.2 Rationale for Using a Questionnaire Design

The literature documents advantages and disadvantages of using questionnaires to gather data for examination. Charach (1975, p. 13) states that:

> . . . the prime advantage of mail questionnaires is that they permit a wide coverage at minimal expense. This advantage is particularly useful for reaching people scattered over a large geographic area or who may be difficult to locate for a personal interview. This greater coverage may result in greater validity through a larger and more representative sample.

The question of geography is particularly relevant in this study.

The following are three main disadvantages of a questionnaire. First, a low response rate suggests that initiating follow-up procedures may be necessary. A follow-up procedure will usually increase the response rate by approximately 10%. However, it can be demonstrated that the additional 10%

is not significantly different from the original respondent population. Since the accessible population was approximately 250 individuals, and since no difference between the original returns population and the follow-up returns population was anticipated, results of data analysis would not have been affected. Therefore follow-up procedures on unreturned questionnaires in this study were not considered necessary.

Second, question interpretation and answer distortion can vary widely. Crowther (1972) was able to demonstrate the valid use of a questionnaire that measured the extent of implementation, which the present questionnaire also attempted to do. The stages used for instrument validation revealed no problem of misinterpretation or distortion in the questionnaire in this study of implementation.

Third, it is thought that the longer the questionnaire - the lower the response rates will be (Wallace, 1954). Though evidence suggests that this might not be a primary concern (Eckland, 1969), the questionnaire used in this study could be considered short.

To enhance response rates in this study communication with the accessible population included:

- *personally signed covering letter
- stamped self-addressed return envelope
- *a promise of confidentiality
- *short questionnaire length (four pages of questions)
- *incentive - results were promised to those wishing them

* can be found in Appendix D

3.3 Target Population

The target population in this study can be described as all practising teachers in British Columbia. This population base is particularly broad since the ENCORE programme has been developed in such a way that its use could apply to all subjects and all grades. The programme is perhaps most suited for use at the intermediate grades.

3.4 Accessible Population

3.4.1 Definition. The accessible population for the purpose of the study was defined as follows:

Practising teachers in B.C. schools who might have:

(a) participated in the introductory workshop about the ENCORE programme,

(b) purchased an ENCORE kit.

3.4.2 Selection. Individuals in the accessible population were identified from two lists, each supplied by the Ministry of Environment. The Ministry of Environment developed the programme and has been giving workshops and/or selling the programmes since 1975. List I included those teachers who had attended ENCORE workshops. List II included those teachers who had purchased ENCORE kits since 1981. The total accessible population was approximately 250 invidviduals.

3.5 Descriptive Survey Instrument

3.5.1 Intent. The survey was developed to articulate ENCORE's present implementation status. Questions were designed to reflect the developer's outline as stated or implied in the teachers' guide book for ENCORE (see Appendix H). Questions were also included to gather demographic information about the users of ENCORE. The information gathered from answers to the

questions, when analyzed, created a profile of the users of ENCORE, isolated the aspects of ENCORE being used at present, delineated the extent to which the programme was being used and established relationships among the above.

3.5.2 Format. The questionnaire was designed to enable ease of response by teachers yet elicit detailed information in order to achieve an accurate account of the implementation of ENCORE in the classroom. Questionnaire items clustered into three sections. Section I included items which provided demographic information about the users. This section was placed first because it would ease the respondents into the process of answering a questionnaire. Section II contained questions about the use of ENCORE. Section III included questions regarding the extent to which the programme was being used. Answers to all questions fit a closed response structure.

3.5.3 Content. Restated, the three sections of questions included demographic details about respondents, uses of ENCORE and extent of ENCORE use by respondents.

Demographic details sought were:

- years teaching experience
- grade levels taught prior to September 1982
- grades presently teaching
- years experience at present grade level
- preferred subjects
- degree(s) held
- source(s) of information about ENCORE
- availability of ENCORE programme in school.

The second set of questions deduced information about the ways in which teachers had used the programme. This set of questions contained four subsets: content, materials, teaching strategy, and time. The nature of the questions in each subset was indicative of a specific dimension of ENCORE. A summative description of dimensions, which Leithwood (1981) discussed can be found in Appendix F.

The third set of questions isolated the extent to which the respondent was implementing ENCORE. Each of the four questions in this set implied a different and distinct level of use of the programme by the respondents. The levels of use for each of the four questions is compatible with those in Hall et al.'s model of "Levels of Use" (1975).

3.6 Stages Of Instrument Verification

The verification of the questionnaire involved three stages which determined format validity, construct validity, and integrity of responses. Modifications occurring at stage two or three necessitated reaffirmation of validity at any of the preceding stages.

3.6.1 Format Validity. Stage one determined whether the form of the instrument was logical and understandable such that anyone could complete the questionnaire. The format was examined for ease of transcription of data to a computor programme. A panel of four measurement experts scrutinized the instrument. Changes in format were made subsequent to their comments.

3.6.2 Construct Validity. Stage two was to establish the validity of the instrument construct. A sample of convenience included five teachers who were familiar with the ENCORE programme. The researcher had no reason to believe that this sample was significantly different from the accessible

population. The five teachers completed the instrument at different times. Several questions included in the questionnaire deliberately but subtly misrepresented the encore programme. After completing the questionnaire the five teachers were asked if any part(s) of the instrument did not accurately reflect the encore programme. Comments to that effect were recorded in writing. Once all of the sample population had completed the instrument the written comments were considered and a decision about possible changes in questions was made. Changes in the construct of the questionnaire were further accepted by the panel of measurement experts.

3.6.3 Integrity of Responses. Stage three established the extent to which teachers' written responses on the questionnaire matched their verbal comments about their use of the programme. Again, a sample of convenience included another five teachers who had used the programme. There remained no reason to believe that the sample group would differ significantly from the accessible population. The researcher gave the questionnaire separately to each of the five teachers. Before each was to complete the questionnaire an interview was conducted by the researcher. The interviews followed an interview schedule (see Appendix I) which contained questions parallel to a selection of those in the questionnaire.

Answers to the oral questions were recorded on the interview schedule and cross-checked with written responses. The comparison of written and oral responses revealed that teachers' responses were consistent.

The process of instrument verification through a cycle of stages one to three ensured that the questionnaire would elicit accurate responses from the

accessible population regarding the use and the extent of implementation of the ENCORE programme.

3.7 Questionnaire Distribution

The questionnaire packages (481) were initially mailed on May 10, 1983 with a requested return date of May 27. A major difficulty arose when it was discovered that the Ministry of Environment had supplied an incorrect list of names. The second and correct list from the Ministry of Environment enabled a cross-check on the initial list. This cross-check plus additional new names amounted to a valid distribution of 254 questionnaires which constituted the accessibility population. The second mailing requested a return of the questionnaires by June 17. The last of the returns was received July 6.

3.8 Questionnaire Return Rate

The return rate of the questionnaires was low (22%). However, it was sufficient to apply a statistical analysis and justify a cautious generalization about the accessible population. There are several plausible reasons for a 22% return rate. First, the general morale of teachers throughout the province in the spring of 1983 was considered to be low because of recent significant financial cutbacks in education. These cutbacks were accompanied by heavily contested political issues about education through the fall and winter of 1982/1983. There existed a general mood of non-cooperation of teachers, encouraged by the B.C. Teachers' Federation. Because of the existing climate in education teachers might not have been inclined to respond to the questionnaire.

Second, the final mailing of the questionnaire was not possible until June 7. This delay was a result of the problems arising from the incorrect mailing list received from the Ministry of Environment. The month of June is a time when teachers are focusing upon completing the school year curriculum and formulating final evaluations of students. It is possible that teachers considered the above to be higher priority and simply could not find the opportunity to complete the questionnaire.

Third, there is no definite way of knowing how many of the questionnaires mailed actually reached the intended people. There were 5% of the questionnaires returned indicating that the addressees had moved. Some questionnaires, each bearing an individual's name, went to school addresses and might not have been passed on to the teacher in the school or to that particular teacher if he/she changed schools.

Considering the possible effect of the three plausible reasons stated above about the return of the questionnaires, the 22% return rate appears to be a very satisfactory result.

3.9 Analysis of Data

The data analysis was conducted with nonparametric statistics. For the data from Section 2 of the questionnaire the analysis involved generating percentage and rank order tables. Rank order of aspects of ENCORE dimensions was established after weighting the responses to questions about each aspect. The dimensions considered were: teaching strategies, materials characteristics, teaching content, and time allotment. Cross-tabulations were created to establish relationships between and among the responses to individual questions and between and among groups of questions. Spearman Rho correla-

tion coefficients were calculated to clarify relationships between subgroups with respect to rank order of the aspects of each dimension mentioned above. Chi square values were calculated to approximate the exact probability of sample proportions in the data from the summary section of the questionnaire. Chi square values were calculated at X =.05. These values served to indicate whether a significant number of teachers as a whole and in each subgroup were modifying any of the dimensions of the ENCORE programme. The null hypothesis was stated: H. there would be no teachers modifying the dimension "X" where X is a dimension of the ENCORE programme.

Example of Chi Square Calculation: (from Table 4.3.3)

1. The expected number (E) of those not modifying the content was 44.
2. There were 64% modifying the content.
3. The actual number (Y) not modifying the materials was
   (100% - 64%) x 44 = 16
4. The Chi square value is $\frac{(Y - E)^2}{E} = \frac{(16 - 44)^2}{44} = 17.8$
5. If X^2 (1)(.05) = 3.84 and X^2 = 17.8 as calculated, then the hypothesis is rejected. Therefore at least one respondent <u>is</u> modifying the content of the ENCORE programme.

CHAPTER 4

DATA SUMMARY AND ANALYSIS

4.1 Introduction

The information contained in Chapter 4 includes a summary and analysis of the data which were accumulated from the ENCORE survey instrument. There are four sections in this chapter.

Section 1 summarizes the demographic data and isolates subgroups of respondents which emerge from the analysis of the data.

Section 2 relates to Specific Problem #1 and includes the summary of the data under the headings of content, materials/characteristics, time allotment, and teaching strategies. An analysis of the data reveals patterns of use of ENCORE. Patterns of use are linked to subgroups of respondents noted in section 1.

Section 3 relates to Specific Problem #2 and includes a summary of data from the survey entitled 'Summary'. A chi square analysis is used to determine the significance of the findings in this section related to modifications of the ENCORE programme.

Section 4 is a compendium of the findings in the chapter in the form of whole group and sub-group profiles of use.

4.2 Section 1 Demographic Data

Question 1, which asked teachers to indicate their gender, shows that 66% of respondents are male and 34% are female. These results are dissimilar to the results of the British Columbia Science Assessment (BCSA, 1982) where 38% of the teachers were male and 62% were female. One cause for the significant-

ly larger number of males in this study could be related to the nature of the ENCORE programme. The programme suggests that many activities take place out-of-doors. It is the author's experience that female teachers are not always as comfortable with the idea of going out-of-doors with students as males tend to be. This reluctance coupled with the fact that ENCORE is considered a science programme (Elementary Science Guide, 1981) and male teachers are used as science specialists to a greater extent than females (BCSA p. 147) might further explain the results.

In question 2 teachers were asked to indicate the number of years teaching they had prior to September, 1982. Table 4.2.1 contains the response frequency and percentages.

Only 5% of the respondents have not yet taught one full year. Almost half (41%) of the total respondents had more than 10 years of experience. It is possible that teachers with more than 10 years of experience find the ENCORE programme more suited to their classroom needs than do teachers with less experience.

Table 4.2.1 Number of Years of Teaching Prior to September 1982

Years Experience

	0	1-4	5-7	8-10	10+	Total
f	2	7	9	8	18	N=44
%	5	16	20	18	41	100

Years of experience in this sample population resembles that of the BCSA sample population. Table 4.2.1 shows this comparison.

Table 4.2.2 ENCORE Respondents/BCSA Respondents Comparison of Number of Years of Teaching Experience (percentages)

Sample Names	* 1-4	* 5-10	10+	Total
ENCORE	21	38	41	100
BCSA	24	26	49	100

* Because the categories were slightly dissimilar between the ENCORE Survey and the BCSA Survey, it is expected that the percentage of ENCORE users would be higher for category 1-4 and lower for category 5-10.

The comparison in Table 4.2.2 is of particular interest because it suggests that, while the number of respondents (N=44) was small in this study, the respondent population for the ENCORE survey was of the same general nature (in terms of years experience) as that of the BCSA respondent population.

Question 3 sought to establish at what grade level teachers had received experience prior to September 1982. Seventy-five percent or more respondents had received most of their past teaching experience at the intermediate grade levels (4-7). Of those respondents 43% had taught grades K-3, 75% had taught grades 4-5, 81% had taught grades 6-7, and 30% had taught at the secondary level.

Question 4 requested teachers to identify the grade level they were presently teaching. Frequency tabulations show that 23% were teaching in grades K-3 inclusive. There were 45% teaching in one of grades 4-5, and 55% were teaching one of grades 6-7. Only 16% were teaching at the secondary level.

The results indicate that the majority of teachers surveyed were practising at the intermediate level. This finding is consistent with respondents past grade level experience. The developer's intention that ENCORE be used primarily at the intermediate grade level seems to have been realized.

Question 5 attempted to determine the teaching experience of ENCORE users at their present grade level. Most respondents (36%), as Table 4.2.3 indicates, had taught five or more years at their present grade level. There were 25% who had taught 4-5 years, and 32% who had taught 2-3 years at their present grade level. Only 7% had taught but 1 year at their present grade level. Since the results show a fairly even spread, the number of years of experience for teachers at their present grade level is likely not a factor in the use of ENCORE.

Question 6 requested information about the educational background of teachers who use ENCORE. The results are recorded in Table 4.2.4. About 41% had received their Bachelor of Education-Elementary degree. There were 19% who had received a Masters of Education degree. Nine percent had no degree and 11% had a Bachelor of Science degree.

Question 7 asked teachers to identify their preferred subject for teaching. Most respondents (57%) chose science as a preferred teaching subject while 23% chose language arts. About 20% indicated mathematics was a preferred teaching subject but only 7% preferred social studies. The high percentage of respondents preferring to teach science is noted. Since the Ministry of Education considers ENCORE to be an optional part of the Elementary Science Materials Based Programme the connection between science as a preferred teaching subject and the use of ENCORE seems logical.

Table 4.2.3 Years of Teaching at Present Grade Level

	0-1	2-3	4-5	5+	Total
f	3	14	11	16	N=44
%	7	32	25	36	100

Table 4.2.4 Educational Background of Respondents

Highest Degree Held	number	%
no degree	4	9
Bachelor of Education - Elementary	19	43
Bachelor of Education - Secondary	1	2
Bachelor of Science	5	11
Bachelor of Physical Education	2	5
Bachelor of Arts	2	5
Bachelor of Recreation	1	2
Master of Education	8	19
Master of Arts	1	2
Master of Science	1	2
	N=44	100

Table 4.2.5 Preferred Subject for Teaching

Subject	f	%
Science	25	57
Language arts	10	23
Mathematics	9	20
Social studies	3	7
Integration of subjects	3	7
Physical education	2	5
Learning assistance	2	5
Environmental education	1	2
Art	1	2
Outdoor education	1	2
Total	57*	130*

* Columns sum to > N=44 and > 100% due to multiple responses.

It is interesting to note that only 7% of the respondents added that they used the integrated method. Fifty percent of the respondents had attended an ENCORE workshop (which encourages an interdisciplinary approach to teaching). However, there was no provision made on the survey to respond to a category entitled integrated method' therefore it cannot be concluded that there are no other teachers using the integrated method. It might be that teachers simply do not agree with this method or that in the teaching situation of the classroom it is difficult to use ENCORE that way.

Question 8 attempted to determine where ENCORE users obtained information about the programme. Information source of colleagues and workshops were used by 52% and 50% of the respondents respectively. The Elementary Science Guide (1981) was a source of information in 18% of the responses. Other sources of information about the programme included the: Ministry of Environment, the Fish & Wildlife Branch, the Canadian Forestry Association, the B.C. Science Teachers' Journal, District Curriculum Centre, Library, U.B.C., and a Recreation Student.

Table 4.2.6 Sources of Information about ENCORE

Information Sources	f	%
Colleague	23	52
ENCORE workshop	22	50
Elementary Science Guide	9	20
Other (which teachers added)	10	23
Total	64*	145*

*Columns sum to >N=44 and >100% due to multiple response.

The percentage of respondents using colleagues as a source of information about ENCORE is not surprising in light of comments by Loucks and Pratt (1979) and by Leithwood and Russell (1973). Both indicated that personal contact with someone who had new ideas such as another teacher enhanced the probability that a given teacher may change his/her ideas and perhaps use a different or new progamme (e.g. ENCORE).

The high percentage of respondents (50%) indicating the workshop as a source of information might also be explainable. Workshops about ENCORE were the formal link between the Ministry of Environment and teachers prior to September, 1982. Most of the people contacted through the list of names from the Ministry of Environment were aware of ENCORE prior to that date.

The 20% who used the Elementary Science Guide as a source of information about ENCORE might be an indication of the extent to which the guide is being used. Results in the BCSA (1982, p. 180) substantiate this finding.

Question 9 asked teachers to indicate whether their school had the ENCORE materials. The materials were present in the schools of 66% of the respondents. About 3% did not have the materials. Thirty-one percent of the respondents did not complete the question. The Ministry of Environment apparently sent the ENCORE materials to every elementary school in British Columbia in the spring of 1982. It is not determinable whether or not this distribution accounts for the high percentage (66%) reporting the presence of the materials in their school.

In summary the most common characteristics of ENCORE users emerging from the data in Section 1 are that they:

(a) are male;

(b) teach intermediate grade levels;

(c) have more than 10+ years experience;

(d) possess a Bachelor of Education - Elementary

(e) have learned about ENCORE through a colleague or ENCORE workshop,

From the demographic data subgroups of ENCORE users were isolated to enable comparisons among the subgroups in the way that ENCORE is presently being used and in the extent to which the programme is presently being used. The following subgroups will be considered in Sections 2 and 3 of Chapter 4.

The male/female comparison of ENCORE users was selected because a higher proportion of males responded to the ENCORE survey than the actual proportion of males known to be teaching at the elementary school level. It was also thought that the length of teaching experience could affect the way in which teachers implement curriculum. Therefore, a comparison among respondents with varying lengths of teaching experience was initiated. In addition, ENCORE is part of the elementary school science programme in British Columbia but it is considered to be interdisciplinary in nature by the developers. Because of this comparison between science/non-science oriented respondents who use ENCORE was performed.

Table 4.2.7 Subgroups of Respondents Selected for Comparison

Comparison 1 Gender	Comparison 2 Teaching Experience	Comparison 3 Preferred Subject
male	0-4 years	science
female	5-10 years	
	10+ years	non science

4.3 Section 2 Ways in Which the ENCORE Programme is Used

Section 2 is a summary and analysis of the data towards a solution to Specific Problem #1. The question to be considered as stated in Chapter 1 and restated here for the convenience of the reader is: What aspects of each dimension of the ENCORE programme are teachers presently using?

The four dimensions of ENCORE which are explored within the context of the problem are: content, materials, time allotment, and teaching strategies.

4.3.1 Dimension #1 Content. Table 4.3.1 details the responses about the content of ENCORE which respondents are presently using. The percentage is recorded of respondents using various aspects of the content either never, sometimes, often or always. Table 4.3.1 shows that all aspects of the ENCORE progamme are used. Most of the programme is used 'sometimes' or 'often'.

In order to determine which aspects of the content of ENCORE receive greater preference the raw scores were weighted and rank ordered. The weighting of response was as follows: 3 for each response under 'always', 2 for each response under 'often', 1 for each response under 'sometimes', and 0 for each response under 'never'. Non responses were considered to be in the 'never' category.

