

THE DEVELOPMENT OF A FIELD DISSEMINATION
NETWORK FOR CURRICULUM IMPLEMENTATION

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NETWORK FOR CURRICULUM IMPLEMENTATION

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Abstract

The study concerns the development and evaluation of a workshop designed to train resource personnel to act as change agents. The purpose of the change agents will be to assist teachers throughout Manitoba in the implementation of the revised Manitoba Junior High Science Curriculum. To fill this role they will be expected to conduct in-services throughout the Province and expose approximately 600 science teachers to the innovation. A week long live-in workshop was sponsored by the Department of Education and STAM and took place from February 13-17, 1978 at the St. Benedict's Educational Center. Forty-five participants representing 28 school divisions attended.

The objective of the workshop was to provide participants with information and materials to conduct in-services. Eleven topics that were considered essential to implementation were presented by experts in their fields. The planning stages, the development of a workshop design, and a rationale for the topics presented are described.

The literature reviewed was designed to point out the aspects of effective implementation, the role of a change agent and the essential elements of a workshop. Any change in an organization is accompanied by a resistance to the change. The role the change agent plays and the methods by which he can overcome this resistance are described. Procedures that are commonly used at workshops along with methods of workshop evaluation are discussed.

The evaluation began with an assessment of the planning stages and a specification of priorities held by participants before the conference. Each topic session was also evaluated. A final evaluation to determine the general effectiveness was administered at the end of the conference. Questionnaires were designed to register opinions on a scale of 1-5, to elicit suggestions and criticisms, and to determine priorities and preferred procedures.

Results include an evaluation summary giving a commentary on the effectiveness of all aspects of the workshop, a table ranking topic sessions in order of effectiveness, histograms comparing positive feedback with respect to certain criteria, tables of priorities and preferred procedures, as well as a role perception study. The evaluation instrument along with cumulative results is presented in the appendix.

The workshop was generally considered successful because most participants (80%+) indicated that they were adequately prepared to conduct in-services on implementation. Some problems occurred in the areas of communication to select participants, the presentation of the curriculum guide, and provision for materials to support in-services. Two topic sessions were considered ineffective. Most of the major objectives of the workshop were achieved at a satisfactory level and five out of the six top priorities of participants were met at an 80% level or better. Small group interaction, participation in activities and informal discussions were procedures that were preferred over lectures and other large group presentations.

On the basis of the evaluation, the elements of a successful workshop were itemized as were the roles of presenters in charge of specific topics. Recommendations for future workshops were made concerning the implementation model, the workshop design, and the field operation.

Chapter 1

INTRODUCTION

Statement of the Problem

The problem is to develop, implement and evaluate a workshop designed to produce a field dissemination network. This network will consist of resource personnel whose responsibility it will be to conduct in-services for Science teachers throughout the province concerning implementation of the Revised Manitoba Junior High Science Curriculum.

Implementation Model

In the fall of 1976 an interim curriculum guide was issued to Junior High Science teachers throughout the Province of Manitoba in response to a need for a more standardized structured science program for Junior High students. The guide was prepared in a period of approximately one and a half years by a committee formed by the Department of Education in conjunction with the Faculty of Education at the University of Manitoba. Teachers and administrators throughout the province were made aware of the new curriculum by correspondence and various in-services. Steps still had to be taken to ensure implementation of the new program in the classroom.

Although there have been many studies done on innovations at the school or school district level, there does not seem to be a scheme or model for the implementation of a curriculum in a province wide educational system that has been tested and proven effective. A tentative implementation model has been formulated for the purpose of implementing the Junior High Science Program. This model consists of three basic elements:

(a) A Field Dissemination Network

This network consists of resource personnel from all divisions in the province who are equipped to conduct in-service sessions in their local divisions to familiarize implementing teachers with the implications of the new program. The network was formed at a workshop designed to train resource personnel held at St. Benedict's Educational Center in February, 1978.

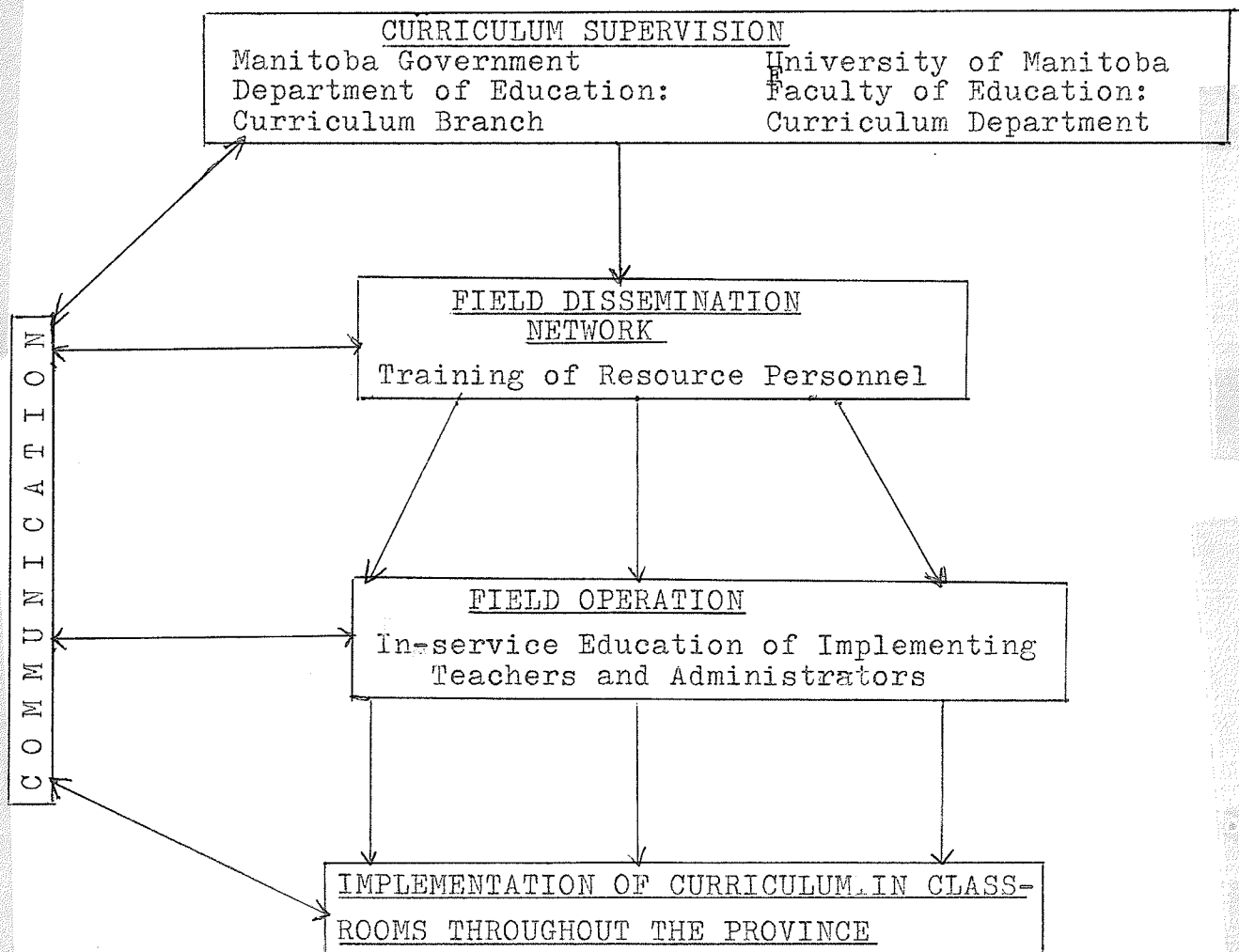
(b) The Field Operation

This involves the in-servicing of all Science teachers throughout the province by resource personnel trained at the workshop. The success of this phase of implementation depends largely on the success of the workshop.

(c) A Communication Vehicle

A system of communication is to be established that includes all levels of science education in Manitoba. Many teachers tend to become isolated in their classrooms and are generally unaware of trends, new developments and ideas, and new programs that are emerging. A communication system consisting of regularly published newsletters, notices and magazines would be advantageous especially at the time of implementation. It is emphasized that there should be two-way communication. Feedback from teachers in the field regarding problems and successes in their classrooms would be valuable.

IMPLEMENTATION MODEL



An important element of the implementation model is that it is a decentralized model. This allows decision making regarding implementation to be made at the local level. Needs and limitations vary from one division to another in the Province and consideration of these factors can best be handled by local school boards and teachers.

The particular portion of the implementation model under consideration in the thesis will be the development of a Field Dissemination Network that will provide in-service education throughout the Province concerning major issues involved with implementation. The Field Dissemination Network will consist of resource personnel whose responsibility will be to communicate with approximately 600 science teachers.

Rationale for the Study

The need for the study arises from the premise that accompanying any change in an organization there seems to follow a resistance to the change on the part of the potential adopters of the innovation. This resistance to change stems from concern on the part of the adopters as to their roles, and abilities, as well as problems involved with the planned change. Fuller identified concern levels of Science teachers implementing new program materials. (La Shier, 1976). During the initial stages of implementation teachers express personal concern regarding their own competency in handling new material and a general reluctance to giving up old practices. Later stages of concern revolve around impact of the innovation on students and finally, concern about improving the programs once they have been established. The Revised Junior High Science Curriculum in Manitoba is in its initial stages of implementation and, therefore, the personal concerns and anxieties of implementing teachers must be the focus of our attention at the present time.

In order to confront the initial problems involved in the implementation of a new program, it becomes necessary to establish personal, direct contact with all teachers in the Province who are or will eventually be concerned with the innovation. An important factor in implementing any program is the creation

of a desire within the adopter to change and accept the new program. It is also important that the implementor be comfortable with any new factors that he may not be familiar with. The contact between the change agent and teacher, then should have the dual purpose of pointing out the advantages of the new program and demonstrating procedures, approaches, and equipment necessary to the program.

The obvious question that follows is how, and by whom, is this contact to be made. The usual way of personally contacting large groups of teachers is through in-service sessions. The people given the responsibility of conducting the in-services must themselves desire the change, be knowledgeable about the implications of the innovation, and be concerned about and aware of the needs of the teachers in a particular area. Herein lies the need for a training program to develop resource personnel capable of conducting in-services specific to the proposed program in any given area of the Province.

The direction the thesis will take will be to:

- (a) review the literature on the varied aspects of initiating an educational program, the role of a change agent in implementation, and methods by which change agents can be trained using a workshop approach.
- (b) describe the developing stages and final design of the workshop held in February, 1978.
- (c) evaluate the effectiveness of the workshop on the basis of feedback from the participants.
- (d) suggest possible methods of increasing the efficiency of the workshop.

The value of the thesis will be in the identification of major factors to be considered in designing workshops concerning implementation of programs along with the specification of possible procedures to deal with these factors. A curriculum implementation committee operating within the model described previously, regardless of subject area, might be able to benefit from the successes and failures of the Junior High Science

Workshop held in February, 1978.

Limitations of the Study

This study centers around one workshop concerned with the implementation of one specific curriculum. The extent to which universal statements can be made concerning workshops in general, may be limited. It is hoped, however, that the study could serve as a reference for future workshop endeavors.

Evaluation

Although the evaluation instrument itself was designed using procedures for measuring the direction and intensity of opinions prescribed in the literature, the document itself is original and has not been previously tested for validity. Test items were designed specifically so that they would conform to the goals and objectives of the workshop under study. No attempt was made to produce a standardized evaluation form that would apply to all workshops.

The sample evaluating the workshop was not randomly selected. All participants were chosen to attend and all were expected to complete an evaluation.

One difficulty that arises when evaluation is designed to monitor the opinions of participants is the humanistic element in responding to questionnaires. It is generally understood that people are more apt to answer positively to items concerning factors with which they already feel comfortable. This tendency reinforces ideas conceived through previous experiences. The assumption that positive feedback reflects the merits of a workshop session may not be valid in all cases.

Another problem encountered was that there was not a one hundred per cent return of evaluation forms. The number of forms returned range from 100% to 70%. The average return was 83%. Prior to the workshop, participants were informed of the importance of the evaluation and steps were taken during the workshop to secure all of the forms by distributing and collecting all forms immediately following every session.

Reasons for the less than one hundred per cent return can only be surmised.

School Division System

More general limitations pertain to variables than exist between school divisions in the Province. Differences exist in student enrollment, value systems, and financial limitations especially between urban and rural divisions. These differences may influence the manner in which a new program of studies is perceived. The needs of implementing teachers in different divisions may vary, therefore, the knowledge and skills required by trainees at the workshop will not be common to everyone. Feedback on evaluation forms may reflect the needs of a trainee in a particular situation rather than the merits of the workshop.

The role of the superintendent and his perception of implementation may also be a factor. Some superintendents are more inclined to initiate programs than others, a factor that influences the diffusion rate of an innovation. (Carlson, 1965). Although the superintendent's position is not a major point of focus in the study, it is realized that he played an important part in selecting candidates for the workshop and eventually makes final decisions regarding implementation plans.

Chapter II

REVIEW OF THE LITERATURE

Introduction

The purpose of this chapter is to provide background information necessary to the study. Since the study deals with the development and evaluation of a program designed to train resource personnel to act as change agents, it is necessary to point out the role a change agent must play, the skills he requires, the methods by which he is equipped with those skills, and factors which may oppose him in his duties.

The study also deals with the change agent's role in implementing curricula. Therefore, aspects of implementation are examined with specific reference to the Manitoba Junior High Science Curriculum.

The main focus of the review of literature is the approach used in designing workshops and in-services in light of the task provided.

Resistance to Change

During the initial stages of implementing a new program it is necessary to become aware of factors that will work against the innovation. All authors dealing with the problem of planned change agree that accompanying any change, whether it be in education, business, or industry, there comes with it a resistance to the change on the part of the people who will be most affected. Many reasons for this resistance, both biological and psychological, have been identified.

Homeostases and primacy are characteristics built into all members of the animal world. Homeostasis causes an individual to react strongly to anything new. Familiar surroundings and methods of operation are preferred to things

unfamiliar. Primacy is illustrated by the fact that first impressions of one's role in a system are the ones that last. When people are introduced to new ideas and practices, they selectively perceive only the parts of the new scheme that are familiar to them, and retain only the ideas that will fit into a previously established format. Many major goals and objectives of the innovation are ignored and omitted.

The most notable cause for resistance to change is the feeling of insecurity that arises in the adopter of the change. Insecurity stems from a feeling of lack of competence in handling new materials and procedures. This feeling leads to a lack of confidence and puts the adopter in a threatened situation with respect to his position in the organization. (Morrish, 1976)

There are many other reasons too numerous to mention that cause people to naturally resist change but the net effect is that: "Most of the time most people do not want to change; they want to keep things the way they are even when outsiders know that a change is required." (Havelock and Havelock, 1973)

Many reasons for resisting change that are unique to the field of education have also been identified. Morrish (1976) points out that "teachers and educators, by and large, are a conservative group, and they are inclined to hasten slowly". This conservative nature causes them to be reluctant to change from conventional or previously accepted ideas.

Teachers also have lately become very skeptical because of recent trends to adopt new teaching practices on the basis of revelations in learning theory, many of which have been proven ineffective. Many educators consider it to be a status symbol to be associated with an "innovative school". "Change for the sake of change" is not an uncommon practice in education. An innovation must be proven to be advantageous before it will be readily accepted by teachers. (Morrish, 1976)

Lippitt and Watson (1958) provide some insight into personality traits of teachers. A major trait is that teachers, as a group, are reluctant to admit weaknesses that they may have. This point is borne out in the results of a needs assessment survey administered by the Manitoba Department of Education to all Junior High Science teachers. (See Appendix A) It seems inconceivable that a science teacher could have an extensive background and expertise in all areas of science and yet responses to requests for additional knowledge of teaching techniques and background in certain content areas were relatively low. This reluctance to admit weaknesses may foster an antagonistic attitude toward the innovation of a new program because teachers may not wish to accept the fact that there might be weaknesses in their present program and that a change might be advantageous. (Lippitt and Watson, 1958)

Two fears arise in teachers faced with a new program that relate to the feeling of insecurity mentioned previously. One is a fear of failing in the new program. The second is fear of losing some of the satisfaction that one has gained previously. (Lippitt and Watson, 1958). Most experienced teachers have developed a series of procedures, materials, audio-visual aids, and test materials that have proven successful in the past. These teachers may be reluctant to "throw away their old filing cabinet" along with the successes they have had and start over again.

A study was done on seven innovative projects in education to determine the nature of the resistance. The study revealed that resisters fell into three categories:

1. those who favored the innovation but disagreed with the particular form in which it was presented.
2. those who disagreed completely with the innovation. These people tended to seek support from their peers and formed independent groups to defeat the innovation.

3. those whose real interests lay elsewhere. (Morrish, 1976)

When introducing an innovation in education, those responsible for implementation must be aware that resistance will occur and must take steps to meet and overcome it. "The anticipated change will be resisted to the degree that the client system possesses little or incorrect knowledge about the change, has relatively little trust in the source of the change, and has comparatively low influence in controlling the nature and direction of the change." (Benne, Bennis, and Chin, 1969). The success of the innovation will depend to a large degree on the extent to which these factors are considered. In order to lessen resistance in an educational innovation, the innovation should be directed at the classroom teacher. "Innovation in education has been regarded as something rather different mainly because education has been seen as a continuing relationship between a teacher and a classroom of children. Therefore, innovations should be directed at innovations in content and methods of learning rather than the management and institutions of the school." (Morrish, 1976)

Aspects of Effective Implementation

Definition of Implementation

"The mechanics of implementation is not something just to be accepted but requires analysis, understanding, and deliberate planning." (Morrish, 1976). The problem of the implementation of the Manitoba Junior High Science Curriculum must be solved by carefully thought out strategies whereby the intentions of the curriculum are correctly explained and demonstrated to all Science teachers concerned throughout the province. "Strategy is a key aspect in this new concept of innovation because it is now recognized that change will only lead to real progress if it is brought about in an orderly sequence of goal setting, planning and systematic execution." (Havelock, 1973)

Much is already known about adopting and accepting change but very little research has been done on actual implementation. Necessary elements in implementation design are cited by many authors but actual methodology is rarely documented.

Robert Chin (1969) defines implementation as "a process which includes the creation of understanding and commitment toward a particular change and devices whereby it can become integral to the client systems' operation". Implementation can also be viewed as "a linkage between theory and practice; between knowledge and action". (Benne, Bennis and Chin, 1969) According to the definition, the implementation of a recently developed curriculum involves two major phases. Phase one is the creation of understanding and commitment to the new program and phase two includes actual procedures and techniques required to put the plan into effect. Both phases are essential to implementation but phase two should not be undertaken until phase one has been completed.

Understanding and Commitment

The nature of the curriculum project itself is a major driving force in the innovation's gaining the acceptance of teachers. One of the most important qualities that a curriculum must have is that it must be easily communicable in order that the client system gain a thorough understanding of the change and its consequences. A long theoretical document containing an excessive use of jargon may mask the actual intention of the program. The rationale for the program along with general goals and objectives should be stated clearly and precisely in as simple a form as possible. (Benne, Bennis, and Chin, 1969)

An innovation must express values as well as methodology and content. The values must be consistent with the value system of the adopter. In the case where the innovation must be implemented over a vast area, the values expressed must be

appropriate to each division in the area. In Manitoba, the values expressed must have a certain universal quality acceptable to all and yet be flexible enough to specifically apply to each school division in the Province.

Flexibility is also essential in that it allows teachers to have some influence in developing and controlling the fate of the change and adapting it to their particular situation. Teacher input into the application of an innovation is an important selling point leading to commitment. (Benne, Bennis, and Chin, 1969)

"A critical factor is the adopter's concept of the changes he himself will have to make rather than the general nature of the innovation and must be understood in terms of teacher - student relationships." (Morrish, 1976). The curriculum package that is developed and printed for distribution must be directed at teachers and clearly illustrate specific objectives and possible activities that can be conducted with students.

Science 7-8-9 Curriculum Guide

Innovation must be concerned with "increased learning or at least with more independent learning with broad attempts to improve the quality of teaching and with more developed, relevant, and refined curricula". (Morrish, 1976). The design of the Junior High Curriculum Guide seems to satisfy these requirements along with those mentioned previously.

Initially, the need for a change is expressed in the introduction and rationale. Science teachers must be convinced that the proposed program is more advantageous than the one presently being used. The shift in emphasis from content learning to a process oriented approach should counteract the ever increasing bombardment of new scientific knowledge. It is impossible for the students as well as teachers to keep

up with the influx of new information and it may now be more important to be aware of the processes by which this knowledge is obtained.

The values expressed in the guide are stated as goals and are designed to aid the student in:

- (a) "self-awareness and understanding the environment"
- (b) "developing skills and attitudes"
- (c) "understanding the impact of science" and
- (d) "fostering positive attitudes towards science"

(Science 7-8-9 Interim Curriculum Guide, 1976). These values are universal in nature and are general enough to be acceptable to all regions of the province.

The role of the teacher is clearly illustrated in that the objectives are stated in behavioral terms along with suggested activities and textual sources.

Flexibility is also built into the curriculum. Although the core objectives are set up to be followed by everyone there is a fair amount of freedom given as to texts and methods used. An extensive bibliography of possible texts using different approaches is provided and coded to the core objectives. A description of three possible approaches to teaching the curriculum are outlined along with the advantages and disadvantages of each.

The curriculum guide satisfies the requirement of being communicable in that general and specific goals are concisely stated. The document is addressed to teachers and can readily be used by teachers with students. The curriculum is an improved professional document in that objectives are plainly stated in behavioral terms and provide a general education in all areas of science.

To summarize, Morrish (1976) cites four process variables that are essential to the implementation of a program. First, the innovation must be of proven quality and have relative advantages over the previous curriculum. It also must be divisible so that it can be tried out in parts or sections on a limited basis. The degree to which the innovation may be diffused to others depends on its complexity. "The number of parts to the innovation, the number of behaviours and skills to be learned, and the number of procedures required for effective maintenance over a period of time" should be kept to a minimum. Finally, the innovation must be easily explained or demonstrated. "Material items find greater acceptance than ideas because they are more easily demonstrated." (Morrish, 1976)

Procedures for Integration

The second phase of Chin's definition of implementation involves the "creation of devices whereby it (the innovation) can become integral to the client systems' operation". A major step towards this goal is the development of suitable educational materials to enhance the new program and provision for specific directions for building instructional models. (Morrish, 1976) Most authors agree that the key to successful implementation is teacher training in the use of these materials employing a "work through the program yourself" approach. Implementation involves new skills through in-service training and retraining of teachers in new curricula. (Morrish, 1976)

The success of the diffusion phase of the project will most likely be assured if certain expectations are held at the onset. Once a curriculum has been developed and its merits demonstrated, the people in local schools and school divisions should accept the responsibility for curriculum improvement. This could involve making adequate time, facilities, and resources available for teacher training. Curriculum workers in each division should attempt to identify problems that may occur in their local area and attempt to find methods of

handling them. Effective communication channels throughout a school division should be established and maintained to deal with policies and procedures. A constant evaluation of the new program should be maintained to ensure the consistency between means and ascribed ends. (Doll, 1976)

The actual teacher training phase must begin with advanced planning. One aspect of this phase is "innovation packaging" where the curriculum is divided into parts making it easily presentable. Some packages in a Science Curriculum might be:

1. general goals of the program.
2. an overview of objectives.
3. possible approaches to teaching the new program.
4. textual material available
5. equipment necessary to the program.

