CHANGE AGENT ACTIVITY BY ELEMENTARY SCIENCE WORKSHOP PARTICIPANTS

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This is to certify that the

thesis entitled

## CHANGE AGENT ACTIVITY BY ELEMENTARY

# SCIENCE WORKSHOP PARTICIPANTS

presented by

Russell A. Mullens

has been accepted towards fulfillment of the requirements for

Ph.D. degree in College of Education

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#### ABSTRACT

# CHANGE AGENT ACTIVITY BY ELEMENTARY SCIENCE WORKSHOP PARTICIPANTS

By

Russell A. Mullens

#### Problem

The College Teacher Workshop in Elementary Science at Michigan State University had as one of its objectives the preparation of participants to act as educational change agents during the year following the workshop. The science programs used were Science--A Process Approach (AAAS) and Science Curriculum Improvement Study (SCIS).

Previous workshop evaluation has largely ignored follow-up studies of workshop participants. This has resulted in an incomplete evaluation, through examining only the personal growth and development of the participants and ignoring any assessment of the use the participants make of their experiences.

The purpose of this study was to examine and describe the amount of change agent activity and selfuse engaged in by the science educators, science teachers, and science curriculum coordinators who were participants.

### Methodology

Measures were taken of participant attitude toward and participant knowledge of the elementary science programs. Questionnaires were administered twice to the participants during the school year following the workshop to assess amount and types of change agent activity and self-use of the programs. Statistical tests were run to investigate possible correlations between participant knowledge and amount of change agent activity, participant attitude and amount of change agent activity, participant knowledge and self-use, participant attitude and self-use, participant knowledge and immediacy of change agent activity, and participant attitude and immediacy of change agent activity.

#### Findings

The data indicated the following: the amount of change agent activity decreased during the second half of the year; both the role of the participant and his geographic location influenced the amount of his change agent activity; the contacts had four major purposes with awareness as an end purpose and awareness leading to decision making dominating the first half of the year contacts and decision making and implementation contacts dominating the second half; only the science educators indicated any self-use of the programs. Significant partial correlations were found between participant attitude and amount of change agent activity, participant attitude and immediacy of change agent activity, and participant knowledge and immediacy of change agent activity.

Implications and recommendations were developed in the following areas: institutional criteria for selection of future participants; the post-workshop role of a participant as a change agent; evaluation of future workshops; and the role of workshop sponsors during the year following the workshop.

# CHANGE AGENT ACTIVITY BY ELEMENTARY

# SCIENCE WORKSHOP PARTICIPANTS

By

Russell A. Mullens

# A DISSERTATION

Submitted to Michigan State University in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

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#### CHAPTER I

#### INTRODUCTION

# Purpose of Study

The purpose of this study was to assess the impact of the Leadership Workshop on Elementary School Science, conducted by the Science and Mathematic Teaching Center at Michigan State University. The science curriculum workshop was a part of a larger model of educational program implementation. This study specifically examined the post-workshop activities of the science curriculum specialists and science subject teachers who were the participants.

# Need for the Study

If a national public opinion survey were taken to identify some of the elements that have contributed to the unsettling era in which we live, certainly one of the factors mentioned would be the rapidly increasing amounts of knowledge with which people have to deal. Technological developments, scientific breakthroughs, and intellectual conceptualizations are just a few examples of the areas that are generating new information

and ideas. This increase in knowledge is accompanied by a proliferation of information management systems and information dissemination systems designed to make information both more manageable and more usable.

During the past ten years the sheer volume of factual knowledge has increased to startling proportions. In some fields three hours of reading a day are necessary to remain current. Absenteeism from a field of study for a short period of time can cause major problems for individuals in overcoming their knowledge gap. Obsolescence of an idea follows closely on the heels of the discovery of the same idea.

The available means of delivery have proliferated to the extent that nothing but the ingenuity of man stands in the way of any method of delivery. Some of the imaginative methods have developed concurrently with the knowledge, others have developed because of the flood of knowledge. Medical doctors can now subscribe to a service that encapsulates items of interest to medicine, puts them on a cartridge tape, and plays them back to the doctor as he drives to and from the hospital. The cartridge tape has also been used by those who run seminars as a method to extend the seminar information beyond the original participants. Information retrieval and dissemination systems, such as ERIC, employ computers and miniaturization

to organize, retrieve, and deliver information. Postgraduate seminars and refreshers courses serve to deliver new information.