Table 4.3.1 also shows the aspects of the content in order of preference. Respondents most preferred to use the content aspect concerned with plants. The content of ENCORE dealing with relationships among living things and relationships among living and nonliving things is also much preferred. The large number of activity cards concerned with these three aspects seems to explain this finding. The content aspects about concepts such as weather, water cycles etc. are preferred much less.

Table 4.3.1 Respondents Use of Various Aspects of the ENCORE Programme Content (%)

Content Aspect	A never 0		B sometimes 1-2		C often 3-5		D always 6+		Total B,C,D		Weighted Use	Rank Order
	#	%	#	%	#	%	#	%	#	%		
1. Animals	19	20	25	57	8	18	1	2	34	77	45	6
2. Plants	10	22	14	32	14	32	7	16	35	80	65	1
3. Environmental elements and forces	12	27	16	36	12	27	4	9	32	72	52	5
4. Relationships among living things	11	25	10	32	15	34	8	18	32	74	64	2
5. Relationships between living and non-living	14	32	12	27	12	27	15	34	39	88	54	3
6. Differences between specific natural environments (e.g. forest, marine)	15	34	13	30	8	18	8	18	32	66	53	4
7. Concepts such as change, weather, water cycle, micro-climates, example _____	18	41	15	34	10	23	1	2	32	59	38	7
8. Waste management in natural environments	27	61	9	20	7	16	1	2	21	38	26	8
9. Other (specify _____)	41	93	0	0	1	2	1	2	3	4	5	9

Table 4.3.2 shows the subgroup comparisons of ENCORE content between male/female. Male respondents used more of the ENCORE content than female respondents. A comparison between male and female respondents indicates there is no significant difference between the groups in the order of preference for specific aspects of the content as shown by the Spearman Rho correlation coefficients. Content aspects about concepts such as weather, water cycles, etc. and about waste management were least preferred by males and by females.

A comparison of the use of ENCORE content aspects among respondents with varying lengths of teaching experience is outlined in Table 4.3.4. There is no significant difference in the rank order of preferred content aspects of ENCORE between respondents in group A and group B. Both groups preferred using the plant aspect of the content more than using the content for teaching concepts such as water cycle, and micro-climate.

There is also no significant difference in the order of preferred aspects of the content between group B and group C. However, it seems that the minor difference between group A and B and the minor differences between group B and C translate into a significant difference between group A and C. Group C preferred the content aspects of 'relationship among living things'. Although the same percentage of groups A & C used the aspect of relationships between living and non-living, group C used it less often.

Table 4.3.4 shows science/non science oriented respondent subgroups. The comparison between science and non science oriented respondents in their use of ENCORE content indicates that both groups used all aspects of the content. There is a significant agreement in the order of their preference of aspects of the content. Differences are, however, observed.

Table 4.3.2 Male/Female Respondents' Preference of Aspects of ENCORE Content

Aspect of Content	% using		weighted use		order of preference	
	male	female	male	female	male	female
1. Animals	93	63	32	13	6	6
2. Plants	93	75	46	19	1	2
3. Environmental elements and forces	82	69	34	18	5	3.5
4. Relationships among living things	89	69	44	20	2	1
5. Relationships between living and non-living	75	63	36	18	4	3.5
6. Differences between specific natural environments (e.g. forest, marine)	82	56	36	17	3	5
7. Concepts such as change, weather, water cycle, micro-climates, example _____	71	56	26	12	7	7.5
8. Waste management in natural environments	46	63	14	12	8	7.5
9. Other (specify _____)	7	0	4	1	9	9

* .93

* Spearman Rho coefficient = .93 > .70 at P= .025.

Table 4.3.3 A Comparison of Respondents' Preferences of Content Aspects With Respondents Grouped According to Length of Teaching Experience

Aspect of Content	% using aspect			weighted use			order of preference		
	Group A 0-4	Group B 5-10	Group C 10+	Group A 0-4	Group B 5-10	Group C 10+	Group A 0-4	Group B 5-10	Group C 10+
1. Animals	66	78	83	6	18	21	6	6.5	3
2. Plants	78	94	78	13	30	22	1	1	2
3. Environmental elements and forces	66	78	78	9	22	21	5	5	4
4. Relationships among living things	55	83	83	10	28	26	4	2.5	1
5. Relationships between living and non-living	66	56	67	11	23	20	2	4	6.5
6. Differences between specific natural environments (e.g. forest, marine)	44	83	72	11	24	18	3	2.5	7
7. Concepts such as change, weather, water cycle, micro-climates, example _____	44	61	72	6	12	20	7	6.5	5.5
8. Waste management in natural environments	55	39	44	5	8	13	8	8	8
9. Other (specify _____)	10	6	6	1	1	3	9	9	9

Science oriented respondents peferred the content aspects of plants and relationships among living things. Non science oriented respondents preferred the content aspects of relationships between living and non-living things and differences between specific environments. Neither group preferred to use the aspects of the content to teach concepts such as weather and water cycles or waste management in natural environments.

4.3.2 Dimension #2 - Characteristics of the Materials. There are 11 prominent characteristics of the ENCORE materials. The characteristics are listed in Table 4.3.5 along with the percentage of respondents who had an opinion about the characteristics which align with one of the five response categories. The extent to which each characteristic of the materials is evident according to the respondents to the programme is established through rank ordering the characteristics. To establish rank order weighting of each characteristic was done as follows: 4 for responses which strongly agreed that the charateristic was evident, 3 for responses which agreed, 2 for an 'I don't know' response, 1 for a disagree response and 0 for a strongly disagree response. The percentage of respondents in each category is included in Table 4.3.5.

The results in Table 4.3.5 demonstrate that the majority of respondents using the ENCORE materials agree that the materials exhibit the characteristics the developer intended them to exhibit. The most outstanding characteristic of the materials, according to the respondents (84%), is that they enable students to explore in the natural environment using their five senses. This finding agrees with responses about teaching strategies where 95% of the teachers liked to use the materials to gain students' interest in the out-of-doors (see Table 4.3.18). Respondents (84%) also felt that the

Table 4.3.4 Science/Non Science Oriented Repondents Preference of Aspects of ENCORE Content

Aspects of ENCORE Content	% using content aspect		weighted use		rank order of preference	
	science	non science	science	non science	science	non science
1. Animals	89	67	31	15	5	6
2. Plants	89	78	44	23	1	4
3. Environmental elements and forces	81	67	35	17	4	5
4. Relationships among living things	81	78	41	24	2	3
5. Relationships between living and non-living	78	94	36	30	3	1
6. Differences between specific natural environments (e.g. forest, marine)	74	78	31	25	6	2
7. Concepts such as change, weather, water cycle, micro-climates, example _____	74	50	27	12	7	7
8. Waste management in natural environments	48	39	19	11	8	8
9. Other (specify _____)	4	11	3	3	9	9

*.73

* Spearman Rho coefficient = .73 > .70 at P= .025.

Table 4.3.5 Opinions of Respondents about Whether Encore Materials Exhibit Certain Characteristics

Characteristics of Materials	Opinion Categories (Percentages)					Agreement With Programme	Weighted Agreement	Rank Order
	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree			
*1. enables the student to explore in the natural environment	48	36	9	2	5	84	185	1
2. requires a minimum of equipment for field trips	30	50	8	5	7	80	172	4
*3. uses language and concepts at appropriate student levels	9	68	7	9	7	77	160	11
*4. have activities which are difficult to expand into larger studies	20	57	7	11	5	77	166	8
5. encourages students to use their five senses	36	54	0	5	5	90	174	3
6. suggests that students express (e.g. poetry, songs, graphs, etc.) what they have learned	9	59	28	2	2	68	163	10
*7. are useable in my preferred subject (specify) _____	25	52	13	5	5	77	171	6
*8. does form a programme easily adopted to the core curriculum	25	52	14	7	2	77	172	5
*9. does include cards which can stand on their own as individual studies (e.g. leaves)	27	57	9	0	7	84	175	2
*10. has most cards which can be combined with others to develop part or all of a unit	16	159	21	2	2	77	169	7
11. has the majority of cards outlined with three major components - before, during and after field trip activities	20	45	26	7	2	65	165	9

* Note that questions 1, 3, 4, 7, 8, 9 and 10 were phrased in the negative on the questionnaire therefore the response pattern would have been reversed (see Appendix 3). Information has been rearranged above for ease of interpretation.

materials included cards which could stand on their own as individual studies. Only 65% of the respondents indicated that the ENCORE activity cards were outlined in the three components (before, during and after field trips).

Male/Female Subgroups comparisons indicate that the majority of male and female respondents were of the opinion that the ENCORE materials exhibited the characteristics that were intended by the developer. Both groups agreed that the materials very much enabled the student to explore in the natural environment. Male respondents (96%) more than female respondents (69%) were of the opinion that the activities required a minimum of equipment for field trips. The rank order difference between males and females for this component was 6 out of a possible 11. Because the majority of respondents were male and preferred science they might simply have found the task of gathering equipment easier. Both groups agreed that the materials were applicable in their preferred subject. Since ENCORE is considered a science programme and the majority of respondents have science as a preferred subject, this finding is not surprising.

Among the three groups (0-4, 5-10, 10+ years experience) there was agreement that the ENCORE materials manifest the characteristics intended by the developer. Eighty-seven percent agreed that the materials enable students to explore in the natural environment while taking a minimum of equipment on the field trip.

Group A (45%) found the materials not useable in their preferred subject and not easily adapted to the core curriculum. Approximately 11% of each group, B & C, felt this way. The difference of opinion may be related to additional teaching experience of groups B & C.

Group B had a higher percentage of agreement with every characteristic of the materials. It might be that these respondents have a reasonable length of teaching experience and that they are more able to accommodate various programmes (i.e. ENCORE) into their practice.

Science and non science oriented respondents were in agreement that the programme materials exhibited the characteristics as intended by the developer.

The characteristic of the materials which enable students to explore in the natural environment was ranked first by both groups.

Science oriented respondents (93%) agreed that the activities require a minimum of equipment for field trips (ranked 2 out of 11) and that the activities are useable in their preferred subject (ranked 3). Non science oriented respondents ranked these characteristics 8th and 9th respectively out of 11. This difference may be attributed to the fact that ENCORE is considered to be a science programme and science oriented teachers are likely more used to gathering appropriate materials.

4.3.3 Dimension #3 Time Allotment. Teachers were asked to describe the amount of time involved in the use of the ENCORE programme with respect to teacher preparation time, student time on task for individual cards and total time spent by a class during the month when ENCORE was most actively used.

The average preparation time spent by 66% of the respondents before using the activity card with students was less than 30 minutes. Of those respondents 36% had preparation time of less than 15 minutes. Only 5% of the respondents spent longer than one hour in preparation (see Table 4.3.6).

When students were using an activity card their average time spent on task was 2 hours or less for 72% of the students. About 36% spent less than

one hour and 36% spent 1-2 hours (see Table 4.3.8). The amount of time generally spent on an activity card was less than that intended by the developer.

Respondents indicated that the approximate time spent by their class in the month of most active use of ENCORE varied from less than 2 hours to more than 6 hours. More than six hours of use in the month of most active use of ENCORE occurred for 30% of the respondents, 3-6 hours of use occurred for 24% of the respondents, 2-3 hours of use occurred for only 14% of the respondents, and 0-2 hours of use occurred for 32% of the respondents. The wide range of time spent in the month when ENCORE was most actively used suggests that some teachers were using only one activity card in that month while others might have been using several cards in concert.

By referring to Table 4.3.8 it can be surmised that those respondents using one card only were doing such things as introducing or reinforcing a concept, or had students involved in individual projects. Those respondents using several cards might have been using the cards in ways such as to teach a unit or teach about a specific topic.

The fact that 72% of the students were reported as using the activity cards for less than two hours suggests that many teachers might not have had their students completing the entire card. Perhaps teachers are frequently using the middle section of the cards (which requires students to go outside). This scenario seems likely given the findings in Table 4.3.8 which show that teachers feel that using the outdoors to stimulate the interest of students in lessons is a high priority.

There were 73% of the respondents who indicated that they spend less than 30 minutes in preparing to use an ENCORE card. Thus possible assumptions may

Table 4.3.6 Average Preparation Time Spent By Respondents Before Using An Activity Card

Time/Minutes	%
0-15	40
15-30	33
30-60	25
60+	2

Table 4.3.7 Average Time Spent By Students Of Respondents When Using An Activity Card

Time/Minutes	%
0-1	36
1-2	36
2-3	17
3+	11

Table 4.3.8 Average Time Spent Using ENCORE By Respondents During The Month of Most Active Use

Time/Minutes	%
0-2	32
2-3	14
3-6	24
6+	30

be made about the general amount of preparation time. First, the cards fit easily into the curriculum and second, they are simply easy to pull out and use as an interesting one shot exercise.

Judging by the response to question #5 in Table 4.3.5 the cards do fit easily into the core curriculum. The data contain no information with which to evaluate the correctness of the second assumption although elementary teachers in the BCSA (1982) implied that programmes requiring less preparation were preferred.

Male/Female Subgroups: Male and female respondents were similar in the average amount of preparation time spent before using an ENCORE card. Male respondents (72%) spent less than 30 minutes in preparation while 80% of the females spent the same amount of preparation time.

There were 20% more male respondents than female respondents who spent 1-2 hours using individual cards.

Generally the amount of time spent by both groups is less than that intended by the developer who suggested approximately three hours to use a complete card.

Experience (0-4, 5-10, 10+ years) Subgroups: Table 4.3.13 indicates that group A (0-4 years experience) had 21-30% more respondents than each of the other 2 groups who were spending 30-60 minutes in preparation time. Possibly teachers with less experience require more preparation prior to using each ENCORE card.

In Table 4.3.13 it appears that group A also spends more time using the activity cards. Approximately 33% of the repondents in group A have their students spend 3+ hours using the cards. As was mentioned earlier these respondents might have students use a complete card rather than parts of a card.

Table 4.3.9 Average Preparation Time By Male/Female Respondents Before Using an Activity Card

Time/Minutes	% of Teachers	
	male	female
0-15	43	31
15-30	29	50
30-60	25	19
60+	4	0

Table 4.3.10 Average Time Spent By A Student of a Male/Female Respondents When Using an Activity Card

Time/Minutes	% of Teachers	
	male	female
0-1	39	50
1-2	39	21
2-3	11	9
3+	11	21

Table 4.3.11 Average Time Spent By Classes of Male/Female Respondents Using ENCORE During The Month of Most Active Use

Time/Minutes	% of Teachers	
	male	female
0-2	33	23
2-3	15	15
3-6	26	31
6+	26	31

Respondents in group B spent less time using the ENCORE programme than the other 2 groups (see Table 4.3.14).

Of the respondents with 0-4 years experience there does not seem to be agreement between the student time spent using an activity card and the amount of time spent during the month of most active use of ENCORE.

Science/Non science Oriented Subgroups: Science oriented respondents spent more time in preparation but less time using individual cards and using the programme during the month of most active use of ENCORE.

There were 32% of the science oriented respondents spending 30+ minutes in preparation compared with 12% of the non-science oriented respondents (see Table 4.3.15).

About 92% of the science oriented respondents used each card for from 0-2 hours whereas only 56% of non-science oriented respondents did. However, 44% of non-science oriented respondents used each card for 2 or more hours in contrast to the 8% of science oriented respondents (see Table 4.3.16).

There were 28% more science oriented respondents than non-science oriented respondents who used the programme for 3+ hours during the month of its most active use (see Table 4.3.17). Possibly the more time spent by science respondents in preparation plus their preference for science as a subject made the activities easier to put into practise and therefore requires less time to use.

4.3.4 Dimension #4 - Teaching Strategies. Teachers were asked to indicate what strategy(s) they employed when using the ENCORE programme. Teachers were to respond to 19 different statements which reflected the way in which the developer intended the progamme to be used.

Table 4.3.12 Average Preparation Time Spent By Respondents With Varying Lengths Of Teaching Experience Before Using an Activity Card

Time/Minutes	% of Teachers		
	Group A 0-4	Group B 5-10	Group C 10+
0-15	14	39	50
15-30	43	50	27
30-60	43	11	22
60+	0	0	11

Table 4.3.13 Average Time Spent By Students Of Respondents With Varying Lengths of Teaching Experience When Using an Activity Card

Time/Minutes	% of Teachers		
	Group A 0-4	Group B 5-10	Group C 10+
0-1	17	50	44
1-2	50	22	44
2-3	0	11	6
3+	33	17	6

Table 4.3.14 Average Time Spent Using ENCORE By Students Of Respondents With Varying Lengths Of Teaching Experience During the Month of Most Active Use

Time/Minutes	% of Teachers		
	Group A 0-4	Group B 5-10	Group C 10+
0-2	50	22	35
2-3	0	6	24
3-6	17	33	17
6+	33	28	22

Columns not = 100% are due to rounding off effects.

Table 4.3.15 Average Preparation Time Spent By Science/Non Science Oriented Respondents Before Using an Activity Card

Time/Minutes	%	
	science	non science
0-15	42	32
15-30	26	56
30-60	26	6
60+	6	6

Table 4.3.16 Average Time Spent By Students Of Science/Non Science Oriented Respondents When Using an Activity Card

Time/Minutes	%	
	science	non science
0-1	46	38
1-2	46	18
2-3	0	18
3+	8	26

Table 4.3.17 Average Time Spent Using ENCORE By Students Of Science /Non Science Oriented Respondents During the Month of Most Active Use

Time/Minutes	%	
	science	non science
0-2	40	21
2-3	16	7
3-6	32	14
6+	12	58

Teachers were to clarify the amount of times they used a particular strategy: never, sometimes, often, or always. The statements were then rank ordered by weighting the responses to each of the 19 statements. Responses were weighted using a 0, 1, 2, 3 rating for each response in the above categories. The percentage of respondents using a particular strategy is included in Table 4.3.18.

Table 4.3.18 shows that teachers most prefer to use the programme to gain student interest in lessons by going outdoors and exploring using their five senses.

Programmes which stimulated students' interest also received high preference in the BCSA (1982, p. 184). In the BCSA (p. 169), teachers indicated
that they wanted the opportunity for more field trips and, in addition, they wanted a programme supplement to their own which was of a hands-on investigative nature. The similarity between the findings in the two studies is interesting.

The lessons seem to be science oriented centred around developing students own appreciation of patterns and organization in the natural environment.

Teachers least preferred to use ENCORE to teach a complete unit or to use the programme to supplement studies in mathematics and social studies.

It is interesting to note that teachers considered the fact that ENCORE was an activity oriented curriculum to rate it 6th of 19 choices. In the BCSA (1982, p. 169) teachers also rated activity centred learning and discovery learning high.

Table 4.3.18 Teaching Strategy Preferences of Respondents When Using ENCORE

Strategy	percentage using	weighted use	rank order
1. introduce a concept	63	35	14
2. reinforce a concept	61	45	13
3. teach about a specific topic (e.g. plants, animals)	95	67	3
4. teach a complete unit	30	15	18
5. use activity-oriented curriculum	92	58	8.5
6. use an individual student projects	59	48	12
7. teach in specific school subjects			
Language Arts	50	27	15
Science	89	64	4
Social Studies	39	16	17
Mathematics	27	17	16
Other (please specify)	10	6	19
8. help students . . .			
- ask questions such as what, where, when, why, about the natural environment	91	59	7
- learn to solve problems	74	58	8.5
- communicate their findings in various ways	77	52	11
- gain a direction for frequent exploration of natural environments by presenting stimulating questions	62	55	10
- develop their own appreciation of patterns and organization in the natural environment	83	63	5
- draw their own conclusions about the value of natural environments	84	61	6
- use their five physical senses	95	75	2
- gain an interest in lessons by going out-of-doors	95	80	1

Male/Female Subgroups: There was general agreement of the two groups regarding the teaching strategies suggested for use with the ENCORE programme.