This preparation period should also include the "identification, preparation and selection of a target audience". (Havelock and Havelock, 1973). It is impossible to reach all teachers concerned at the same time, therefore, a selected group from each school division would be exposed to initial presentations. This group could then disperse information to others in their division.

The presentation of material generally takes the form of a workshop or in-service. Material should be presented using a variety of techniques. Multi-media presentations, demonstration of new methods and materials, along with group discussions could be employed. It is essential to have active teacher involvement where trainees can work with materials prescribed for the program. A follow-up and evaluation should complete each training session. (Havelock and Havelock, 1973)

The National Science Foundation in the United States, recently implemented a series of Mathematics and Science programs. The dissemination of information was deemed successful because the programs were presented in unit packages,

instructional materials were made available, and in-service training of teachers was offered at no cost. (Morrish, 1976)

An essential catalyst in the implementation process is a change agent. "The process of planned change involves a change agent, a client system and a collaborative attempt to apply valid knowledge to the client system's problems." (Benne, Bennis, and Chin, 1969). "A change agent is needed to overcome their (the client system's) inertia, to prod and pressure the system to be less complacent and to start working on its serious problems." (Havelock and Havelock, 1973). The selection and training of effective change agents will, to a great degree, determine the success of implementation as it is the change agents who become the communication channels between the central organizing body and local school divisions as well as individual schools.

Communication and Acceptance Rate

The rate of acceptance of a new practice depends upon three factors:

1. "the characteristics of the adopters and their readiness to change"
2. "the way the adopting unit is joined to communication channels and sources of information, and
3. the position the adopting unit holds in the social structure of like units." (Carlson, 1967)

Referring to the situation involving the implementation of educational programs, it is known that certain schools and school divisions are more innovative than others and programs are usually started in these areas. Communication takes place in a two step flow. The message first reaches opinion leaders (those initially exposed to a training program) who pass on their knowledge to associates who are influential to them. The message is then mediated by reference groups and adapted to their own personal situation.

Natural diffusion or the spread of the adaption of a new practice then starts. "After 10 - 20% have adopted the innovation the vast majority of potential adopters will follow due to the forces of social interaction." (Havelock, 1973)

Once implementation has started in certain areas, further acceptance in other areas proceeds by a chain reaction. "The number of people adopting new practices in each unit of time increases in proportion to the numbers that have already accepted the new practice. The act of initial adoption influences others to adopt new practices." (Carlson, 1967). Communication channels then form between groups and they learn from each other. The rate of adoption follows a normal "S" curve. (Carlson, 1967).

Change Agents

The Role of a Change Agent

A change agent is "a person who facilitates planned change or planned innovation." (Havelock, 1973). Havelock identifies the four major functions of a change agent as:

1. a catalyst to overcome resistance to change
2. a "solution giver" to overcome organizational problems of implementation
3. a "process helper" to demonstrate how to implement and
4. a "resource linker" to open communication channels to sources of information.

In his role as a catalyst, the change agent stresses the need for a change and promotes the merits of the prescribed program. (Havelock, 1973). He must "engage in an active program of selling his wares and himself". To this end he organizes workshops and circulates reports thus opening communication channels. For the duration of implementation he must constantly

remain in the picture because "the decision to begin the process does not indicate the determination to carry it out". (Lippett, Watson, and Westley, 1958). He must be an organizer and promoter who can create a feeling of common identity and purpose among the group he is dealing with. (Havelock, 1973).

Once a client system has been exposed to the innovation, the change agent must demonstrate the process of implementation. His ability to demonstrate the innovation is critical. "If the individual is shown how the innovation will work for him, he will be more inclined to make a favorable evaluation." (Havelock, 1973).

The greatest chance of failure occurs during the trial stage. Frequent communication with the change agent through in-service training and newsletters must occur at this stage so that unforeseen problems can be handled and also so that the goals and objectives of the program are adhered to.

Different schools within a division may have different methods and approaches. In order to meet a variety of needs, the change agent must exhibit a certain amount of flexibility and offer a diverse number of solutions.

"He must be sensitive to the fact that he alone does not have the full range of skills to bring change about. Teamwork, collaboration, and utilization of both inside and outside resources remain important aspects of planned change." (Havelock, 1973). There may be somebody who has more experience or is more qualified on a particular topic. The communication between the resource and the client must be established by the change agent in his role as a "resource linker".

Methods of Communication

In order to disseminate information to a large audience, the change agent must utilize a variety of communication methods. Redundancy should be built into the presentations and material should be reviewed constantly using different media.

Some common one-way communication channels are lectures, films, and demonstrations. Lectures are traditional but limited in effectiveness. Written reports can supplement lectures to allow the audience to review the major points presented. There has been a trend in recent years to carefully packaged audio-visual presentations in the form of video tapes, films, filmstrips with audio cassettes, and film loops. The one danger here is that they sometimes become "Lectures on celluloid". Demonstrations are effective if two conditions are satisfied. The setting and conditions under which the demonstration is presented must be natural and similar to those prevailing in the area where the client practices. Also, the change agent must know that the demonstration will work and clearly illustrate critical points of the innovation.

Two-way communication channels may be opened in the form of person to person contact and group discussions. Communication with leaders, resistors to the innovation, and other key people in a school division gives feedback on the reaction of the entire client system. "Diffusion of an innovation begins with the acceptance of the idea by a few key members of a community.... and then spreads by word of mouth." (Havelock, 1973).

Group discussion gives the adopter a feeling of participation and increases the feeling of safety among the participants. The safety in numbers creates a willingness to take risks and move toward a commitment to try the innovation. Feelings of doubt about the innovation and one's ability to use it may also be exposed in a group setting.

All of the previously mentioned forms of communication can be exploited within the framework of a workshop or conference. Workshops are generally regarded as enjoyable experiences in which the participants are left with new ideas and skills which may lead to further self-training and practice back in their own situations. Also, personal direct contact with change agents and innovation leaders may create feelings of trust and respect between the two parties allowing them to work more closely together towards implementation. (Havelock, 1973).

Internal and External Change Agents

A change agent was originally defined as one who facilitates planned change. Such a person could come from within a school division (internal change agent) or could also operate from outside the school division (external change agent). Considering the case under study in this thesis, the external change agents are represented by persons in the Department of Education and Faculty of Education who originally saw the need for a change and developed a curriculum to satisfy that need. Internal change agents are the key people from each school division who are selected and appointed to act as resource persons for the implementation of the curriculum in their own areas. The training of internal change agents is the major topic of the thesis.

Internal change agents have several advantages over external change agents. Because they are an autonomous subpart of the organization, they can strengthen their position from within and can exert a forceful influence. They are in a position to give support throughout the process of change and may be more easily accessible than an external change agent. (Lippitt, Watson and Westley, 1958). An "insider" is a familiar face, a known quantity who identifies with the needs of his organization and is better able to identify specific problems that may arise in the implementation of the curriculum. The fact that he has made a personal commitment to his school division to act as a resource person may increase his motivation to complete his task successfully. (Havelock, 1973).

There are also disadvantages to internal change agents. From one's position as a teacher or department head in an individual school he may lack perspective in seeing the school division as a whole in operation. He may also lack the special knowledge or skills necessary to be a resource person. Although a training program is provided, the limited time given may not be sufficient to fully equip an individual with the full range of skills desired. In his position as a teacher, the internal

change agent may also lack a sufficient power base to cause things to happen. In this regard, he must keep in communication with superintendents and consultants in his division. Finally, his obligations to his teaching duties within his school may restrict his movement and availability as a resource person. (Havelock, 1973).

Sequence of Duties

Havelock specifies a six step sequence of events leading up to full integration of a new program and also identifies the change agent's role during each phase.

<u>Client's Stage</u>	<u>Change Agent's Activities</u>
1) awareness	1) promotion
2) interest	2) inform
3) evaluate	3) demonstrate
4) trial	4) train
5) adoption	5) help and service
6) integration	6) nurture

One of the hazards in past implementation projects is that there has been a tendency to hurry and skip steps, or at least change the order of steps. It is ill advised to start the next phase of implementation until the one previous to it has been completed successfully. A change agent is also advised not to ignore differences of opinion. Resistance will be presented and points of view contrary to those of the change agent may be expressed. Each new idea must be dealt with and must either be rejected or added into the implementation project based on its merits. (Havelock, 1973).

Implementation Models and Change Agents

The role that a change agent must play has been discussed previously. However, the specific manner in which he carries out his duties depends upon the type of implementation model that is considered most effective for a given situation. When change agents are to be used for a short time period, it becomes

necessary to clearly identify the desired skills that need to be developed in a change agent within the framework of a specific implementation model.

Several implementation models have been described in the literature but the model that seems to parallel our situation most closely is the "Research and Development" model. This is the most authoritarian and seems most practical when implementation must extend over a vast area. Once a need for a change has been realized, the central authority develops, produces, and packages the innovation for dissemination to a mass audience. The audience, for the most part, is a passive one as it listens to presentations and follows instructions. Input and feedback on the part of the adopter is limited and takes place at the time of initial implementation efforts. (Morrish, 1976).

Change agents can be categorized into two groups according to their methods of operation. The group most suited to the "Research and Development" model are "change agents who emphasize methodological objectives, and describe their goal of achievement as a certain process or method of working through a problem with the client system. The client system then proceeds toward desired goals." (Lippitt, Watson, and Westley, 1958). The fact that the audience remains passive does not deemphasize the importance of "selling" the program. In fact, in order that implementation take place effectively, the change agent is under more pressure to efficiently illustrate the merits of the program and demonstrate means of carrying it out.

The second category of change agents are those who emphasize a clear image of the final goal and spend no time on procedures. A clear definition of the final goal will produce the process of change. Adopters have total input in producing and developing the curriculum. The change agent acts as a moderator keeping the goals in focus and guiding the adopters in their quest to meet these goals. (Lippitt, Watson, and Westley, 1958).

This type of change agent is more suited to a "Problem Solving" model which emphasizes the client system's role in finding its own solutions. This model is most effective when dealing with change on a smaller scale such as in an individual school or division. (Morrish, 1976).

Selection of Change Agents

A major concern in working with a large system is that the change must be accepted by all important parts of the system and not just a few subparts. The innovation must spread through the entire system before it can become stabilized. A major danger in an implementation project is "uneasiness of a change agent about the justification for what he is trying to do". (Lippitt, Watson, Westley, 1958). The change agent must have a desire to see the change come about and have some sort of personal interest.

"One of the easiest ways to be sure that a given change will be internalized is to get the trainee to become a trainer." (Lippitt, Watson, Westley, 1958). The people who have most at stake are the educators in each school division. If some teachers, administrators, consultants, and department heads from all school divisions are trained in implementation methods, they in turn, can "demonstrate the change techniques to neighboring systems, thus acquiring a kind of investment in their own success". (Lippitt, Watson, Westley, 1958).

The number of representatives from each school division is limited by the facilities and space available at the training site. All divisions, however, must be represented. The selection of representatives must be based on predetermined criteria such as personal qualities, leadership ability, and willingness to innovate. Morrish uses several adjectives to describe the characteristics of innovators. An innovator is usually strong, benevolent, highly intelligent, individualistic, creative, and often idealistic. (Morrish, 1976).

The Training of Change Agents

Rationale for a Training Program

An attitude survey regarding in-service education was conducted in the state of Washington. (Stronch, 1974). One of the major objectives of the survey was to determine the needs for science in-service programs as applied to administrators, elementary teachers, and secondary teachers. The results revealed that the greatest need was the learning of "ways to manage facilities; to manage equipment and material; to manage community relations and resources; to teach Science more humanistically; and to evaluate the quality of education". When a change in curriculum is proposed, these needs become greater.

Some problems constantly arising in in-service education up to now are: (a) failure to relate in-service plans to the needs of the participants, (b) failure to select appropriate activities for implementing program plans and, (c) failure to use sufficient staff and resources. (Harris and Bessent, 1969). Regan and Leithwood (1974), on completion of the Ontario Conceptual Skills Project, found that one of the major problems in the implementation of a program was that "teachers are often neither trained nor encouraged to think through the specifics of the goals and methods that govern their practice". Three major recommendations made in this project in the area of implementation were:

- (a) Teachers must have the opportunity to study the program.
- (b) Implementation requires that special skills in the areas of teacher training, evaluation, measurement, and school change processes be developed.
- (c) Change agents are necessary. The closer the change agent is to the client, the less distortion in the message.

Harris and Bessent (1969), describe in-service education as a process for planned change taking place through personnel

development. During the process of training, time and facilities must be provided to develop strategies to promote implementation. Strategy as defined by Lawler (1970) is "the means for causing an advocated innovation to become successfully installed in an on-going educational system". Three guidelines for producing strategies are:

1. In-service training of teachers in the strategies aimed at achieving the goals of the program.
2. Anticipating the kind of problems teachers may encounter in developing a supportive element.
3. Developing instructional materials necessary to the program and training teachers in the usage of these materials. (Miles, 1973).

Goals of a Training Program

The purpose of the training program is to create "A cadre of an individual with a new set of skills who will be able to effect further change in a larger sphere". (Havelock and Havelock, 1973). Knowledge, attitude, and intention are attributes which are insufficient when attempting to influence people. The development of skills in the change agent is the key to causing change. (Havelock and Havelock, 1973).

Several general goals should be focussed upon during the organizing stages of a training program. One of the most important goals to be attained is that the trainees visualize themselves as change agents and fully realize their responsibilities and the performance expected of them. Prior to the conference all participants would have been informed of their forthcoming duties, but the development of self images as change agents requires time and training.

Change in education can be considered to be a discipline separate from others in education as it requires unique skills to solve unique problems. The trainee should be knowledgeable about concepts in educational change and should be introduced to theory and methodology of change so that he can understand

the processes involved before attempting to carry them out.

During his tenure as a change agent an individual may have to play the role of a therapist, counsellor, caseworker, trainer, and consultant. One of the most important goals of the training program should be to equip the trainees with operational skills in these areas enabling him to select and organize appropriate bodies of knowledge, both theoretical and practical, for use in the field. The development of operational skills is probably the single most important aspect of the training program. To ensure mastery of these skills, time must be given for practice in exercising learned skills or developing techniques with others at the conference.

It is essential that some monitoring be done as to the effectiveness of the change agent as well as the reaction to the innovation itself. The change agent must have the ability to conduct an evaluation of his presentation in order to allow feedback on his effectiveness. This feedback may indicate the need for additional support and follow-up in-service training sessions. Self-evaluation allows the change agent to critically analyze his own performance and make appropriate changes for future presentations. (Lippitt, Watson, and Westley, 1958).

Most of the literature dealing with the training of change agents involves whole role training where the training program lasts from months to years. The sole occupation of the graduates of these programs is to affect change in organizations. The situation under consideration in this thesis involves a limited term of duty for the participants and a relatively short training period. The general goals mentioned previously are still relevant except that, because of time limitations, the entire program should be geared to the specific innovation under consideration. Exposure to ideas regarding theory of change is important but the majority of time in the program should be spent on developing operational skills of implementation.

Principles of Goal Training Design

Many factors must be considered while designing a training program. At the outset, it is necessary to clearly specify intended outcomes of the program. The general goals and objectives should be formulated in light of the innovation itself and the performance demanded of the trainees. Once general goals have been established, specific objectives with specific learning activities may be designed to meet the goals. An evaluation of the effectiveness of the learning activities should conclude proceedings.

Structure is an essential element of any training program especially if limited time is involved. A schedule of the sequence of events making maximum use of the time available should be drawn up in the form of a time table. A certain amount of rigidity must be maintained so that all important topics are given ample time for discussion. Provision must also be made for two-way communication. Input into the program by experts in specific areas is essential for training participants but, of equal importance is the reaction of the trainees to the input. As a result, the timetable should also provide a certain amount of flexibility for feedback, discussion, or examination of materials. The amount of flexibility provided would depend on the length of time the program is in operation. Shorter workshops would not allow as much flexibility as longer ones.

Relevance is essential. The training program must be relevant to the objectives of the innovation. The goals of the training program must be relevant to the implementation mechanics to be used. The training methods must be appropriate to the abilities, backgrounds, and needs of the trainees. At first, this may appear to be an understatement but the introduction of extraneous material is not an uncommon occurrence at workshops. It is necessary always, to maintain a constant focus on the goals of the program.

Provision must be made for the trainee to be able to generalize from the specific learning he experiences. For learning to be internalized the trainee must be able to go from specific to general. (Havelock and Havelock, 1973). "Unless the trainee has help in abstracting the process from the particular event he experiences, he will have difficulty in translating what he has learned into a useable form." (Bennis, Benne, and Chin, 1969). The learning must also be general enough to suit the variety of situations of those present at the conference. (Havelock and Havelock, 1973). Regional differences existing in a large area would indicate that it would be impossible for all change agents to act in exactly the same fashion. Learning should be general enough so that regional differences are not a factor. Each trainee should then have the opportunity to adapt generalities to the specifics of his own situation. Another advantage of generalizing is that, once trained, a change agent may be used as a resource person in a variety of areas other than the one for which he initially trained.

Linkage in several areas is another important area of a training program. Linkage must be established between the trainee and appropriate resources and resource personnel that he can call upon to aid him in demonstrating the innovation. Secondly, linkage developed between individual members of the training group tends to create a "self as a change agent" concept. Working in small groups enables participants to develop a shared identity with a common fate. It is also suggested that there be at least two representatives from each division to aid each other in their duties. Finally, there should be linkage between training activities conducted at the workshop and the realities of the home situation. The potential change agents must be given a clear image not only of the innovation itself but also of how it can be effectively presented to teachers at the local level.

Evaluation is an essential element of a training program. "In-process evaluation should be built into the training program

as a whole and should be relevant and specific." (Havelock and Havelock, 1973). Evaluation requires the developers and trainers to plan and think clearly about what they want to achieve and how they want to achieve it. Evaluation also provides information on modifications in future endeavors. (Havelock and Havelock, 1973).

A Workshop Approach

A workshop differs from an in-service session because a workshop is of longer duration and emphasizes a problem solving approach using group work as the major vehicle for accomplishing the task. In-service sessions are usually concerned with the dispensing of information using a one way communication channel for a short period of time. A workshop approach utilizes larger group general sessions to dispense information and to enable the entire group of participants to clearly define the goals of the program. All general sessions are designed to facilitate group work. The heart of a workshop approach is small group interaction to solve problems. "A true learning situation is a problem solving situation." (Kelley, 1951).

The advantage of a workshop approach is that it places the participants in a situation where they can break down barriers and communicate in order to work toward a common goal. Trainees are given the responsibility for their own learning and the facilities for working on problems that are of direct concern to them. Methods and techniques as well as resource materials can be developed and used in the home situation.

Earl C. Kelley feels that a workshop, in the true sense of the word, should be an ongoing affair lasting for several months on a one or two night a week basis. He is reluctant to call a planned program of a week's duration a workshop, but rather a conference or meeting designed to inform rather than solve problems. Regardless of the terminology used, Kelley does elaborate on the necessary ingredients of a "short workshop".

Any workshop should be over two days duration and should

be held away from a city. City life presents too many distractions that may interfere with proceedings. An essential stipulation is that all participants should live at the training site and attend continuously. Commuting or only attending certain sessions destroys the continuity of the program. The workshop should consist of a planning session at the beginning where everyone is involved, a schedule of events for the week allowing considerable time for group work sessions, and a summary and evaluation at the end.

A suggested procedure for a workshop is as follows. The workshop should begin with introductory remarks to the entire group made by a designated chairman. At this time the objectives are clearly given and the participants are introduced. The large group is then randomly divided into smaller groups between ten and fifteen members, each group having a designated chairman. These groups spend time discussing and listing their needs, concerns, and expectations from the workshop. The entire group then reassembles and the chairmen of all small groups are asked to state the concerns that were discussed. The workshop chairman records all ideas and makes a master list of all group concerns which can be consulted from time to time throughout the conference. The participants are then divided into working groups, each group selecting a topic to deal with. These topics may be chosen from the master list produced by the first group encounter. In order that everyone enjoy full participation, group size should never exceed twenty members. The perfect group size is between eight and twelve people. Each group appoints a chairman who is responsible for directing conversation, keeping discussion moving, and reporting back to the large group. Careful documentation of all that transpires must be done continuously. "As to the achievement of goals, there is more satisfaction if members can carry out something tangible and in writing." (Kelley, 1951).

As mentioned previously, general sessions are valuable in aiding the group problem solving process. Large group sessions may take the form of lectures or audio-visual presentations

that may motivate discussion on a certain topic. Audio-visual materials provide an increase in perception so that groups may be shown how something is done rather than just being told how to do it. These materials can only be effective if they specifically suit what the group is trying to do. Other uses for general sessions may be to have group leaders present progress reports on progress made in small group sessions. Panel discussions by group leaders and resource persons may link concepts together.

The use of resource personnel from the community enhances workshops. A resource person is one who "has knowledge and experience that bears on the problem the group is trying to solve". (Kelley, 1951). The greatest resource in the group approach to problem solving is the group's own members, however, enrichment may be provided by outside sources. A resource person should be more familiar than the participants, with the literature on a particular topic and should be able to provide information and inspiration to the participants. During small group sessions, resource people should be well distributed in the groups but should not take charge or direct the problem solving process. Their purpose is to add necessary information only.

Social activities, dinner hours, and time for relaxation are also valuable in a training program. In a formal situation people tend to remain silent and are reluctant to voice their concerns. In a relaxed atmosphere of conversation, it is usually found that communication barriers are broken down and individual personalities become more open. At these times, individual participants discover that their concerns are usually common among most members of the group. Once the members are willing to expound on their problems, progress can be made more quickly in the problem solving process.