The ramifications of a growing body of knowledge and of the changing methods of delivery carry the potential to threaten the existence of the present-day educational process. The educational system must be responsive to the increasing body of knowledge, and the need to condense and to transfer this knowledge among individuals, if it is to be responsive to the needs of its students.

This explosion of knowledge and the techniques of delivery primarily affect educators in two areas forcing them to continually address the issues of what to teach and how to teach. Traditionally it has been the role of formal schooling to convey all past and continuing knowledge. Since the formal process as it now exists cannot possibly transfer all knowledge, the role has shifted to one of providing a minimum of skills and the mechanics and methods necessary for the student to be able to obtain the knowledge he specifically requires. The second area of education affected is the teaching Teachers are faced with new concepts, new process. information, and new techniques of teaching. Continual research and observation is exposing and developing new ideas about the nature of the learner, the nature of the system in which he exists, the nature of the subject

matter, and the interaction of all parts of these elements. Both in utilizing and in conveying these parts, teachers have become directly affected by the knowledge explosion.

As education attempts to become more responsive through the utilization of new knowledge and teaching processes, it must seek out methods of becoming aware of what is available. Thus, in many instances, the educator needs to become the learner, so that in the role of the teacher new knowledge can be conveyed and new delivery processes can be used. Too often this process of teacher as learner is unsystematic and unplanned. However, the lack of systematically planned change in education has been lessened by the use of post-graduate training opportunities, recertification requirements for teachers, and educational change agents, people often specifically trained for the purpose of reeducating teachers either in terms of actual knowledge or educational methods.

Much has been made of the cry for change agents to operate within our school systems and indeed a great deal of time, effort, and money has been spent to develop and implement new programs and to develop new models to disseminate these programs. Basically what was and is being sought is a model on which to conduct inservice education for teachers. This inservice education would serve to introduce teachers to new developments in

their own and other fields and to train them in utilizing their new knowledge.

Not all teachers are exposed to these various forms of inservice training. Most of the training programs take place away from the teacher's immediate location, and at a time unavailable to many. What is of concern then is a continuation of the training received in pre-service education that would be available to all teachers rather than just the few who are able to attend these sessions. This inservice would focus on input of information and formation of new ideas, attitudes, and techniques to enable teachers to become more responsive to the needs of their students. The educational change agent is one attempt to meet this need for greater availability of training.

Unfortunately, educational change agents involved in a systematically planned change effort are few. Attempts have been made to compensate for this void in a variety of ways: Federal programs such as Title III centers, regional labs and experimental statewide networks of change agents; commercial publishers; educational consulting firms and university-based professionals, to name a few. These efforts have attempted to take the changes to the teachers, have attempted to reach the teacher in the classroom. These efforts have attempted to expand the numbers of teachers involved in systematic change.

Whatever the methods used to carry out inservice training, two elements of that process are beginning to receive increased attention. One is the need for justification of the programs or activities and the other is the need for assessment and documentation of the effort.

Educators have enjoyed a relatively high degree of freedom from justifying the goals of their programs. This situation is beginning to change as increased emphasis is being placed on educators to be held accountable for their actions and activities. Educators have had to begin to justify the money spent and effort expended with respect to its benefit to taxpayers, teachers, and students. Educators can no longer afford to be content to administer programs, involve hundreds of students and teachers, conduct training, and so forth, and not know in more exact terms than previously the outcomes of their efforts.

This emphasis on knowledge of results has led to increased effort toward assessment and documentation. The need for this type of activity has been recognized. The practice has begun to be implemented.

Unfortunately, the implementation of assessment activities too often focuses on the short-term effects. Very little is known about the long-term effects of a particular training program. Most of the literature reports on evaluation and assessment of the effect of

a program on the participant during the program. There is a scarcity of information on what happened during the next year, the next five years, or the next ten years as a result of the program.

Generally, it is hoped that a training program will affect the participant during the workshop and that this effect will have some carry-over after the participant has left the training program. Research compiled on such programs shows that assessments are made of the immediate effect. Assessments of the long-range effect are lacking.

Thus, the use of training programs including change agents has resulted in part from a need by educators to remain current and responsive to their students. As the number, size, and complexity of information and information transmission systems increases, the need for inservice training also increases. And as these programs increase the need for adequate information about the effect of such programs also increases.

This study was designed to provide information relative to the long-term effects of a leadership training program in elementary science. The focus of the program were thirty science curriculum coordinators, science educators, and science subject specialists; the topic was two elementary science programs; and the goal was to equip them to assist in the implementation of these programs in the elementary schools.