Table 4.3.19 indicates there is a significant degree of agreement between the two groups about the order of preferred teaching strategies. Both groups felt the main strategy for using the programme was to gain students' interest in lessons about a science topic by going out-of-doors and exploring the natural environment by using their five senses.

More than male repondents, female respondents prefer to have students try to develop their own appreciation of patterns and organization in the natural environment.

Males prefer, to a greater extent than females, to involve their students in individual projects.

Experience (0-4, 5-10, 10+ years) Subgroups:

Group A (0-4 years experience), group B (5-10 years experience) and group C (10+ years experience) are using the majority of teaching strategies suggested for use in the programme although group A uses the strategies somewhat less (see Table 4.3.20).

There is no significant difference among the three groups about the order of preference for the various strategies as calculated with the Spearman Rho correlation coefficient. All three groups extensively used the strategy of gaining student interest in lessons by going out-of-doors. The three groups also agreed that using ENCORE in mathematics and socials studies orientation is not often done.

Table 4.3.19 Male/Female Respondent Preferences of Teaching Strategies For Using the ENCORE Programme

Strategy	percentage using strategy		weighted use		order of preference	
	male	female	male	female	male	female
1. introduce a concept	71	56	24	11	14	14
2. reinforce a concept	75	63	29	15	12	13
3. teach about a specific topic (e.g. plants, animals)	86	100	42	25	4	3
4. teach a complete unit	36	19	12	3	16	17
5. use activity-oriented curriculum	100	81	40	18	7	10
6. use an individual student projects	64	63	29	19	13	8.5
7. teach in specific school subjects						
Language Arts	46	50	17	10	14	15
Science	100	94	40	24	6	4
Social Studies	14	13	4	2	18	18
Mathematics	36	25	13	4	15	16
Other (please specify)	14	6	4	2	17	19
8. help students . . .						
- ask questions such as what, where, when, why, about the natural environment	89	94	37	22	9	7
- learn to solve problems	82	88	38	20	8	5.5
- communicate their findings in various ways	82	75	36	19	10	12
- gain a direction for frequent exploration of natural environments by presenting stimulating questions	82	63	36	18	11	8.5
- develop their own appreciation of patterns and organization in the natural environment	89	75	45	17	3	11
- draw their own conclusions about the value of natural environments	86	83	38	23	5	5.5
- use their five physical senses	100	100	48	27	2	2
- gain an interest in lessons by going out-of-doors	100	100	53	27	1	1

*.87

Spearman Rho coefficient .87 > .46 at P= .025

Table 4.3.20 Teaching Strategies Preferred By Respondents Grouped According to Lengths Of Teaching Experience, When Using ENCORE

Teaching Strategy	% Using the Strategy			weighted use			rank order of preferences		
	A 0-4	B 5-10	C 10+	A 0-4	B 5-10	C 10+	A 0-4	B 5-10	C 10+
1. introduce a concept	66	56	78	7	12	16	11	14	14
2. reinforce a concept	22	83	83	3	22	20	14.5	11	11
3. teach about a specific topic (e.g. plants, animals)	100	94	83	10	29	28	8	3	3
4. teach a complete unit	11	17	39	1	6	8	16	16	16
5. use activity-oriented curriculum	77	94	94	11	24	23	7	9	5
6. use an individual student projects	22	78	67	6	23	19	13	10	12
7. teach in specific school subjects									
Language Arts	33	56	50	3	13	11	14.5	13	15
Science	88	94	88	14	26	24	4	6.5	4
Social Studies	0	6	28	0	1	5	17.5	17.5	18
Mathematics	11	39	33	2	8	7	15	15	17
Other (please specify)	0	6	17	0	1	5	17.5	17.5	19
8. help students . . .									
- ask questions such as what, where, when, why, about the natural environment	66	100	89	7	30	22	11	2	8
- learn to solve problems	44	100	83	7	28	23	11	4.5	6
- communicate their findings in various ways	55	83	83	9	21	22	9	12	9
- gain a direction for frequent exploration of natural environments by presenting stimulating questions	77	83	67	12	25	18	6	9.5	13
- develop their own appreciation of patterns and organization in the natural environment	100	89	72	16	26	21	2.5	6.5	10
- draw their own conclusions about the value of natural environments	88	94	78	13	25	23	6	8.5	7
- use their five physical senses	66	100	94	12	28	31	2.5	4.5	1
- gain an interest in lessons by going out-of-doors	100	100	94	17	34	29	1	1	2

Group A more frequently than the other groups, used ENCORE to help students develop an appreciation pattern and organization in the natural environment, as well as to help students gain a direction for frequent exploration.

Group B was more inclined to use ENCORE to help students ask questions such as what, where, when, why about particular topics such as plants in the natural environment. These same respondents were less inclined to use ENCORE in a science oriented way.

Groups B and C more than Group A, preferred to teach about a specific topic of study to help students use their five senses when exploring and learn to solve problems.

Science/Non Science Oriented Respondent Subgroups:

Approximately 60-70% of the teachers use the teaching strategies suggested or implied by the developer (see Table 4.3.21). There was a significant agreement between the groups in the extent to which they used each of the strategies.

Both groups preferred to use the programme to gain an interest of students in lessons by going out-of-doors and exploring the natural environment using the five senses.

The science oriented respondents preferred to use the programme to focus upon a particular science topic (i.e. plants) while non-science oriented respondents preferred to use the programme to help children solve problems by asking questions such as what, where, why, when about the natural environment.

Table 4.3.21 Science/Non-Science Oriented Respondents' Preferences of Teaching Strategies When Using the ENCORE Programme

Teaching Strategy	% Using Strategy		weighted use		order preference	
	Science	Non Science	Science	Non Science	Science	Non Science
1. introduce a concept	33	61	18	17	14	14
2. reinforce a concept	74	67	26	19	13	11
3. teach about a specific topic (e.g. plants, animals)	89	94	42	25	3	6
4. teach a complete unit	26	28	7	8	17	16
5. use activity-oriented curriculum	96	83	39	18	5	12
6. use an individual student projects	63	61	30	18	12	13
7. teach in specific school subjects						
Language Arts	41	56	17	10	15	15
Science	96	89	41	23	4	7
Social Studies	11	22	2	4	19	17
Mathematics	37	22	13	4	16	18
Other (please specify)	11	6	4	2	18	19
8. help students . . .						
- ask questions such as what, where, when, why, about the natural environment	85	100	34	27	9	3
- learn to solve problems	74	89	33	19	11	5
- communicate their findings in various ways	85	72	35	20	8	10
- gain a direction for frequent exploration of natural environments by presenting stimulating questions	74	78	33	23	10	9
- develop their own appreciation of patterns and organization in the natural environment	85	83	37	26	7	4
- draw their own conclusions about the value of natural environments	85	83	38	23	6	8
- use their five physical senses	89	100	46	30	2	1
- gain an interest in lessons by going out-of-doors	96	100	50	29	1	2

Spearman Rho coefficient, 83 > .46 at P= .025

4.4. Section 3 Extent to Which the ENCORE Programme is Used.

Section 3 is a summary and analysis of the data towards a solution for Specific Problem #2. The question to be answered (as stated in Chapter 1 and restated here for the convenience of the reader) is: To what extent is the current use of the ENCORE programme being implemented?

The research hypothesis is stated as follows: An ENCORE user will align with one of the four levels of use for each dimension according to the extent to which he/she is implementing each dimension.

4.4.1 Total Group. Table 4.4.1 displays percentages of the respondents who were using or who had used ENCORE at each level of use for each dimension of the programme. In the process of analyzing the data it can be said that 85% of the responses had integrity in the following sense - if a respondent put a check beside a particular dimension at a given level of use then he/she had almost always checked the same dimension in each of the preceding levels of use.

Generally, it was noticed that in moving from levels 1 through 4 there was a progressive decrease in the percentage of teachers who were or had been at each level. This decrease suggests that teachers do progress sequentially through
levels of use 1 to 4 and that as levels of use increase fewer and fewer teachers attain the subsequent level.

Note that approximately 70% of the respondents were familiar with all dimensions of the programme, but only 63% are attempting to apply them. About 55% of the respondents were familiar with, had attempted to apply and had been able to determine the effectiveness of the programme in general. Approximately 42% had generally decided to modify the programme.

Table 4.4.1 Levels of use By Respondents With Respect to Particular Programme Dimensions of ENCORE

Programme Dimensions	Levels of Use (Percentages)				
	1 familiar with	2 attempting to apply	3 able to determine effectiveness	4 are modifying	*Chi - square values
Materials	89	77	68	50	11.0
Content	89	84	77	64	17.81
Time allotment	57	39	27	43	8.20
Teaching strategies	68	59	55	52	12.0
Programme objectives	59	39	*suitability 52	23	2.27
Underlying assumptions of the programme	61	*apparent 81	*suitability 50	*not agreeing 20	1.8
mean percentage	79	63	55	42	

df = 1

* Chi-square value requires 3.84 at p = .05

For all tables of levels of use these terms apply:
suitability - the programme objectives or the programme assumptions were found to be suitable when using ENCORE
apparent - the programme assumptions were found to be apparent in the ENCORE programme
not agreeing - the programme assumptions were not agreed with as outlined or implied in ENCORE

Hall and Loucks (1975) model concerning 'levels of use' of a programme by a teacher, is considered to be operant in this study.

Some exceptions to the model are evidenced. Examining the dimension 'time allotment' revealed that 12% of the respondents were modifying the time allotment before determining its effectiveness and 4% decided to modify the time allotment before actually trying it. It would seem these respondents consider it a higher priority to fit ENCORE into their teaching schedule than using ENCORE in the time suggested by the developer.

There were 13% of the respondents who found the programme objectives to be suitable before having actually applied them. It might be assumed the programme objectives were consistent with teaching objectives already operant in the classroom.

While 81% of the respondents felt the programme assumptions were apparent, 13% decided they agreed with them before finding out if they were suitable when working with students. The results could have occurred as shown if respondents were making a personal judgement about the programme assumptions separate from the classroom context.

The exceptions to the model, discussed in the previous three paragraphs, might also have occured because no information was included in the questionnaire about each of the dimensions time allotment, programme objectives and underlying programme assumptions. Therefore respondents were answering questions for which they might not have had a clear sense of the subject concerned. This lack of information could affect the accuracy of the response.

A chi-square analysis was performed on the results for each dimension at level 4 (modifying) in order to test the null hypothesis that teachers are not modifying programme dimensions.

The null hypothesis was rejected in four instances as follows:

There was a significant number of respondents using ENCORE to the extent that they had made decisions to modify the materials, content, and teaching strategies. ENCORE, which teachers have a choice of using, is one of many parts of the Elementary Science Materials Based option. It might be that the respondents, in creating their total science programme, could best use ENCORE within their programme by modifying these dimensions. Respondents could also see a need to modify ENCORE in these dimensions if they were using it within the context of other disciplines such as language arts.

There was not a significant number of respondents who were modifying the dimensions of time allotment, and programme objectives or who were disagreeing with the underlying programme assumptions. Time allotment is stated in such general terms for the programme that respondents might not have considered that they were modifying this dimension. Regarding programme objectives it might be that they are well suited to the goals of the elementary school science programme. The underlying programme assumptions may be written in such a way as to be considered motherhood statements and therefore very difficult to disagree with.

4.4.2 Subgroup Comparisons

Male/Female Subgroups: Table 4.4.2 outlines the results for the male/female respondent subgroups. The findings are generally consistent with those for the total accessible population.

However more males appear to be using the programme to a greater extent than female respondents. Females apparently do not modify the programme materials whereas males do. Perhaps because some females have their students

Table 4.4.2 Levels of Use By Female/Male Respondents With Respect to Particular Programme Dimensions of ENCORE

Programme Dimensions	Levels of Use (Percentages)				
	1 familiar with	2 attempting to apply	3 able to determine effectiveness	4 are modifying	*Chi - square values
Materials	100 / 96	94 / 84	75 / 81	44 / 62	3.06 / 10.32
Content	100 / 96	100 / 88	88 / 85	50 / 69	4.0 / 12.89
Time allotment	63 / 69	38 / 50	25 / 38	50 / 50	4.0 / 7.0
Teaching strategies	63 / 77	56 / 69	50 / 58	56 / 65	5.06 / 11.57
Programme objectives	56 / 69	44 / 50	31 *suitability / 58	19 / 27	.56 / 12.28
Underlying assumptions of the programme	63 / 69	*apparent 69 / 100	*suitability 19 / 81	*not agreeing 44 / 8	3.06 / .14

f = percentage of female teacher
m = percentage of male teacher

df = 1

* Chi-square value requires 3.84 at p = .05

For all tables of levels of use these terms apply:
suitability - the programme objectives or the programme assumptions were found to be suitable when using ENCORE
apparent - the programme assumptions were found to be apparent in the ENCORE programme
not agreeing - the programme assumptions were not agreed with as outlined or implied in ENCORE

spend a longer time using an activity card there is not the need to modify the materials as there might be if the cards were being used within a smaller time frame. However with a higher percentage of females teaching in the grades K-5 one could assume the materials would likely require modifying (i.e. language, concepts) since the programme is primarily for intermediate grades.

Experience (0-4, 5-10, 10+ years) Subgroups: Groups A, B, C respondents all followed the pattern of moving through successive levels of use 1-4. The majority of respondents in each group were familiar with the six dimensions of ENCORE, particularly the dimensions of materials and content.

In each group there was a significant number of respondents who were modifying the programme dimensions materials, content and teaching strategy. They were not modifying the dimensions of time allotment or programme objectives nor were they disagreeing with underlying assumptions of the programme.

Group A (0-4 years experience) was less familiar with the ENCORE programme than in group B (5-10 years) and group C (10+ years) (see Tabel 4.4.3). It may be the less experienced group use parts of various programmes like ENCORE to create their complete Science programme. Less experienced teachers in the BCSA study (1982, p. 179) use more additional activities than did the more experienced teachers (10+ years experience).

It would appear that respondents with the least amount of experience (Group A) who used ENCORE, modified certain dimensions of the programme before they had actually attempted to apply the dimensions. The dimensions which were modified are: content, time allotment, teaching strategies within group A. Among the dimensions, content is modified by more respondents than any of the other five dimensions.

Group B respondents (5-10 years experience) were similar to the total group in the extent to which they used the programme (see Table 4.4.3). The dimensions content, materials and teaching strategies were modified. A larger proportion of Group B respondents modify the materials than in either group A or group C.

Group B respondents indicated that the underlying programme assumptions were apparent and agreed with them although they were not particularly familiar with them.

Group C respondents (10+ years experience) were also similar to the total group in the extent to which they used the programme. About 50% of the respondents using the programme were modifying it in some way.

Approximately 83% of Group C respondents were familiar with the suggested teaching strategies. This was a higher proportion than in group A or B. A slightly lower proportion of group C respondents modified the teaching strategies. Generally this group appears to modify the programme less.

As with Group B respondents, Group C respondents indicated that the underlying programme assumptions were apparent and they agreed with them although they were not particularly familiar with them.

Science/Non Science Oriented Respondent Subgroups: There was a similar percentage of respondents at each level of use in each group.

From Table 4.4.4 it is evident that science and non science oriented respondents both agreed with the underlying assumptions of the programme and also agree with the programme objectives.

Both groups were modifying the content and teaching strategies of the programme. Since 80-90% of the respondents had taught the intermediate grades before it would seem that, based upon their experience, they felt a need to

Table 4.4.3 Levels of Use By Respondents Grouped According to Years Teaching Experience (0-4, 5-10, 10+) With Respect to Particular Dimensions of ENCORE

Programme Dimensions	Levels of Use (Percentages)				
	1 familiar with	2 attempting to apply	3 able to determine effectiveness	4 are modifying	*Chi - square values
Materials	77 / 100 / 78	55 / 89 / 72	44 / 78 / 61	55 / 67 / 50	2.0 / 8.0 / 4.5
Content	66 / 94 / 89	77 / 89 / 78	77 / 78 / 72	77 / 67 / 61	4.5 / 8.0 / 6.9
Time allotment	44 / 61 / 61	22 / 39 / 44	22 / 28 / 28	66 / 39 / 28	5.48 / 2.7 / 1.41
Teaching strategies	55 / 50 / 83	55 / 56 / 61	33 / 56 / 44	66 / 56 / 55	5.48 / 5.6 / 5.9
Programme objectives	33 / 61 / 61	33 / 33 / 50	11 *suitability / 56 / 44	33 / 11 / 11	.87 / .21 / .21
Underlying assumptions of the programme	44 / 61 / 61	*apparent 55 / 83 / 89	*suitability 22 / 44 / 67	*not agreeing 33 / 22 / 27	.87 / .87 / 1.31

A
B
C

A = percentage of respondents with 0-4 years teaching experience
B = percentage of respondents with 5-10 years teaching experience
C = percentage of respondents with 10+ years teaching experience

df = 1
* Chi-square value requires 3.84 at p = .05

For all tables of levels of use these terms apply:
suitability - the programme objectives or the programme assumptions were found to be suitable when using ENCORE
apparent - the programme assumptions were found to be apparent in the ENCORE programme
not agreeing - the programme assumptions were not agreed with as outlined or implied in ENCORE

Table 4.4.4 Levels of Use By Science/Non Science Oriented Respondents With Respect to Particular Dimensions of ENCORE

Programme Dimensions	Levels of Use (Percentages)				
	1 familiar with	2 attempting to apply	3 able to determine effectiveness	4 are modifying	*Chi - square values
Materials	89 / 89	78 / 78	72 / 63	44 / 56	3.55 / 8.1
Content	94 / 85	78 / 85	78 / 74	67 / 56	8.0 / 8.1
Time allotment	56 / 59	39 / 41	33 / 26	56 / 37	5.5 / 3.55
Teaching strategies	50 / 51	50 / 67	50 / 48	50 / 59	4.5 / 9.05
Programme objectives	50 / 63	39 / 44	33 *suitability / 44	22 / 22	.88 / 1.25
Underlying assumptions of the programme	56 / 63	*apparent 78 / 85	*suitability 44 / 59	*not agreeing 28 / 22	1.3 / 1.25

NS = percentage of non science oriented teachers

S = percentage of science oriented teachers

df = 1

* Chi-square value requires 3.84 at p = .05

For all tables of levels of use these terms apply:

suitability - the programme objectives or the programme assumptions were found to be suitable when using ENCORE

apparent - the programme assumptions were found to be apparent in the ENCORE programme

not agreeing - the programme assumptions were not agreed with as outlined or implied in ENCORE

modify these two dimensions to suit their teaching situation. This would seem consistent with the majority of respondents in both groups who stated that the programme could easily be adapted to the core curriculum.

In addition science oriented respondents modified the materials. Because they preferred to use the programme in science and the science programme is often a blend of materials this finding seems logical.

Non science oriented respondents preferred not to modify the materials. This finding is surprising because non science oriented respondents probably use the materials in subjects other than science.

4.5 Section 4 - Whole Group and Subgroup Profiles

For the convenience of the reader a profile of typical ENCORE use by teacher in this study has been outlined in Table 4.5.1. The same profile form has also been used in Tables 4.5.2 to 4.5.7 to outline each of the subgroups considered in this study. Comments in Chapter 5 can be referenced to these profiles.