The final session should be the most meaningful. It takes the form of a general session and the values and concepts the groups have gained are summarized. The original list of concerns drawn up at the start of the workshop could again be

presented and the extent to which they have been treated could be discussed. It is also necessary to reconfirm an understanding of the nature and extent of the roles the participants are to play in their school divisions and the manner in which they are to carry out their duties. A post-conference evaluation should then be conducted. (Kelley, 1951).

Specific Activities Within the Workshop

Several types of activities used in workshops and inservices have been discussed in the literature. The most common ones used in large group encounters are lectures and demonstrations. Small group sessions can consist of such activities as buzz sessions, brainstorming, group discussion and role playing.

"A demonstration is an activity in which participants observe planned, carefully presented examples of real or simulated behavior illustrating certain techniques, materials, equipment, and procedures as they might realistically be employed." (Harris and Bessent, 1969). The purpose of demonstrations and lectures is to inform participants of materials and methods and to stimulate interest in the use of these techniques. The focus of the presentation must be defined as specifically as possible and it should only be expected to serve a limited purpose. The one handling the presentation should be selected carefully. He should have considerable skill and knowledge with the topic he is discussing. It is advised that workshop leaders not play such a role as their time should be limited to the duties of organizing the workshop. Careful planning must precede the presentation to ensure its coherence and suitability. Suggested follow-up activities are to have participants discuss the material presented and perhaps to actually practice the techniques themselves. As a rule, skills are not developed by lectures or demonstrations. "Knowledge and understanding may come from watching a demonstration but skill development is another matter." (Harris and Bessent, 1969).

Brainstorming may be conducted in small groups as well as large groups of up to seventy people. This activity can serve as an introductory session to a workshop. "Brainstorming is an activity in a group session in which ideas held by participants are orally expressed with special procedures employed to avoid any discussion, criticism, or analysis." (Harris and Bessent, 1969). A session is started by focussing the group's attention on a particular topic. The group is given a set time period to express as many ideas as possible, all of which are recorded. No discussion or criticism of ideas is permitted. The purpose of brainstorming is to develop ideas and explore as many approaches to a problem as possible. A follow-up session where ideas are dealt with in more detail is mandatory. They must have some prior knowledge, experience, or interest in the topic before participating.

Buzz sessions are useful when attitudes, feelings, and opinions of the participants are important in dealing with the problem in question. "A buzz session is a small group activity in which groups are temporarily formed to discuss a specific problem with minimum structure, maximum emphasis on interaction, and full opportunity to express ideas related to the topic." (Harris and Bessent, 1969). Groups of at least five members are formed randomly and assigned a certain location away from other groups. Free interaction on a set topic follows and all ideas presented are recorded. Follow-up activities could include the analysis of ideas or synthesis of ideas in the form of a policy statement. Buzz sessions are excellent sources of feedback from participants on their opinions of what has already transpired at the workshop.

Group discussion as an activity can be differentiated from brainstorming and buzz sessions in that it is not only concerned with the expression of ideas but also with arriving at consensus, decisions, or recommendations. Discussions are more in-depth and go on over longer time periods. Participants are selected on the basis of previous experience, interest, and desire to deal with the problem. Outside resources are frequently introduced to add more insight and information. The

groups, whose size can range from seven to fifteen members have the responsibility of coming up with answers or concrete methods of dealing with the problem.

"Role playing may be defined as a spontaneous dramatization involving one or more persons assuming designated roles in relation to a specified problem in a given situation." (Harris and Bessent, 1969). In the situation where participants are being trained as change agents, a role playing experience could prove invaluable as trainees would assume unfamiliar roles that they will be filling after the workshop. Groups of between ten and fifteen people are given a problem and each member is asked to assume a role to deal with the problem. The purpose of the activity is to develop new skills associated with unfamiliar roles, to develop new attitudes, and to provide examples of behavior which perhaps were previously unfamiliar. When role training is the essential purpose of the workshop, role playing may also be referred to as guided practice. (Harris and Bessent, 1969).

Harris and Bessent have arranged workshop activities in order of their experience impact. "By experience impact we mean that the learner is more likely to interact with the learning situation in such a way that the experience will have some impact that will affect his later behaviour." (Harris and Bessent, 1969). Large group activities such as lectures and demonstrations were rated lowest in experience impact; however, they are a very necessary means of dispensing information. Group activities were rated from lowest to highest as follows: brain storming; group discussion; buzz sessions; role playing; and guided practice.

The level of experience impact depends upon three factors. If the participant can have some control of the content presented, there is a greater chance that it will be more relevant. The use of a multimedia approach will increase the probability that the learner will become involved in the learning situation. Finally, two-way communication has more experience impact than one-way communication. (Harris and Bessent, 1969).

Limitations of the Workshop Approach

The workshop approach prescribed by Kelley has been more recently defined by Harris and Bessent as the laboratory approach to in-service education. The identifying element of a laboratory approach is that participants are actively involved in problem solving through various group work procedures. Problems are simulated and data is gathered, discussed and analyzed to lead to general methods for implementation. The main features are structured activity, limited focus, and freedom of opinion.

This type of approach has been found to be useful in creating understanding, overcoming misconceptions, and stimulating interest in approaching problems. It does not lend itself particularly well to the development of a variety of skills or presenting new information. The group work process is, by nature, a time consuming type of endeavor and may, by some standards, be considered inefficient. (Harris and Bessent, 1969).

Concerning the week long workshop designed to train resource personnel, it may be necessary to provide more input than is recommended by proponents of the workshop or laboratory approach. This is necessitated by the fact that a fair amount of information must be disseminated and certain skills must be taught. Group activities, however, should play a major role in the program in order that a thorough understanding of a change agent's role be conveyed.

Related Projects and Workshops

This portion of the thesis will consist of a discussion of previous workshops and curriculum implementation projects which apply to our effort in Manitoba. In the literature available, there is no one study done that totally coincides with the aims and objectives of the program under consideration, however, portion of workshops done seem relevant.

Integrated Science Education in Africa

A workshop whose general nature seems to most closely resemble the February, 1978 workshop was held in Nigeria from September 20 to October 4, 1971 for leaders of Science education at the primary and secondary levels. The main theme of the teacher workshop was teacher education for an integrated approach to Science teaching. An integrated science program involved a process approach. The aim for science education in Africa was stated as: "An education is required that replaces rote, static, and examination-centred learning with a dynamic process of preparing individuals for change and helping them to develop their self-concept and think critically." The main emphasis of the workshop was to provide methods for training teachers by exposing them over long periods of time "to experience in scientific processes of inquiry and situations which will promote the development of attitudes which compliment the process".

The method employed at the workshop was to divide the participants into four groups. Group A was concerned with curriculum planning and produced a planning guide along with a specimen lesson. Group B was involved in teaching materials and facilities. Printed material, audio-visual aids, and science equipment were prepared. Group C dealt with teacher education and arrived at the conclusion that "the workshop must isolate the implications of integrated science teaching to the training of the teachers". Specimen teacher materials for orienting teachers in a process approach were produced. Group D was involved in the evaluation of the program and defined areas in both formative and summative evaluation.

To make the most efficient use out of the expertise available in the five day workshop it may be advantageous to utilize a group or team approach to solving the tasks at hand. A "division of labour" approach followed by subsequent sharing of information and materials collected would enable a wider range of material to be covered. The development and examination of resource material by the groups should also be an

integral part of the workshop.

Leadership Conference in Elementary Science Education

This conference was held during the summer of 1975 at the University of New Mexico. The main objective of the project was to train a group of twenty curriculum consultants in the philosophy, teaching methodology, and materials of seven new curriculum programs available in elementary science education. The purpose of the program was to produce an in-service model for developing the most effective means of bringing about change in science education. Seven programs were compared and analyzed in terms of a process approach to science. The participants were mainly concerned with the supervision and administration of implementation.

Of significance in this study were the activities of the participants. They participated as learners and teachers in activities within the curriculum. Specialists were employed to interact with participants to broaden content and framework. In-service programs were tried and evaluated at the conference, in an attempt to "adapt and adopt" the most effective program for their area.

In the workshop, it may be possible to utilize specialists in various areas such as processes of science, curriculum specialists, audio-visual media experts, content area specialists, etc. A certain amount of expertise could also come from the participating group itself so that the participants could act as both teachers and learners. During the five day period, in-service programs should be developed so that each member could have a useful model that would apply to his area.

In-Service Education -- SCIS Materials

A four week workshop was held for thirty-seven teachers from six school districts who were concerned about the life science phase of the S.C.I.S. program. The format of the workshop involved a rationale along with advocated teaching strategies inherent in the program, daily experiences with

actual students, and instruction on basic biological principles.

Although there is little similarity between this workshop and ours, some light was shed on methods of evaluating in-service sessions. Two instruments were used:

1. A concern questionnaire based on the "Concern Based Adaptation Model" developed by Fuller (1973). A sequence of concerns in teachers from "concerns for self" to "concerns for the task of teaching" to "concern about the impact on students" were identified. A questionnaire was administered before and after the workshop to determine the degree to which the session helped the teacher feel more comfortable with the program. Levels of concern were interpreted by analyzing the results of the questionnaire. Results indicated that with the passage of time concern shifted from personal concerns to concerns regarding program efficiency and more universal implications such as benefits to the students.
2. Level of Use Test developed by Hall, Loucks, Rutherford, and Newlove. The purpose of this test is to determine the extent to which a particular program is being used by teachers. The range of useage levels identified in the test are nonuse, orientation, preparation, mechanical use, routine, refinement integration, and renewal. This test was administered four months after the workshop. Results indicated that 79% of the teachers had reached the mechanical level of use or higher.

Neither one of these questionnaires specifically applies to the evaluation of our workshop. It may be possible during the session however, to develop methods for resource personnel to evaluate their own in-service sessions using similar types of tests. At some future date, it may be desirable to obtain some feedback as to the concerns of teachers using the revised curriculum and also the level to which they have implemented it.

The Development of Material for the Training of Science Education Personnel

Although this was not a workshop as such, a committee of Science education supervisors assumed the responsibility of producing learning materials designed for use in institutions for science supervision. The general aims of the project were to respond to a need for in-service training materials in the area of education technology and to provide skills in the utilization of education technology processes to improve science education programs.

Four kits were produced along with validation tests for each kit. Kit #1, entitled "The Role of the Science Supervisor" was intended to orient new supervisors to their job function in a broad sense. The kit included a slide-tape presentation with utilization directions along with pre and post assessment. Kit #2 consisted of two audio-tapes and three slide presentations on education technology. Kit #3 consisted entirely of printed material. It provides structure for understanding a systems approach for the preparation of an in-service program for local needs. Kit #4 provides direction and materials for program management. Validation tests in the project attempted to assess attitudes, interests, skills and deficiencies.

One of the main activities of the February, 1978 workshop would be to develop materials for use at in-service sessions. This material may be in the form of video-tape or slide-tape presentations, film-strips, and printed material. Material of this type would aid a field resource person in planning and conducting in-service sessions that would be of greatest value to participating teachers.

Model For Developing In-Service Modules Providing Content Background in Science Education

In this article, the authors, Cleland and Uffelman discuss a model for developing modularized and behavioralized in-service

materials for improving content background in science. The model is designed to reduce apprehension about using new materials and approaches not clearly understood by teachers. "A compliment to a process centred in-service training model is a content centred approach".

There are four clearly defined stages to the model:
Stage 1 -- Needs analysis for curriculum content areas. This involves the analysis of the curriculum to identify content areas where background is weak. This forms the core of the in-service program.

Stage 2 -- Definition of performance skills necessary to master and teach content.

Stage 3 -- Design activities to facilitate mastery of performance skills identified in Stage 2.

Stage 4 -- Development of criterion reference tests to evaluate, diagnose, and prescribe.

Once again the objectives of the model don't specifically coincide with the goals of our workshop. Content background will form only a part of the program. Elements of this model, however, might be useful in setting up the workshop.

Evaluation of Workshops

Measurement Techniques

The success or failure of a workshop depends almost entirely on the opinions and attitudes that participants have formed as a result of the experience. Techniques of quantitatively measuring opinions and attitudes must be utilized. Osgood (1951) refers to attitudes as "tendencies of approach and avoidance" or "Favorable or unfavorable". Therefore, attitudes can be "ascribed to some basic bipolar continuum with a neutral or reference point" because they have both direction and intensity. To measure direction and intensity, the semantic differential involving association and scaling procedures can be used. The participant is given a concept or idea on which he should have formed some opinion. Along

with each concept, he is given a seven point scale. Negative feelings are assigned low values, positive feelings are assigned higher values up to "7", and "4" is the neutral point. The direction of the respondent's attitude is indicated by his selection to the left or right of the neutral point. The intensity is indicated by the distance from the neutral point. To obtain an "attitude score" the sum total of all numbers chosen is obtained. This number in itself means nothing but can be made useful when comparing it with scores of others in the group or scores from participants in other similar workshops. The instrument used to measure attitudes should be designed so that the maximum amount of information can be obtained in the minimum amount of time. Evaluation forms should be easy to administer and explain. All responses should be made by numbering, checking, or circling something. (Kelley, 1951). All questions should be relevant to the goals and intended outcomes of the conference. Comparative judgment leading to rational decision choices should be provided. (Havelock and Havelock, 1973).

Kelley (1951) specifies examples of certain types of questions that might be used.

1. Participants might be asked to compare their feelings regarding workshop activities with previous experiences. The response would be the checking of "more beneficial, less beneficial, the same."

2. Participants could be asked to rate certain methods, materials, or activities by assigning them a value. A list would be provided and participants could arrange the items in order of importance.

3. A simple "yes - no" response could be used to monitor feelings or indicate growth in certain areas.

4. The value of activities could be rated on a continuum scale or checking "great value; some value; little value; no value".

5. Space should always be left for general comments and

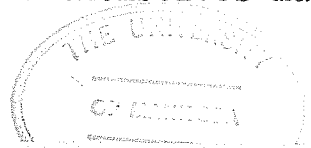
opinions not expressed elsewhere, and suggestions for improvement.

When dealing with the problem of anonymity of the respondents, Havelock (1973), feels that having people sign evaluation forms has the one advantage of pressuring people to respond conscientiously. Bias may enter, however, as a person tends to say things that put him in a favourable light. Evaluation should be non-threatening. To obtain objective results, data should be anonymous. Kelley (1951), states that people should not be compelled to sign forms because no correlations have been found between the nature of comments and signings.

Purpose of Evaluation

Havelock (1973) specifies four stages of workshop evaluations. The first stage called "content evaluation" ascertains the needs of teachers in areas of implementation, skills, materials, or content. The Needs Analysis Survey (Appendix A) completed by Science teachers throughout Manitoba serves as the example. The second stage, "input evaluation" is designed for resource people, group leaders, and trainers contributing to the program. "Process evaluation" is a day by day accounting of procedures. Questionnaires are distributed after each session enquiring about as many features as possible and more general questions monitoring attitudes. Finally, the "product evaluation" is administered at the end of the conference to determine overall effectiveness.

The evaluation of workshops should serve many purposes and should be designed to provide relevant feedback for specific groups. For program developers, researchers, and trainers, it should illuminate successes and failures that had occurred. From this feedback certain plans of action should be derived such as the redesigning of negative features, maintenance of positive features, and the examination of alternate approaches. The evaluation of one workshop should enhance the quality of subsequent workshops. Trainees may also benefit from the evaluation. The completion of the forms themselves may lead



to a better understanding of the goals and objectives of the program. Examining the evaluation results may confirm subjective feelings about the value of the program. (Havelock and Havelock, 1973).

Chapter III

RESEARCH DESIGN

Introduction

When the need for a workshop first became evident, the initial exploration into its feasibility was pursued by members of the original Curriculum Revision Committee. (Appendix B) with some external input. Tentative dates of between November 21 and 25 were set. At a later date, a sub committee was established to formalize plans and procedures. A five day workshop sponsored by the Department of Education (Manitoba Government) in conjunction with the Science Teachers' Association of Manitoba was set up and took place between February 13 and 17, 1978.

Development of the Workshop - Planning Stages

General Goals

The first step in organizing the workshop was to form a clear picture of the desired results. The main objective was to train and develop resource personnel from all school divisions throughout the Province of Manitoba who would be able to effectively help teachers and administrators in the implementation of the Junior High Science Curriculum. On the basis of the nature of the curriculum guide as well as the Needs Assessment Survey (Appendix A) administered to Science teachers throughout the Province, it was decided that, in order to carry out the stated function, the resource personnel must be equipped with:

(a) A thorough knowledge of the curriculum guide itself including goals, course content, suggested approaches, and methods. The highest priority indicated by teachers concerning information required about the new science program was information pertaining to program design and the guide.

(b) Strategies to nurture the implementation process.

This would take the form of plans or guidelines for conducting in-service sessions for teachers as well as administrators. The question of "how to implement the program" must be answered at administrative as well as teacher - pupil levels in each school taking into consideration value systems, the financial situation, and facilities already present.

(c) Support materials to aid in the conducting of in-services. These aids could take the form of audio-visual packages, suggested text books, and other suitable printed matter. The Needs Assessment Survey indicated a strong desire to have "more information concerning the selection of materials, possible patterns whereby modules can be organized within the classroom, and the implementation of materials". Another high priority was "short information packages about successful activities and techniques, resource persons and their special capabilities, and other areas related to Science 7-9". (Needs Assessment Survey, 1977).

(d) A general knowledge of the ramifications of the Junior High Science Program. A resource person would have to be familiar with:

- SI units acceptable in the various content areas of the "core" program.
- methods by which the program could be modified and adapted to suit the needs of slow learners, handicapped, or exceptional students.
- the suitability of the curriculum with respect to the developmental level of middle years students.
- methods by which objectives in the affective domain can be dealt with, examining the role science plays in modern society. The Needs Survey indicated the relating of science to its interaction with technology and society as a fairly high priority as well as "the role of student interest and needs in developing a science program".

There is much other relevant information that would be of value to a resource person but with the relatively short training period, it was decided to restrict the scope of the objectives.

Workshop Design -- Initial Stage

The form that the workshop finally took evolved in stages. An initial proposal including a possible schedule of events was submitted for discussion at a meeting held in October, 1977. (Appendix C). This timetable was based on three assumptions. First, input into the conference from experts in the various pertinent fields is essential as an information giving process. Secondly, the production of resource materials and development of strategies can be effectively undertaken by a group problem solving approach on the part of the participants who will eventually use them. Finally, participants could more efficiently complete the tasks provided if they were to reside at the training site where they could become totally emersed in the conference without distraction.

Each day would be divided into sessions of one and a half hours duration allowing two sessions in the morning and afternoon as well as evening sessions. Provisions would be made for coffee breaks as well as lunch and dinner. The morning sessions would be used for formal presentations made by experts selected on the basis of their knowledge of topics important to the participants. Once necessary information has been given, the participants would spend the remainder of the day in group activities such as discussing the topic and producing back-up resource materials to be used at in-services. While the group work is in progress, the resource persons making the presentations should be available for consultation and giving advice but should not lead discussions. In this manner, one topic per day could be studied.

The first day would begin with general introductions. Presentations would then be given on the goals of the workshop, expectations of the participants, as well as the implementation model within which they will be working. The nature of the

curriculum guide would form the major part of the day's content. After an initial presentation, participants could be divided into groups for the purpose of identifying specific topics for in-service sessions on the guide itself as well as developing methods of promoting the merits of the guide. The evening session would be used to examine suggested text materials to support the content of the program.

A major emphasis in the Junior High Science Program is a process approach to science teaching. The second day would begin with a presentation on "Processes in Science" which would include the identification of processes, construction of process lessons, and the evaluation of processes. The afternoon and evening sessions would be spent in group sessions identifying specific areas of content where processes could be easily demonstrated. An audio visual package along with printed material could then be produced.

The third day would be used to deal with course content. A presentation could most suitably be made by the members of the Curriculum Revision Committee who designed the program. After a question and answer session, group work would then resume with the purpose of again producing a media package or printed material in the areas of a specimen science lesson, sample activities in each content area, equipment lists, suitable textual materials, as well as necessary S I units in the six content areas.

The main topic on Day 4 would be in-service education. It was likely that a large number of participants had little or no previous experience in conducting in-services and, therefore, the topic was deemed necessary. After a presentation of general principles of in-service design, groups could meet to develop their own in-service plans to meet the requirements of teachers in their divisions utilizing materials prepared on Day 1 to 3.

The final day would be spent, for the most part, in a large group situation with the purpose of tying all of the previous days' activities together. Topics would be:

- (a) A reaffirmation of the duties and responsibilities of the trainees to their school divisions.
- (b) A review of the events taking place in the previous four days including a sharing of ideas and materials produced.
- (c) A discussion of the major implications of how to implement the program.
- (d) A suggested means of conducting an on-going evaluation of in-services held throughout the Province in the next year, and providing feedback to the Department of Education.
- (e) A final evaluation of the five day conference.

Grouping Procedures

Concerning the grouping procedures to be used at the conference, it was originally thought that all participants would be assigned to two groups. One group would be called a "Location Based Group". Participants would be placed in this group according to where they work in the Province. It is generally accepted that financial situations, student enrolment, facilities, and teacher workload differ from one school division to another and therefore, teacher and administrative needs are different. For this reason members with similar circumstances are grouped together in an effort to produce strategies for conducting in-services suitable to their particular areas. The specific topic that the location based groups would pursue would be:

- developing methods of informing teachers about the program along with promotion of the merits of the guide.
- designing in-service sessions using suitable support materials.

The second group to which each member would belong is called the "Content Area Group". Each trainee would select the content area in which he desires to work. Content area groups would be responsible for producing resource material pertaining to the content of the program such as S I information, specimen lessons, equipment lists, sample activities, etc. Each group would select a chairperson to conduct group meetings, supervise proceedings in the group during activity sessions to ensure the given tasks

are accomplished, and to act as a spokesman for the group in large group meetings.

Criticisms and Modifications

Although the topics suggested in the stated proposal were considered appropriate by the committee, the format was criticized in three areas. The main criticism was that there was an over reliance on the group approach to produce resource materials. Group interaction is necessary at any workshop but perhaps not to the extent suggested. The method of having participants produce media packages and printed materials assumes a certain amount of expertise within each group. It also assumes that all participants are at the same awareness level concerning the innovation as well as the same readiness level to produce materials and conduct in-services. Neither of these assumptions can be made. Another factor was that time limitations simply wouldn't allow the production of quality material in the quantity suggested.

The second criticism was directly related to the first. It was felt that there was insufficient input by resource persons possessing expertise in areas of concern. Participants should be provided with more information and materials rather than being expected to produce them. A more profitable use of the time available would be to have a greater number of topics with resource material prepared by an external source and given to the participants. Group interaction would take the form of examining and discussing the information and materials presented.