### Background of the Study

With the announcement of Sputnik in 1957, increased emphasis was placed on the sciences; and subsequent developments were launched to find the reasons for our failure to educate people to become top-notch scientists and engineers. As new programs were developed to educate potential scientists and the responses of the United States in the space race began to improve, the emphasis turned toward examination of the existing educational programs and toward the longrange effect of these science programs. It was evident that many of our science courses were not accomplishing what they were expected to accomplish. Courses were not creating an interest in science; they were not developing the use of a scientific method of thinking. Further, there seemed to be no coordinated and articulated program of science in the first through twelfth grade.

Foremost in the urging of the development of new programs, both with counsel and money, has been the National Science Foundation. It has invested a substantial amount in the development of programs of science that would be responsive to the increased amounts of knowledge in the sciences and would refine or develop improved ways of transmitting this knowledge.

The efforts of the NSF extended beyond course development. They recognized that development of science

courses, even those tested and modified through trial basis in selected schools, was not sufficient. Consequently, they were interested in focusing on the task of disseminating and implementing the newly developed programs.

There is no single dissemination and implementation model that has proven effective. In fact, there is very little research that focuses on the consequences of utilizing a particular model of implementation.

Just as Rogers<sup>1</sup> suggested the analysis of diffusion within educational systems needed to look at the consequences of adoption of an innovation, there is also need to look at consequences of the use of workshops and other activities in models of dissemination and implementation. While feedback about any action is desirable, the fact that money, time, effort, and involvement of many children and teachers are often a part of these models would seem to be ample reason for evaluation. Evaluation will give us the choice of continuation, modification, or termination of a model of implementation and dissemination.

<sup>&</sup>lt;sup>1</sup>Everett M. Rogers, "Toward a New Model for Educational Change" (paper presented at the Conference on Strategies for Educational Change, Washington, D.C., November 8-9, 1965, sponsored by The Ohio State University and U.S. Office of Education, 1965).

The Science and Mathematics Teaching Center of Michigan State University developed a dissemination and implementation model that involved elementary and higher education teachers and curriculum and resource coordinators. The proposed model takes two years to complete a full cycle and operates on the principle of expanding knowledge awareness by continual expansion of the number of people affected by the knowledge. This process, a multi-step flow of dissemination and consultation, would result in widespread awareness and, hopefully, use of the programs in the classroom.

The two-year cycle starts during the summer of the base year (see Figure 1.1). During this summer a workshop is held to acquaint college teachers, resource workers, and curriculum supervisors with the two programs under consideration. These people are labeled T<sub>3</sub>'s. During the school year following an individual's orientation to the programs, he is expected to operate from his position in a college or school system and to make contacts with prospective users of the programs. This contact could take the form of creating an awareness of the programs or helping to implement the programs on a pilot basis. Ideally, the participant (T<sub>3</sub>) should be able to bring about implementation on a pilot basis with several schools. The pilot teachers would be labeled T<sub>1</sub>'s. Throughout the school year the T<sub>3</sub> would assist

Time	Activity	<u>Participant</u>	Participant Activity		
First Summer	Workshop	Τ <sub>3</sub>	Attend Workshop		
First Aca- demic Year	Work with schools Work with pilot teachers (T1's)	т3	Create Awareness Develop pilot programs and pilot teachers (T1's) Select group from pilot teachers for T3 training (T2)		
Second Summer	Workshop	<sup>T</sup> 2	Attend Workshop		
Second Aca- demic Year	Work with schools	T <sub>2</sub> now serving as T <sub>3</sub>	Help create awareness Assist in imple- mentation in school systems		
	Work with schools	T <sub>3</sub> (original)	Create awareness Work with original T1's Assist T3/T2's Develop programs for schools		

Fig. 1.1. Curriculum Implementation Model

these T<sub>1</sub>'s in implementing the program as well as continuing to work with other schools and systems in creating awareness. Some time during the spring of the first year a subset of the pilot teachers from all the  $T_1$ 's would be chosen to participate in a workshop the following summer. These T<sub>1</sub>'s would then become known as T<sub>2</sub>'s. During the summer they would receive training in the running of the programs as well as training to enable them to serve as resource people within their school or school system. In effect, they would become T<sub>3</sub>'s. They would return to their systems in the fall and help in the decision to implement on a total scale, continue pilot programs, or discontinue the program. They would also serve as resources for additional people desiring training either from within or without their system. This would bring the model through a complete cycle and prepare it to recycle at a new grade level or with a new activity. Throughout the entire cycle, the Center would provide assistance and coordination when requested by the people in the systems.