Table 4.5.1

Profile of ENCORE Use

by Respondents in this Study

Content	most preferred - plants - relationships among living things - relationships among living & non living	least preferred - animals - concepts such as weather
Materials	most prevalent - enables students to explore in the natural environment - cards can stand on their own as an individual study - encourages students to use 5 senses	least prevalent - use appropriate language and concepts on cards - suggests students express what they have learned - 3 components of a card
Teaching Strategies	most preferred - help students use their 5 senses - help students gain interest in lessons by going out doors - teach about a topic	least preferred - use in mathematics - use in social studies - use in language arts
Time Allotment	most frequently used - prep - 0-15 minutes - student use - 0-1 hours/1-2 hours - use in 1 month - 0-2 hours	least frequently used - prep - 60+ minutes - student use - 2-3 hours - use in 1 month - 2-3 hours
Dimension	Modifying - materials - content - time allotment - teaching strategies	Not modifying/agreeing - program objectives " assumptions

Table 4.5.2

Profile of ENCORE Use

By Male Respondents

Content	most preferred - plants - relationships among living things - differences among environments	least preferred - animals - concepts such as weather
Materials	most prevalent - enable students to explore in the natural environment - require minimum of equipment for full trips - cards can be combined to make part or all of a unit	least prevalent - activites easy to expand into larger study - use language and concepts at appropriate level - suggest students express what they have learned
Teaching Strategies	most preferred - help students gain an interest in lessons by going out of doors - help students use their 5 senses - help students develop appreciation of patterns & organization of the natural evnironment	least preferred - use in social studies - use in mathematics - teach a complete unit
Time Allotment	most frequently used - prep - 0-15 minutes - student use - 0-1 / 1-2 hours - use in 1 month - 0-2 hours	least frequently used - prep - 60+ minutes - student use - 2-3/3+ hours - use in 1 month - 2-3 hours
Dimension	Modifying - materials - content - time allotment - teaching strategies	Not modifying/agreeing - programme objectives " assumptions

Table 4.5.2

Profile of ENCORE Use

By Female Respondents

Content	most preferred - relationships among living things - plants - relationships between living/ non living things	least preferred - animals - concepts such as weather
Materials	most prevalent - encourages students to use 5 senses - enables students to explore in the natural environment - cards can stand on their own as an individual study	least prevalent - cards can be combined with others to make part or all of a unit - cards have 3 components - use appropriate language and concepts at student level
Teaching Strategies	most preferred - help students gain an interest in lessons by going out-of-doors - help students use their 5 senses - teach a specific topic	least preferred - use in social studies - use in mathematics - teach a complete unit
Time Allotment	most frequently used - prep - 15-30 minutes - student use - 1-2 hours - use in 1 month - 0-2 hours	least frequently used - prep - 60+ minutes - student use - 2-3 hours - use in 1 month - 2-3 hours
Dimension	Modifying - content - time allotment - teaching strategies	Not modifying/agreeing - materials - programme objectives - assumptions

Table 4.5.3

Profile of ENCORE Use

By Respondents With 0-4 Years Teaching Experience

Content	most preferred - plants - relationships between living/ non living things - differences between environments	least preferred - animals - concepts such as weather
Materials	most prevalent - cards can stand on their own as an individual study - enables students to explore in the natural environment - require a minimum of equipment for field trips	least prevalent - use language and concepts at appropriate student level - easily adapted to core curriculum - useable in preferred subject
Teaching Strategies	most preferred - help students gain an interest in lessons by going out-of-doors - help students develop an appreci- - ation of patterns & organization in the natural environments - teach science	least preferred - use in social studies - use in mathematics - teach a complete unit
Time Allotment	most frequently used - prep - 15-30/30-60 minutes - student use - 1-2 hours - use in 1 month - 0-2 hours	least frequently used - prep - 60+ minutes - student use - 2-3 hours - use in 1 month - 2-3 hours
Dimension	Modifying - content - time allotment - teaching strategies	Not modifying/agreeing - materials - programme objectives - programme assumptions

Table 4.5.4

Profile of ENCORE Use

By Respondents With 5-10 Years Teaching Experience

Content	most preferred - plants - relationships among living things - differences between environments	least preferred - animals - concepts such as weather
Materials	most prevalent - enables students to explore in the natural environment - require a minimum of equipment for field trips - cards can stand on their own as an individual study	least prevalent - there are 3 components of a card - use language and concepts at students level - suggests students express what they have learned
Teaching Strategies	most preferred - help students gain an interest in lessons by going out-of-doors - help students ask questions about the natural environment - teach science	least preferred - use in social studies - use in mathematics - teach a complete unit
Time Allotment	most frequently used - prep - 15-30 minutes - student use - 0-1 hours - use in 1 month - 3-6 hours	least frequently used - prep - 60+ minutes - student use - 2-3 hours - use in 1 month - 2-3 hours
Dimension	Modifying - materials - content - teaching strategies	Not modifying/agreeing - time allotment - programme objectives - programme assumptions

Table 4.5.5

Profile of ENCORE Use

By Respondents with 10+ Years Teaching Experience

Content	most preferred - relationships among living things - plants - animals	least preferred - differences between specific environments - relationships between living and non living things
Materials	most prevalent - enable students to explore in the natural environment - require a minimum of equipment for field trips - useable in preferred subject	least prevalent - activities are not difficult to expand into larger studies - suggests students express what they learn - 3 components of a card
Teaching Strategies	most preferred - help students use their 5 senses - help students gain an interest in lessons by going out-of-doors - teach about a specific topic	least preferred - use in social studies - use in mathematics - teach a complete unit
Time Allotment	most frequently used - prep - 0-15 minutes - student use - 0-1/1-2 hours - use in 1 month - 0-2 hours	least frequently used - prep - 60+ minutes - student use - 2-3/3+ hrs. - use in 1 month - 3-6 hrs.
Dimension	Modifying - materials - content - teaching strategies	Not modifying/agreeing - time allotment - programme objectives - programme assumptions

Table 4.5.6

Profile of ENCORE Use

By Science Oriented Respondents

Content	most preferred - plants - relationships among living things - relationships between living and non living things	least preferred - differences between environments - concepts such as weather
Materials	most prevalent - enable students to explore in the natural environment - require a minimum of equipment for field trips - useable in preferred subject	least prevalent - use language and concepts at students level - 3 components of a card - activities can be expanded into larger study
Teaching Strategies	most preferred - help students use their 5 senses - help students gain an interest on lessens by going out-of-doors - teach about a specific topic	least preferred - use in social studies - teach a complete unit - introduce a concept
Time Allotment	most frequently used - prep - 0-15 minutes - student use - 0-1/1-2 hours - use in 1 month - 0-2 hours	least frequently used - prep - 60+ minutes - student use - 2-3 hours - use in 1 month - 6+ hours
Dimension	Modifying - materials - content - teaching strategies	Not modifying/agreeing - time allotment - programme objectives - programme assumptions

Table 4.5.7

Profile of ENCORE Use

By Non Science Oriented Respondents

Content	most preferred - relationships between living and non living things - differences between environments relationships among living things	least preferred - animals - concepts such as weather
Materials	most prevalent - enable students to explore in the natural environment - encourages students to use 5 senses - cards can stand on their own as an individual study	least prevalent - 3 components of a card - cards can be combined to make part or all of a unit - useable in preferred subject
Teaching Strategies	most preferred - help students use their 5 senses - help students gain an interest in lessons by going out-of-doors - ask questions about the natural environment	least preferred - use in social studies - use in mathematics - teach a complete unit
Time Allotment	most frequently used - prep - 0-15 minutes - student use - 0-1 hours - use in 1 month - 6+ hours	least frequently used - prep - 30-60/60+ minutes - student use - 1-2/2-3 hrs. - use in 1 month - 2-3 hrs.
Dimension	Modifying - content - time allotment - teaching strategies	Not modifying/agreeing - materials - programme objectives - programme assumptions

CHAPTER 5

CONCLUSTIONS DISCUSSION AND LIMITATIONS

5.1 Introduction

The study undertook to explore the present use of the ENCORE programme by teachers in British Columbia Public Schools.

This study was considered of particular relevance to elementary teachers in British Columbia and to the Ministry of Education for the following reasons:

1. The British Columbia Science Assessment (1982, p. 169), demonstrated that more than 50% of elementary school teachers indicated they would like the general elementary science programme to place greater emphasis upon the following:
   (a) printed material other than textbooks
   (b) activity centred learning
   (c) integrating science with other subjects
   (d) environmental education
   (e) discovery learning
   (f) field trips

The ENCORE programme includes all of the above attributes. Fullan & Parks (1981) would probably agree that ENCORE might be a 'response to a need' which can be considered a quality of a programme. Information about the use of ENCORE would likely aid teachers who are using or intend to use the ENCORE programme as part of their curriculum.

2. The Ministry of Education is presently planning implementation strategies for the ENCORE programme as part of the Elementary Science curriculum.

The information from this study might provide direction in the implementation process. Further implementation plans could be formulated on the description of actual rather than assumed use of the ENCORE programme.

5.2 Conclusions

Conclusions from the data analysis are discussed here under Specific Problem #1 and Specific Problem #2.

5.2.1 Specific Problem #1. A detailed analysis of the ENCORE programme was completed using Leithwood's model of dimensions of curriculum innovation (1981, p. 25). Using this model questions were developed for each aspect of the programme within each dimension.

With respect to the aspects of the ENCORE programme this study has demonstrated that:

1. each aspect of each dimension of the ENCORE programme was being implemented by at least some of the respondents. Examples: use of time allotment for activity cards, use of activity cards in preferred discipline, and teaching of programme topics such as plants and/or animals interrelationships;
2. certain aspects of each dimension of the ENCORE programme were considered prevalent and/or received preferential use by all subgroups of respondents and by the respondents, as a whole;
3. certain aspects of each dimension of the ENCORE programme were not considered prevalent and/or did not receive preferential use by all subgroups of respondents and by the respondents as a whole;

4. certain aspects of each dimension of the ENCORE programme fluctuated in preference among various subgroups of respondents.

Recall that Holland (1980, p.) commented that teachers have many questions about a new programme. Therefore if an innovation is too complex it can adversely affect the ability of teachers to implement it. Based on 1-4 above ENCORE does not appear to be a particularly complex innovation for teachers to implement.

There are certain aspects of ENCORE which respondents found to be a quality of the programme. The clarity with which the programme objectives were presented is evident since the majority of respondents appeared to have had no difficulty becoming familiar with them. Many respondents were able to determine their suitability and few respondents modified the objectives. Clarity is important since, as Fullan and Park (1981, p. 16), Gross et al. (1971), and Kritek (1976, p. 88) point out, a lack of clarity with which aspects of a new programme are written can make it difficult to implement the programme.

Generally respondents agree with the underlying programme assumptions and find them suitable in use. The assumptions are difficult to disagree with when presented as motherhood statements. In this instance a broad, seemingly vague statement can be advantageous. Huberman (1979, p. 3) believes that a "lack of clarity could be purposeful, on the part of developers, since it may lower resistance of teachers to use a programme and further makes accountability evaluation very difficult to carry out".

The respondents found student interest easily stimulated by using the ENCORE programme and these findings might encourage teachers to further use the programme. Leithwood & McDonald (1981, p. 110) indicated that teachers

rely heavily upon student evaluation of methods and content through enthusiastic responses.

Other positive aspects of the programme were noted by the respondents: preparation time is minimal, a minimum of equipment for field trips is required, the length of time for activities if flexible, and topics for study are a part of the core curriculum notably in science. These particular aspects are importrant in implementation since excessive time and energy spent learning new skills can inhibit the implementation (Fullan & Park, 1981, p. 27; Fullan & Pomfret, 1977, p. 388; House, 1974, p. 97).

Certain aspects of ENCORE, however, are not considered positive attributes of the programme. Some materials contain inappropriate language and concepts at the student level and the materials require additional suggestions to students about ways to express what they have learned.

Respondents were particularly concerned that it was difficult to use the programme in mathematics, social studies and language arts teaching. Possibly topics and concepts (see Appendix G) are most appropriate for use in science. As mentioned above too much time and energy required to implement the programme in these subjects might therefore be having a negative effect on teacher use of the programme.

Differences exist in the use of the ENCORE programme among subgroups of respondents. For example, respondents with 0-4 years teaching experience did not use the content aspect of animals whereas repondents with 10^{+} years experience did. Other differences among subgroups are detailed in Chapter 4. These differences can be accounted for if particular aspects of an innovation (i.e. ENCORE) are relevant to some teachers and not to others. Often

teachers will modify a programme when certain aspects of the programme are not entirely relevant or useful. This fact is well documented in Chapter 2. The conclusions for Specific Problem #2 indicate that many respondents in the subgroups are in fact modifying the ENCORE programme.

5.2.2 Specific Problem #2

The extent to which each dimension of the ENCORE programme was being implemented was examined by creating a modified version of Hall & Loucks' model 'Levels of Use' (1975, p. 52). Teachers were identified as being at one of four levels of use for each dimension: level 1, becoming familiar with; level 2, attempting to apply; level 3, determining effectiveness of; and level 4, modifying an ENCORE dimension. The extent of use of ENCORE in this instance focused on each dimension as a whole.

For the dimensions of content, materials, time, and teaching strategy there were approximately:

1. Sixteen percent of the respondents at each of the levels 1, 2 and 3;
2. Fifty-two percent of the respondents at level 4.

For the dimensions programme objectives and underlying programme assumptions there are approximately:

1. Twenty-five percent of the respondents at each of the levels 1 and 2
2. Thirty percent of the respondents at level 3
3. Twenty percent of the respondents at level 4.

Hall & Loucks (1975, p. 56) found in their research concerning innovation implementation that 30-40% of innovation users had progressed as far as level three (as defined for the purpose of this study) after three

cycles of innovation use. Most respondents had had access to the ENCORE programme long enough to complete about three cycles (three years) of use. The findings in this study show that, for all dimensions, in the extent of implementation of the ENCORE programme most respondents are as advanced or further advanced then the respondents reported in Hall & Loucks' studies. This observation would support the statement made previously in Chapter 5 that the ENCORE programme does not seem to be a particularly complex innovation to implement.

Approximately 50% of the respondents familiar with the programme objectives and the underlying programme assumptions found them suitable in use (level 3). Only 30% of those familiar with the objectives and programme assumptions were modifying (levels 4) the objectives or were disagreeing with (level 4) the underlying assumptions.

A logical prerequisite to programme use is agreement with programme objectives and underlying programme assumptions (Kritek, 1982, p. 88). Since few respondents disagree with either the programme objectives or programme assumptions a logical explanation exists as to why respondents were using the programme at all.

Whether an innovation fulfills the classroom needs of teachers also affects the extent of programme implementation (Fullan & Parks, 1981, p. 14). For example, teachers need to feel that students are interested in lessons. Respondents noted that ENCORE lessons did interest students. The programme appears to address respondents' needs mentioned above. The programme also appears to address other needs of respondents who teach science (see Chapter 5, p. 1). Because the programme appears to meet the

needs of respondents it may have been less difficult evolving from level 1 to level 3 and perhaps level 4. This is somewhat ironic since level 4 indicates that respondents were modifying the programme. However as W. Glasser (1981) indicates, people who feel they have attained their wants, establish new wants. It may be that while still using ENCORE respondents have determined they can better achieve the curricular objectives (more encompassing wants as it were) by modifying the programme.

The fact that a significant number of respondents were modifying (level 4) the dimensions of materials, content, time allotment, and teaching strategy is understandable in view of the discussion in Chapter 2. Although the type and number of modifications was not clarified in this study the modifications seem to be occurring in order to:

1. meet some "teacher concerns" in the classroom such as time restraints or the need to integrate activity cards into an ongoing unit;
2. overcome some "programme deficiences" such as the inappropriate language on activity cards or the inapplicability of programme content to a teacher's preferreed teaching subjects.

Innovations are seldom used precisely according to the developer's intentions (Hess, 1974, p. 2; Mahon, 1972; Solomon et al., 1972). ENCORE was found to be no exception.

5.2.3 General Conclusions. The general problem investigated in this study was to ascertain whether the actual implementation of the ENCORE programme was occurring as was intended. It can be concluded that the programme was, in fact, being implemented as intended with respect to the

general intent of the programme. Modifications to the programme did occur. Those modifications addressed some programme deficiences and helped alleviate some of the logistical problems of implementation common to many innovations.

It is significant that the general intent of ENCORE was preserved in the implementation of the programme. The school, particularly the elementary setting, has been found to be an appropriate setting in which to develop positive environmental attitudes (Aliamo and Doran, 1978, p. 129; Fensham & May, 1979, p. 15; Hart & McLaren, 1978, p. 497; Jaus, 1978, p. 79).

5.3 Recommendations

The results of this study have provided insights into the ENCORE programme and into the process which yielded the data. These insights are included in the form of recommendations for the programme and for further research. Each recommendation is briefly discussed.

With respect to the ENCORE programme and the ways in which it is presently being used this study recommends the following:

1. The Exploring Science textbook (ES) series is the most widely used option of the elementary science programme in B.C. schools. Because of the changes suggested by teachers for the elementary science programme, this option might require that attention be paid to the suggested changes noted at the beginning of Chapter 5. The ENCORE programme seems to address those concerns and therefore is a likely programme to complement the Exploring Science textbook series in the area of biological sciences. The way(s) in which ENCORE might best be integrated with the textbook series could be outlined and included with the programme.

2. The ENCORE programme was originally developed to encourage children aged 9 to 13 to explore their natural environment as a step towards creating their own environmental ethic. There have been no attempts to determine the effects of the programme upon children who have used the programme. Yet the Ministry of Education has considered the programme to be suitable material for the elementary school science progamme. The effect of the ENCORE programme upon children who use it should be determined, particularly where it pertains to evaluation of the existing or planned implementation strategies, with an interest to furthering the ability of the programme to achieve its objective.

3. Since it has been determined that the programme is, in fact, being modified, the specific ways in which the programme is modified should be examined. The information could aid in any further development and/or implementation of the programme.

4. The ENCORE programme was developed in such a way as to facilitate its use among various disciplines. The programme is not being used extensively in this manner. This finding should be explored to determine whether the programme itself really has the potential to be used in this manner. If the programme has this potential, specific information about the 'how to' of using ENCORE should be included with the materials.

5. There is no question that the ENCORE programme is used primarily as a vehicle to stimulate interest in school lessons by using the out of doors and exploring the natural environment. Because outside activities are unfamiliar to most teachers and because the activities require additional commitment on the part of teachers, the following is suggested. A succinct but informative

set of directions and suggestions should be included with the programme to expediate the process of taking students outside in an efficient and safe manner.

6. Activity cards were noted as having an over-emphasis on written expression as a method of summation in section 3 of the activity cards. This point seems justified and perhaps should be kept in mind as changes to the programme are initiated. It might well be that de-emphasing the written expression is one way teachers are modifying the materials at present.

7. There was considerable concern expressed about the level of language and concepts used on the cards as being inappropriate for the grade levels in which the programme was most extensively used (5 to 7). The concept and language levels should be clarified as to which grade(s) they are best suited or it should be made clear that, in general, the language and concept levels might need to be modified for use. There was also concern expressed about a wide degree of variability in concept and language level among the cards. This concern should also be addressed.

8. "More cards" was mentioned as being a desirable addition to the programme. Since many teachers use the cards to teach a topic, additional sets of cards could be developed with this use in mind.

With respect to the process involved in gathering the data about the extent to which the ENCORE programme is used this study recommends that:

1. the rate at which ENCORE users progress from one level of use to another level of use within each dimension be examined,

2. the factors which affect the progression rate within each dimension be determined,

3. the factors which affect the progression rate differentially across dimensions be determined.

The review of the literature in Chapter 2 discusses at length the clusters of variables thought to influence the implementation process. Although the intent of Chapter 2, in part, was to acknowledge these clusters of variables as a function of the complexity of the implementation process, it was not intended that this study address the dynamics of their relationships. It would be of particular interest to examine to what extent these variables are a function of the implementation process related to the ENCORE programme.

The basis upon which further studies are predicated is the assumption that Hall & Loucks' (1975) model is a useful method to determine the extent to which a programme is being used. The researcher has little doubt that further applications of Hall & Loucks' model of "levels of use" would be of value given the effectiveness of the model in this study.