The third criticism was that, although a full day would be devoted to examining content, there was not enough attention payed to specific areas in science that have historically been found to be difficult and, therefore, avoided by a great number of Science teachers. The areas of Astronomy and Geology were cited. The new Junior High Science Program makes these areas mandatory for study, therefore attention must be paid to them at the workshop.

On the basis of these criticisms, certain revisions were made to the original plan at a meeting of the sub committee held on November 11, 1977. (Appendix C). The examination of S I units was changed to an input session conducted by an external resource person. Formal presentations on Astronomy, Geology, and Reading in Science were added. A social evening on the evening of the second day in the form of a wine and cheese party sponsored by the Science Teachers' Association of Manitoba was also included. To make room, some group interaction was deleted and the day long sessions on in-services originally scheduled for Day 4 was combined with the implementation activities on Day 5.

The finalized schedule of events (Appendix C) was later drawn up by the Program Development Secretariat, Department of Education. Additional sessions dealing with developmental theory, slow learners, and a technology and issues approach to science teaching were added. The securing of facilities, equipment, materials, and resource people were also taken care of by the Program Development Secretariat. Presenters at the conference were selected and informed of the goals of the conference and the needs of the participants. They were asked to include some sort of in-service package or suggestions as part of their presentation.

Facilities

The site chosen for the conference was St. Benedict's Educational Center. This facility can provide food and lodging for 40 - 45 live-in guests and is far enough away from the city that distractions are unlikely. Classroom facilities are also available as well as a lounge with some recreational facilities.

Cost

The funds for the workshop were provided by the Department of Education. The cost of substitutes and release time for the participants was to be absorbed by the school divisions involved. The allocation of funds was approximated as follows:

Live-in costs for 40 participants	\$2,400.00
Transportation Costs	\$1,000.00
Materials	\$ 400.00
Resource Persons (Presenters)	<u>\$ 600.00</u>
Total	\$4,400.00

Selection of Participants

Attendance at the workshop should include representation from all school divisions in the province and should be on a selection basis rather than a request for volunteers. Selection would ensure a higher quality resource person who would exhibit a greater degree of ability and enthusiasm concerning the given task. Participants should show some interest and concern for the implementation of the program and should be willing to conduct in-services as well as other forms of communication for science teachers in their divisions.

It was decided that the school division superintendents were most qualified to make the selection of suitable participants. On November 24, 1977, a letter was sent by the Program Development Secretariat to all superintendents and professional development committees. (Appendix E). The suggested criteria for selection stated in the letter was that a team of two should be chosen on the basis of leadership potential and from a school that will be implementing at least a part of the program next year.

Conclusion

A group of 44 participants representing 28 school divisions was submitted by superintendents. (Appendix D). Each participant was then sent a letter and several hand outs by the Department of Education preparing them for the conference.

Final Workshop Design

Introduction to Workshop and Curriculum Guide

The morning of the first day was used for general introductions, and a presentation dealing with the operation of the center as well as the function of the workshop. Some insight into the nature of the curriculum guide and the expectations of the participants was also provided. Specific objectives of the introductory session were to:

- (a) review the rationale of the workshop and its relationship to the total implementation model.
- (b) provide an opportunity for each participant to meet and discuss pertinent matters with others in the group who were previously unfamiliar.
- (c) provide participants with an opportunity to state their expectations of the conference.
- (d) study the nature of the curriculum guide.

After the initial introductory presentation, participants were asked to group themselves with three other people who were not acquainted to discuss their concerns regarding implementation and their forthcoming duties as resource personnel. After a twenty minute period, the entire group reconvened and a spokesman from each small group stated the main points raised in the discussions. A list of concerns was written on the chalkboard. This list would be referred to on the final day to determine the extent to which the conference handled the concerns.

The remainder of the morning was taken up by formal presentations on the nature of the guide, the role of the participants in implementation, and possible methods of evaluation and feedback regarding in-services that would be held by the trainees during the following year.

Support Materials

After lunch the entire group met to examine textual materials. The objective of the session was to provide participants with information concerning the variety of texts, modular materials,

and workbooks which use different approaches to support the content of the guide. Criteria for evaluating the relative merits and defficiencies of support materials were also provided.

A formal session was conducted utilizing a slide tape presentation which would later become available to the trainees for use in the field operation. Time was then given for participants to examine materials individually and evaluate a number of texts on the basis of criteria provided. To conclude the session, the entire group met to discuss the results of their evaluation and share ideas.

S I

An evening session on S I units was provided for the purpose of supplying participants with an understanding of the nature of S I as well as sample activities representing a concrete approach to thinking metric. The session took the form of a lecture presentation followed by a question and answer period. Activities and hand outs were provided and time was given to work on practice exercises.

Unit Development and Concept Mapping

An entire day was devoted to examining the nature and content of the curriculum guide. The specific objective was to foster an understanding of the scope and sequence of the objectives stated in the guide in the six content areas over three grade levels. Content groups were formed and participants prepared concept maps. Time was also spent on unit design where specific units of work were examined and related to content at other grade levels.

Processes in Science

The morning of the third day was spent on science processes. The use of a process approach to science is emphasized in the Junior High Science program and the clarification of the approach in all content areas will be a major factor in successful implementation. The purposes of this session were to:

- (a) identify processes in science.
- (b) provide methods along with sample activities that could be used to teach processes.
- (c) discuss means by which a process approach can be incorporated into a science program.
- (d) develop methods by which processes can be evaluated.

As a result of this session, trainees should have the means and materials to instruct teachers in the teaching of processes.

Developmental Theory

Two afternoon sessions were designed to provide background in the ability and conceptual levels of junior high school students. The intention was to observe some correlation between the level of objectives in the curriculum guide and the developmental level of the students. Also, some insight was given as to the suitability of various teaching methods to match different conceptual levels. A formal presentation was followed by group discussions.

Slow Learners

A session was conducted concerning the achievement level and needs of students with low academic ability. The purpose was to identify difficulties in teaching this type of student and to develop methods by which a science program can be modified and adapted to suit their needs. Reading materials geared to the reading level of slow learners were made available.

Reading in Science

The major objectives of this session were to provide methods for:

- (a) establishing the reading comprehension level of students by observation, activities, and diagnostic tests.
- (b) evaluating textual materials by formal and informal methods.

- (c) instructing reading to whole classes, small groups, and individuals.
- (d) approaching reading materials and using reading guides.
- (e) teaching reading skills such as comprehension vocabulary, critical reading, studying, and following directions.

Special attention was paid to reading skills pertaining to science such as interpreting pictures and diagrams, sequencing of steps, following instructions, and reading for comprehension.

Science and Technology

Value education forms an important part of the curriculum as objectives in the affective domain are stated throughout. This particular session dealt with relating science to technology and issues in modern society. Methods by which this approach could be incorporated into the program were discussed. A pre-workshop task was prescribed to prepare the participants for the session. The identification of the role played by science in everyday occurrences as well as newspaper articles was suggested. One difficulty was that only one of the two people involved in the presentation was able to attend the conference.

Astronomy and Geology

An evening session was provided in content areas which have often been avoided by science teachers. A brief introduction to the Science of Astronomy was presented to provide participants with some insight into the nature of the content. Some simple activities that could be used with students were also demonstrated.

The geology session took the form of examining the use of a stream table. A demonstration was given on the setting up of a stream table for use in reproducing land formations that occur naturally over large periods of time.

Implementation

The last formal presentation dealt with factors to be considered when implementing a program as well as methods of examining implementation needs in schools. After an initial presentation, participants were divided into groups of between eight and ten members. Each group was given a description of a particular school situation and were assigned the problem of identifying major factors of implementation in each. All members had the opportunity to participate in a role playing situation where the problems of implementing a program could be observed from different points of view. The main purpose of this session was to provide insights, strategies, and materials with which the participants could design in-service sessions to suit the needs of their school divisions.

At the conclusion of this session, a brief review of what had transpired during the five day conference was conducted. Reference was made to the initial list of concerns drawn up at the first session and the extent to which these concerns were effectively handled was discussed. The remainder of the day was spent viewing films and listening to presentations from various government departments on resources available to science teachers.

Evaluation of the Workshop

The evaluation was done in the form of questionnaires administered to the participants. The questionnaires were designed to determine the extent to which the workshop met the needs of the participants and objectives of the conference.

A preliminary questionnaire was administered after the first session of the workshop to monitor the participants' perception of their role as resource persons, their awareness of their responsibilities to their school divisions, and their level of knowledge about the 7-9 science program prior to the workshop. It also, to some extent, measured the effectiveness of the planning done in preparation for the workshop. Participants

were also asked to rate their priorities according to their needs and expectations of the conference. A final evaluation form was distributed after the conference to measure the effectiveness of the workshop. Specific areas monitored were the extent to which the workshop enhanced their capabilities as resource persons and provided sufficient information and background resource material to conduct in-services. Participants were also asked how they perceived their roles as resource persons and if they were totally aware of their duties and responsibilities.

Concerning the design of the workshop, participants were questioned as to the type of procedures (Lecture presentations, group discussions, individual work, etc.) they found to be most effective. They were also asked to suggest ways in which the workshop could be improved.

Following every topic session, a questionnaire was administered to determine the value of the session and the extent to which they could use the information provided at their own in-services.

An evaluation form was also given to the resource people who presented topics at the conference in order to monitor their feelings as to the effectiveness and limitations of their presentations.

The evaluation instrument itself was designed to take a minimum amount of time to complete as time was at a premium at the conference. Most questions involved circling a number from one to five indicating the extent to which participants agreed or disagreed with a given statement. Several questions demanded written opinions or suggestions but these were kept to a minimum. All questionnaires were answered anonymously to ensure maximum objectivity.

CHAPTER 1V

Evaluation Results

Introduction

The results of the workshop evaluation are presented in four parts. The first part consists of an evaluation summary which describes, in narrative form, the feelings and opinions of the participants as to the effectiveness of the workshop. The second part includes a table ranking the topic sessions in order of effectiveness. A series of histograms is presented in the third section to illustrate the degree to which certain criteria were met at each topic session. The fourth part consists of tables concerning priorities and preferred procedures.

Part One -- Evaluation Summary

The evaluation summary is derived from cumulative results of responses to questionnaires (Appendix F). Total responses are expressed as a per cent and any total not reaching 100% for any item indicates that some participants did not answer certain questions. The summary also includes suggestions from trainees and feedback from presenters.

Part Two -- Ranking of Topic Sessions

The purpose of this section is to determine which topic sessions had a greater impact on participants and were more effective in dealing with their problems. Once this has been resolved, the elements of successful sessions as well as the weaknesses of lower rated sessions can be ascertained. The method used was to calculate a raw score for each participant in each topic session by adding the values of their choices between one and five for all items. The raw score was then converted to a per cent by dividing their score by the total possible (choice of 5 on every item). The statistics on

Line computer program ST 11 was then used to determine the mean, median, standard deviation and range of scores as well as the skew and kurtosis of the curves for each topic session. Although the scores in themselves are relatively meaningless, they can serve as a frame of reference when they are compared with each other. The preliminary and final workshop evaluations are not included as there is no previous standard for comparison.

Part Three -- Positive Feedback Histograms

Certain test items on all evaluation forms were designed to monitor the importance of the topics, the value of the session, and the extent to which participants were provided with information, strategies, and materials to conduct in-services. The total per cent positive feedback (choices 4 or 5) was calculated for each session. No consideration was given to the strength of response between 4 - agree and 5 - strongly agree.

A histogram is also presented indicating the amount of use a particular session might have in terms of actual in-service time. Participants were asked to indicate the extent to which they could use a particular session at an in-service and were given the choices of a full day, half day, portion of half day, and no use. To tabulate cumulative results a full day session was assigned a value of 1; a half day = .5; a portion of half day = .25; and no use = 0. This histogram represents the total number of in-service days that could be expected from all participants. One major factor to be considered for the histogram is that the totals are derived only from forms turned in. Therefore, more in-service days are shown when a larger return was received.

Some topic sessions were omitted from certain histograms. For example, the histogram dealing with the importance of the topic does not include the sessions on implementation, evaluation of support materials, science processes or the introduction to the guide because they are inherently important to the nature of the curriculum guide and to the workshop. The implementation session was also omitted from the histogram dealing with the

level of use of topic sessions because the session was geared at approaches to conducting in-services and dealing with specific school problems. No in-service session would specifically be given on this topic in the field operation.

Part 1V — Priority Tables

The final section includes lists relating priorities of participants prior to the conference and the effectiveness of the workshop in dealing with these priorities. A list of effective procedures such as lectures, group discussions, individual work time, organized activities, etc. is also presented in order of preference.

The preliminary and final evaluation forms contained a question designed to determine the participants' perception of their roles as resource personnel. A study was done on the effect of the workshop in changing role perception, the results of which will be presented in Part 1V.

Part I

Evaluation Summary

Preliminary Evaluation

General response to items in question one were considerably lower than could be expected. One third of the participants were not sure of the role they would play as resource personnel in their divisions and 36% were not fully informed as to the goals and objectives of the workshop. One hundred per cent positive feedback could be expected if no communication problems occur.

Question two indicated that most of the participants were familiar with the structure and content of the guide but were unaware of support material available.

No clear concensus of opinion was indicated concerning the participants' perception of their roles as resource persons although 80% felt that their task would be a challenging one.

A list of priorities will be presented in the fourth section of this chapter.

Introduction to the Workshop and Curriculum Guide

The most significant positive feedback was that the participants' role as resource personnel was clarified (88%). The remainder of the feedback was highly neutral to negative. Less than 40% of the group felt that they were competent enough or had sufficient information and materials to successfully conduct an in-service on the guide and only 56% felt that the session was useful. One point that seems inconsistent was that the degree to which they could conduct in-services rated fairly high. This seems to indicate a need for more information concerning the guide.

Several suggestions were submitted concerning issues that needed discussion. They were:

- More detail on the guide. An up-to-date version of the guide should have been made available to all trainees and time given to examine it. An analysis of the thought that went into choosing the objectives in the guide was requested. Why are processes emphasized?
- A step by step examination of the guide should have been undertaken. An attempt should have been made to sell the guide to the participants before they should be expected to promote it to teachers in their school divisions.
- A request for reference material was also made. This was done in the afternoon session.
- More support material in the form of video tapes or other media, presentations, for use at in-services should be provided.

Other suggestions concerned information from pilot schools involved in the program as well as more detail on the implementation model itself. One comment referred to the terminology used in the session. Some expressions used were unfamiliar to the participants making the ideas hard to understand.

Evaluation of Support Materials

Most feedback was positive. All but one participant was made aware of resource material relevant to the 7-9 program. Over 80% felt that they were capable of evaluating support materials and could use information provided. Several trainees were unsure of the availability of the materials presented for their own personal use. Results indicated a desire for more time to personally examine the texts and modules.

Two suggestions for things that might have been included were input from pilot teachers who had used the material and test scores showing the reading level of the material.

S I

The majority of the participants felt that this was an important topic as only 40% were comfortable with metrics before the session. The main criticism lies in the manner in which the session was presented. Although a thorough presentation on metrics was given, insufficient activities, resource material, and information that are specifically related to the content in the curriculum were provided. Only 58% felt that the session met their expectations.

Some comments made were that the session could have been more practical and relevant to the Junior High program. Although hand outs that could be used in the classroom were dispensed, the materials used in the lecture that could be utilized at in-services were not made available.

Concept Mapping and Unit Design

Almost all participants agreed that the topic was an important one but little positive feedback concerning the use of the information and materials was received. Ninety-one per cent indicated that they had been given the opportunity to examine one specific area in the guide but only 52% expressed an awareness of how to use information and material at an in-service. An entire day was spent on this topic with too little gain. This type of format may be useful to teachers attempting to familiarize themselves with the guide but was ineffective in training resource personnel. The presenter felt the topic was reasonably well defined but no clear strategy for implementation was immediately evident. The strategy had not been tried so its success remains to be seen.

Processes in Science

Feedback concerning the value of the session was very positive. Strategies, material, and information were adequately provided. Only 62% felt comfortable about presenting an in-service on processes, and almost half, were unsure of how to evaluate processes.

Some suggestions submitted were that processes should be identified more clearly and taught at a higher level. Some felt that too much information was crammed into too short a time period.

The presenter of the session felt that ~~the~~ basic objectives for most people were met at a reasonably high (80%) level. Some were already convinced about the emphasis on processes while others may still be a little nervous about giving positive leadership.

Developmental Theory

The generally negative feedback indicated that the topic was considered unimportant and that the session was of little value. The only positive feedback was that 75% indicated that they were aware of the ability levels of Junior High students.

Some comments presented were that the guide should identify activities as to their operational level. One felt that the ideas expressed were too difficult and was not clear on how they could be applied.

Slow Learners and Reading for Content

Both of these sessions were rated very highly in almost all areas. Almost all participants were provided with a good background along with useful information and materials. A large per centage felt that more time should have been spent on these topics.

One comment made was that the topics could be applied to any subject area and should have been designed more specifically for science.

The presenter of the slow learner session commented on the positive reaction given regarding implementation of the curriculum amoung slow learner classes. More time was necessary for group interaction.

Societal Approach to Science Teaching

Less than half of the participants responded favorable to all items. Generally speaking, the session was of little value in terms of information gained and would be of little use at in-services. Only 30% felt that this type of approach could be adapted to the curriculum.

The presenter of the session disagreed stating that it was a good introduction to this aspect of Science teaching and that the feedback was good.

Astronomy-Geology (Stream Table)

General feedback concerning these content areas was positive. Sixty-one per cent were unfamiliar with common Astronomy topics prior to the session while only 6% felt uncomfortable after the session. Over 80% felt that it was a valuable session and specific activities were provided. One criticism was that many of the activities didn't specifically apply to the objectives set out in the curriculum guide.

The presenter felt that the curriculum material was so clear that, rather than going over it, he chose to try and build confidence and enthusiasm. He felt that teacher response was useful and indicated great interest.

Implementation

This session received a very positive rating as participants were provided with general principles as well as a model for in-service design. They are aware of methods used in examining implementation needs in schools and have access to materials and resource personnel. All but one clearly understood their role as a resource person. The session contained enough relevant content and was organized in a clear logical manner.

Questionnaire for Presenters

All of the presenters of topic sessions were informed as to the general goals and objectives of the workshop as well as the needs of the participants. All felt they had accomplished what they had intended to do. A significant number (5 out of 12) stated that time was a major factor in completing their presentation. A few presenters did not intend to provide resource materials, strategies, and activities for use at in-services.

Final Workshop Evaluation

All feedback concerning the efficiency and effectiveness of the conference was rated at 80% or better. All but 2 trainees felt that the workshop was a worthwhile experience that provided them with useful information. The entire group felt that their capabilities as resource people were enhanced by the experience.

Some recommendations made regarding future workshops were:

- Provide fewer sessions with more time on each.
- Provide a shorter period of time. One week is too long.
- Concentrate on one theme only.
- Include more activity centred material.
- Provide more sessions on content.
- Reorganize societal approach session.
- Conduct the implementation session earlier in the week.
- Include a session on lab and teaching gimmicks.

In response to sessions that participants would like to see at future sessions:

- Session on financial arrangements necessary when implementing a program.
- Results from pilot schools.
- The selling of a program and convincing people to change.