The Science and Mathematics Teaching Center at Michigan State proposed to operationalize this model with the help of the National Science Foundation. It was planned that the participants would be trained to assist in the dissemination and implementation of two elementary science programs, both in advanced stages of development

and testing. The two selected were the Science--A Process Approach, developed by the American Association for the Advancement of Science (AAAS), and the Science Curriculum Improvement Study, developed by a committee of the same name (SCIS). The initial step of the proposed implementation and dissemination model was to be undertaken during the summer of 1968.

The objectives of the initial workshop were the following:

- To provide the participants with considerable knowledge of the purposes, history, recommended modes of teaching, objectives, materials, and teacher education procedures of the SCIS and AAAS projects.
- To provide opportunities for the participants to teach children science, using the new curriculum materials, and to provide them with feedback on their teaching.
- 3. To engage the participants in giving feedback to elementary classroom teachers they have observed teaching children with the new curriculum materials.
- 4. To familiarize the participants with the school setting and with the administrative aspects of an implementation process.

- 5. To assist the participants as a group and as individuals to plan and to prepare appropriate materials and activities for orientation sessions and pre-service and inservice teacher preparation programs.
- 6. To provide actual experience in organizing and presenting orientation sessions on the programs to groups of school teachers and administrators.

The workshop also included training in change agent strategies and group process skills which it was hoped would better equip the participants for the introduction of the two programs into the schools during the year.

The rest of this chapter is organized as follows: first, a definition and discussion of some terms or descriptive phrases that will appear throughout the remainder of this study and, if appropriate, how they are measured; second, a discussion of the objectives; third, a discussion of the assumptions and limitations which bound the implementation model and this study; and fourth, the procedures and methodology used to conduct this study.

### Definition of Terms

Participants.--one or more of the thirty individuals who attended the workshop in order to be trained as change agents.

<u>Change Agent</u>.--in this study, a participant who makes contact with an individual or a group in order to introduce SCIS or AAAS, assist in the decision making to adopt one of the two science programs, or assist in the training or retraining of individuals who will implement the program.

Participant Change Agent Activity (PCAA).--a person-to-person contact relating to AAAS or SCIS between a participant and an individual or group. The amount of PCAA is quantified both by a count of the number of contacts and the number of people per contact. The amount of PCAA is qualified according to the purpose of the contact.

Participant Self-Use Activity.--when a participant adopts AAAS or SCIS for use in his own classroom as quantified by the number of times a participant used AAAS or SCIS or both.

<u>Participant Attitude</u>.--the extent to which the participant views the science programs either favorably or unfavorably as measured on the Attitude Toward Programs test administered at the close of the workshop.

Participant Knowledge.--the understanding and comprehension a participant has about the elementary science programs as measured by the score on the Knowledge of Program Characteristics and Program Implementation procedures tests administered at the close of the workshop.

Immediacy of Change Agent Activity.--how soon following the close of the workshop the participant began change agent activity.

# Objectives of the Study

There are three major objectives of this study that are designed to provide an assessment of the impact of the workshop on the participants.

### Objective I:

To examine the participant activity during the year following the workshop.

#### Objective II:

To examine the relationship between participant attitude and knowledge and participant activity.

#### Objective III:

To develop implications and recommendations for future workshops.

Objective I was designed to examine the participant activity during the year following the workshop. This activity was a key component of the educational program implementation model. It was hoped that during the year the participants would be engaged in a large number and variety of activities in the public schools related to the elementary science curricula.

The following questions were generated in order to meet Objective I:

- How many contacts did the participants make concerning AAAS, SCIS, or both programs?
- 2. Was there a relationship between the occupational role of the participant and the number of contacts?
- 3. How many people were involved in the contacts concerning AAAS, SCIS, or both programs?
- 4. Was there a relationship between the role of the participant and the total number of people involved in the contacts?
- 5. Was there a relationship between the geographic residence of the participant and the number of contacts?
- 6. Was there a relationship between the number of contacts and the time of year the contact took place?

- 7. Was there a relationship between the role of the participant, the number of contacts, and the time of year the contact took place?
- 8. Was there a relationship between the number of people involved in the contacts and the time of year the contact took place?
- 9. Was there a relationship between the role of the participant, the number of people involved in the contact, and the time of year the contact took place?
- 10. Was there a relationship between the number of contacts and the purpose of the contacts?
- 11. Was there a relationship between the purpose of contact and the time of year the contact took place?
- 12. How much self-use did the participants make of the science programs?
- 13. Was there a relationship between the role of the participant and the amount of self-use?