5.4 Limitations of the Study

The focus of this study on the environmental education programme ENCORE was of a preliminary fact finding nature. Therefore the logistical techniques used in data gathering and the theoretical constructs within which these data were gathered need not be as refined as those in a study of experimental design. The findings in this study should be judged accordingly.

Regarding the logistics of information gathering, using the questionnaire format required compromises with respect to the quality and quantity of information which could be gathered. The number of questions was limited. In addition the style of questions was restrictive in terms of

complexity and length. These conditions were necessary, in the opinion of the researcher, to enhance the response rates of a questionnaire.

Difficulties arose in the timing of questionnaire delivery for optimum teacher response. It is assumed that the low return rate was largely due to the timing problem. This problem is discussed in Chapter 3. The total overall return (22%) greatly restricts the generalizability of the findings in this study. The instrument development process and the statistical analysis applied to the data provides reassurance as to the validity of the conclusions drawn in this chapter.

Regarding the theoretical constructs within which the data were gathered, it must be remembered that Hall & Loucks' model was modified to become less cumbersome in light of the nature of the information sought in this study. Eighty-five percent of the responses to the section of the questionnaire concerned with levels of use were consistent (see Chapter 4, p. 95). The researcher therefore feels confident that the modified model for determining levels of use was sensitive to the needs of the study.

REFERENCES

A. Implementation

Allan, G.S. and Wolf, W.C. Relationships between perceived attributes of innovations and their subsequent adoption. Peabody Journal of Education, 1978, 4(8), 332-338.

Aoki, T., Rothe, P. and Werner, W. Tasks of evaluating, teaching and developing programs: some concerns and orientations. paper, University of British Columbia, no date.

Benham, B. Thoughts on the failure of curriculum reform. Educational Leadership, 1977, December.

Berman, P. and McLaughlin, M. Implementation of educational innovation. Educational Forum, volume 40, No. 3, 1976.

Carpenter-Huffman, H. Change in education. Ballinger press, Cambridge, Mass., 1974.

Chakagondua, J. and associates. A plan for a practicum in curriculum evaluation. Paper submitted to Division of Program and Development, North Vancouver School District, April, 1978.

Chakagondua, J. Defining characteristics of a new elementary science curriculum: variance among developers, teachers, and in classrooms. Unpublished doctoral dissertation, University of British Columbia, 1981.

Churchman, D. A new approach to evaluating the implementation of innovative educational programs. Educational Technology, 1979, 19(5), 25-28.

Coley, T.G. The implementation of planned educational change: a multivariate analysis of the decision source for change, organizational commitment, and job satisfaction among elementary teachers. Unpublished doctoral dissertation, University of Wisconsin, Madison, 1980.

Crowther, F. Factors affecting the rate of adoption of the 1971 Alberta social studies for elementary schools. Unpublished master's thesis, University of Alberta, 1972.

Datta, L.E. Damn the experts and full speed ahead: an examination of the study of Federal programs supporting educational change as evidenced against directed development and for local problem-solving. Education Review, 1981, 5(1), 5-32.

Downey, L. & Associates. The social studies in Alberta - 1975. Edmonton Alberta: L. Downey Research Associates, 1975.

Doyle, W. and Pounder, G. The practicality ethnic in teacher-decision-making. Interchange, 1977-78, 8(3), p. 31-37.

Evans, W. and Sheffler, J. Assessing the implementation of an innovative instructional system. The Journal of Educational Administration, 1980, 14(1) 26-32.

Flaherty, M.E. A comparison of the effects of individualized versus group in-service education on Elementary school teachers. Unpublished doctoral dissertation, 1980.

Flynn, F. Evaluations and the fate of innovations. Nova University, Fort Lauderdale, Florida, 1981.

Frey, W. How to keep the new programme alive and well. Educational Leadership, 1979, December.

Fullan, M. and Park, P. Curriculum implication, a resource booklet, Ministry of Education, Ontario, 1981.

Fullan, M. and Pomfret, A. Research on curriculum and instruction implementation. Review of educational research, Winter, 1977, Vol. 77, No. 1, 335-397.

Gallogher, J.J. Three studies of the classroom. Monograph Series in Curriculum Evaluation, No. 6, Chicago: Rand McNally, 1970.

Garrou, T.M. Implementing the "new" social studies curriculum: a case study. University of North Carolina at Chapel Hill, 1980.

Goodad, J. and Klein, M. Behind the classroom door. Ohio: Jones Publishing Company, 1970.

Gross, N., Giacquinta, J. and Bernstein, M. Implementing organizational innovations: a sociological analysis of planned educational change. New York: Basic Books, 1971.

Hall, G. and Loucks, S. A developmental model for determining whether or not the treatment really is implemented. Research and Development Centre for Teacher Education, University of Texas at Austin, 1978.

Hall, G. and Loucks, S. Levels of use of the innovation: a framework for analyzing innovation adoption. Journal of Teacher Education, 1975, 16(1).

Hall, G., Wallace, R.C., & Dossert, W.A. A developmental conceptualization of the adoption process in educational institutions. Research and Development Center for Teacher Education, University of Texas at Austin, 1973.

Harlen, W. A stronger teacher role in curriculum development. Curriculum Studies, 1977, 9(1), 21-29.

Hess, R. & Buckholdt, D. Degree of implementation as a critical variable in program evaluation. Paper presented at the meeting of the American Educational Research Association, Chicago, April, 1974.

Hess, R. and Rogers, A. Fidelity of program implementation and student achievement of program objectives. Paper presented at the annual meeting of the Evaluation Network, St. Louis, Missouri, 1977.

Holland, A.K. Characteristics of information teachers perceive as necessary for adopting a curriculum. Unpublished doctoral dissertation, Kent State University, 1980.

House, E.R. Technology versus craft: a ten year perspective on innovation. Journal of Curriculum Studies, 1979, 1(1), 1-5.

Howey, K. & Joyce, B. A data base for future directions in inservice education. Theory into Practise, 1979, 17(3).

Huberman, M. Microanalysis of innovation implementation at the school level. received from M. Fullan by Chakagondua, J., March, 1979.

Kritek, W. Lessons from the literature on implementation. Eductional Administration Quarterly, 1976, 12(3), 86-102.

Lane, K.R. Curriculum implementation: characteristics and factors related to the change process. Unpublished doctoral dissertation, Kent State University, 1980.

Leinhardt, G. Evaluation of the implementation of a program of adaptive education at the second grade (1972-73). Paper presented at the meeting of the American Educational Research Association, Chicago, April, 1974.

Leithwood, K.A. The dimensions of curriculum innovation. Journal of Curriculum Studies, 1981, 13(1), 25-36.

Leithwood, K.A. and MacDonald, R.A. Implementing curriculum innovations. Canadian Journal of Education, 1981, 6(2).

Keithwood, K.A. and Russell, H. Focus on implementation. Interchange, 1973, 4(1), 10-26.

Lippit, R. and colleagues. The teachers as innovator, seeker, and sharer of new practises. Centre for Research on the Utilization of Scientific Knowledge, University of Michigan, 1980.

Loucks, S. and Hall, G. Assessing and facilitation the implementation of innovations: a new approach. Educational Technology, 1977, February.

Loucks, S., Newlove, B. and Hall, G. Measuring levels of use of the innovation: a manual for trainers, interviewers, and raters. Austin: Research and Development Centre for Teacher Education, University of Texas, 1976.

Loucks, S. and Pratts, H. A concerns-based approach to curriculum change. Educational Leadership, 1979, December.

Nicodemus, R. Why science teachers adopt new curriculum projects. Institute of Educational Technology, The Open University, 1976.

Okpalobi, M. An exploration of levels of use of the innovation in the evaluation of teaching reading in content areas, staff development project. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, California, April, 1979.

Pincus, J. & Williams, R. Planned change in urban school districts. Phi Delta Kappa, 1979, 60(12), 729-733.

Reid, W. Schools, teachers and curriculum change: the moral dimensions of theory building. Educational Theory, 1980, Vol. 29, 4.

Reid, W. The changing curriculum: theory and practise. Case Studies on Curriculum Change. Reid, W. & W. Alker, D.F. n.d.

Reynolds, L. Problems of implementing organizational change in the elementary school: a case study. Unpublished doctoral dissertation, University of Oregon, 1973.

Smith, L. & Keith, P. Anatomy of educational innovation: an organizational analysis of an elementary school. New York: Wiley, 1971.

Stephens, G. The effect of implementation process on the levels of use of an innovation. Unpublished doctoral dissertation, Wayne State University, 1980.

Taylor, H. General report, science assessment 1982: a report to the Ministry of Education, Province of British Columbia, 1982.

Waring, M. The implementation of curriculum change in school science of England and Wales. European Journal of Science Education, 1979, 4(3), 257-275.

B. Environmental Education

Alaimo, S.J. and Doran, R.L. A study of factors influencing environmental values of junior and senior secondary high school students. Studies in Educational Evaluation, 1978, 4(2), 129-136.

Barr, J.E. Development of the needs-based curriculum plan in environmental education. Unpublished doctoral dissertation, The Louisiana State University and Agricultural & Mechanical College, 1980.

Bateson, D.J. Changes in student-teacher perceptions following a residential outdoor program. Unpublished doctoral dissertation, University of British Columbia, 1981.

Bateson, D.J. and Worthing, D.C. A study of outdoor education in British Columbia schools. Report available through the University of British Columbia library: Curriculum Laboratory, 1976.

Cohen, M.R. Environmental information versus environmental attitudes. Journal of Environmental Education, 1973. 5(2), 5-8.

Couchman, J.K. Mini-climates: examining your environment. Holt, Reinhart and Winston and Winston of Canada, Limited, Toronto, 1971.

Disinger, J.F. and Lee, B. A directory of projects and programs in environmental education for elementary and secondary schools. Eric Information Analysis Centre for Science, Mathematics and Environmental Education, Ohio State University, Columbus, Ohio, 1973.

Disinger, J.F. Alliance. Affiliate activities: non governmental organizations in environmental education. College of Education, Ohio State University, Columbus, Ohio, 1978.

Disinger, J.F. Environmental education activities of Federal agencies. Eric Centre for Science, Mathmatics, and Environmental Studies, College of Education, Ohio State University, Columbus, Ohio, 1978.

ENCORE. Information Services Branch, Ministry of Education, Victoria, British Columbia, 1975.

Fefferman, J. Forest Appreciation, Vancouver Environmental Education Project, University of British Columbia, 1972.

F.I.C.E. Subcommittee of Environmental Education. A sampler of environmental education activities and programs in the United States of America. Eric Information Analysis Centre of Science, Mathematics, and Environmental Education of the National Institute of Education, 1976.

Fleetwood, G.R. and Hounshell, P.B. Assessing cognitive and affective outcomes of environmental education. Journal of Research in Science Teaching, 1976, 13(1), 29-35.

Hambleton, D.C.; Wright, E.; Doolittle, Gins and Burbidge, S. A survey of outdoor education in Metropolitan Toronto: attitudes, activities and facilities. Toronto: Research Department: Metropolitan School Board, 1970.

Hart, P. and McLaren, M. Attitudes of high school students towards environmentally oriented issues. Science Education, 1978, 62(4), 497-508.

Hoebel, M. Pond Book. Western Educational Development Group, University of British Columbia, 1981.

Jaus, H. The effects of environmental education instruction on teachers' attitudes towards teaching environmental education. Science Education, 1978, 62(11), 79-84.

Kelley, J. An evaluation of a delivery system for the implementation of instruction in environmental education at the K-12 level. Unpublished doctoral dissertation, University of Connecticut, 1980.

Knapp. C.E. Attitudes and values in environmental studies. Journal of Environmental Education, 1972, 3, 26-29.

Lucas, A. Science and environmental education: pious hopes, self praise and disciplinary chauvinism. Studies in Science Education, 1980, &, 1-26.

Mirka, G. Factors which influence elementary teachers' use of outdoor classrooms. Journal on Environmental Education, 1973, 4(4), 31-33.

Supplementary Activity Guide for Grades K through 6: Project learning tree. The American Forest Institute, Inc., Washington, D.C., 1977.

Sacko, A. and associates. Current issues VI: a yearbook of environmental education and environmental studies. Clearing House for Science, Mathematics, and Environmental Education, Ohio State University, College of Education, 1980.

Schlageter, J. Student cognition, attitudes and action-orientation and teacher attitudes towards environmental education concepts at the seventh grade level. Unpublished doctoral dissertation, University of Rochester, 1980.

Tanner, R. Ecology, environment and education. Nebraska: Professional Educators Publications, Inc., 1974.

Taank, A. Environmental education network within the EEC. Journal of Science Education, 1979, 1(2) 231-233.

Yaakobi, D. Some differences in modes of use of an environmental education programme by school teachers and community leaders. Science Education, 1981, 3(1), 69-76.

C. Survey Instruments

Boldt, W. Bibliography on current research on mail surveys. Unpublished paper, University of British Columbia, 1981.

Caarach, L. Using mail questionnaires: the optimal methodology and an example. Vancouver: Research Institute of British Columbia, 1975.

Feber, R. Sheatsley, P., Turner, A., Wakesberg, J. What is a Survey? American Statistical Association, Washington, D.C., 1980.

Fitz-Gibbon, C. How to design a program evaluation. Centre for the Study of Evaluation, University of California, Los Angeles, 1981.

Healy, Peter. The limited success student in science. Unpublished masters thesis, University of British Columbia, 1978.

Issac, S. & William, B. A collection of principles, methods, and strategies useful in the planning, design, and evaluation of studies in education and behavioral sciences: Handbook in research and evaluation (for education and behavioral sciences). San Diego: Edits Publishers, 1977.

Nasar, G.E. The implementation of CHEM study in British Columbia Secondary Schools: a survey. Unpublished master's thesis, University of British Columbia, 1977.

Weisberg, H. & Bowen, B. An introduction to survey research and data analysis. San Francisco: W.H. Freeman and co., 1977.

Yu, J. A guide to the designing and analysis of questionnaires. Simon Fraser University Computing Centre, User Services, 1976.

D. Data Interpretation

Gay, L.R. Educational Research: competencies for analysis and application. Charles E. Merrill Publishing Company, Columbus Ohio, 1976.

Lynch, M. & Huntsberger, D. Elements of statistical inference for education and psychology. Boston: Allan and Bacon, Inc., 1976.

Appendix A

Summation of Curriculum Innovation Dimensions

(Leithwood, 1981)

1. Platform/Image
- implicit, explicit beliefs, assumptions about what to include exclude from curriculum
- developer's value systems ------ information about society, culture learners, learning process, nature of knowledge
classes of beliefs assumptions are: conceptions - beliefs about what is possible theories - beliefs about relationship between entities images - identify something that is desirable procedures - identify desirable courses of nature
elements of curricular platforms - five coherent patterns: development of cognitive processes curriculum as technology self-actualization social reconstruction relevance and academic rationalism
knowing the curriculum platform allows a clarification of the range of adaptions which might take place yet still achieve the integrity of the innovation

2. Platform Objectives
- developer's intended learner outcomes
- definition of images - might be statements of "aim" - might describe student behavior - might describe material to be used and a time line
- usually follow taxinomic schemes simple to complex
- importantance to teacher is that it provides a focus for instruction
- inclusion of objectives: delimits teachers responsibilities, locates areas where variations in practises within the curriculum dimensions might occur

3. Assessment Tools and Procedures

- test forms, test items: any means to determine extent of learner outcomes

- they are a more specific statement of developer's intentions for learner outcomes

4. Student Entry Behaviors

- competencies the student is expected to possess at the outset of a programme

- is the link between students and the objectives

- i.e. affective, cognitive

- can be an identified level within a component of behavior

- delimits responsibilities of the teacher and alerts teacher to possible prerequisite work

5. Instructional Objectives

not discussed in the article

6. Time
- qualilatively different from decisions about other dimensions
- decisions indicate preferred patterns of emphasis among alternative courses of action within those curric. dimensions
- kinds of time - Carroll - spent on learning, needed for learning
- devoloper statements of time - policy decisions (over all time) - allocations of time within other dimensions is a concrete way for developer to make clear how he is proposing to achieve his goals

7. Content
- specific facts, concepts, principles, generalizations, thoughts included in curric.
- content selection criterion: teachability, public availability, representitiveness of the field (i.e.) conceptual structure or principals of a discipline), reflection of the mode of inquiry or problem solving styles or syntactical structure
- content organization - possibilities are: simple --> complex, availability, prerequisite learning, chronological, concrete to abstract - definitely should reflect substantive and syntactical structure of discipline, reflect student recovery of meaning, stimulate imagination and interest of student
- very specific curric. objectives are necessary to identify areas of content students are intended to master
- content helps clarify intended outcomes of curric. and indicates teacher treatment of content related to intended outcomes

8. Teaching Strategy
- patterns of teacher behavior designed to facilitate student learning - reasoning style physical clusters of students
- Joyce & West - teaching models have 4 categories: social interaction, information processing, personal sources, behavior modification
- strategies are dependent upon multi-criteria: objectives, availability of materials and environments, student characteristics, teacher preferences and skills etc.
- in general the more complex the innovation the more criteria that need to be examined
- the criteria can each be further refined. Example: "for student characteristics one might use Hunt's model of "conceptual levels" - such that one could state a teaching strategy given a particular set of criteria and the characteristic of each criteria

9.
Learning Experience
- mental & physical responses to curriculum
- assuming a cognitive model the learning experience is a product of interaction between the learner and his environment and it mediates all influences on the pupil achievement
- however, learner experiences are also a function of students' perceptions, interests and past experiences and are therefore out of teacher's influence
- determine order of interaction with materials i.e. gathering facts or developing inquiry skills

10.
Instructional Material
- any materials (in any medium) used by the student in the curriculum
- makes curric. content meaningful to students
- 90 - 95% of available school time is spent interacting directly with instructional material
- little time has been spent identifying the characteristics of instructional material that influence student learning (Klein)
- Popham states: 7 subdimensions of curric. material These following are often left to the teacher's own devices: - pacing - not a priority of materials themselves - sequencing - no empirical evidence supports its relatedness to student learning - organizes, practise, knowledge of results, learner interest, communication channels
- reason instructional materials are so important: - task is too complex for the unaided teacher - so important to student outcomes

12.
Student Outcomes
(not discussed in article)

Criteria Worth Consideration in Describing
An Innovations For Teachers

1. Characteristics of innovation consistent with existing practises, yet giving attention to important novel features of innovation

2. Description of particular dimensions should be compatible with teacher's views of his work

3. Selected dimensions should be compatible with teacher's views of his work

4. Selected dimensions should facilitate description of critical aspects of innovation (not in inferential tone)

5. An innovation is substantially defined by the setting in which it is to be implemented. The needs of differences between particular school settings is evident

6. Often, some aspects of the curriculum are focused upon for implementation and not others .·. emphasising particular dimensions of an innovation for attention is critical since implementation and development approaches are powerful determinants in the nature and degree of implementation

7. Information processing theory suggests change in cognitive and effective structures controlling behaviour of uses of an innovation occurs incrementally .·. examining the stages of growth in behavioral change in each dimension is helpful in measuring how much change is occuring.

   This can determine where further changes in the implementation process should focus.