PART II - Effectiveness of Workshop Sessions

TABLE 1

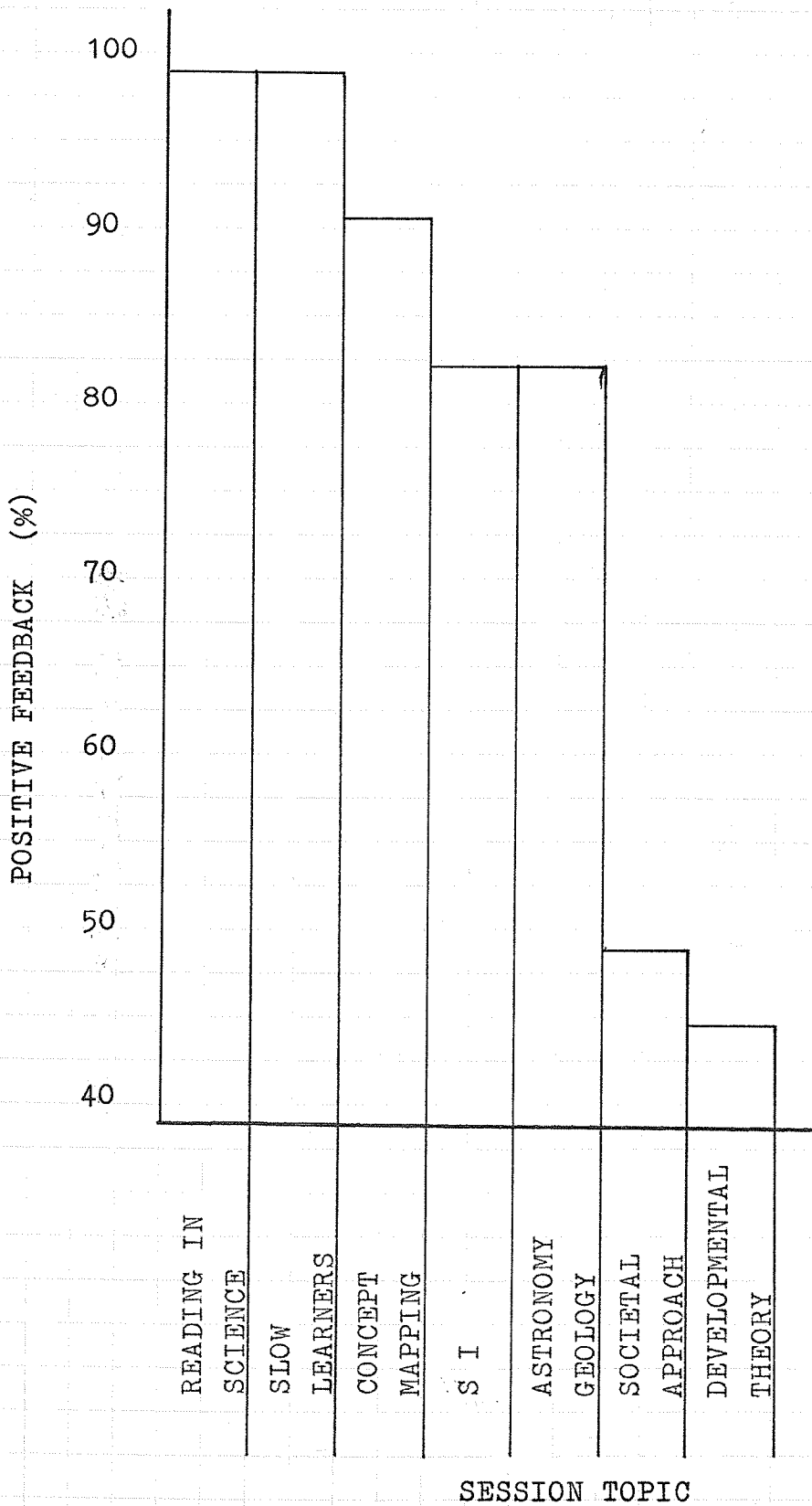
EFFECTIVENESS OF SESSIONS RANKED IN ORDER OF MEANS

SESSION	RESPONDENTS	MEAN	STANDARD DEVIATION	MEDIAN	RANGE	SKEW	KURTOSIS
SLOW LEARNERS	38	85.0	8.8	86	31	-.113	1.736
READING IN SCIENCE	38	83.2	8.9	82	36	.059	2.488
IMPLEMENTATION	33	81.7	8.8	83	40	-.244	2.693
SUPPORT MATERIALS	40	77.6	9.5	76	49	.095	3.659
SCIENCE PROCESSES	37	77.5	10.5	80	49	-.682	3.304
ASTRONOMY GEOLOGY	31	73.9	10.0	74	36	.129	2.116
S I	35	71.4	12.6	73	50	-.425	2.330
CONCEPT MAPPING	35	71.3	11.0	70	38	-.255	1.931
INTRODUCTION TO GUIDE	43	68.1	10.6	68	47	.231	2.683
SOCIETAL APPROACH	33	62.6	12.7	65	56	-.500	2.837
DEVELOPMENTAL THEORY	32	61.3	16.9	67.5	68	-.164	2.090

Part III - Positive Feedback Histogram

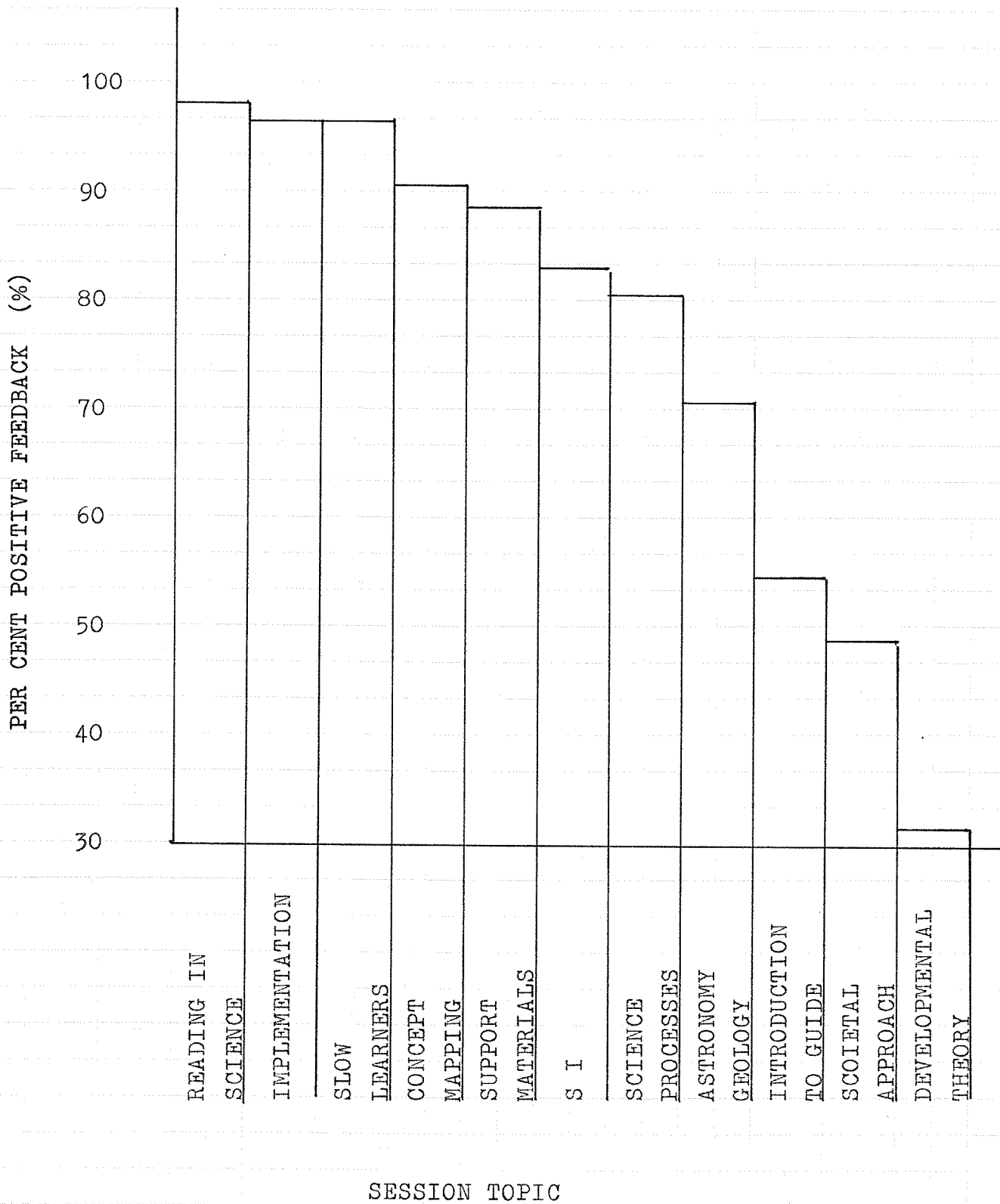
IMPORTANCE OF THE TOPIC

Histogram 1



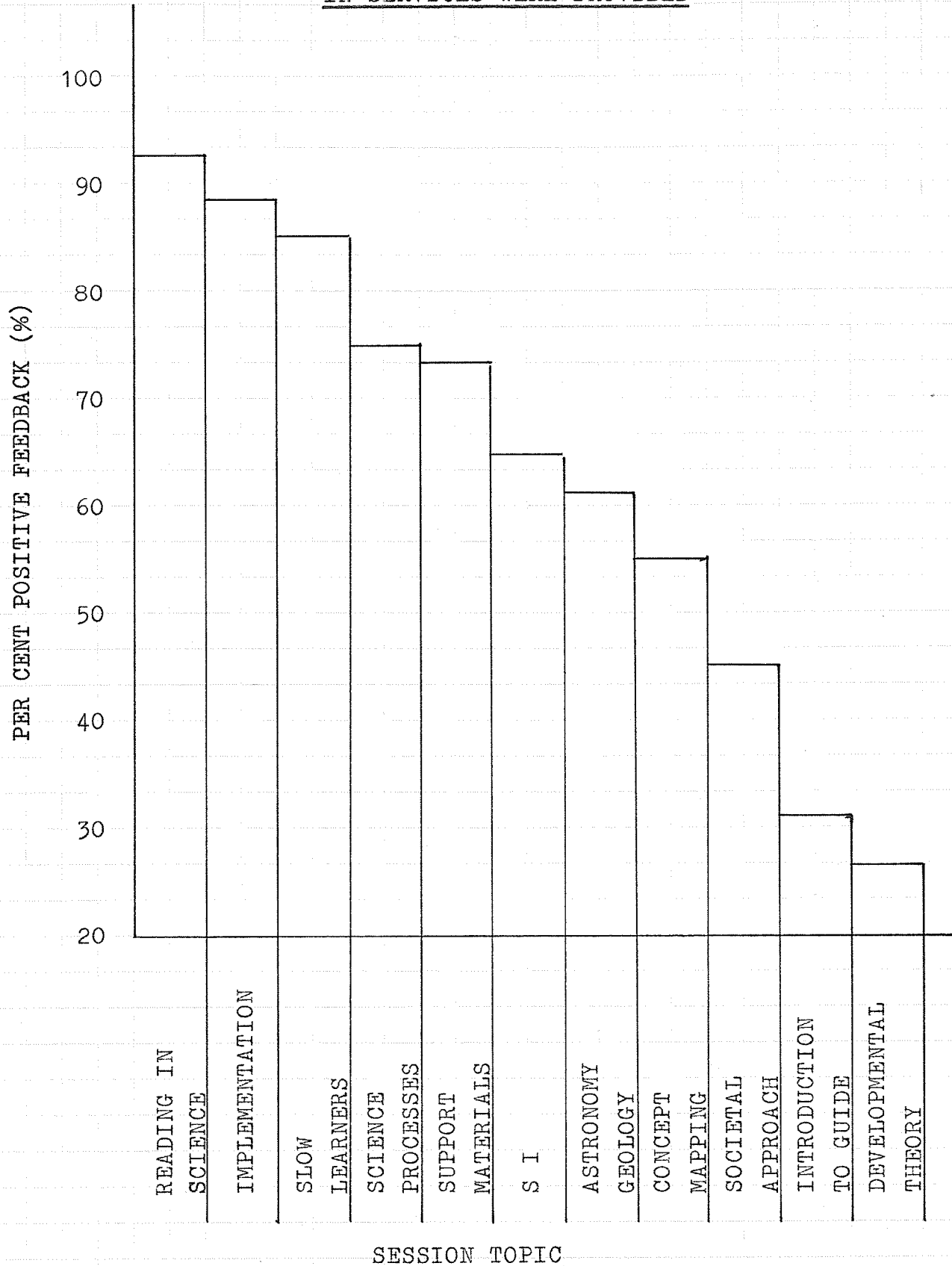
Histogram 2

VALUE OF THE SESSION

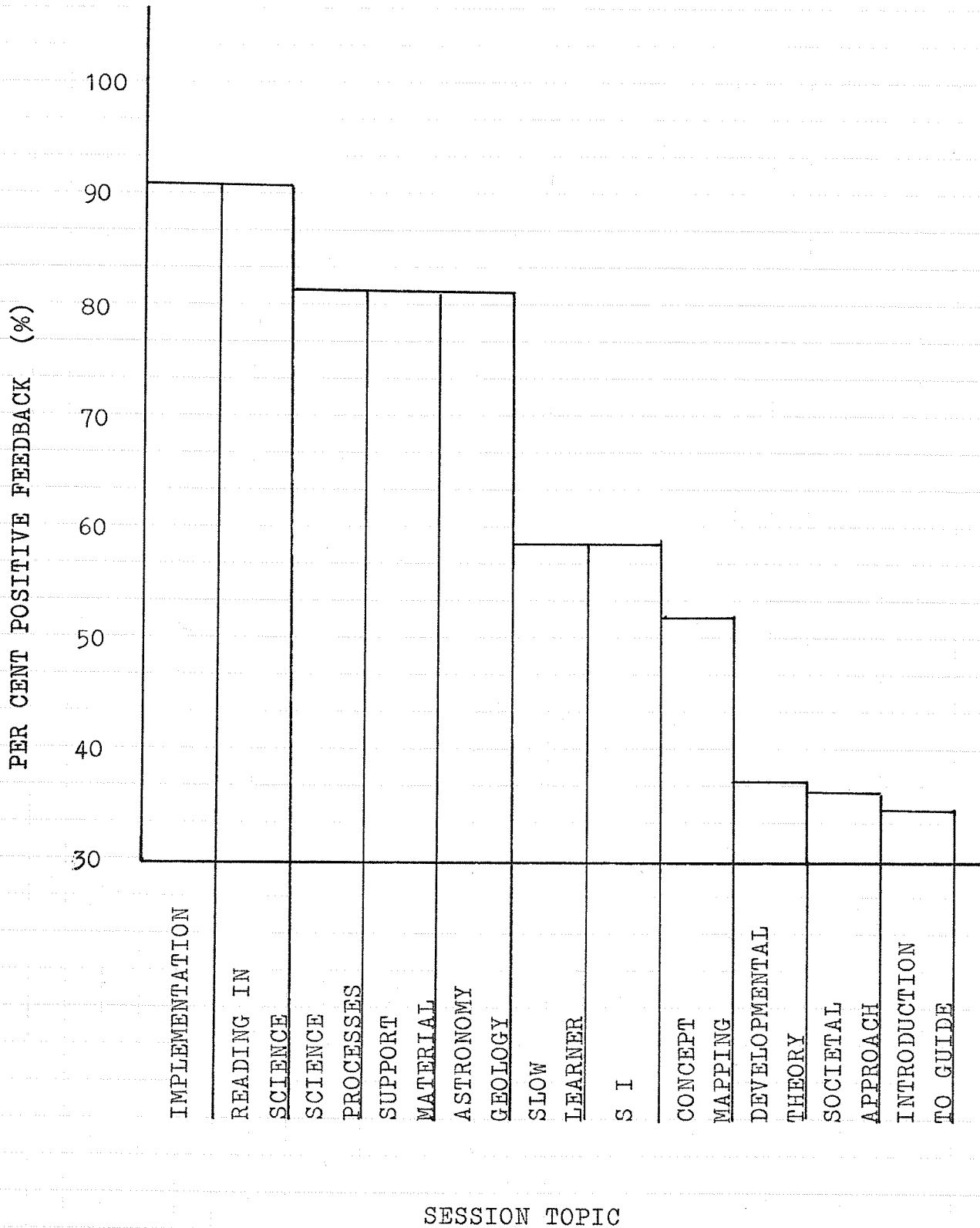


Histogram 3

THE DEGREE TO WHICH MATERIALS TO SUPPORT
IN-SERVICES WERE PROVIDED

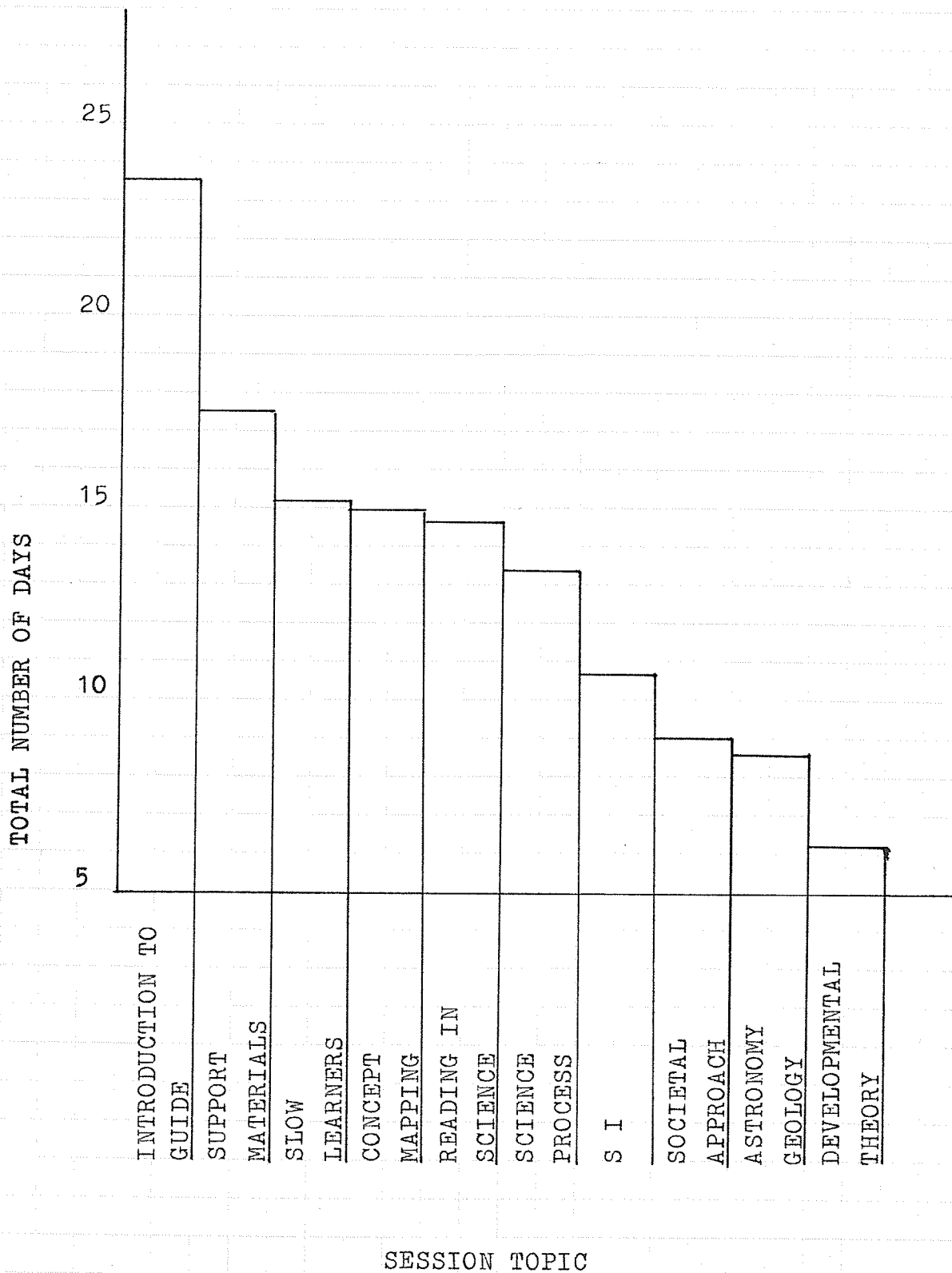


Histogram 4
PROVISION FOR INFORMATION AND IN-SERVICE
STRATEGIES



Histogram 5

DEGREE TO WHICH THE TOPIC COULD BE USED
FOR AN IN-SERVICE



Part IV. — Priority Tables

Table 2

RANKING OF THE TOP PARTICIPANT PRIORITIES

HELD BEFORE THE WORKSHOP

(Compiled from Priority Question - Preliminary Evaluation)

<u>RANK</u>	<u>PRIORITY</u>	<u>%</u>
1	Support Materials available for the 7-9 program	88
2	Adapting the 7-9 program to different learning levels	79
3	Role of resource personnel	76
4	Strategies for in-servicing administrators	74
4	Methods of conducting in-services	74
5	Information about the guide	71
5	S I in Junior High	71
6	Developmental levels of Junior High students	68
7	A - V Material to support in-services	62
8	Information on Activities and equipment necessary in the curriculum	59
8	Unique approaches to Science teaching (Societal)	59
8	Content background	59
9	Reading skills applied to Science	53

Table 3

EXTENT TO WHICH REQUIREMENTS WERE MET

(Compiled from adequacy question — final evaluation)

RANK	REQUIREMENT	%
1	Science processes	97
2	Role of a Resource Person	93
3	Methods of planning and preparing in-service sessions	87
3	Resource material for in-services	87
3	Factors for consideration in implementation	87
4	Information about the guide	83
4	Information on materials to support the guide	83
5	Developmental levels of Junior High students	77
6	Adapting the Science program to slow learners	73
7	Strategies for in-servicing administrators	70
8	Information on reading skills as they apply to Junior High Science	67
9	Content background in areas of Science	63
10	A - V aids to support in-services	60
10	S I in the curriculum	60
10	Activities to support content in guide	60

Table 4

PREFERRED PROCEDURES AT WORKSHOPS

(Compiled from procedure question — final evaluation)

Scoring Procedure as follows:

- High rating - 3 points
- Medium rating - 2 points
- Low rating - 1 point

RANK	PROCEDURE	SCORE
1	Small group discussions	85
2	Informal discussions outside topic sessions	77
3	Time spent on organized activities	74
4	Lecture presentations	60
4	Time allowed for individual work	60
5	Large group discussions	59
6	Time spent listening to presentations	57

Role Perception

Test Item - Question #3 on the preliminary evaluation and question #6 on the final evaluation were designed to determine role perception of the participants as resource personnel. Positive values of easy, well-defined, rewarding, challenging, and flexible, were opposed by corresponding negative values of difficult, vague, frustrating, routine, and rigid.

The Sample - Twenty-five participants, 18 of whom had no previous experience at conducting workshops and 7 experienced, were selected because their pre and post test forms could be identified.

Assumption Violation - The assumption violation of random sampling is violated because participants were not tested randomly nor were they randomly selected to attend the workshop.

Research Hypothesis

There will be no significant differences between pre and post-test scores on role perception for (a) the entire group (b) inexperienced group and (c) experienced group.

Statistical Hypothesis: For all 3 cases.

$$H_0: \mu_1 - \mu_2 = 0 \text{ or } \mu_1 = \mu_2$$

$$H_1: \mu_1 - \mu_2 \neq 0 \text{ or } \mu_1 \neq \mu_2$$

Test Statistic - Dependent Sample T Test.

Significance Level - $\alpha = .05$ (.025 region of rejection for non-directional T Test).

Decision Rule

- (a) For entire group $df=24$ we reject H_0 if $|t| > 2.06$
- (b) For inexperienced group $df=17$ we reject $|t| > 2.11$
- (c) For experienced group $df=6$ we reject $|t| > 2.36$

Tables - Role Perception

GROUP	N	$\bar{X}_1$	$\bar{X}_2$	df	CRITICAL VALUE	T-CALCULATED
total	25	17.12	17.76	24	2.06	-1.098
inexperienced	18	16.83	17.44	17	2.11	-1.078
experienced	7	17.86	18.57	6	2.36	- .451

Statistical Decision

In all three cases H_0 is not rejected because $|t| > t$ calculated $< t$ (critical value).

Chapter V

CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

Introduction

The purpose of the chapter is to arrive at some conclusions regarding the degree of success achieved at the workshop and to make recommendations beneficial to future workshops. The basis for these conclusions and recommendations is derived from the results in Chapter 1V and the literature in Chapter 11.

Along with a general evaluation of the workshop, specific areas of study will include planning stages, workshop procedures, and the potential advantage gained at the conference. Conclusions regarding the general effectiveness are reflected by the readiness and ability of trainees to fulfill their roles as resource persons. The two most important aspects of the planning stages are methods used in selecting participants and matching specific topic objectives with the priorities of trainees. The analysis of results of topic sessions presented in various forms in Chapter 1V will shed light on essential elements of successful workshops.

Conclusions

General Effectiveness

On the basis of information received from the final evaluation, it can be stated that the workshop was highly successful. Over 80% of the respondents made the following statement possible. As a result of the workshop, participants were fully aware of their responsibilities as resource persons and were given sufficient information and materials to carry out their duties. The conference was well organized and expectations were met at a high level. Generally speaking, it was a worthwhile experience that enhanced the capabilities of all present. Five out of the six priorities that participants declared beforehand were met at an 80% level or higher.

Achievement of Basic Objectives

Concerning the degree to which the four major objectives stated in Chapter 111 were fulfilled, the following statements are possible.