Objective II related the participant attitude and knowledge to the participant activity described in Objective I. Among the conditions assumed necessary for a high degree of participant activity during the year was a favorable attitude toward the science programs and a high degree of knowledge about them. It was assumed that these factors would contribute to a high degree of change agent activity.

The following questions were generated:

- What was the relationship between participant attitude and amount of change agent activity?
- 2. What was the relationship between participant knowledge and amount of change agent activity?
- 3. What was the relationship between participant attitude and self-use of the workshop content?
- 4. What was the relationship between participant knowledge and self-use of the workshop content?
- 5. What was the relationship between participant attitude and the time that change agent activity was begun?
- 6. What was the relationship between participant knowledge and the time that change agent activity was begun?

The third objective was to develop recommendations in the areas of selected participant institutional characteristics and content of the workshop. It was hoped that this study could generally serve to guide the development of future workshops and specifically to guide the possible refinement of this workshop and the post-workshop activities. The following questions were generated:

- Can institutional criteria be developed for selection of workshop participants?
- 2. Can the post-workshop role of a participant be as a change agent?
- 3. What guidelines should be established for evaluating future workshops?
- 4. What role should workshop sponsors have during the year following the workshop?

## Assumptions of the Study

It was assumed that the participants of the Leadership Workshop on Elementary Science would meet the workshop conditions necessary for their involvement. Specifically the workshop assumed:

- That participants who were selected were willing to assume a role as a change agent during the year.
- That the participants would either have or develop favorable knowledge and attitude toward the programs.
- That the participants either were or would become knowledgeable about change agent strategies to

employ in introducing new ideas without causing unnecessary resistance.

- 4. That the employers of the participants were familiar with the role it was intended that the participants would play and were aware of the translation of that role in terms of time and effort.
- 5. That the employer of the participants would offer encouragement in the form of released time for the individual to operate as a change agent.

It was also assumed that the other parts of the implementation and dissemination model were operating. Specifically, the assumption was that pilot teachers would be selected and provided with supplies with which to operate, schools would be receptive to the programs to the extent of instituting pilot programs, and that funding of the submitted proposal for the following year's workshop would be approved.

# Limitations of the Study

There were two major limitations of the study: generalization of results and a precise and finite definition of success.

While statistical generalization is restricted, it is by no means limited to the thirty participants. Although no specific population is delineated, it was

assumed that there does exist a wider population of science curriculum coordinators and science subject teachers like those observed. Inferences can be made to this population. This procedure lengthens the statistical span of the study but leaves the location at the far end vague. "This lengthening and blurring is likely to be worthwhile."<sup>2</sup>

The second limitation stems from a need to arbitrarily place time or structural parameters around a study. These parameters necessarily make static what is, in fact, a process. Figure 1.2 provides a description of the evaluation parameters and factors used in previous studies, in this study, and suggested for future studies.

As the literature indicates, most evaluations have focused on the actual workshop, thus placing their parameters around the Time #1 column. This study extended the parameters to encompass Time #1 and Time #2. Future studies need to extend the parameters beyond this.

The number and type of evaluation factors also limit a study. Evaluations of workshops that focused on Time #1 generally looked at attitude change, knowledge change, evidence of professional growth, and stated intentions of future behavior. This study extended that

<sup>&</sup>lt;sup>2</sup>J. Cornfield and J. W. Tukey, "Average Values of Means Squares in Factorials," <u>The Annals of Mathemati</u>cal Statistics, 27 (1956): 907-49.



Fig. 1.2. Evaluation Parameters and Factors

to document and describe the post-workshop activities of the participants and, where possible, relate these activities to the workshop experience. Future studies need to include additional variables.

#### Procedure and Methodology

The primary focus of this study was on the activities of the thirty participants at the College Teacher Workshop held at Michigan State University by the Science and Mathematics Teaching Center during the summer of 1968. During the course of the workshop, the participants were administered pre- and post-tests to measure the effect of the workshop on several variables: knowledge and attitude toward the SCIS program and knowledge and attitude toward the AAAS program. Twice during the school year following the workshop, data were gathered from the participants on two key variables: amount of selfuse of AAAS and SCIS and amount of change agent activity with the science programs. These data were gathered at the scheduled mid-winter conference and during the spring months by mail and telephone.