APPENDIX B

LEVELS OF USE

SCALE POINT DEFINITIONS OF THE LEVELS OF USE OF THE INNOVATION **Levels of Use are distinct states that represent observably different types of behavior and patterns of innovation use as exhibited by individuals and groups. These levels characterize a user's development in acquiring new skills and varying use of the innovation. Each level encompasses a range of behaviors, but is limited by a set of identifiable Decision Points. For descriptive purposes, each level is defined by seven categories.**	CATEGORIES **KNOWLEDGE** **That which the user knows about characteristics of the innovation, how to use it, and consequences of its use. This is cognitive knowledge related to using the innovation, not feelings or attitudes.**	**ACQUIRING INFORMATION** **Solicits information about the innovation in a variety of ways, including questioning resource persons, corresponding with resource agencies, reviewing printed materials, and making visits.**	**SHARING** **Discusses the innovation with others. Shares plans, ideas, resources, outcomes, and problems related to use of the innovation.**
LEVEL 0 NON-USE: State in which the user has little or no knowledge of the innovation, no involvement with the innovation, and is doing nothing toward becoming involved.	Knows nothing about this or similar innovations or has only very limited general knowledge of efforts to develop innovations in the area.	Takes little or no action to solicit information beyond reviewing descriptive information about this or similar innovations when it happens to come to personal attention.	Is not communicating with others about the innovation beyond possibly acknowledging that the innovation exists.
DECISION POINT A	*Takes action to learn more detailed information about the innovation.*		
LEVEL I ORIENTATION: State in which the user has acquired or is acquiring information about the innovation and/or has explored or is exploring its value orientation and its demands upon user and user system.	Knows general information about the innovation such as origin, characteristics, and implementation requirements.	Seeks descriptive material about the innovation. Seeks opinions and knowledge of others through discussions, visits, or workshops.	Discusses the innovation in general terms and/or exchanges descriptive information, materials, or ideas about the innovation and possible implications of its use.
DECISION POINT B	*Makes a decision to use the innovation by establishing a time to begin.*		
LEVEL II PREPARATION: State in which the user is preparing for first use of the innovation.	Knows logistical requirements, necessary resources and timing for initial use of the innovation, and details of initial experiences for clients.	Seeks information and resources specifically related to preparation for use of the innovation in own setting.	Discusses resources needed for initial use of the innovation. Joins others in pre-use training, and in planning for resources, logistics, schedules, etc., in preparation for first use.
DECISION POINT C	*Begins first use of the innovation.*		
LEVEL III MECHANICAL USE: State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs. The user is primarily engaged in a stepwise attempt to master the tasks required to use the innovation, often resulting in disjointed and superficial use.	Knows on a day-to-day basis the requirements for using the innovation. Is more knowledgeable on short-term activities and effects than long-range activities and effects of use of the innovation.	Solicits management information about such things as logistics, scheduling techniques, and ideas for reducing amount of time and work required of user.	Discusses management and logistical issues related to use of the innovation. Resources and materials are shared for purposes of reducing management, flow and logistical problems related to use of the innovation.
DECISION POINT D-1	*A routine pattern of use is established.*		
LEVEL IV A ROUTINE: Use of the innovation is stabilized. Few if any changes are being made in ongoing use. Little preparation or thought is being given to improving innovation use or its consequences.	Knows both short- and long-term requirements for use and how to use the innovation with minimum effort or stress.	Makes no special efforts to seek information as a part of ongoing use of the innovation.	Describes current use of the innovation with little or no reference to ways of changing use.
DECISION POINT D-2	*Changes use of the innovation based on formal or informal evaluation in order to increase client outcomes.*		
LEVEL IV B REFINEMENT: State in which the user varies the use of the innovation to increase the impact on clients within immediate sphere of influence. Variations are based on knowledge of both short- and long-term consequences for clients.	Knows cognitive and affective effects of the innovation on clients and ways for increasing impact on clients.	Solicits information and materials that focus specifically on changing use of the innovation to affect client outcomes.	Discusses own methods of modifying use of the innovation to change client outcomes.
DECISION POINT E	*Initiates changes in use of innovation based on input of and in coordination with what colleagues are doing.*		
LEVEL V INTEGRATION: State in which the user is combining own efforts to use the innovation with related activities of colleagues to achieve a collective impact on clients within their common sphere of influence.	Knows how to coordinate own use of the innovation with colleagues to provide a collective impact on clients.	Solicits information and opinions for the purpose of collaborating with others in use of the innovation.	Discusses efforts to increase client impact through collaboration with others on personal use of the innovation.
DECISION POINT F	*Begins exploring alternatives to or major modifications of the innovation presently in use.*		
LEVEL VI RENEWAL: State in which the user re-evaluates the quality of use of the innovation, seeks major modifications of or alternatives to present innovation to achieve increased impact on clients, examines new developments in the field, and explores new goals for self and the system.	Knows of alternatives that could be used to change or replace the present innovation that would improve the quality of outcomes of its use.	Seeks information and materials about other innovations as alternatives to the present innovation or for making major adaptations in the innovation.	Focuses discussions on identification of major alternatives or replacements for the current innovation.

Procedures for Adopting Educational Innovations Project, Research and Development Center for Teacher Education, University of Texas at Austin, 1975, N.I.E. Contract No. NIE-C-74-0087.

CATEGORIES

ASSESSING	PLANNING	STATUS REPORTING	PERFORMING
Examines the potential or actual use of the innovation or some aspect of it. This can be a mental assessment or can involve actual collection and analysis of data.	**Designs and outlines short- and/or long-range steps to be taken during process of innovation adoption, i.e., aligns resources, schedules activities, meets with others to organize and/or coordinate use of the innovation.**	**Describes personal stand at the present time in relation to use of the innovation.**	**Carries out the actions and activities entailed in operationalizing the innovation.**
Takes no action to analyze the innovation, its characteristics, possible use, or consequences of use.	Schedules no time and specifies no steps for the study or use of the innovation.	Reports little or no personal involvement with the innovation.	Takes no discernible action toward learning about or using the innovation. The innovation and/or its accouterments are not present or in use.
Analyzes and compares materials, content, requirements for use, evaluation reports, potential outcomes, strengths and weaknesses for purpose of making a decision about use of the innovation.	Plans to gather necessary information and resources as needed to make a decision for or against use of the innovation.	Reports presently orienting self to what the innovation is and is not.	Explores the innovation and requirements for its use by talking to others about it, reviewing descriptive information and sample materials, attending orientation sessions, and observing others using it.
Analyzes detailed requirements and available resources for initial use of the innovation.	Identifies steps and procedures entailed in obtaining resources and organizing activities and events for initial use of the innovation.	Reports preparing self for initial use of the innovation.	Studies reference materials in depth, organizes resources and logistics, schedules and receives skill training in preparation for initial use.
Examines own use of the innovation with respect to problems of logistics, management, time, schedules, resources, and general reactions of clients.	Plans for organizing and managing resources, activities, and events related primarily to immediate ongoing use of the innovation. Planned-for changes address managerial or logistical issues with a short-term perspective.	Reports that logistics, time, management, resource organization, etc., are the focus of most personal efforts to use the innovation.	Manages innovation with varying degrees of efficiency. Often lacks anticipation of immediate consequences. The flow of actions in the user and clients is often disjointed, uneven and uncertain. When changes are made, they are primarily in response to logistical and organizational problems.
Limits evaluation activities to those administratively required, with little attention paid to findings for the purpose of changing use.	Plans intermediate and long-range actions with little projected variation in how the innovation will be used. Planning focuses on routine use of resources, personnel, etc.	Reports that personal use of the innovation is going along satisfactorily with few if any problems.	Uses the innovation smoothly with minimal management problems; over time, there is little variation in pattern of use.
Assesses use of the innovation for the purpose of changing current practices to improve client outcomes.	Develops intermediate and long-range plans that anticipate possible and needed steps, resources, and events designed to enhance client outcomes.	Reports varying use of the innovation in order to change client outcomes.	Explores and experiments with alternative combinations of the innovation with existing practices to maximize client involvement and to optimize client outcomes.
Appraises collaborative use of the innovation in terms of client outcomes and strengths and weaknesses of the integrated effort.	Plans specific actions to coordinate own use of the innovation with others to achieve increased impact on clients.	Reports spending time and energy collaborating with others about integrating own use of the innovation.	Collaborates with others in use of the innovation as a means for expanding the innovation's impact on clients. Changes in use are made in coordination with others.
Analyzes advantages and disadvantages of major modifications or alternatives to the present innovation.	Plans activities that involve pursuit of alternatives to enhance or replace the innovation.	Reports considering major modifications of or alternatives to present use of the innovation.	Explores other innovations that could be used in combination with or in place of the present innovation in an attempt to develop more effective means of achieving client outcomes.

Appendix C

Outline of Significant Dimensions in ENCORE

(Summarized From ENCORE Teacher Handbook)

Underlying Programme Assumptions

Civilization is pushing natural systems to the limit of their resilience. People are demanding to know the consequences of changes in natural environments. People need a broader understanding of natural systems' functions to understand particular environmental systems. Understanding natural systems is quite likely a matter of survival.

Objectives

To help students develop in an active and personal way a greater understanding of natural systems.

To help students draw their own conclusions in order to define their own environmental ethic.

Content

Activities which help students focus on natural systems:

- parts of systems
- whole systems
- interrelationships between/among: whole systems, a whole system and its parts, parts of a system(s)

In particular:

- plants
- animals
- forces and elements
- appreciation of above

Time

There is:

No specific time allotment for program.

Each card involves 3+ hours to complete in full.

Teaching Strategy

Use open ended activities which:

- encourage students to develop their own appreciation of the organization and patterns found in nature
- encourage students to draw their own conclusions and solve problems to answer their own questions
- point students in the right direction and suggest first question to ask
- bring students into everyday contact with the environment for easiest learning

Instructional Materials

A cross reference is included to match activities to various plants animals, forces and elements.

- Each card is an activity involving a concept and method which helps the student to establish contact with his surroundings and to start asking questions in an organized manner.

- Each card introduces a topic and helps students explore using the five senses, creative imagination and minimum equipment.

- Each card can stand on its own but is interrelated with the others.
- Each card has three paragraphs:
    1. introduces topic and asks for some initial investigation
    2. gives an activity for a field trip to explore the topic
    3. gives field trip followup activities
- Each card suggests ways the student can communicate his learning.

ENCORE

Dear Colleague:

My name is Craig Worthing and I am presently teaching in Richmond, B.C. I am gathering information about the unique uses of the ENCORE programme so that you, the classroom teacher, can have direct input into the formal implementation of ENCORE. The results of this survey will be communicated immediately to the Ministry of Education so that they are correctly aware of the present status of ENCORE use in B.C. schools. This is important because they are presently considering implementation plans for ENCORE. You can affect those plans!

You have been selected from among the many users of the ENCORE programme to help in this important information gathering project. You were selected because of your personal knowledge about ENCORE. Your response, which will provide a valuable insight into the use of ENCORE, will remain confidential.

ENCORE is one of the first environmental education programmes in B.C. to become prescribed curriculum (Elementary Science Guide, 1981). Every elementary school in the province should have received an ENCORE programme last spring. If your school has not yet received one, you might contact the Ministry of Environment, Victoria.

Please complete and return the questionnaire by May 27 to 13061 15-A Ave., White Rock, B.C. A self-addressed, postage-paid envelope is included for your convenience.

I would be pleased to send you a copy of the results of my findings. Include your return address if you wish a copy. The questions will take approximately 15 minutes to complete.

Thank you very much for your participation.

Yours truly,

D. Craig Worthing

If you have not used ENCORE please explain by checking any of the following which apply:

I don't have access to an ENCORE kit ____
I have not had time to examine it ____
I have no time to use it ____
ENCORE is difficult to understand ____
ENCORE is difficult to use ____
ENCORE is not very interesting ____
Other (please specify) _____

GENERAL INFORMATION

Please respond to the following by "checking" the appropriate spaces:

Gender: male ____ female ____

Number of years teaching prior to September 1982:

0 ____
1 - 4 ____
5 - 7 ____
8 - 10 ____
>10 ____

Grades presently teaching: (check all that apply)

K - 3 ____
4 - 5 ____
6 - 7 ____
secondary ____

Grades taught prior to September 1982: (check all that apply)

K - 3 ____
4 - 5 ____
6 - 7 ____
secondary ____

Years of teaching at present grade.

0 - 1 ____
2 - 3 ____
4 - 5 ____
>5 ____

Additional comments about the characteristics of the materials:

_____

_____

TEACHING: CONTENT

When using ENCORE how frequently do you teach about the following? Check the appropriate category.

I teach the following when I am using ENCORE materials:

	Never	Sometimes (1-2 times)	Often (3-5 times)	Always (6+ times)
1. Animals	___	___	___	___
2. Plants	___	___	___	___
3. Environmental elements and forces	___	___	___	___
4. Relationships among living things	___	___	___	___
5. Relationships between living and non-living things	___	___	___	___
6. Differences between specific natural environments (e.g. forest, marine)	___	___	___	___
7. Concepts such as change, weather, water cycle, micro-climates, example _____	___	___	___	___
8. Waste management in natural environments	___	___	___	___
9. Other (specify _____)	___	___	___	___

Comments about the content of ENCORE are invited (e.g. interesting, appropriate to grade level, comprehensive, would like more cards, needs clearer instructions, . . .) _____

_____

cont.

	Never	Sometimes (1-2 times)	Often (3-5 times)	Always (6+ times)
4. teach a complete unit	___	___	___	___
5. use activity-oriented curriculum	___	___	___	___
6. use as individual student projects	___	___	___	___
7. teach in specific school subjects				
Language Arts	___	___	___	___
Science	___	___	___	___
Social Studies	___	___	___	___
Mathematics	___	___	___	___
Other (please specify)	___	___	___	___
8. help students . . .				
- ask questions such as what, where, when, why, about the natural environment	___	___	___	___
- learn to solve problems	___	___	___	___
- communicate their findings in various ways	___	___	___	___
- gain a direction for frequent exploration of natural environments by presenting stimulating questions	___	___	___	___
- develop their own appreciation of patterns and organization in the natural environment	___	___	___	___
- draw their own conclusions about the value of natural environments	___	___	___	___
- use their five physical senses	___	___	___	___
- gain an interest in lessons by going out-of-doors	___	___	___	___

9. Are there other strategies you have tried? (please specify)

_____

_____

MATERIALS: CHARACTERISTICS

Check whether you agree or disagree that the ENCORE materials have the following characteristics:

The ENCORE materials . . .	Strongly agree	Agree	Don't know	Disagree	Strongly disagree
1. do NOT enable the student to explore in the natural environment	___	___	___	___	___
2. require a minimum of equipment for field trips	___	___	___	___	___
3. do NOT use language and concepts at appropriate student levels	___	___	___	___	___
4. have activities which are difficult to expand into larger studies	___	___	___	___	___
5. encourage students to use their five senses	___	___	___	___	___
6. suggest that students express (e.g. poetry, songs, graphs, etc.) what they have learned	___	___	___	___	___
7. are NOT useable in my preferred subject (specify) _____	___	___	___	___	___
8. do NOT form a programme easily adapted to the core curriculum	___	___	___	___	___
9. do NOT include cards which can stand on their own as individual studies (e.g. leaves)	___	___	___	___	___
10. have very few cards which can be combined with others to develop part or all of a unit	___	___	___	___	___
11. have the majority of cards outlined with three major components - before, during, and after field trip activities	___	___	___	___	___

Present degree(s) held: (check all that apply)

- No degree ___
- Bachelor of Education Elementary ___
- Bachelor of Education Secondary ___
- Master of Education ___
- Master of Arts (_____) ___
- Other (please specify) ___

_____

Your source of information about ENCORE: (check all that apply)

- Colleague ___
- Workshop ___
- Elementary Science Guide ___
- Other (please specify) ___

_____

Does your school have an ENCORE kit?

Yes ___ No ___

Preferred subject for teaching:

- Language Arts ___
- Science ___
- Social Studies ___
- Mathematics ___
- Other (please specify) ___

TEACHING: STRATEGIES

How extensively have you used ENCORE materials in the following ways?

I have used the ENCORE programme to ...	Never	Sometimes (1-2 times)	Often (3-5 times)	Always (6+ times)
1. introduce a concept	___	___	___	___
2. reinforce a concept	___	___	___	___
3. teach about a specific topic (e.g. plants, animals)	___	___	___	___

Which, if any, of the following aspects of ENCORE have you attempted to apply when using the programme? (check all those applicable)

- materials ____
- content ____
- time allotment ____
- teaching strategies ____
- programme objectives ____

Are the underlying assumptions of ENCORE apparent in the programme?

- Yes ____
- No ____

For which, if any, of the following aspects of ENCORE have you been able to determine the effectiveness? (Check all those applicable)

- materials ____
- content ____
- time allotment ____
- teaching strategies ____

For which, if any, of the following aspects of ENCORE have you been able to determine the suitability? (check all those applicable)

- underlying programme assumptions ____
- programme objectives ____

Which, if any, of the following aspects of ENCORE have you modified to increase effectiveness? (check all those applicable)

- materials ____
- content ____
- time allotment ____
- teaching strategies ____
- programme objectives ____

Are you generally in agreement with the underlying programme assumptions when using ENCORE?

- Yes ____
- No ____
- assumptions not apparent ____

TIME

Estimate the amount of time spent on the following:

1. Average preparation time before using an ENCORE card with your students:
   - Minutes
   - 0 - 15 ____
   - 15 - 30 ____
   - 30 - 60 ____
   - 60+ ____
2. Average time spent by a student using an individual card while at school:
   - Hours
   - 0 - 1 ____
   - 1 - 2 ____
   - 2 - 3 ____
   - 3+ ____
3. Approximate time spent by your class in a month when most actively using ENCORE as part of student studies:
   - Hours
   - 0 - 2 ____
   - 2 - 3 ____
   - 3 - 6 ____
   - 6+ ____

What comments do you have regarding time required for using ENCORE?

_____

_____

SUMMARY

With which of the following aspects of ENCORE were you familiar prior to the survey? (Check all those applicable)

- materials ____
- content ____
- time allotment ____
- teaching strategies ____
- underlying programme assumptions ____
- programme objectives ____

over →

Appendix E

Typical Behavior Exhibited By A Teacher
Who Is A Specific Level Of Use
With Respect To Each Dimension Of ENCORE

Materials

Level 1 - is able to confirm he is familiar with the materials

Level 2 - is able to confirm he has attempted to apply the materials

Level 3 - is able to confirm he had determined the effectiveness of the materials of the programme

Level 4 - is able to confirm he has, in some way, modified the materials

Content

Level 1 - is able to confirm he is familiar with the content

Level 2 - is able to confirm he has attempted to apply the content

Level 3 - is able to confirm he has determined the effectiveness of the content

Level 4 - is able to confirm he has, in some way, modified the content

Time Allotment

Level 1 - is able to confirm he is familiar with the suggested time allotment

Level 2 - is able to confirm he has attempted to apply the suggested time allotment

Level 3 - is able to confirm he has determined the effectiveness of the suggested time allotment

Level 4 - is able to confirm he has, in some way, modified the time allotment

Teaching Strategies

Level 1 - is able to confirm he is familiar with the teaching strategies

Level 2 - is able to confirm he has attempted to apply the teaching strategies

Level 3 - is able to confirm he has determined the effectiveness of the teaching strategies

Level 4 - is able to confirm he has, in some way, modified the teaching strategies

Programme Objectives

Level 1 - is able to confirm he is familiar with the programme objectives

Level 2 - is able to confirm he has attempted to apply the programme objectives

Level 3 - is able to confirm he has determined the suitability of the programme objectives

Level 4 - is able to confirm he has, in some way, modified the programme objectives

Underlying Programme Assumptions

Level 1 - is able to confirm he is familiar with the programme assumptioms

Level 2 - is able to confirm the programme assumptions are apparent in the programme

Level 3 - is able to confirm he has determined the suitability of the programme assumptions

Level 4 - is able to confirm whether he agrees with the programme assumptions

FOREST/WILDLAND

Materials: notebook, pencil, field guide to plants, collecting bag

All evergreen trees, or conifers, carry needles for leaves. The shape, size, and arrangement of needles on a branch can be used to identify these trees. Find out what the word ***coniferous*** *means and what a number of different coniferous trees look like.*

At the site, examine as many coniferous trees as possible. Write a short note on the approximate size, height, colour, arrangement of branches and condition of each one. Try to find a branch that has fallen from each type of tree and study the needles on each branch. Use a field guide to identify the trees from which the branches have fallen, then take several small samples of the fallen branches with you.