Objective 1 — Conveying a knowledge of the Guide: This was a high priority topic before the conference and rated the highest in the extent to which it could be used at in-services. Relatively low positive feedback was obtained from the two sessions pertaining to the guide as revealed in histograms relating value of the sessions, provision for information, and provision for materials. This seems to indicate that a different approach involving more efficient methods for dispensing information and developing resource materials is desired.

Objective 2 — Provision of Strategies to facilitate the Implementation Process: Positive feedback in this area on the final evaluation was at a 90% level and an 80% positive response was received in the specific session on implementation. According to the histogram on this point only five of the eleven sessions received an 80% level or higher while the remaining six were below 60%.

One contributing factor to the apparent inconsistency existing between topic session and final evaluation feedback was that the topic of implementation was dealt with last at the conference and may have given insight into the usage of information. The final session tied loose ends together and gave meaning to what had previously transpired. Nonetheless, all topic presentations could have been expected to deal more specifically with possible methods usable at in-services.

Objective 3 — Provision for Support Material to Aid In-Service Design: This was met at an 80% level according to the final evaluation. The histogram measuring the degree to which resource materials were provided shows that three sessions rated above 80%, three lower than 50%, and the remainder in the middle. Of greatest concern at the lower end of the scale would be the two sessions dealing with the guide. The extent

to which audio-visual material was provided also rated fairly low (final evaluation). Only one slide-tape presentation was made available for use in the field operation. The obvious conclusion is that more emphasis could have been placed in this area by presenters at the conference.

Objective 4 — Knowledge of other Ramification of the Curriculum: Sessions concerning these areas were Reading in Science; Slow Learners; Science Processes; S I; Societal Approach; and Developmental Theory. Four out of the six sessions rated highly in the topic importance, and session value histograms. The low rated sessions of Developmental Theory, and Societal Approach could either have been omitted or presented in a different form. Although the session on S I was considered important and valuable, its use in the field was very low. The approach taken was too general and could have been directed more at the content specified in the curriculum. In most cases, however, this objective was adequately handled.

Suitability of Participants

According to preliminary evaluation, eleven people were not clear as to the role they were expected to play in their divisions and twelve were not aware of the goals and objectives of the workshop. This is a critical point of concern because the lack of willingness and competence on the part of even one participant could lessen the ability of all Junior High Science Teachers in an entire school division to implement the program. The fact that two participants indicated that they were not familiar with the structure of the guide and three were not aware of the content, provides proof that, in some cases, the most suitable people were not chosen to attend. It could be assumed that anyone accepting the role of a resource person in implementation would have had some sort of previous involvement in the planned curriculum or, at least, would have taken time to read the curriculum guide.

The letter sent out by the Secretariat to all Superintendents was very specific as to the purpose of the workshop and type of people required. It is not likely that communication problems occurred at this level. Two possibilities are immediately evident. Either the method of selection used by Superintendents was inadequate or the candidates themselves did not properly prepare themselves for the task at hand. In any case, steps must be taken in future endeavors to eliminate these problems and assure that all of the participants are qualified.

Although it can not be determined from the forms, it is likely that much of the negative feedback on evaluation forms given throughout the conference came from people who did not want the responsibilities expected of them in the first place. This would influence results as the evaluation format assumes that all participants are attending because of a desire to serve as resource persons.

Selection of Topics

Six of the eleven topics chosen in the planning stages were considered as top priorities by over 70% of the participants. (Priority Table 3 of Chapter 1V). Three additional topics were considered to be of major importance by over 80% after the sessions. (Histogram 1 Chapter 1V). Two topics, Developmental Theory and Societal Approach, were neither a priority or considered important. The success of topic selection could be rated as 9 out of 11 or 83%.

Usage at In-Services

By referring to Histogram 5 of Chapter 1V dealing with the degree to which topics can be used at in-services, it can be determined that 134.5 in-service days are possible. The average number of respondents to evaluation forms was 36.2. The average number of in-service days per person is calculated to a value of 3.71. It is not likely that all participants will conduct this number of sessions because of circumstances such as lack of in-service days offered or a lack of personal commitment. The significance of this figure is that most

participants are capable of and should be expected to conduct at least one day of in-service with a total possible of four.

Also of significance is the fact that the session which accrued the highest level of use was the introductory session on the guide even though other studies indicated that insufficient information and support material was provided. The second most highly rated session, Evaluation of Support Materials, included a slide-tape presentation, an abundance of demonstration material, and evaluation criteria all of which were made available to trainees for use at in-services. The conclusion is that factors such as topic importance and provisions made for in-services will increase the utility level of a workshop session. The value of a session does not necessarily reflect on its use in the field.

Role Perception

The results of the brief study done concerning participants perception of their roles as resource persons, indicate that the workshop had no effect within the limits of the experiment. This finding is consistent with the results of an attitude study conducted by La Shier (1976). This study dealt with implementing teachers rather than resource personnel trainees and indicated that although the concern level changed, teacher attitudes did not. Teacher attitudes and role perception seem closely linked, therefore, it was to be expected that no change would occur.

One factor that may have influenced the results is the limitation of the test instrument itself. Also, the participants were selected to attend on the basis of personal aptitudes and abilities and their duties were outlined beforehand. Their perception of their roles were positive prior to their attendance at the workshop and were not likely to change.

Elements of a Successful Workshop

Starting Point

Any workshop must have some form of introductory session on the first day, not only to familiarize participants with general goals and procedures, but also to prepare them for the tasks ahead. The introductory session in the workshop under study included a presentation on the curriculum guide, the main point of focus in implementation. As indicated previously, this session rated very highly in the areas of importance and the extent to which it could be used but received a low rating in the area of provision for information and materials to support in-services. A point that must be considered, however, is that the session was not specifically designed to be used as an in-service topic at this stage but rather to provide a background relative to the nature and development of the guide. The fact that a good number of suggestions and concerns were raised, many of which were discussed later in the week, indicates that the concern level and level of involvement of the participants were increased. The most positive feature of this particular session was that it was a good starting point on which to base the week ahead.

Effective Topic Sessions

A ranking of the most effective sessions in order of their mean scores is shown in table 1 in the second part of Chapter 1V. A study of the data reveals that the five most highly ranked sessions are consistent in that both their means and medians are above 75% and the range of marks and standard deviations are relatively low. The high central tendency and low dispersion of the scores indicates a high level of agreement as to the success of these sessions. The skew of the marks are of little consequence because values less than + or - 1 are not significant. Concerning kurtosis, a value of 3 indicates a normal distribution, less than 3, a flat curve with a wide distribution of marks and greater than 3, a tall curve with a low mark distribution. A study of the elements common to these five sessions as well as the deficiencies of lower ranked

sessions may shed light on elements necessary in successful workshops.

Four of the five most effective sessions concerned topics that are necessary to the implementation process. The importance of support materials and science processes are pointed out in the guide along with the implementation process itself, which rated highly in importance. (Histogram 1). The Slow Learner session was also considered important as methods of adapting the program to different learning levels was the second ranked priority before the conference. An interesting point was that Reading in Science, a topic not of immediate importance to implementation and a very low priority, rated as the second most highly effective session. This seems to indicate that the presenter did an excellent job of selling the merits of the topic and made it an important topic for the audience. Evidence to support this is the fact that the topic was rated the highest in importance after the presentation. (Histogram 1). It can also be concluded that a good presentation will be appreciated on its own merits regardless of its immediate importance to the implementation process.

Predictably, the value of the top five sessions received an over 80% rating. (Histogram 2). They were also the top ranked sessions on the Histogram concerning provisions for materials to support in-services. Four out of five rated the highest in provision for in-service strategies. (Histogram 4). The session on slow learners rated fairly low at 60% positive feedback. This indicates that in order for a session to be of value, support materials should be provided. Strategies and general information are also desirable but if resource material is made available, most experienced teachers are capable of developing suitable strategies around them.

A significant factor in workshop planning is allotting the proper amount of time for each session. Highest priority items should be given the most time. The majority of participants (over 85%) felt that more time was required for the two most highly effective sessions. Both of these sessions

were given one time slot of approximately one and a half hours. One could conclude that either more time should have been provided or that presenters should gear their presentations to the amount of time provided. Because of the relatively low importance of the reading session to implementation, the latter is probably more valid.

An examination of the two least effective sessions reveals that both rated fairly low in all the histograms in Chapter IV. The fact that they were not considered to be important topics would immediately detract from their success potential. Most participants felt that the Societal Approach session did not adequately provide them with enough information to enable them to initiate this type of approach. Only 57% were convinced it should be implemented as part of the program. A study of the Developmental Theory session reveals that although 77% were familiar with developmental levels of Junior High students, they were not able to adapt the information to the science program. The importance of selling the program to motivate the audience is again evident. Adequate information and materials specific to the needs of the participants is also essential.

Methods used at workshops also play a large role in contributing to its success. A study of preferred procedures (table 4) reveals that small group interaction, informal discussions, and organized activities are considered highly effective while lectures and other forms of large group presentations and discussions rank lower. Formal presentations are necessary to dispense information but perhaps actual learning and assimilation of materials is better done in small groups. This is consistent with the literature on the topic, most of which emphasizes the importance of group interaction in a problem solving approach. It should also be noted that most of the highly successful sessions incorporated the use of group discussion and activities such as role playing, examining materials, and completing prescribed exercises.

Concluding Session

At the conclusion of the workshop, some sort of summary of events should be presented to give more meaning to what has previously transpired and provide direction as to its future use. In the workshop under study, the final session on implementation was successful in serving this purpose. Evidence to support this statement is that feedback concerning many similar items on evaluation forms was more positive at the end of the workshop than it was during the week.

Role of the Presenter

The function of a resource person with expertise in a given area should be clarified. The role of the presenter should be to:

(a) promote the merits of the topic and point out reasons why it is necessary in the field operation. If the topic was not considered important prior to the conference, it should be after the session. This selling program should also increase the motivation level of participants.

(b) present background information and results of research done on the topic. A bibliography to allow participants to study the topic in more detail might also be of value.

(c) display resource materials and audio-visual aids that have been already developed on the topic. These materials should be made available to participants for use in the field. Materials that are presented but not made available are totally useless and could cause frustration.

(d) provide the method and supervise the production of resource material where none are available.

(e) present a possible outline for an in-service session using support materials available.

(f) suggest possible activities which might be suitable at in-services. Trainees should actually attempt some of these activities at the conference to increase their confidence level in using them in the field.

(g) allow sufficient time for group interaction for examining or producing materials, performing sample exercises, and discussing relevant points presented.

(h) allow for feedback from the group and answer questions.

Summary

In conclusion, the essential elements of a successful workshop are:

1. A starting point that gets the audience interested, involved, and motivated.
2. Topics that directly relate to the needs of the participants in light of the role they are expected to fulfill.
3. Adequate strategies, information, and support materials for use by participants in the field operation.
4. Presenters that are capable of fulfilling the role described previously.
5. Time allotted for group interaction.
6. A concluding session that provides meaning and direction for the workshop.

Recommendations

Implementation Model

The first recommendation concerns one point in the implementation model described in Chapter 1. The specific area of concern is the stage at which administrators including superintendents are fully exposed to the innovation. In the implementation model, the in-servicing of administrators takes place at the field operation stage and the presentations are conducted by resource personnel trained at the workshop. Undoubtedly, superintendents are exposed to the revised curriculum and given necessary information regarding implementation before this stage but full implementation procedures are not discussed in detail until the field operation.

In an attempt to speed up the diffusion rate and promote a more efficient implementation process, it might be advantageous to train superintendents before the development of the field dissemination network. This training session could take place at a province-wide meeting of superintendents conducted by the Department of Education. If such a meeting is not possible, some form of direct personal contact should be made by representatives from the Department. These meetings need not take a great deal of time and need not delve into all of the details of the curriculum. The main purpose should be to point out the merits of the program, to illustrate the advantages of the new curriculum over the one presently being used, and to show how it is economically feasible. If superintendents are convinced that the program should be implemented, they will then take steps to promote it in their divisions.

The position of a superintendent is that of a leader in education. His authority is respected and the decisions he makes are usually carried out. In a study relevant to the adoption of educational innovations in Pennsylvania and West Virginia, Richard O. Carlson emphasizes the importance of superintendents in the implementation process. "Though it is true that a school division as a whole accepts or rejects

innovations, the school superintendent is at the focal point in the decision process regarding innovations. Whether he convinces his staff or is convinced by them, the superintendent is in a position to make the final decision."

One advantage of in-servicing superintendents during the initial stages is that methods they use to select candidates to be trained as resource personnel may be improved. As noted earlier, some communication problems occurred at this stage of workshop preparation even though the letter sent by the Department to superintendents was very specific. If superintendents are aware of the program and how it is to be implemented, they will likely take greater care in selecting participants.

The authority possessed by a superintendent is a factor that can also enhance implementation. If a superintendent decides to take initial steps in introducing a program the concern level of both the principals and teachers will be increased. Also, the readiness level of teachers to accept presentations made by resource personnel will be raised if they know that they will definitely be required to implement the program in their classrooms. The need for authority was reflected in the final session of the workshop. The general concern of many of the participants was indicated as they raised questions such as, "How mandatory is the curriculum?" and "What authority do we have to tell teachers to implement the program?" If the trainee has the support of the superintendent, these concerns may be reduced.

Communication with Presenters

In order to maintain a unifying theme throughout the week, it may be advantageous to conduct a meeting of all people presenting topics prior to the conference. The purpose of this meeting would be to go over the goals of the workshop and specify the needs of participants. Presenters could then adapt their programs to suit the situation. Having the entire group take part in the planning of the workshop would add to the uniformity as all topics could be related to each other,

It should also be mentioned that the problem for presenters is twofold. First they must convey an understanding of the topic to trainees. Then they must demonstrate the methods by which the trainees could deal with the topic at in-service sessions. An entire in-service package complete with audio-visual aids and other support materials would be desirable.

Dealing with Resistance to Change

The review of the literature in Chapter 11 indicates that resistance to change on the part of the adopters of an innovation is very strong during the initial stages. Although no concrete solution to deal with this problem can be given, participants should at least be aware that it will occur. This is especially important when trainees are inexperienced in conducting in-services. A topic dealing with the reasons for resistance to change could be incorporated as part of the introductory session in which the roles of resource persons are clarified. The degree to which the resistance to change is overcome will depend, to a certain extent, on the capability of resource persons in convincing teachers that the change is beneficial.

Curriculum Guide

A clear understanding of the curriculum guide is probably the most important aspect in the successful implementation of a program. Efficient methods for presenting the guide to teachers in a simple yet meaningful form must be developed. As indicated by the feedback from the workshop under study, methods of handling the guide were generally ineffective.

A session dealing with the guide should have some input from the committee that originally developed the curriculum. A video-tape or slide-tape presentation would be useful because of its portability. A media presentation could be reproduced and made available to trainees for use at in-services. The presentation should include a discussion of the need for a program alternate to the one presently in use. The thought

processes involved in the development of the new curriculum as well as a rationale for choosing objectives and emphasizing certain approaches should also be explained. No detailed account of any particular part of the guide is necessary. The intention of the presentation is to promote the merits of the program in an attempt to convince audiences that a change is necessary and beneficial.

Concept maps and unit design showing the scope and sequence of objectives in as concise a form as possible should also be produced. In this way, an understanding of the content will be conveyed. This type of document could form the basis for discussion sessions at in-services.

Evaluation

Two problems concerning workshop evaluation became evident in the study. The first is the difficulty in retrieving the evaluation forms from all participants. The second refers to the time the evaluation takes place. Evaluation is almost always done immediately following the session. After participating in a workshop for a one and a half hour time period, many people do not appreciate the additional task of evaluating even though its importance may have been stressed. Many are anxious to leave to have a cup of coffee, go for dinner, meet friends, and generally pursue more interesting activities. One might wonder then, as to how thoughtfully evaluation items are contemplated and how carefully responses are made.

In a workshop of several days' duration, it is possible to complete evaluation forms in the first ten minutes of the following session. Participants would be less reluctant to respond to the evaluation and all forms could be retrieved. The time between sessions would also allow participants to think about and form opinions on the relative merits and deficiencies of a session.

Concerning the evaluation of the field operation, an in-service evaluation form could be a part of in-service packages presented at the workshop. These forms could later be reproduced and distributed by trainees to teachers attending their in-services. Specific instructions for the return of these forms should also be provided. This procedure may clarify the responsibilities of participants in the field operation as well as providing a method of informing the Department of Education on progress made in implementation.

Time Allotment

As mentioned previously, the outcome of a workshop session should be a model for an in-service on a particular topic, complete with support materials. In order to feel comfortable with the model, participants should have either seen, worked through, or taken part in developing the model. In order to allow for the maximum use of time at a week long conference, topic sessions should be allotted no less than a half day and no more than a full day. A session of less than a half day would not allow time for group interaction. A session of over one full day might over emphasize one topic at the expense of others. If a complete in-service package is available beforehand, a half day session should be sufficient to adequately handle most topics. If material has to be developed, a full day may be required. A typical session would commence with a formal presentation presenting background information and materials. This would be followed by the participants' examination or production of resource materials and responding to the presentation.

A half day at the start of the week should be devoted to general introductory procedures and another half day at the end of the conference should deal with general implementation procedures and provide a resumé of the week's activities. A full day should be devoted to the curriculum guide as it is the focus point of the innovation. This leaves three full days or six possible topic sessions remaining not including

possible evening activities. It is not likely that a resource person would conduct any more than four in-services, therefore, a repertoire of seven topics including the guide should be sufficient.

Topics should be selected on the basis of their immediate importance to the implementation process, the guide being the most critical. The importance of a topic can be determined by some sort of needs assessment survey as well as the specifications within the guide itself. Immediate identifiable areas in most curricula aside from the guide are textual materials available, skill development (processes) units and measures, different approaches and methods, and adapting the innovation to different learning levels. Sessions on specific areas of content are also usually appreciated.

Field Operation

The initial in-service presented by resource personnel should be the promotion of the guide. A session on the guide should be held in conjunction with a session on support materials. If the texts that are available to support the guide are of a high calibre, the chances of teachers accepting the program are increased.

Some negative feedback from teachers is to be expected. These feelings should be understood and allowed to be expressed. Time must be given at all sessions to allow teachers to express themselves and ask questions regarding the proposed change.

Before proceeding to more advanced stages of implementation, a resource person must be sure that the innovation is accepted by the majority of teachers in his division. The means of determining this fact would be by including pertinent test items on questionnaires distributed after the session. To proceed to later stages of implementation before the initial stage of acceptance is complete, would be a pointless endeavor.

Implications for Future Study

Field Operation

The most critical immediate need is the study of the role that the participants have played or are now serving in their divisions. A true measure of the effectiveness of the workshop can only be ascertained by determining the extent to which trainees have used the information gained at the conference in the field operation. Four important questions must be answered.

1. What per centage of the participants have actually conducted in-services on implementation? All were expected to fulfill this role but some, for one reason or another, may not have been given the opportunity.

2. How successful were the in-service sessions? Some sort of evaluation on the part of the resource persons and the teachers attending the sessions, could be expected for all in-services conducted throughout the province. Once difficulties become apparent, some sort of assistance can be provided. Also, these problems can be approached at future workshops.

3. How effective was the workshop in preparing the resource persons to perform their functions? Immediate post workshop feedback was very positive but, as stated previously, the true effectiveness cannot be determined until the field operation is completed.

4. What topics are used most, requested for most or represent the areas of greatest concern? These areas represent the greatest needs of implementing teachers. These needs were assumed on the basis of a needs assessment form prior to the workshop. Verification of these needs as well as others that may arise is of value to future endeavors of this nature.

Communication

A communication flow must be maintained between the Department of Education, school division administrators, principals, and teachers in order to maintain uniformity

in a province wide curriculum project. Some communication channels have already been opened in the form of a STAM science magazine, a periodical called "The Electron", and a Junior High Science Newsletter. The effectiveness of these publications as well as the feasibility of establishing additional communication vehicles could be determined.

The resource personnel trained at the conference or other responsible people in each division could become a part of a province wide communication network by acting as a liaison between teachers, administrators, and the Department of Education. This type of network would facilitate two-way communication.

Implementation Workshops in other Subjects

If the implementation model followed for the Science 7-9 Program is proven to be effective, it can easily be adapted to other subject disciplines. Curricula in all subject areas are constantly being revised and problems inherent in implementation will always emerge. A type of needs assessment form similar to the one used in the science program (Appendix A) that is administered to teachers, principals, and superintendents may reveal (a) implementation concerns at different levels of education and (b) common concerns in different subject areas. On the basis of this type of survey, standard procedures at implementation workshops could be developed.

Workshop Evaluations

Although many varied sorts of evaluation forms for inservices and workshops are available, few can be found that specifically apply to the training of resource personnel or implementation workshops. One of the major problems of producing such a form may be that no two workshops have exactly the same objectives. In the area of implementation, it may be possible to devise a form that is general enough to deal with most conferences yet specific enough to be meaningful.

Standardized pre and post workshop forms would allow for the use of inferential statistics to determine significance levels of effectiveness.

Standardized evaluation forms for use by trainees in the field operation could also be developed. Relevant feedback concerning progress in implementation could efficiently be obtained if data from the forms could be computerized.

Scales designed to measure attitude, confidence level, and role perception have already been developed. These can be modified to apply to resource personnel and teachers at various stages in implementation. The effectiveness of workshops and in-services in these areas can then be monitored for Manitoba curriculum implementation projects.

Concluding Statements

"Curriculum implementation has been treated by many writers as a sub-category of the more general question of how to introduce and establish innovation....There is no substantial basis in descriptive theories for propositions about how the process should be carried out." (Reid, 1975). It is hoped that the implementation model used for initiating the Manitoba Junior High Science Curriculum throughout the Province and the study concerning the development of a Field Dissemination Network presented in the thesis will provide some insight into this aspect of curriculum change.

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A P P E N D I X A

Needs Assessment
Survey

NEEDS ASSESSMENT SURVEY - SCIENCE 7-9

INTRODUCTION

This survey will attempt to discover those needs that you perceive to be important in order to effectively teach science in your school. This knowledge will help the Science 7-9 Curriculum Committee to determine the priorities that should be assigned to the development of different kinds e.g. in-service, materials. This questionnaire contains two major parts: an area concerning general needs, and an area which is related to specific in-service or other concerns. Since all possible needs may not be suggested in the questionnaire, a section is provided for your reactions concerning those needs that may be omitted and that you perceive as being important.

I. GENERAL INFORMATION

Please place a check mark (✓) beside the response which best describes your teaching and/or administrative responsibilities, professional background, and facilities.