# Organization of the Remainder of the Dissertation

A review of the literature is presented in Chapter II; the research and design procedures of the study in Chapter III; a report of the data and the

findings in Chapter IV; and a summary of the findings, implications, and recommendations in Chapter V.
#### CHAPTER II

REVIEW OF THE LITERATURE

#### Overview

Through the review of the literature those studies and ideas that have some relationship to the current study will be discussed. This review will focus on workshop objectives, the role of the workshop in the change process, workshop evaluative criteria, and selected studies that have been done evaluating the effectiveness of workshops.

Most workshop directors attempt to build an evaluation capacity into their workshops. There are very few workshop administrators who do not make some attempt to reflect on the quality of the experience. Unfortunately that reflection often falls short of a systematic appraisal either of the experience or of the participants. Additionally, where an appraisal is attempted it usually focuses on the time during the actual experience and leaves post-workshop experience to tenuous projections and extrapolations based on some measures of the quality of the experience and the

stated intentions of the participants for their postworkshop activities.

#### Purpose of the Workshop

A workshop generally serves two major purposes. The first is to provide new knowledge and skills for the individual involved.<sup>1</sup> The second is to assist that individual in utilizing the knowledge and skills, generally through some kind of a behavior change.<sup>2</sup> The most frequent topic of such workshops in education, found by O'Rourke and Burton, was " . . . the improvement of curriculum and instruction. . . "<sup>3</sup>

Generally, a workshop's objectives can be divided into two types: those that are to be accomplished during the actual workshop and those that are to be accomplished after an individual leaves the workshop. This time differential distinguishes between the short-range and longrange objectives.

The short-range objectives focus on the improvement of skills in an individual, exposure to new skills for an individual, or exposure to additional knowledge.

<sup>1</sup>Kenneth L. Heaton, <u>Educational Method</u>, 20 (March 1941): 293-96.

<sup>2</sup>Ibid., p. 294.

<sup>3</sup>Mary O'Rourke and William H. Burton, <u>Workshop</u> <u>for Teachers</u> (New York: Appleton, Century, and Crofts, Inc., 1957), p. 61. These objectives attempt to "develop new insights, understandings, attitudes and other evidences of learning."<sup>4</sup> The long-range objectives are built on the question of "To what end new skill or knowledge?" Its focus is the application of the workshop experience to the participant's life. These objectives are often times implied or understood rather than explicitly stated in workshop announcements and literature.

The short-range objectives can and are usually assessed during the workshop through a combination of pre- and post-tests and open-ended questionnaires. The long-range objectives are usually not measured.

## The Workshop in the Change Process

The process that a person experiences when he attempts to modify his attitude or his behavior has long concerned those who are interested in advancing new ideas and new products from a theoretical or research stage to a practical application or in-use stage. The investigation of that process has concerned those disciplines that are interested in the behavior of an individual either alone or in groups. Education, which is interested in the systematic introduction of change into its system, has also been concerned with the process that its individuals experience in undergoing change. The workshop experience

<sup>&</sup>lt;sup>4</sup>Sumner Morris, "Evaluation of the Education Workshop," <u>Dissertation Abstracts</u> (1953), p. 23.

as utilized by education can play an instrumental role as the vehicle by which people are introduced into the change process or assisted in progressing through the change process.

For the purpose of explaining the change process and for showing the functions that a workshop or institute serves within that process, it is useful to partition the process into four stages. Rogers<sup>5</sup> has conceptualized the process through a sequence of four stages that are discrete on paper, but continuous and overlapping in actual practice. These four stages are:

- <u>awareness</u>, in which the individual first learns of the product, idea, or program;
- <u>evaluation</u>, in which the individual obtains more information on which to base a decision;
- <u>decision</u>, in which the individual decides to adopt or reject on a personal basis; and
- 4. <u>confirmation</u>, in which the change agent or organization that introduced the person into the process gives the individual support for his decision.

<sup>&</sup>lt;sup>5</sup>Everett M. Rogers with Floyd Shoemaker, Diffusion of Innovations: A Cross-Cultural and Communication Approach (New York: Free Press of Glencoe, 1971).

Most individuals attending a workshop have already experienced one or more of these stages. All will have some awareness of the workshop content either independently of the workshop or through advance notices published by the workshop. Some will have made a decision to adopt or accept new knowledge or skills through their own resources. Others will not have progressed beyond the awareness stage.

The role of the workshop from a change point of view, then, will be to introduce the uninitiated, to assist the undecided in making a decision, to introduce participants to implementation skills and procedures, and to provide confirmation for the participant decision.