Make a forest collage with the needles you have gathered. Find out why some trees have round, hard needles for leaves, while others have broad, flat plates. Do you think **evergreen** is a good descriptive word for coniferous trees? Why? Find out whether or not evergreen trees lose their needles, and if they do, how they appear ever-green.

Larch and Douglas Fir branches

Illustration: Dianne Bersea

FOREST/RURAL 34

Materials: notebook, pencil, necessary equipment

Plants grow up towards the sun, but up is not always straight up. Before the field trip, find out how to measure the angles of large objects. Take the necessary equipment with you when you go.

At the field trip site, measure and note the angles at which 30 plants grow from the ground. Estimate the angles at which the branches and leaves of plants grow away from the central stem. Does this growth pattern vary from plant to plant? Why do you think leaves and plants grow as they do?

Learn why trunks, branches and leaves grow in specific patterns. Why don't branches grow underground or roots grow in the air? Draw several imaginary plants that grow upside-down.

Angles and patterns of growth

Illustration: Nettie Adams

OPENSPACES/URBAN 154

Materials: notebook, clipboard, drawing paper, pencil, 4 pegs, 40 feet of string

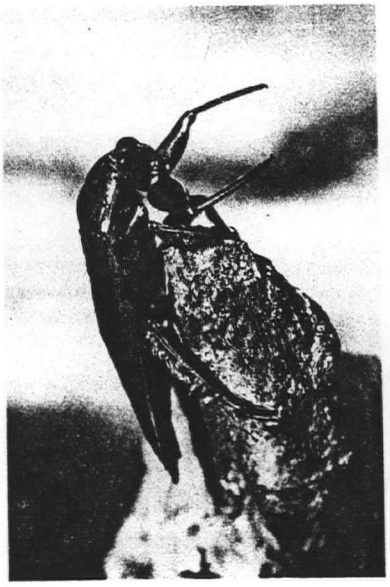
Grasses grow in groups, mosses in mats, bushes in bunches, and clovers in clusters. In fact, most plants grow in predictable patterns.

At the site, use 4 pegs and 40 feet of string to mark off a 10 foot square of lawn. Map where the dandelions, clover, chickweed, grasses, and all other plants grow within the area. If you do not recognize a type of plant, draw a detailed picture of it and identify it later. When your study of that square is complete, repeat it in a neighbouring lawn area. Compare the numbers and arrangements of weeds within the two squares.

Find out what things affect the growth of city plants. Make one list of things that help their growth, such as sunlight, and another of things that limit their growth, such as car pollution. Try to include things related to people in both lists.

Fireweed and chicory are common city plants

Illustration: Dianne Bersea



FOREST/URBAN 75

Materials: notebook, pencil

A bug is a bug is a bug. Is it true that when you have seen one bug you've seen them all? Before the field trip, find pictures of a centipede, a millipede, a spider, a beetle, and any flying insect. These are all bugs, but can you count the ways in which they differ from one another?

At the site, look for each of these creatures. Watch them for a while, noting what they look like, how they move, and what they are doing. While watching, write a riddle for each bug you have found.

Give your riddles to another person to answer. Use the pictures you found before the field trip to make up another series of riddles about the ways in which these bugs differ from one another.

Giant Water beetle

Illustration: Richard Wright

OPENSPACES/WILDLAND 113

Materials: notebook, pencil

Mother Nature doesn't leave cleared areas without life. Within a short time after clearance, plants and animals will begin to fill a once-empty space. Five, ten, or twenty years after land has been cleared, it will be closed in and covered with grasses, shrubs, and trees.

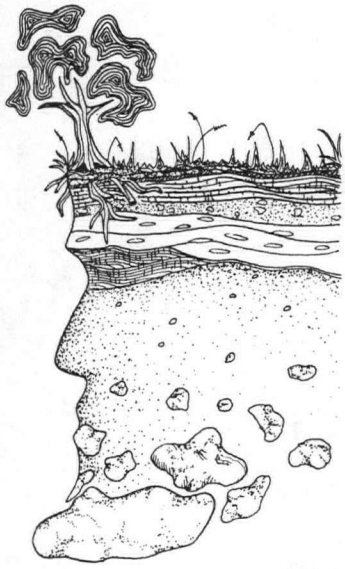
Has the open space of the site been there a long time or did it occur recently? Within your lifetime? What evidence can you find? How could you **prove** that it is an old or a new open space? Will it continue to be an open space for a long time to come? Why, or why not? Compare the length of time it takes people to clear an area to the length of time plants need to fill it in.

Imagine what the site will look like when you are a grandparent. What could you tell your grandchildren about the good old days at the site? Do you think the area will have changed very much? As much as you will have?

Open spaces fill in

Illustration: M.E. Schretlen

OPENSPACES/RURAL 138



Materials: notebook, pencil, trowel, 12" ruler

Soil is made of different layers of material that form on top of one another. A cross-section of these layers is called a soil profile. Find or draw a picture of a soil profile before the field trip; use it to learn how layers of soil are formed.

Look at a soil profile at the field trip site. First, choose a place where few plants will be damaged, then carefully dig into the earth to a depth of 30 centimeters. Make a note of:

1. the number of layers of soil
2. the depth of each layer
3. the colour, texture and odour of each layer.

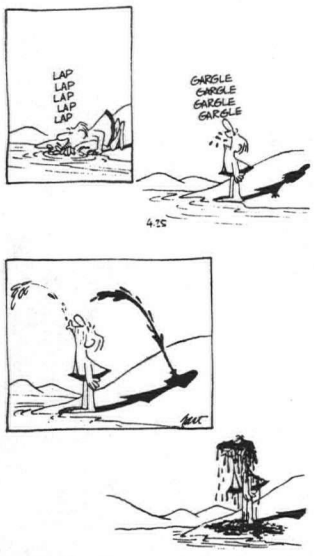
When you are finished, carefully fill in the hole and leave the area as you found it.

Find out what makes each soil layer different from the ones above and below it. What stories can the layers of the earth tell? Make up a history of the field trip site based on what you saw in the soil profile. Learn how geologists and archeologists read soil profiles.

Soil profile

Illustration: Brenda Guild

WATERBODIES 256



Materials: notebook, pencil

If the ground could talk or water could listen, what do you think would be said and heard?

At the field trip site, sit by yourself close to the water and listen to it. What do you see and hear? Can it tell you anything? Does every sound that is heard at the site have an obvious source? Make a note of all the reasons you know of for the sounds and movements you see. Are you a good audience?

Write a short play of all that occurred at the site as you watched, with the water and trees as the main characters.

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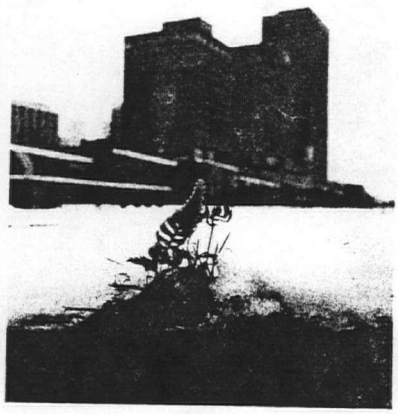
ONGOING PROJECTS 232



The city is an ideal place for people who live there to begin studying nature. Although nature is more readily evident in rural and wildland areas, there is much to see and know in a city neighbourhood.

In the fall, look for green living things near your home. Begin making a collage of photos, drawings, names and words to describe all that you find, from weeds in pavement cracks to lichens growing on fence posts. Add to it as you discover more things.

In the spring, make a second collage of all the new growth that appears in the warm spring months.

A city plant

Illustration: Mits Naga

INTERTIDAL 182

Materials: notebook, clipboard, drawing paper, pencil

Seaweeds are plants of the ocean; they differ in many ways from plants on land. Before the field trip, look through a book of seaweeds to see what sizes, shapes, and colours they can be.

At the field trip site, look through the seaweeds that have been brought in by the tides. Find and compare 3 different kinds. Do they have roots? Trunks? Branches? Find a fern or moss plant inland from the beach and compare it to the seaweeds. Draw detailed pictures of the two plants, emphasizing the ways in which they differ.

After the field trip, find out how a seaweed survives underwater. Design and name an imaginary fern or moss plant that spends half of its time in the wind and half in the water. What features would it need in order to survive? Do you think your invented plant has existed, or ever will?

Seaweeds: ***Laminaria*** *and* ***Ulna***

Illustration: Dianne Bersea

Appendix G

Subject Cross Reference

SUBJECT OF CARDS	FOREST/ WILDLAND (1-30)	FOREST/ RURAL (31-60)	FOREST/ URBAN (61-90)	OPENSPACE/ WILDLAND (91-120)	OPENSPACE/ RURAL (121-150)	OPENSPACE/ URBAN (151-180)	INTER-TIDAL (181-212)	ONGOING PROJECTS (213-244)	WATER-BODIES (245-256)
ECOLOGY	20,21,22, 23,24,25, 26,27,30	36,39,44, 45,46,47, 48,50,51, 53,54,55, 56,57,58, 59	64,67,77, 84,85,86, 87,88,89, 90	94,101,103, 112,113,114, 115,117	123,124,128, 130,133,137, 141,142,143, 144,145,147, 148,149,150	154,155,169, 172,174,175, 176,177,178, 179,180	191,193,198, 200,204,205, 207,208,210	213,219,223, 224,226,227, 228,229,230, 231,232,233, 234,240,241, 242,244	250,253,254
BOTANY	1,2,3, 4,5,6, 7,8,9, 10,11,20	31,32,33, 34,35,36, 37,38,39, 40,41,42, 43,52,55	61,62,63, 64,65,66, 67,68,69, 70,71,72, 73,83,87	91,92,93, 94,95,96, 97,98,99, 100,110,114	121,122,123, 124,125,126, 127,128,129, 143,144,145 147	151,152,153, 154,155,156, 157,158,159, 160	181,182,183, 184,188	213,217,220, 222,223,224, 228,231,232, 233,234	245
ZOOLOGY	4,12,13, 14,15,16, 25	36,44,45, 46,47,48, 53,56	64,73,74, 75,76,77, 78,79,86	101,102,103, 104,105,106	131,132,133, 134,135,136, 143,145	161,162,163, 164,165,166, 174,176	185,186,187, 188,189,190, 191,192,193, 194,195,196, 197	215,216,219, 221,223,230, 231,232,235, 236,238,239, 241,244	247,248,249
SOCIAL STUDIES	17,22,24, 28,29	44,45,46, 54,58	71,74,83, 85,89	103,105,112, 113,118,120	122,124,125, 129,133,134, 135,138,139, 140,141,144, 147,148,150	151,152,153, 157,161,162, 167,172,173, 180	184,203,206, 207,209,210, 211,212	214,219,225, 226,227,228, 230,231,237, 242,244	253,254
GEOGRAPHY & PHYSICAL SCIENCES	17,18,19, 20	49,50,51, 52	80,81,82, 85	107,108,109, 110,111,113, 115,116,119	137,138,139, 140,141,148 149	155,167,168, 169,170,171, 172	198,199,200 201,202	221,224,228, 231,240,243	247,250,251, 252,254,255, 256
LANGUAGE ARTS	2,3,5, 7,9,14, 15,17,18, 24,27,28, 29,30	33,37,38, 40,42,44, 45,47,48, 49,50,53, 56,57,58, 59,60	61,62,66, 68,70,72, 73,74,75, 76,78,79, 80,81,82, 84,88,89	91,92,96, 99,100,106, 107,109,111, 112,114,117, 118,119	121,122,123, 125,135,138, 139,146,147	155,158,159, 162,163,164, 165,166,168, 169,173,175, 176,179,180	185,186,187, 188,190,197, 200,203,204, 205,206,207, 208,209	214,218,225, 229,231,238, 239,243	247,248,249, 253,255,256
ARTS	1,6,8, 9,11,21, 25	33,34,35, 39,41,43, 45,47,48, 51,55	61,63,64, 67,68,69, 70,73,77, 81,82,83, 86,87,90	92,93,94, 95,96,97, 98,99,102, 108,109,117, 119,120	123,126,127, 128,129,130, 131,134,137, 140,146,149	151,152,153, 156,159,160, 164,170,171, 172,177,179, 180	181,182,183, 185,192,193, 195,196,198, 200,205,207, 210,211	213,215,216, 221,222,223, 225,228,230, 231,232,235, 236,237,239	245,248,250, 252,253
MATHEMATICS	1,2,18, 29	33,34	63,77,90	103,104,105, 110	135,142,148, 149	154,174,175, 176,177	185,189,197, 202	217,231	
MUSIC (SOUND)		57	61,79,88	120	139	169		218,220,231, 237,239	

Animal Life Cross Reference

SUBJECT OF CARDS	FOREST/ WILDLAND	OPENSPACE/ WILDLAND	FOREST/ RURAL	OPENSPACE/ RURAL	FOREST/ URBAN	OPENSPACE/ URBAN	INTER-TIDAL	ONGOING PROJECTS	WATER-BODIES
ANEMONES							188		
ANIMAL BEHAVIOUR			48			162		215	
ANIMAL LIFE GENERAL	13		44, 45	136	74	161	204	239, 244	249, 250
ANIMAL STRUCTURE				130, 131		164	195	235	
ANTS						162		230	
BARNACLES							187		
BEETLES			47						
BIRDS	14	105, 106	48, 56	132, 133, 134, 136	79	165	193, 196	216, 241	
CHARACTERISTICS	13	102, 105							
CRABS							185, 187		
CAMOUFLAGE	25		46			174			
FEATHERS								236	
FISH							191		
HABITAT	4	101, 103	40, 42, 45, 47, 53	124, 133, 134, 135, 143	86	172	204, 207	230, 241	247, 250
HUNTING								219	
INSECTS	15, 25	104		131, 145	75, 86	162, 163, 176	190	238	247, 248
MAMMALS	12		44	135		166			
NICHE		101, 103							
PESTICIDES				144				233	249
SHELLS							195		
SLUGS					76				
SNAILS							194		
SPIDERS	16				77	163			
STARFISH							189		
WOODBUGS					78				
WORMS						164	186, 192	230	

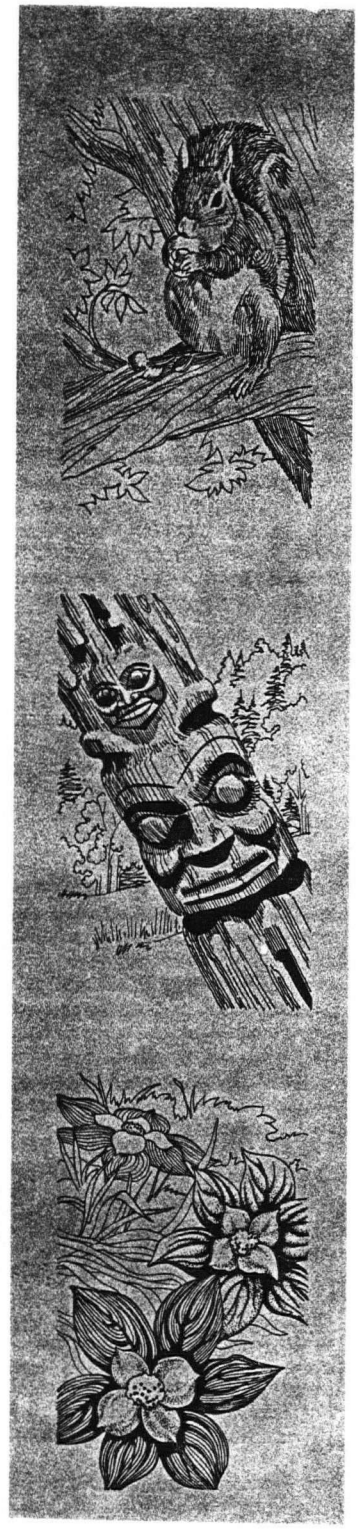
Plant Life Cross Reference

SUBJECT OF CARDS	FOREST/ WILDLAND	OPENSPACE/ WILDLAND	FOREST/ RURAL	OPENSPACE/ RURAL	FOREST/ URBAN	OPENSPACE/ URBAN	INTER-TIDAL	ONGOING PROJECTS	WATER-BODIES
ALGAE & SEAWEEDS							181, 182, 183, 184		
COMPARISON	3, 4, 5, 7	91, 112	31, 35, 38	122, 129	64, 73, 84	151, 154, 156, 158	181, 182		246
FERNS	11				69				
FERTILIZER				125				229	
FLOWERS	7	99	36		66	156			
FUNGI			41		72	159			
GRASSES		99	38	122, 127	68				
GROWTH PATTERNS		94, 99	42	123, 124	71, 72	154, 155			
HERBICIDES				144				233	249
LEAVES	1, 5, 6	96, 97	35		67			222	
LICHENS	9	100	40		71	157			
MOSSES			39		70				
PLANT LIFE		114		124		154		213, 232	
PLANT GROWTH		110, 113	31, 52, 34	125		160		217, 222, 224, 228, 232, 234	
PLANT STRUCTURE		91, 93, 98	31, 33, 34, 36, 37, 38	121, 126	66, 68	156, 158			245, 246
ROOTS		98		126		180			
SEEDS & SPORES	8, 10			128, 129		159, 160			
SHRUBS	3				65				
STUMPS					63				
TERRARIUM								234	
TREES	1, 2, 3, 5		31, 32, 33		61, 62, 64				
WEEDS						152			

Cross Reference continued

SUBJECT OF CARD	FOREST/ WILDLAND	OPENSPACE/ WILDLAND	FOREST/ RURAL	OPENSPACE/ RURAL	FOREST/ URBAN	OPENSPACE/ URBAN	INTERTIDAL	ONGOING PROJECTS	WATERBODIES
ELEMENTS & FORCES									
BEACH							198, 199, 201		
ELEMENTS	17	108, 110				168, 169			
EROSION	19	107						221	
ROCKS		111		129		170	199		
SALT WATER							198, 202		
SOIL	20	111	52	138	82	171		224	
TIDE POOLS							200		
WATER	19	109	51	139, 140	81		198	240	247, 250, 251, 252, 253, 254, 255
WEATHER & WEATHERING	18, 19	107, 111	49, 50	137, 139	80	168, 169		243	
INTERACTION									
ADAPTATION	14	97, 101, 102, 110, 119		128, 132	78	163, 166, 172, 174	182, 191, 193, 195, 198, 205	236	245, 246
CHANGE	21, 22	112, 113, 114	54	124, 142, 148, 150	83, 84, 85	152, 173, 161	203		248
CYCLES	21	116			84				
DEATH	21, 24			130, 147					
ECOLOGY & THE ENVIRONMENT	23	116		148				242	
INTERACTION GENERAL	12, 23	103, 109, 113, 115	53, 56	134, 137, 141, 142, 145	61, 85, 86	163, 172, 173, 176	192	229, 244	
INTERDEPENDENCE	23	115	55	141, 143, 144, 145	73	175	205		
LIFE	30		59		84, 86				
POLLUTION						154, 157	211	223, 228, 233, 240, 242	254
RECYCLE								226	
APPRECIATION									
MYTHS & LEGENDS	18			139	72	165	206	237	
OBSERVATION	26, 27, 29	120	31, 32, 58, 59, 60	121, 138, 143, 146, 149, 150	61, 65, 88	151, 155, 161, 178 179	183, 208, 209, 210	225, 227 229, 230, 232, 235, 243	253, 256
PATTERNS & COLOURS		96, 117, 119			63, 87	177		222	
PERCEPTION & PERSPECTIVES	26, 28, 30	108, 119, 120	58, 59, 60	148	62, 88, 89	167, 180	203, 204, 206, 207, 212	214, 218, 220, 223, 225, 227, 231, 235	250
SHAPES & TEXTURES	8, 25	95			90	167	208		250
USES		94	39, 43, 55, 58	125, 129, 138	71, 74	152, 153	184, 203, 209, 212		
WORDS & NAMES	12, 29	92, 117, 118	32, 33, 44, 49, 50, 57	122, 137, 146, 147	70, 74, 75, 76, 80, 83, 84	152, 168, 170, 175, 178	185, 208	229	252

Appendix H



At a time when our civilization seems determined to push natural systems to the limit of their resilience, a good understanding of these systems and the ways in which we relate to them is a matter not simply of interest but quite likely of survival. More and more people are recognizing this, and as a result, are demanding to know the consequences of changes taking place around them. Agencies charged with environmental management responsibilities, such as the Ministry of Environment, are making major efforts to provide this kind of information to the public. But both they and the public for whom it is intended have come to realize that the details of any particular environmental situation can only be understood in the context of a broader understanding of how natural systems function.