Area of teaching responsibility:

1. 1 ☐ 35.6 Teach science less than 50% of the time
- 2 ☐ 63.7 Teach science more than 50% of the time
2. 1 ☐ 50 Administrator with science teaching responsibilities
- 2 ☐ 37.5 Administrator with other than science teaching responsibilities
- 3 ☐ 12.5 Administrator with no responsibilities for teaching

Professional background includes:

3. 1 ☐ 18.6 Two or more university courses in the biological sciences
- 2 ☐ 25.9 Two or more university courses in the physical sciences
- 3 ☐ 40.7 Two or more university courses in both the physical and biological sciences
- 4 ☐ 17.0 Fewer than two university science courses

Facilities

4. ☐ 45.2 VTR equipment is readily available in your school
5. ☐ 70.4 Sufficient laboratory space is available to timetable students

II. GENERAL NEEDS

This section is essentially concerned with perceived needs for implementing a science program at the school level. Please rank the order of importance of the needs statements by numbering the items from one (1-most important) to nine (9-least important).

6. 3.85 Adequate facilities (room, storage, ease of access)
- H ✓ 7. 3.59 Adequate supplies and equipment
8. 4.78 Adequate library reference and other reference materials
- H ✓ 9. 3.50 Time to organize and prepare for science teaching
- ~~H~~ 10. 4.87 Additional knowledge of teaching techniques which emphasize different kinds of objectives (e.g. process, problem solving)
- L * 11. 5.31 Adequate time allotment for teaching the program
- L * 12. 5.57 Additional background in certain science areas (e.g. life science, earth - space science)
- L * 13. 7.5 Community interest and support for the teaching of science
14. 5.1 Decision-making capabilities and time to implement a new science program

This section is essentially concerned with modifying or not modifying the structure of the Science 7-9: Interim Curriculum Guide (1976). Please indicate the order of importance by numbering the items from one (1-most important) to eight (8-least important). Implementation of the new Science 7-9 program would best be supported by:

- L * 15. 6.57 Not changing the present structure of the guide (mode = 8 74/135 cases)
16. 4.59 Providing more definition to the objectives
- H ✓ (17) 2.52 Providing more information concerning the selection of materials, possible patterns whereby modules can be organized within the classroom, and the implementation of materials
- I ✓ (18) 3.86 Providing more detail concerning "core" objectives and extension of objectives
- L * 19. 5.46 Providing additional "extension" objectives
20. 4.10 Providing more detail concerning "core" and "extension" activities
21. 4.40 Providing additional "core" and "extension" activities
- 4 ✓ (22) 3.82 Providing more detail concerning alternative approaches to teaching junior high school science

III. IN-SERVICE NEEDS

Provision for these needs may be made through a number of methods such as in-service sessions or information packages. These needs include five "need" categories. (a) Curriculum Network (b) Classroom Management Skills (c) General Information Needed about New Programming and Materials (d) Student Evaluation (e) Curriculum Modification by Teacher and/or School. Please RANK ORDER the item statements within each of these categories to indicate the priority you assign to each statement. Use (1) to indicate the highest priority, followed by (2) for the next highest priority until all statements in each "need" category have been prioritized.

A. Curriculum Network

A curriculum network should be developed which will provide junior high school science teachers with:

- | | | | | | |
|-----|------|------|---|-----|--------|
| H ✓ | (23) | 1.97 | Short (2-3 page) information packages about successful activities and techniques, resource persons and their special capabilities, and other areas related to Science 7-9 | 1.0 | 63/135 |
| H ✓ | (24) | 2.43 | Information and sample teacher-designed modules or units | 2.0 | 43/135 |
| L * | 25. | 4.27 | Arrangements for special sessions at universities or community colleges concerning background and new developments related to Science 7-9 programming | 6.0 | 38/135 |
| | 26. | 3.90 | Information about and samples of teacher-made tests | 3.0 | 36/135 |
| | 27. | 3.50 | Samples of Manitoba-oriented support material kits which can be borrowed | 4.0 | 39/135 |
| L * | 28. | 4.86 | Manitoba-oriented T.V. programs which can be videotaped | 6.0 | 57/135 |

B. Classroom Management Skills

- | | | | | | |
|-----|-----|------|--|-----|--------|
| | 29 | 3.10 | Safety in Science | 4.0 | 28/135 |
| L * | 30. | 3.60 | General care and management of living things | 4.0 | 38/135 |
| H ✓ | 31. | 2.97 | Grouping of students by interest and other means | 2.0 | 37/135 |
| L * | 32. | 3.25 | The making and use of equipment | 3.0 | 33/135 |
| H ✓ | 33. | 2.25 | Program organization whereby students may be conducting different activities | 1.0 | 59/135 |

C. General Information Needed about New Programming and Materials

Information is needed about:

			<u>Mode</u>
H ✓ (34)	2.81	Program design and the guide	2.0 37/135
L * 35.	4.70	Teaching techniques important to new programs and objectives	6.0 28/135
H ✓ (36)	3.72	The successes and failures in piloting materials	3.0 30/135
H ✓ (37)	3.42	Implementation models and techniques for incorporating the program into the school	3.0 30/135
L * 38.	5.12	Cost of materials and necessary equipment	7.0 43/135
39.	3.72	A listing of necessary equipment to develop the "core" objectives	2.0 21/12
40.	4.09	Experiences with new materials which use unique activities or approaches	5.0 24/135

D. Student Evaluation

41.	2.02	Information concerning different instruments for evaluation students	1.0 52/135
H ✓ 42.	1.90	Techniques for evaluating students in groups and individually	2.0 52/135
L * 43.	2.85	Subjective evaluation techniques	3.0 51/135
L * 44.	3.15	Information and methods concerning the writing of different kinds of objectives e.g. performance	4.0 65/135

E. Curriculum Modification by Teacher and/or School

L * 45.	4.35	Information, techniques and check-lists concerned with the evaluation of materials	6.0 33/135
H ✓ 46.	2.53	Development of science units (objectives, teaching approaches, student projects)	1.0 43/135
L * 47.	3.93	Integration of science and mathematics (or other areas) relative to common objectives	5.0 30/135
48.	3.74	Articulation of the Science 7-9 program with K-6 and 10-12	6.0 31/135
H ✓ 49.	3.04	The role of student interest and needs in developing a science program (S.O. = 1.599)	1.0 29/135
H ✓ 50.	3.24	Relating science to its interaction with technology and society (S.O. = 1.489)	3.0 32/135

51. If there are additional inservice-needs which have not been identified in this survey, please outline these in the space below and indicate the priority you attach to these additional inservice-needs.

[illegible]

52. Additional Comments.

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or printed text on the paper.

A P P E N D I X B

Curriculum Revision

Committee

ACKNOWLEDGEMENT

The Department of Education wishes to express its appreciation to the following teachers and administrators who constituted the committee responsible for this program.

Mr. G. Curle

Mrs. P. Dunn

Mr. M. Hart

Mrs. G. Holloway (1975)

Mr. J. Kozak

Mr. P. Pybus

Mr. R. Scott

Mr. K. Slentz (Chairman)

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A P P E N D I X C

Tentative and Final Drafts
of Workshop Schedules

Tentative Workshop Schedule

Session 1 - 8:30 - 10:15 - External Input Sessions

Session 11 - 10:30 - 12:00

Lunch

Session 111 - 1:00 - 2:45 - Development of ideas and materials

Session 1V - 3:00 - 5:00

Dinner

Evening Session - 7:00 - 9:00 - Production of Materials

Day 1

Session 1 - Introduction of participants
- Presentation of goals of the workshop
- Expectations of participants

Session 11- Implementation model
- Implementation Committee
- Question - Answer period

Session 111- Presentation of goals and objectives of the program
- thorough review of guide

Session 1V- Formation of location based groups and content area groups
- Location based group meetings to:
 (a) identify specific topics for in-service sessions
 (b) administrative details re: in-service
 (c) "selling" techniques
 (d) feedback from pilot schools

Evening Session - Review of Materials - texts and references
- Categorize materials as to orientation:
 - content - modular materials
 - activity based - integrated approach
 - other

Materials required for Day 1

1. Curriculum guides
2. Text and reference materials

Day 2

Session 1 - Presentation on Science processes
and - Activities and films

Session 11 - How do you evaluate processes?
- Content area group meetings
 (a) identify specific areas of content where process
 approach can easily be demonstrated
 (b) plan for UTR or slide tape presentation

Evening Session - Production of Materials (taping sessions or script writing)

Materials Required

1. Films and A-V aids or processes
2. U.T.R. unit
3. Slide film, camera, Audio Tape
4. General Science equipment

Day 3

Session 1 - Presentation of core content (could be taped)
and - Revision Committee

Session 11 - Question-Answer period

Session 111- Content area group meetings

- and
Session 1V
- (a) Specimen lesson in each of the content areas
 - (b) Selection of sample activities from each of the content areas
 - (c) Equipment lists (recommended)

Evening Session - Taping of specimen lesson and activities
- Categorize resource material (texts) into content areas

Materials required for Day 3

1. V.T.R. unit or film tape
2. Text materials in content areas

Day 4

Session 1 - Presentation on in-service education
and - resource person

Session 11 - Question-Answer period and discussion

Session 111- Location based group meeting

- and
Session 1V
- (a) Develop specific strategies for in-service sessions based on session 1 and resources previously developed
 - Processes in Science
 - Content
 - Implications of guide
 - S I materials
 - Teaching techniques
 - Materials available etc.

Evening Session - Development of S I Materials
- Content area group meeting
- Identification and production of S I materials for each content area and grade level

Materials Required

1. Literature on in-service education
2. S I materials
3. Film(s) on in-service education

Day 5

Session 1 - Role of resource person relative to 7-9 program
and - Sharing of ideas from Day 4 P.M.

Session 11- Evaluation of workshop
- Plans for continuing evaluation
- How do you implement?

Session 111 - Open session
and

Session 1V

and
Evening

Science 7-9 In-Service Program

St. Benedict's Educational Centre

(February 13th-17th)

- Enclosed are some materials in a binder. These materials will be used in the sessions on Middle Years Science (Day 3) presented by H. Williams and the Science - Technology Issues approach (Day 4) presented by R. Kirbyson and R. Johnson. The materials on Middle Years Science should be previewed before the sessions at St. Benedict's and the outline of the program concerning Science - Technology suggests that two small tasks be completed before you come to the in-service.
- The session on Astronomy could include some short, outside activities; therefore, bring warm clothing.
- Additional materials are being developed by the presenters and will be distributed at the in-service. The intent of the support materials being developed by the presenters is that of providing basic materials and an in-service design that you may be able to use at a later time.
- The design of the five day in-service is presented below. This is similar to the information sent earlier; however, some slight modifications have been made and additional information concerning the design is provided. All sessions are about $1\frac{1}{2}$ hours in length.

Day 1 (Monday)

Objectives

Session 1
9:00-10:30 a.m.

Introduction to
the in-service

Session 2
10:30-12:00 p.m.

Status, Design and
function of the
Science 7-9 Guide

To provide information
concerning the guide, its
structure and function.
Evaluation of the
in-service.

LUNCH

Session 3
1:00-2:30 p.m.

Evaluation of support
materials, and their
function, and relation-
ship to the guide.

To provide information
concerning resource
materials and to
familiarize participants
with the materials and
their relationship to
the guide.

COFFEE BREAK

Objectives

Session 4
2:45-4:00 p.m.

Continuation of
Session 3

SUPPER

Session 5
7:00-8:30 p.m.

SI in the Junior
High School

To provide materials
and information
concerning the in-
troduction of SI
into the science
program.

Day 2

Sessions 1-4

Concepts structure
of the guide and
unit plan using
the guide and
materials.

To develop concept
structure of a unit
and relate materials
to the structure.

SUPPER

Session 5

Open session -
related films and
other materials will
be available.

Day 3

Sessions 1 and 2

Processes in the
junior high school
program and the
evaluation of processes.

Nature, approaches,
and evaluation.

LUNCH

Sessions 3 and 4

Developmental theory
and teaching the
junior high school
science program.

To provide methods of
relating processes to
developmental theory.
To match concept
development and
teaching style.

SUPPER

Session 5	STAM Function	Includes presentation concerning earth science.
-----------	---------------	---

Day 4

Session 1	Slow learners and the junior high school science program.	To provide information and resource materials concerning the slow learner.
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COFFEE BREAK

Session 2	Reading for Content in Science	To provide information concerning reading in science, techniques of evaluation, and approaches to solving problems.
-----------	--------------------------------	---

LUNCH

Sessions 3-4	Approaches to relating science to technology and issues.	To provide background and ways to relate the junior high school science program to related areas.
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SUPPER

Session 5	Astronomy in the science program.	To provide techniques in astronomy and to provide simple resources in the development of units.
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Day 5

Sessions 1-2	Implementation of the junior high school science program.	To provide information concerning factors to consider in implementing the junior high school science program. To develop methods for examining implementation needs in schools.
--------------	---	---

Resource aid in
teaching energy
units.

LUNCH

Session 3
1:00-2:30 p.m.
or 3:30 p.m.

Going home

To provide participants
with information
concerning support for
resource persons and
to examine the needs of
participants as
resource personnel.

PRESENT STATUS OF JUNIOR HIGH IN-SERVICE

1. Number of participants - 44
Number of School Divisions represented - 28
List of participants and School Divisions available for distribution
2. Facilities arrangements:
 - St. Benedict's - sleeping, arrival, accommodations O.K.
 - rooms (arranged)
 - equipment (videotape machines...)
 - Preparation of materials -
 - materials prepared at St. Benedict's to be copied at the Department
 - need name tags
3. Contact with participants:
 - Letter and hand-outs available
 - Letter to Superintendents re participants and participants removed from list
4. Session arrangements
 - Day 1
 1. Introduction - W.S.
Status - completed
 2. Guide's design and role - K.S., V.N., R.S.
Status -
 - 3-4. Evaluation of Support Materials - P. Dunn - R. Zuk
Status -
 5. SI in Junior High School - R.L.
Status -
 - Day 2
 - 1-4. Concept structure and unit plan design - K.S.
(J. Welsh)
Status - initial contact O.K.
 5. Astronomy - B. Birks (Museum)
Status - initial contact
 - Day 3
 - 1-2. Processes - T. Meadows
Status - initial contact O.K.
 - 3-4. Developmental Theory and Middle Year's Science - H. Williams
Status - initial Contact O.K.
 5. STAM Function - E.U.
Status -
 - Day 4
 1. Slow Learners and Science - Mrs. Villar
Status -
 2. Reading for Content and Science - D. Partridge and L. Fisher
Status - initial contact
 - 3-4. Science - Societal Approach - R. Kirbyson and R. Johnson
Status - initial contact
 5. Equipment, Stream Table (free period?)
R.S., G. Henderson...
Status -
 - Day 5
 - 1-3. Implementation - E.U. and W.S.
Status - partially complete (see hand-out)

A P P E N D I X D

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42. David Wilkins -- R. D. Parker Collegiate, Mystery Lake S.D. # 2355
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43. John Hjalmarson -- Department of Education
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Phone -- 778-4411 Ext. 370
44. George Ballantyne, Morden Elementary School, Western School Div. #47
Box 3003,
Morden, Manitoba
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A P P E N D I X E

Letter to Superintendents



Province of Manitoba
Department of Education
Program Development & Support Services
Program Development Secretariat

Telephone: 786-0321
Robert Fletcher Building
404 - 1181 Portage Avenue
Winnipeg, Manitoba
R3G 0T3
November 24, 1977.

TO: SUPERINTENDENTS AND PROFESSIONAL
DEVELOPMENT COMMITTEES

Subject: Development of Resource
Personnel for Science 7-9

As you are aware, copies of the Interim Guide for Science 7-9 (1976) were sent to schools in the fall of 1976. Modifications to the "core" portion of the program were made in the spring of 1976 according to feedback received from pilot teachers. The modifications are presently being tested in six pilot schools and, on the basis of feedback received to date, appear to be satisfactory. The Science 7-9 Committee expects to complete the revision of the Interim Guide by May of 1978. The guide will suggest "core" topics which represent approximately 60% of the Science 7-9 program, objectives and activities which can be used to extend the "core", and supplementary information concerning recommended materials and their possible organization within schools. The published materials, in textbook and/or modular form enable schools to modify programs as they begin to consider replacing worn-out texts. For example, schools could inexpensively use a limited number of modules in order to evaluate the materials, approach used, and related questions.

The design of the Science 7-9 program enables a school division to initially retain their approach to teaching science and to modify their approach, over a period of time, to include a greater emphasis upon the development of process skills or themes. As schools begin to consider the modification of their programs because books require replacement or for other reasons, decisions about the following basic questions are necessary:

1. The relationship of the science program to the total middle years program and the needs of their students.
2. The teaching approach(es) to be used and its effect upon the kinds of support materials which should be obtained.
3. The rate at which a school intends to implement the change.

The decisions, which are made by schools, in regard to the above questions will determine the information and in-service needs of schools. A variety of in-service activities, which serve different objectives, may be required in order to serve the specific needs of different schools.

During the 1976-77 school year the "core" program of the Interim Guide for Science 7-9 was tested within six pilot schools in the province. On the basis of the feedback from pilot schools, a part of the "core" program was redesigned. The redesigned portion of the program is being evaluated in six pilot schools during the current year. Present feedback indicates that the redesigned program is satisfactory and the Science 7-9 Committee expects to complete the final version of the guide by May of 1978.

A survey on teacher needs during the past year, identified concerns such as methods for selecting and using curriculum materials, alternative approaches to teaching junior high school science, and student evaluation. This information, in addition to recommendations from representatives of the Science Teachers' Association of Manitoba, has been used to determine the design of an in-service for Science 7-9 resource personnel. Continuing cooperation and support for the program is being provided by the Science Teachers' Association via publicity and the development of a part of the program.

Support which is sensitive to the different professional development priorities of school divisions and individual schools is considered to be a critical aspect of the in-service for resource personnel. Thus, the following in-service design and suggestions are made for your consideration.

1. Resource personnel within divisions will be developed by means of a five-day in-service which will be held at St. Benedict's Educational Centre during the week of Monday, February 13th to Friday, February 17th, 1978 inclusive. Facilities and the program design limit participation to a total of 40 - 45 resource personnel; therefore, the names of resource persons will be accepted according to the date on which we receive the names.
2. It is suggested that personnel should be chosen as a team of two on the basis of leadership potential and hopefully from a school which has made a decision or are beginning to modify their program during the coming school year. This would enable the school and the school division to plan for the immediate use of their resource personnel. Resource personnel are essentially responsible for in-service needs within their division. More than two resource people per division will be accepted if the total of 45 is not reached.
3. The five-day in-service for resource personnel will include evening sessions. Thus, it is expected that participants will live at the Centre for the period of the in-service. Since some resource personnel will likely be arriving in the area Sunday night and may require

lodging, arrangements can be made for those resource persons who wish to stay at St. Benedict's on Sunday night. Please indicate this need on the form which we have enclosed.

4. The workshop will be conducted in association with the Science Teachers' Association of Manitoba. STAM, through sessions held at its annual conference, has continued to support the development of junior high school science.
5. Information concerning the design of the five day in-service, workshop materials, new information concerning the curriculum guide, and other pertinent data will be sent to resource personnel early in the new year.
6. The design of the in-service will provide background concerning curriculum directions and methods of implementation, suggested designs for different in-service packages, and back-up materials to support resource personnel as they provide specific in-services. A description of the sessions, which will be provided within the five day in-service, follows:
 - a) A session concerning the Science 7-9 Guide will provide resource personnel with an opportunity to examine its role relative to the implementation of a science program.
 - b) A session will provide an in-service design for presenting the processes of science, methods of evaluating processes and designs for science process lessons.
 - c) Information, comparison and evaluation of materials, and suggested ways to begin the implementation of the program.
 - d) A session concerning extensions to "core" and unit design.
 - e) A session concerning the concept - content structure of "core".
 - f) Science 7-9 and the use of SI units.
 - g) Different approaches to the development of the Science 7-9 program.

Since the in-service design is still in the developmental stage and can be modified, if you or your resource persons have any concerns about the specific sessions, please indicate your recommendations on the resource personnel form. More specific information concerning the design will be submitted early in the new year to yourself and resource personnel.

7. The sharing of costs and responsibilities is proposed as follows:

- a) Released time for resource personnel will be the responsibility of school divisions.
- b) Food and lodging at St. Benedict's Educational Centre, transportation costs for resource personnel (one vehicle per school division for one trip to St. Benedict's and return) and support materials for resource personnel will be the responsibility of the Department of Education.
- c) Input regarding the design of the program and responsibility for a session will be provided by the Science Teachers' Association of Manitoba.

In order to send materials to participants and to complete our plans, the deadline for applications will be Friday, December 16th. Applications should be sent to W. Soprovich, Program Development Secretariat, Room 404-1181 Portage Avenue, Winnipeg, Manitoba. R3G 0T3.

May I take this opportunity to thank you for any consideration that you are able to make concerning this proposal. If additional information is required, I can be contacted at 786-0314.

Yours truly,

W. Soprovich,
Program Consultant.

WS/hr
Enc.

RESOURCE PERSONNEL

Science 7-9 In-service

St. Benedict's Educational Resource Centre

(February 13th-17th, 1978)

Please list participants in order of preference, if any.

SCHOOL DIVISION _____ NO. _____

1. NAME _____

SCHOOL _____

SCHOOL ADDRESS _____

POSTAL CODE _____ SCHOOL PHONE NO. _____

2. NAME _____

SCHOOL _____

SCHOOL ADDRESS _____

POSTAL CODE _____ SCHOOL PHONE NO. _____

Requires arrangements to be made for sleeping at St. Benedict's on
Sunday evening.

(Please check) _____ Expected time of arrival _____

3. NAME _____

SCHOOL _____

SCHOOL ADDRESS _____

POSTAL CODE _____ SCHOOL PHONE NO. _____

Specific items which are not indicated in the in-service design but should
be included are:

Signature _____ Position _____

PLEASE RETURN THE FORM TO W. SOPROVICH, PROGRAM DEVELOPMENT SECRETARIAT,
ROOM 404-1181 PORTAGE AVENUE, WINNIPEG, MANITOBA. R3G 0T3 BY FRIDAY,
DECEMBER 16, 1977.

A P P E N D I X F

Evaluation Instrument with
Cumulative Results

Part 1 -- Test Item Analysis

DAY 1 A.M.

PRELIMINARY EVALUATION

A. I am presently involved with the Junior High Science Program as a:

teacher 22 department head 9 consultant 1administrator 1 other coordinator 1

B. I have had previous experience in conducting in-service sessions:

yes 12 no 22.

C. Circle the number which best indicates the extent to which you agree or disagree with the following statements. The number

1 = strongly disagree

2 = disagree

3 = neutral

4 = agree

5 = strongly agree.