This final stage, confirmation, is crucial to the success of the long-range objective, the application of skills and knowledge. It is during this time, following the close of the workshop, that the decisions made during the workshop must be put into practice. It is a time when stated attitudes and intended behaviors must be put into practice. As Rogers points out,<sup>6</sup> change agents (which workshops and workshop personnel in this context can be considered) play an important role in the confirmation stage. A workshop participant who experiences dissonance, encounters unanticipated obstacles, or discovers that his knowledge is incomplete, needs to be

<sup>&</sup>lt;sup>6</sup>Ibid.

able to rely on his own change agent for follow-up support. This follow-up by workshop personnel may make the differences between attitude change without behavior change or behavior change which is unsuccessful through lack of supporting confirmation.

Almost all workshop directors agree that personal face-to-face follow-ups are needed.<sup>7</sup> Indeed, one estimate is that 50 per cent of the effectiveness of the workshop results from the follow-up of the participants after the workshop is over.<sup>8</sup>

## Evaluation of the Workshop

One of the major forces for the holding of workshops for teachers has been the federal government with its supply of money to be used for this purpose. In 1965, approximately 20,000 elementary and secondary teachers participated in over 500 institutes and workshops funded under the National Defense Education Act.<sup>9</sup>

<sup>&</sup>lt;sup>7</sup>Annual Report of the University Programs on Education in Family Finance (New York: National Committee for Education in Family Finance), p. 14.

<sup>&</sup>lt;sup>8</sup>Albert Oliver in B. Bertha Wakin, "An Evaluation of the Education in Family Finance Workshops at the Pennsylvania State University, <u>Dissertation Abstracts</u> (1962), p. 35.

<sup>&</sup>lt;sup>9</sup>National Education Association, Department of Audiovisual Instruction, EMIE: Educational Media Institute Evaluation Project, Evaluations of Summer 1965, NDEA Institute (Washington: Department of Audiovisual Instruction, 1965), Chapter 7, p. 7.

In addition, there are institutes and workshops funded by other agencies of the government, most notably the National Science Foundation, which has given support since 1956; universities in conjunction with local school systems; commercial firms such as publishing companies; and private foundations.

It is difficult, if not impossible, to make an accurate estimate as to the total amount of money spent on individuals involved in attendance at workshops during a given year. It is equally difficult, if not more so, to evaluate the workshops by measuring the effect these workshops have on those who attend them and on those who benefit by the participants' attendance--generally, the students and teachers who come into contact with the participants. The measure of effect, however, is not only crucial, but it has become increasingly mandatory.

The evaluation of a workshop through its effect on the participant serves two purposes. It determines how well the objectives of the workshop were met, and it can serve as feedback for possible alteration or modification of objectives or content. From the point of view of the workshop sponsors, it can also serve as arguments for or against future workshops. To be complete, an evaluation must determine if the short-range or immediate goals--growth of the participant--were met, and if the long-range goals--use of the growth--were met. Only

by evaluation of both can a judgment be made as to the worth of a workshop.

The majority of workshops have relied on some or all of four measures to obtain feedback and evaluation:

1. Attitude change on the part of the participant;

2. Knowledge change on the part of the participant;

3. Evidence of professional growth;

4. Stated intentions of future behavior.

Attitude and knowledge change is usually measured through a pre- and post-test given the participants on selected activities and on the total program. This is then converted to a difference score that gives an indication of the change in attitude and knowledge that the participant experienced during the workshop. Evidence of professional growth is usually measured in terms of bibliographies collected, curriculum guides developed, course and unit outlines developed, and other concrete data. Stated intentions on future behavior are usually obtained near the end of the workshop through such questions as, "What do you intend to do with this information in your classes?" and, "How do you plan to apply what you have learned?"

The first three criteria are designed to measure the immediate effects of the workshop on the participant which is the first objective, learning and growth within

the individual. The fourth criterion, stated intentions of future behavior, is intended to measure the second objective, behavior on the part of the participant following the workshop.