We can learn about our surroundings in many ways. Sometimes the lessons are cruel ones, such as when we are confronted with the consequences of major environmental changes. But we can learn most easily through our everyday contacts with the many environments that we relate to or simply pass through in the course of our various activities. These lessons are subtle ones, but they are extremely important because they can teach us not only the working mechanisms of these environments, but also about our own feelings and sympathies for other parts of the living world.

Such contacts take many forms. The naturalist seeks out these experiences directly. The recreationalist develops his contacts as a by-product of a particular outdoor activity such as hiking, hunting, fishing or canoeing. Even the individual who has no organized outdoor activities is nonetheless constantly interacting with many environments which may arouse his curiousity or present him with new ideas. All of these are valid ways of learning about our surroundings, and as similar components and relationships exist in all environments from the center of a city to a wilderness area, it is obvious that the opportunity to learn is readily available. What is most often required is a system for learning — a means of pointing us in the right direction and suggesting the first questions to ask.

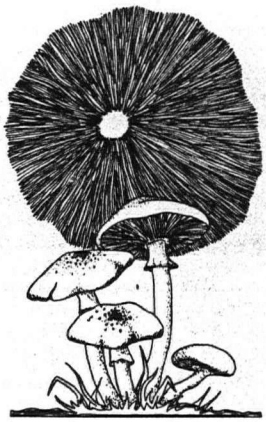
Programs designed to inform or educate often grow from the questions "What is this?" "Why is it this way?" Recreation programs just as often grow from such queries as "Where is there to go?" "What is there to do?" ENCORE is a response to all these questions, and it also attempts to answer another question which is probably the most important of all: that is, "Why do we bother?"

By providing somewhere to go, and something to do, ENCORE generates the curiousity that prompts such questions as "What?" "Why?" and "When?". The pleasure of experiencing and learning through answering these questions is part of what makes the bother worthwhile.

With an understanding of natural systems as its goal, this program could have been developed simply by laying out the principles of Ecology, or environmental science, and describing a series of activities to illustrate each of these. It was not. Instead, we have assembled a series of activities that are intended to encourage students to develop their own appreciation of the organization and patterns found in nature and to draw their own conclusions about what these mean. ENCORE is not, in itself, an attempt at detailed descriptions of environments or the mechanisms of natural systems. It is simply a means of making contact with our surroundings and of starting to ask questions in an organized manner. The lessons as well as the conclusions depend much more on the individual student than on the program itself. But in drawing their own conclusions, they are beginning the design of their own environmental ethic, which must be an individual and personal thing if it is to have any real meaning.

This different approach in the program has also resulted in a rather different format; hence, a word of warning. While a series of booklets and booklet-supplements have been produced to assist in program development, these are not the main focus of the program and it is not in these that a good understanding of the program is to be found. As ENCORE is an activity program, the real basis of the program is to be found in the activity cards. It is here that the activities, the concepts and the methods are located, both individually as single units and collectively, as a more complete survey of a particular environment. But even these are not an end in themselves. Each concept illustrated by an activity card is much broader and more detailed than could possibly be revealed by a single activity. In this way, each individual card should be seen as an introduction to a particular topic, any one of which could quite possibly be expanded into an entire program.

As suggested by its title, ENCORE is the second step in a series of educational programs which began with CORE, or the Conservation and Outdoor Recreation Education program. As an essentially recreation oriented program, CORE was unable to provide a means of introducing broader environmental concepts and ENCORE was produced to fill this gap. However, recreational and awareness programs are two sides of the same coin, with recreation acting as a mechanism for making contact with outdoor environments and awareness adding another dimension to the outdoor experience. In this way we hope that the programs will be seen as complimentary and, further, that ENCORE will satisfy some of the needs identified by those who have worked so hard to make CORE a success.

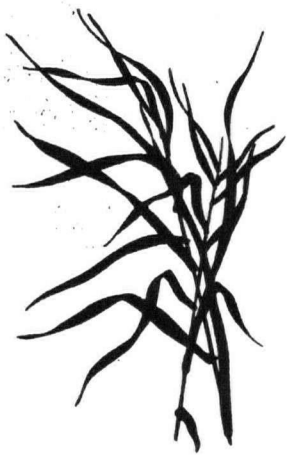


The Environment

The term 'environment' is one with which we have become very familiar in the past decade. With a great deal of attention placed on "saving the environment," the word became synonymous with preventing pollution and conserving our vanishing wilderness. The environment was seen as something fragile, disappearing, and far too large and complex for the average person to understand.

Although this rather gloomy definition served as most people's introduction to the concept of 'environment,' a more positive definition of the term has grown. *The environment is the totality of where we live, from busy city streets to distant alpine meadows.* This means that we needn't drive miles to a wilderness area in order to learn about the environment and we needn't take a course in ecology in order to understand it. It also means that the environment is not something for which only experts are responsible.

Quite simply, environment means surroundings. Awareness of the parts and functions of our surroundings is the first step in learning to appreciate our world and to being responsible for our impact on it.



Environmental Education

If 'environment' means surroundings, then environmental education means learning about our surroundings.

One way to begin learning about our surroundings is to study one type of environment closely to see what it contains and how it works. From knowing one system well, we can begin to see how other, different environments work. This has been the approach most often used in environmental education.

There has been a tendency in many localities to base a program on a single site, usually a large semi-wilderness area several miles out of an urban centre. This approach provides some security allowing for the construction of overnight field trip facilities and the development of in-depth site programs. It can, however, create some problems.

For city people, the initial concept learned may be that the environment is something "out there," something which they will come in contact with only on holiday weekends. Also, obtaining, developing, and maintaining an environmental education site can be expensive and time consuming. Finally, when a large number of people use a single site, they may destroy the very things they came to study.

If environment means our total surroundings, then the place to begin learning about it is anywhere and everywhere. But the freedom to choose your own starting points, or your own field trip sites, can be as confusing as the one-site-only approach is limiting. Where should you begin? Once you've begun, what should you look for? What should you do with what you've learned? The ENCORE program has been designed to help you answer these questions.

The Encore Program

Several years ago the British Columbia Department of Recreation and Conservation published a program entitled the Conservation and Outdoor Recreation Education program, or C O R E. This program forms the basis of a hunter training course offered by the British Columbia Fish and Wildlife Branch. Although it is only compulsory for all first-time hunters in the Province, many people such as students, teachers, parents, and community groups have taken the course as an introduction to the outdoors, as well as an introduction to various aspects of hunting. Feedback from these people

indicated that another outdoor program, with more emphasis on general awareness and appreciation of the environment, would be of value.

ENCORE is a program of environmental studies for people who would like to learn more about their surroundings. It is an introduction to the plants, animals, elements, and forces of a wide range of environments.

ENCORE evolved and grew with two major goals: first, to produce a program that could be used at almost any nature site in British Columbia, from city to wilderness areas, and second, to help people learn about the environment in an active, personal way. ENCORE consists of an introductory book, a site catalogue, and a set of 256 activity cards.

Terminology

It is hoped that all words and phrases used in ENCORE are easy to understand. An internationally known scientist at the University of British Columbia once said that he often tried to explain his latest work to ten to twelve year old people. If they could not understand his theories and proofs, he knew he had not explained them well or he had more research to do. When ENCORE was being developed, this anecdote served as an important guide.

Approaches to Learning

Learning about an environment is not just for naturalists and scientists. For some, knowing the names of species, measuring the natural world, and writing detailed reports are good ways to learn. However, this is not true for everyone. Others may want to create their own names for things, to express the personal way they feel about them. They may want to relate to the natural world by hiking, canoeing, camping, or cycling through it. They may want to write songs and stories to share what they know about it. ENCORE includes these and other ways of getting to know an environment and becoming involved with it. They are, in general, the approaches of the *Naturalist*, *Artist*, and *Recreationist*. There are activities for each approach, although *Naturalist* and *Artist* activities are more prevalent, since the C.O.R.E. program was designed primarily for the recreationalist.

Equipment and Supplies

In ENCORE, the equipment and supplies needed are minimal. In most cases, only a pencil and notebook are necessary. If other things are required, they are specified. It is important to remember that the most valuable things to take on a field trip, other than what is necessary for physical comfort, are five keen senses and a creative imagination.

Categories of Environments

The phrase "environment means surroundings" is the basis for ENCORE. But since learning everything about everywhere is impossible, 'environment' in ENCORE is limited to the *natural* environment. This doesn't mean that human-constructed environments are excluded, for natural systems and forces have many expressions in the city, and this is often the best place for a city person to begin learning about nature. The 'natural' focus of ENCORE means that the study of an area is limited to the study of plants, animals, elements, and forces that compose it, rather than the social and cultural aspects that dominate many environments.

The diversity of natural environments in British Columbia makes it a beautiful and unique province, but this diversity can pose problems for those who want to begin learning about their surroundings. The choices of starting points are almost infinite. In ENCORE, a system for categorizing different types of environments was devised. It is a simple, flexible system, with the ENCORE program built around it. It is meant as an aid to the use of the program, not a definitive way of categorizing environments.

The purpose of the ENCORE program is to suggest ways to seeing and learning about the natural world. Yet it is obvious that some activities are more suitable at one place than another. Learning to see the rhythm of life in a city park is very different from learning about life in an evergreen forest. ENCORE divides environments into seven main categories, to make it easier for people to know which activities might be more suitable at one site than another.

When we first visit a site, we notice a great number of things about it. If the site is to be categorized, these many things must be placed in some logical order. Two major aspects of a site are considered most important in the ENCORE classification system. First, the appearance of an area is affected by the amount of plant cover present. In very general terms, areas can be separated into those that have trees on them and those that are open spaces. In ENCORE, these are called FOREST and OPENSPACE areas. Secondly, the way in which people have developed an area affects its appearance. Many thousands of acres in British Columbia have been changed by people to varying degrees. Three general terms, WILDLAND, RURAL, and URBAN are used in ENCORE to describe the extent to which people have affected an environment.

When the two features of plant cover (FOREST and OPENSPACE) and development (WILDLAND, RURAL, and URBAN) are combined, they form six distinct categories of environments.

The shoreline of the ocean is a unique environment, not covered by these descriptions. An INTERTIDAL category is included for the study of coastal areas.

These seven categories describe, very generally, every type of environment in British Columbia. It is important to remember that the categories are designed to make the ENCORE program easier to use, not to describe any particular site. Many areas are patchworks of forested and cleared land.

or contain both developed and undeveloped sections. A field trip site may be a combination of two or more categories of environments. The value of this classification system is that it creates a starting point when we begin to learn about the environment and it serves as a reference point as we proceed.

The Encore Site Catalogue

The site catalogue lists a number of places in British Columbia where environmental studies are possible. The catalogue is not a complete listing of environmental education sites in the province, nor was it intended to be. The purpose of the catalogue is to give the beginner in outdoor studies an idea of the range of field trip areas suitable for study, with a few examples listed for most areas of the province. Once the idea that any site is suitable becomes familiar, the catalogue should no longer be needed.

The sites are listed by the seven Resource Management Regions of British Columbia, then further divided into School Districts within these areas. Each assessment includes the name, location, and a brief descriptive paragraph of the site. In addition, each site is keyed to the ENCORE site classification system so that the appropriate set or sets of activity cards can be taken on the field trip.

The Encore Activity Cards

The activity cards are the focus of the ENCORE program; the introductory book and the site catalogue are complements.

Activity cards are not a new concept, but the ways in which they can be used have grown. Flash cards are an early form of activity card, valuable when

learning arithmetic and spelling, and for simple identification tasks. Each card is a separate section that interrelates with all the rest; in this way, a new and complex subject can be divided into workable units. The ENCORE activity cards are an extension of this idea although each has much more information on it than a flash card.

There are 256 ENCORE activity cards, covering many topics and many ways of learning about different types of environments. The most immediate purpose of the cards is to solve the problem of having "nothing to do" on a field trip. They offer ways to begin learning about and enjoying any environment.

Format

The activity ideas could have been written in book form, but cards have a number of advantages. Their format and design is more appealing than a list of activities, particularly for younger people. Each idea can be presented in a unique way, which allows people using the activity cards to use their imagination as they explore an environment. The cards can be more easily distributed to a group than information from a book, and they can easily be taken outdoors.

There is a set of 30 activity cards for every type of environment described by the ENCORE classification system. This means there are cards to take to FOREST/WILDLAND, FOREST/RURAL and FOREST/URBAN areas, as well as to OPENSPACE/WILDLAND, OPENSPACE/RURAL, OPENSPACE/URBAN, and INTERTIDAL areas. Any of the FOREST or OPENSPACE categories could contain a water body, so a set of 12 WATERBODY cards is included. Finally, for those who wish to do a project over a number of weeks or months, rather than a single activity on a single field trip, a set of 32 ONGOING activity cards is also included.

Each card has a list of materials needed, three paragraphs of text, an illustration, and a number from one to 256. Each set is printed in a different colour, so it may be easily distinguished from other sets.

The list of materials needed are only those to be taken on the field trip. If a pre-trip or follow-up activity is to be done, the materials needed are either mentioned in the text or the activity is one for which standard materials can be used. With few exceptions, all materials needed are commonplace and inexpensive.

All cards, except those from the ONGOING category, have three paragraphs of text. The first paragraph is an introduction to the subject or activity of the card. Approximately half of the activities involve obtaining information or materials before the field trip; such pre-trip activity is contained in this first paragraph.

The second paragraph describes the activity to be done at the site. Each requires from one-half to three hours of outdoor involvement, although most can be expanded to longer projects.

The third paragraph contains suggestions for follow-up activities. These are related to the field trip activity and provides ways for expressing, interpreting, or expanding what was learned on the field trip.

The illustrations on the cards show some aspect of the subject or activity of the card. They include pen-and-ink line drawings, photographs, "B.C." cartoons by Johnny Hart, and a number of M. C. Escher graphics; they were selected to encourage a variety of approaches in the study of the card topic.

Each card is numbered for easy reference. These numbers also form the basis for the cross-referencing tables of card activity and subject included in this book.

Topics

The ENCORE activity cards offer many suggestions on ways to learn about an environment and ideas for things to do while visiting a site. The activities are designed to illustrate some of the things that make each category of environment unique. A set of cards thus covers a wide range of subjects, making the overview of each environment as complete as possible. The subjects of the activity cards can be arranged into five general sections: *Plant life, Animal life, Elements and Forces, Interaction,* and *Appreciation.*

Plant life: Plants are often the most obvious parts of a natural environment. Ten of the 30 cards in each set deal with plant life. The subjects of these cards range from fungi and trees to patterns of growth and change.

Animal life: Larger animals are often difficult to find in natural environments. In ENCORE Animal life includes insects, birds, and other small creatures, as well as prints and traces of larger animals. In each set of 30 cards there are five activities for studying animal life.

Elements and Forces: The non-living parts of an environment such as soil, weather, and water are as important as the living ones. Each set of 30 cards contains five activities relating to elements and forces.

Interaction: This term describes the relationships between living things and their environment. Five activities in each set of cards deal with interaction.

Appreciation: Five cards in each set of 30 deal with the ways in which the environment for some part of it affects an individual. Appreciation includes such subjects as perspectives, patterns and colours, and words and names.

All of the cards have been cross-referenced as to card subject and card activity. This means that a person interested only in learning about trees, birds, or soil can quickly find out which cards deal with these specific subjects. Likewise, a person interested only in art, history, or geology can quickly find out which cards deal with these specific activities. These cross-reference tables can be found on the last pages of this book.

Use of the Encore Program

ENCORE is not designed for use by any group of people in particular, nor is it a definitive introduction to ecology. One of environmental education's greatest strengths is that learning about an environment is a very individual experience. Although ENCORE can be used anywhere in British Columbia, its intent is not to standardize this experience. The format and content of ENCORE will hopefully preclude such misinterpretation.

ENCORE is yours. Use it creatively, through environments as diverse as cities and wildlands.

Appendix I

Interview Schedule

Teaching Strategy

What most captures students interest about ENCORE?

Do you ever use ENCORE to teach a full unit?

For what other reason do you use ENCORE?

Materials

Do your students usually understand what the activity cards are asking them to do?

How much time do you spend gathering equipment to do the activities?

Content

What do you most often teach about with ENCORE?

What else do you teach about?

Time

What is the longest time taken to complete a card by your class?

How long do most take?

Summary

What would you say are the main objectives of this programme?

Do you think your students will benefit from exposure to the programme that has these objectives?

How difficult is it to complete an activity card within the time suggested?

Appendix J

Comments By Teachers Taken From The Survey

Content

- other types of summation materials and not so many individual activities, small group or 1/2 class activities would be useful
- clearer, simplified instruction for lower level students
- more information on the urban aspect of the natural would needed
- winter cards
- my use has mainly been science 8 - for outdoor activities
- it never is a part of my biology curriculum
- needs more background information; more science oriented
- needs a snow set!
- life cycle concepts studied
- pollution concept studied - conservation, energy sources
- found cards to be very flexible; catalyst for further study
- reading level for individuals grade 5's is sometimes high which affects individuals use of cards
- the Ministry says this is to inculcate?? an 'ecology ethic' in an area where the Kootney Diversion is being considered. I find this hypocritical
- very good for individualization
- a good starter

Strategies

- used ENCORE primarily to supplement self generated curriculum and use instructional techniques of ENCORE to stimulate my own curriculum strategies
- students develop their own units using ENCORE format
- use part of lesson, invent the rest
- just discovered the kit, plan to use it next year
- I integrate
- resource for teacher constructed activities
- like to integrate
- to come to (the beginnings) terms with their unique place in the universe by using circle graphs
- to 'see' in new ways i.e. perspectives of others, viewfinders etc.
- to value their own personal strengths and abilities within the ecosystem
- used as part of a unit on Environmental Studies, in a centres approach
- use with other programs such as OBIS, local resource materials, information from museums, zoos, park etc.
- would like to see a more scientific & pragmatic approach for our setting the outdoors

Materials

- I find that ENCORE specific activities concentrate heavily on language areas (written) summation rather than oral presentation, models, dramatic presentation etc.
- would be helpful if laminated for outside use
- questions are often too vague
- too integrated for my purposes. Used solely for science purposes
- the cards are too difficult to use because they are not specific enough
- not enough directions
- kids can't use cards by themselves
- cards are often too hard or too easy
- oriented to teacher understanding
- post trip activities generally more suited to lower intermediate students
- our school does not have enough money to bus students to various fields of study (e.g. forest)
- some cards have too many questions in the middle section
- once materials have been presented and used - familiarity - their uses become more flexible and extensive
- I offer ENCORE to the less experienced teachers at our school. It is a good start for them

Time

- selection of specifically appropriate activities and actual teaching time exceed the student commitment to ENCORE activities. My time can better be spent outside of ENCORE.
- it is of great assistance to teacher who wishes to get into the world not just teach about it
- preparation varies depending on the activity and where it will occur
- would like to have a lot more time. I try to teach other curriculum areas through the use of ENCORE, so that we can open more time using it, especially out of the classroom
- we have our sudents for 1 week at Outdoor school and we often use if for 2 1/2 hours session
- different students work at variety of rates