1. Prior to my attendance at the workshop

	1	2	3	4	5
(a) I was fully informed as to the goals and objectives of the workshop.	0	18	18	47	14

(b) I was made aware of the role I would play as a resource person in my division.	3	9	21	53	15
--	---	---	----	----	----

(c) I made preliminary preparation for same session(s) to be held at the conference.	9	6	56	18	6
--	---	---	----	----	---

(d) I was made aware of the topics to be considered at the workshop.	3	6	18	53	18
--	---	---	----	----	----

2. Concerning the Science 7 - 9 Curriculum Guide, I am generally aware of:

(a) structure of the guide	3	3	15	50	29
----------------------------	---	---	----	----	----

(b) the role of the guide	0	9	32	38	21
---------------------------	---	---	----	----	----

(c) content found in the guide	6	3	9	62	18
--------------------------------	---	---	---	----	----

(d) methodologies suggested in the guide	3	15	38	35	9
--	---	----	----	----	---

(e) support materials available for 7 - 9 program	12	18	41	21	9
---	----	----	----	----	---

3. I would expect that my role as a resource person will be	1	2	3	4	5
(a) difficult (as opposed to easy)	6	21	41	24	6
(b) well defined (as opposed to vague)	3	12	26	50	6
(c) rewarding (as opposed to frustrating)	3	12	26	47	9
(d) challenging (as opposed to routine)	6	3	12	44	35
(e) rigid (as opposed to flexible)	12	41	35	9	0

4. As participants in this workshop, you likely have certain expectations. Classify the following as to their priority level. Add others that you feel necessary.

	Necessary	Useful	Not necessary
(a) Information concerning my role as a resource person.	76	24	0
(b) Methods of conducting in-services.	74	24	3
(c) A-V aids to support in-service sessions.	62	32	6
(d) Information about the guide.	71	29	0
(e) Content background in certain areas of science.	59	41	0
(f) Information on support materials available (e.g. textbooks) for 7 - 9 program.	88	12	0
(g) Information on SI in Junior High.	71	24	6
(h) Unique approaches to science teaching (e.g. societal approach, issues approach, historical approach).	59	41	0
(i) Information on adopting 7 - 9 Science Program to certain learning levels.	79	18	3
(j) Information on specific activities of the program and equipment necessary for these activities.	59	41	0
(k) Information on reading skills as they apply to science teaching.	53	47	0
(l) Research on capability levels of Junior High students.	68	29	3
(m) Back-up resource material to use at in-service sessions.	68	29	3
(n) Strategies to use when in-servicing administrators re: implementation.	74	24	3
(o) Others			

DAY 1 A.M.

INTRODUCTION TO WORKSHOP

AND

Sessions 1 and 2

CURRICULUM GUIDE

Circle the number indicating the extent to which you agree with the following statements:

- 1 = strongly disagree 2 = disagree 3 = neutral
4 = agree 5 = strongly agree.

As a result of the morning's activities:

	1	2	3	4	5
1. I have become more familiar with the structure of the guide.	2	9	23	58	7
2. I have been made more aware of my role as a resource person.	0	2	9	72	16
3. I am familiar with the intent of the guide (i.e. how it can be used with support materials).	0	9	37	44	9
4. I feel competent enough to explain the role and function of the guide to teachers and administrators in my division.	5	12	47	33	5
5. Adequate time was spent on the guide.	5	19	35	37	5
6. I found this session useful to me in my role as a resource person.	0	5	37	44	12
7. I have been provided with or given access to resource materials to conduct an in-service in this area.	2	40	28	26	5
8. I have been provided with sufficient information to conduct an in-service on the curriculum guide.	5	19	33	30	5
9. The degree to which I could conduct an in-service session on the curriculum guide would be (check one):					

full day in-service 30

half day in-service 28

portion of half day session 42.

10. Mention other things you would like to have had discussed or provided material for.

Session 3 and 4

EVALUATION OF SUPPORT MATERIAL

Circle the number indicating the extent to which you agree with the following statements:

- 1 = strongly disagree 2 = disagree 3 = neutral
4 = agree 5 = strongly agree.

1	2	3	4	5
---	---	---	---	---

As a result of the afternoon activities:

- | | | | | | |
|--|----|----|----|----|----|
| 1. I am aware of possible support materials relevant to the Science 7 - 9 program. | 3 | 0 | 0 | 53 | 45 |
| 2. I have been given or have access to support materials that I could use at an in-service session. | 3 | 10 | 15 | 53 | 20 |
| 3. I am familiar with criteria that could be used to evaluate support materials as to their relative merits. | 0 | 3 | 18 | 68 | 13 |
| 4. Adequate time was provided for the session. | 0 | 15 | 15 | 50 | 20 |
| 5. I felt this session was useful to me as a resource person. | 0 | 3 | 8 | 55 | 33 |
| 6. I was given sufficient time to evaluate and examine support material on my own. | 0 | 28 | 23 | 43 | 8 |
| 7. I would definitely use the information gained at this session at an in-service. | 0 | 0 | 13 | 55 | 33 |
| 8. I am aware of: | | | | | |
| (a) activity oriented materials | 0 | 0 | 10 | 60 | 15 |
| (b) content oriented materials | 0 | 0 | 13 | 70 | 15 |
| (c) reading level of support material | 5 | 13 | 20 | 50 | 10 |
| 9. I am able to advise administrators or department heads on methods of selecting textual materials. | 0 | 3 | 20 | 55 | 15 |
| 10. To what degree do you feel you could use the knowledge and materials gained at this in-service. (Check one). | | | | | |
| full day in-service | 10 | | | | |
| half day in-service | 45 | | | | |
| portion of half day | 45 | | | | |
| no use | 0 | | | | |
| 11. Mention other things that could have been of value to you as a resource person. | | | | | |

DAY 1 EVENING

Session 5

SI IN JUNIOR HIGH

Circle the number indicating the extent to which you agree with the following statement:

1 = strongly disagree 2 = disagree 3 = neutral
4 = agree 5 = strongly agree.

1 2 3 4 5

- | | | | | | |
|---|----|----|----|----|----|
| 1. I felt this topic was important to me in my role as a resource person. | 3 | 3 | 11 | 34 | 49 |
| 2. I am fairly comfortable with the use of the SI system of units and measures. | 3 | 28 | 31 | 37 | 3 |
| 3. (a) I have been provided with or have access to resource material that I could use at in-service sessions on SI. | 0 | 17 | 17 | 51 | 14 |
| (b) I would use this information. | 0 | 9 | 20 | 49 | 23 |
| (c) I would use other materials that I am familiar with. | 3 | 9 | 31 | 48 | 11 |
| 4. I have been made aware of sample activities that I could use with teachers at an in-service session. | 0 | 17 | 29 | 49 | 6 |
| 5. Enough time was given to this topic. | 3 | 23 | 26 | 37 | 11 |
| 6. This session met my expectations that I had prior to the workshop. | 11 | 9 | 23 | 49 | 9 |
| 7. I have been given information where SI specifically applies to 7 - 9 Science Program. | | | | | |
| 8. To what extent would you feel comfortable in conducting an SI in-service? | | | | | |
| (a) full-day <u>6</u> | | | | | |
| (b) half-day <u>26</u> | | | | | |
| (c) portion of half-day <u>49</u> | | | | | |
| (d) no use <u>20</u> | | | | | |
| 9. List other aspects you would like to have seen at this session. | | | | | |

Circle the letter indicating the extent to which you agree or disagree with the following statements:

- 1 = strongly disagree 2 = disagree 3 = neutral
4 = agree 5 = strongly agree.

As a result of the day's activities:

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
1. I felt the topic was important to the implementation of the Science 7 - 9 program.	0	9	3	60	31
2. I felt the session was generally useful to me as a resource person.	0	11	17	49	23
3. I am generally familiar with all content areas in the 7 - 9 program.	3	17	14	49	17
4. I have access to a concept map showing the sequencing of all objectives in the "Core" program.	3	17	14	40	26
5. I have developed materials that I can use at a local in-service in my division.	3	17	26	43	11
6. I will use the materials in questions 4 and 5.	6	17	23	37	11
7. I have had time to examine content in:					
(a) one specific area	3	6	0	57	34
(b) several areas	3	29	23	23	3
(c) all areas of the program.	17	20	23	14	0
8. I have had the opportunity to test the suitability of support materials to a concept map.	9	29	26	32	3
9. I could use the type of in-service format presented in this session to test the suitability of any materials to a concept map.	0	17	43	23	17
10. I am aware of how to use the information and materials provided at this session at in-services in my school division.	0	9	40	43	9
11. Indicate the extent to which you could use the information gained from today's session. (Check one).					
full day session <u>14</u>					
half day session <u>34</u>					
portion of half day <u>46</u>					
no use <u>3</u> .					

Concerning the day's activities (underline one) relating to:

- A - content { (a) too much - enough - insufficient
 (b) too general - serves the purpose - too specific
- 17 72 6

B. relative to organization	(a) ⁶⁶ logical ²³ sequence - not sequenced
	(b) clear - confused
C. relevance	⁶⁶ ²³
	- conveyes an understanding of my responsibilities - Yes - No
	77 20

Sessions 1 & 2

PROCESSES IN SCIENCE

Circle the number indicating the extent to which you agree or disagree with the following statements:

1 = strongly disagree 2 = disagree 3 = neutral
4 = agree 5 = strongly agree.

1 2 3 4 5

- | | | | | | |
|--|---|---|----|----|----|
| 1. I am personally familiar with processes in science. | 0 | 0 | 14 | 59 | 27 |
| 2. This topic was valuable to me as a resource person. | 0 | 5 | 14 | 51 | 30 |
| 3. I have been provided with strategies and/or activities that I could use while conducting an in-service on a process approach to science teaching. | 0 | 5 | 14 | 54 | 27 |
| 4. I have been provided with resource material (A-V aids, printed matter, etc.) which would enhance an in-service session. | 0 | 3 | 22 | 48 | 27 |
| 5. I would use the materials and strategies (questions 3 & 4) at an in-service. | 3 | 5 | 19 | 59 | 14 |
| 6. I feel fairly comfortable about presenting an in-service on processes as they apply to the Science 7 - 9 program. | 0 | 5 | 32 | 46 | 16 |
| 7. Enough time was devoted to this topic. | 0 | 8 | 16 | 51 | 24 |
| 8. I could provide information to teachers in my division with methods of adapting processes to specific content areas in the 7 - 9 Program. | 0 | 0 | 27 | 65 | 8 |
| 9. I could convey methods of evaluating processes to teachers in my division. | 3 | 8 | 35 | 49 | 5 |
| 10. Indicate the extent to which you would use material and strategies gained at this session in your division.
(Check one). | | | | | |

(a) full day session 8

(b) half day session 38

(c) portion of half day 46

(d) no use 8.

11. Indicate criticisms of this session or things you would like to have seen done.

DAY 3 P.M.

Sessions 3 & 4

DEVELOPMENTAL THEORY

Circle the number indicating the extent to which you agree with the following statements:

1 = strongly disagree 2 = disagree 3 = neutral
4 = agree 5 = strongly agree.

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
1. I felt this topic was important to the implementation of the 7 - 9 Science program.	6	34	16	31	13
2. This session was valuable to me as a resource person.	19	19	31	22	9
3. I have been given information that I will use in my division.	16	28	19	28	9
4. I have been given or have access to resource materials (A-V aids, printed matter, etc.) that I could use at an in-service training session.	22	25	28	22	3
5. I have been made aware of methods of adapting concepts in the curriculum guide to developmental levels of the students.	6	31	28	25	9
6. I have been made aware of methods of adapting processes in science to the ability level of Junior High students.	3	25	38	31	3
7. I am generally aware of the ability levels of Junior High students.	3	3	19	69	6
8. Indicate the degree to which you would use the content and materials presented at the session. (Check one).					
(a) full day session <u>3</u>					
(b) half day session <u>13</u>					
(c) portion of half day <u>41</u>					
(d) no use <u>44</u> .					

Session 1 & 2

SLOW LEARNERS & READING FOR CONTENT

Circle the number indicating the extent to which you agree with the following statements:

- 1 = strongly disagree 2 = disagree 3 = neutral
4 = agree 5 = strongly agree.

SLOW LEARNERS

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
1. I felt the topic is important to the implementation of the 7 - 9 Science program.	0	0	0	42	58
2. I felt this session was useful to me as a resource person.	0	0	3	47	50
3. I am familiar with methods of adapting the "Core" program to the level of slow learners.	0	3	21	63	13
4. I have been given resource materials that I could use at in-service sessions.	0	0	13	39	47
5. I have developed strategies using the information available to conduct in-service sessions on slow learners in Junior High Science.	3	0	39	42	16
6. I felt more time should have been spent on this topic.	0	3	11	26	61
7. I found the session informative.	0	0	8	42	50
8. Indicate the degree to which you would use the information and materials gained at this session. (Check one).					

full day session 10

half day session 29

portion of half day 61

no use 0.

READING FOR CONTENT

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
1. I feel this is an important topic relative to me as a resource person in Science.	0	0	3	53	45
2. I felt this session valuable.	0	0	3	53	45
3. I have been provided with strategies to establish student reading comprehension levels.	0	3	5	58	34
4. I have been provided with criteria for determining the reading level of textual materials.	0	3	0	61	37

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
5. Resource materials have been provided for my use at in-services.	0	0	8	50	42
6. I am familiar with teaching strategies and/or methodologies concerned with reading in Science.	0	3	37	53	8
7. I am familiar with reading skills common to the Sciences.	0	0	32	58	11
8. I felt this session was specific enough to the 7 - 9 Science program.	0	3	13	58	24
9. I have been provided with activities that I could use at in-service sessions in my division.	0	0	11	63	26
10. More time could have been spent on this topic.	0	0	0	42	50
11. Indicate the degree to which you would use the information and materials gained at this session.					

- (a) full day session 11
 (b) half day session 26
 (c) part of half day 58
 (d) no use 0.

Criticisms or other items that could have been discussed.

Sessions 3 & 4

SOCIETAL APPROACH TO SCIENCE TEACHING

Circle the number that best indicates the degree to which you agree with the following statements:

- 1 = strongly disagree 2 = disagree 3 = neutral
4 = agree 5 = strongly agree.

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
1. I felt this session was valuable to me as a resource person.	0	18	33	42	6
2. I felt this session required more time.	9	27	42	15	6
3. This topic is important to the workshop as a whole.	0	21	30	36	12
4. I have become familiar with the major characteristics of a "problems and issues" approach to science teaching.	0	9	30	61	0
5. I feel this approach should be incorporated in the 7 - 9 Science program in some form.	3	21	18	45	12
6. (a) I had completed the pre-workshop tasks suggested.	42	18	9	12	18
(b) I found the pre-workshop tasks were (would have been) valuable to the session itself.	9	21	33	33	3
7. I would be able to initiate projects concerned with a societal approach in schools upon request.	9	12	42	30	6
8. (a) I have been provided with strategies to disseminate information on an "issues and problems" approach to science education.	3	18	42	36	0
(b) Resource materials have been provided in this session.	9	12	33	42	3
(c) I could use these strategies and materials at an in-service.	9	15	36	39	0
9. I feel this approach could be readily adapted to the 7 - 9 Science program.	9	24	36	21	9
10. I could use the information gained at this session during:					
(a) full day session <u>6</u>					
(b) half day session <u>21</u>					
(c) portion of half day <u>42</u>					
(d) no use <u>30</u> .					
11. Possible activities were suggested that I could use at in-service sessions.	0	21	30	48	0
12. Comments, criticisms, suggestions.					

Session 5

ASTRONOMY

Circle the number indicating the extent to which you agree with the following statements:

	1	2	3	4	5
1 = strongly disagree					
2 = disagree					
3 = neutral					
4 = agree					
5 = strongly agree.					
1. I felt comfortable with Astronomy prior to the workshop.	26	35	16	23	0
2. I feel more comfortable with this area as a result of this session.	0	6	23	52	19
3. I felt this was an important session to me as a resource person.	0	0	13	48	35
4. The session matched my expectations.	0	3	23	52	23
5. I have been provided with possible activities specific to certain content areas in the guide.	0	3	16	68	16
6. I have been given or have access to resources that I could use at an in-service session.	3	10	26	52	10
7. I have been provided with content background suitable to the "Core" Science Astronomy section.	0	16	39	35	10
8. I feel more time should have been spent on this area.	0	6	26	48	19

STREAM TABLE

1. I felt that this session was useful.	0	3	16	39	29
2. I felt that more time should have been spent on equipment specific to certain activities in the 7 - 9 Science program.	6	13	35	19	16
3. I could utilize the information from this session at a local in-service.	0	0	32	48	10
4. Indicate the extent to which you could utilize the information gained at this evening's sessions. (Check one).					
(a) full day session <u>3</u>					
(b) half day session <u>23</u>					
(c) portion of half day <u>52</u>					
(d) no use <u>6</u> .					

Session 1 - 3

IMPLEMENTATION

Circle the letter that best indicates the extent to which you agree with the following statements:

1 = strongly disagree 2 = disagree 3 = neutral

4 = agree 5 = strongly agree.

1 2 3 4 5

1. I felt that this session was valuable to me as a resource person. 0 0 3 42 64
2. I have been provided with a model in-service that I could use in my division for examining implementation schemes. 0 0 9 36 55
3. I am familiar with the general principles of in-service education. 0 0 9 73 18
4. I am familiar with methods of in-servicing administrative personnel with respect to implementation procedure. 0 0 39 48 9
5. I have been provided with or have access to resource materials and personnel that I could use at a local in-service. 0 0 12 70 18
6. I am fully aware of my responsibilities as a resource person. 0 3 18 61 18
7. I am aware of methods of examining implementation needs in schools. 0 0 18 61 18
8. Concerning the day's activities (underline one)
 - A. Relating to content -
 - (a) too ⁰ much - enough - ⁸⁵ insufficient ⁹
 - (b) too ⁹ general - serves the purpose - ⁸⁵ too specific ⁰
 - B. Relative to organization
 - (a) ¹⁰⁰ logical sequence - not ⁰ sequenced
 - (b) ¹⁰⁰ clear - ⁰ confused
 - C. Conveys an understanding of my role as a resource person - yes - no.

97 3

QUESTIONNAIRE FOR PRESENTERS

Figures represent number of responses.

Please check "yes" or "no" to the following questions.

1. Are you aware of the general goals and objectives of the workshop?
yes 12 no 0
2. Were you informed as to the needs of the participants in the workshop relative to their role as resource personnel?
yes 12 no 0
3. Was it your intention to provide the participants in the workshop with
 - (a) general information on the topic? yes 12 no 0
 - (b) resource materials (A-V aids, printed matter) they could utilize at their own in-service? yes 9 no 3
 - (c) activities participants could use at local in-service sessions? yes 11 no 1
 - (d) strategies or possible methods they could use at local in-service sessions? yes 10 no 2
 - (e) other intentions.
 - build confidence and awareness of possible depth and extension of subject.
 - to broaden teachers' backgrounds.
 - create enthusiasm.
4. Did you feel that you accomplished what you had intended to do?
yes 12 no 0
5. Was time a major factor in limiting what you intended to do?
yes 5 no 7
6. General comments on the session.

DAY 5 P.M.

1 of 3

FINAL WORKSHOP EVALUATION

Circle the number that best indicates the extent to which you agree or disagree with the following statements:

1 = strongly disagree 2 = disagree 3 = neutral
4 = agree 5 = strongly agree.

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
1. I am fully aware of my responsibilities to my school division as a resource person.	0	3	7	63	27
2. I feel confident about my competency at fulfilling my role.	0	3	20	57	20
3. I have gained sufficient information at this workshop to use at in-service sessions.	0	7	3	60	30
4. I have been provided with sufficient back-up resource material to use at in-service sessions.	0	3	13	63	17
5. I felt the workshop enhanced my capabilities as a resource person.	0	0	0	63	37
6. I would expect that my role as a resource person will be:					
(a) difficult (as opposed to easy)	0	20	37	27	17
(b) well defined (as opposed to vague)	0	13	27	43	13
(c) rewarding (as opposed to frustrating)	0	0	33	43	17
(d) challenging (as opposed to routine)	0	0	3	53	37
(e) rigid (as opposed to flexible).	10	30	43	10	0
7. The conference met my expectations.	0	0	13	63	23
8. I felt the workshop generally was well organized.	0	0	3	47	50
9. Generally speaking, the conference was a worthwhile experience.	0	0	7	37	56
10. I feel that I can use most of the information and materials provided or developed at the workshop.	0	0	3	63	33

2 of 3

Classify the following as to their adequacy in meeting your needs. "Adequate" indicates you have sufficient material. "Inadequate" indicates you required more. Some information you may not feel you required.

1. Information concerning my role as a resource person.
2. Methods of conducting in-services.
3. Methods of planning and preparing for in-service sessions.
4. A-V aids to support in-service sessions.
5. Information about the guide.
6. Content background in certain areas of Science.
7. Information on support materials available (e.g. textbooks) for the 7 - 9 Science program.
8. Information on SI in Junior High.
9. Unique approaches to science teaching (societal approach, "issues and problems" approach, etc.)
10. Information on developmental levels of Junior High students.
11. Information on adapting 7 - 9 Science program to the slow learner.
12. Specific activities involved with the content of the program and equipment necessary for these activities.
13. Information on reading skills as they apply to Junior High Science.
14. Resource material to use as back-up at in-service sessions.
15. Strategies to use when in-servicing administration re: implementation.
16. Information on Science processes.
17. Factors to be considered in implementation.
18. Content background in area of science.
19. Others. (Please List).

Adequate	Inadequate	Not necessary
93	7	0
87	13	0
83	17	0
60	37	3
83	7	10
63	33	3
83	17	0
60	30	10
50	43	7
77	23	0
73	20	7
60	37	3
67	33	0
87	13	0
70	20	10
97	3	0
87	10	3
63	30	7
0	0	0

Rate the following procedures as to their relative effectiveness:

	High	Medium	Low
(a) lecture presentation	20	60	20
(b) large group discussions	13	70	17
(c) small group discussions	87	10	3
(d) time allowed for individual work	23	53	23
(e) time spent listening to presentation	10	70	20
(f) time spent on organized activities	53	40	7
(g) informal discussions outside the actual sessions.	63	30	7

Which session did you find of exceptional value to you as a resource person?

Which session did you feel could have been eliminated?

Which sessions did you feel could have been lengthened at the expense of other sessions?

If we were to run a similar workshop again to train additional resource personnel, what changes do you recommend we make?

Mention any topics that were not included in the workshop that you would like to have seen.