Of the two objectives, the second is a more critical indicator of the success of the workshop than is the first. While the second is probably dependent on the first, without some application of what is learned, the workshop is of limited value. This is particularly true when the workshop, as most are, is attempting to influence more than just the immediate participants and is aiming at a larger audience through the participants. There is minimum benefit to either the participant, the student of the participant, or the sponsors of the workshop if what one is exposed to at a workshop is left there and old attitudes, knowledge, and values are picked up again. Consequently, change in behavior is more important as an indicator of workshop success in achieving its purposes than is the first objective. The workshop must be evaluated in terms of what the participant will do with the change in himself or with the materials he produced once he leaves the workshop. If the participant does not implement new programs, or does not utilize the curriculum guides, outlines, and courses developed at the workshop, then the success of the workshop must be seriously questioned. Consequently,

the criteria used for evaluation of a workshop must include assessment of behavioral change that it is hoped the participants will engage in following the workshop.

Use of the four criteria mentioned above exposed a serious weakness in the workshop evaluations reported in the literature. The assumption that seems to be made is that a favorable attitude and a decision to adopt arrived at during the workshop will remain during the actual working conditions in which the adoption will be put into practice. Can this assumption be made?

One need only examine the social forces operating in the world today to seriously question that assumption on a nonscientific basis. On a more scientific basis, that assumption has been questioned by Corey<sup>10</sup> and LaPiere<sup>11</sup> and by Lippet who states: "A warm emotional glow about a given program or a feeling of having been influenced, is not a genuine indicator that real change in a person's thinking or behaving has been brought about."<sup>12</sup>

<sup>11</sup>R. T. LaPiere, "Attitude vs. Actions," <u>Social</u> <u>Force</u>, 13, 230-37.

<sup>12</sup>Ronald Lippit, <u>Training in Community Relations</u> (New York: Harper & Brothers, 1949), p. 19.

<sup>&</sup>lt;sup>10</sup>Stephen M. Corey, "Professed Attitudes and Actual Behavior," Journal of Educational Psychology, 28 (April 1937): 271-80.

Most people would probably agree that "the final evidence of the worth of a workshop can be found only in the transfer to actual teaching situations of things learned by members."<sup>13</sup> Therefore, workshop evaluation must include a follow-up study in order to evaluate accurately the effect of the workshop on the individual and the workshop's success in meeting its objectives. As Morris points out in his extensive review of workshops and evaluative criteria, "there are few accounts of this type of evaluation in the professional literature."<sup>14</sup> There are still few accounts of this type of evaluation reported.

In a review of the literature on workshop evaluation, it is evident that all workshops conduct some type of evaluation. The difference arises in the extent to which they evaluate. Evaluators have been interested in looking for clear-cut evidences of change in the participants' professional behavior, but in many cases the evaluation lacked the necessary follow-up that could bring these answers to light. Instead, evaluation has concentrated on evidence that would seem to indicate a propensity for future change.

<sup>13</sup>O'Rourke and Burton, <u>Workshop</u>, p. 68.
<sup>14</sup>Morris, "Evaluation of Workshop," p. 36.

## Studies of Workshops

Even Morris, who cautions against evaluation on the basis of stated intentions rather than actual behavior, fails to do so in his evaluation of a Fresno, California workshop on guidance and counseling in the high school.<sup>15</sup> From a questionnaire given near the end of the workshop he found "a high proportion of response indicated that participants plan to emphasize and develop desirable aspects of quidance services in their schools." From this result, he concludes that "considerable evidence of the workshop effectiveness is represented in these findings."<sup>16</sup> He also measured attitude change on fourteen categories of guidance and counseling services for high schools and concluded, "it is believed that the items which showed a significant change toward desired category positions . . . testify to the effectiveness of the workshop."<sup>17</sup> Both conclusions are based on the assumption that stated intentions of behavior and significant attitude change will manifest themselves in behavior change following the workshop. He does indicate his awareness of the problem when he acknowledges that a follow-up study would be necessary to verify these findings.

<sup>15</sup>Ibid., p. 42.
<sup>16</sup>Ibid., p. 46.

Although the majority of evaluations concerning workshops confine themselves to the time period during the workshop, there have been several exceptions. Α study by Wakin<sup>18</sup> evaluated the effects of two family finance workshops held during the summers of 1960 and 1961 in Pennsylvania. The purpose of the workshops was to acquaint teachers with selected areas of family finance that could be used by them both personally and professionally. Through the use of a mailed questionnaire and personal interview, Wakin attempted to evaluate workshop content, organization, and structure, and the use the participants had made of the workshop knowledge both personally and professionally. The questionnaire was primarily concerned with specifics of the workshop in retrospect. It also attempted to determine what personal and private use they had made of the content of the workshop.

The results indicate that there was use of each of the fourteen areas both personally and professionally. The larger share of use was in the personal area, however, possibly indicative of the difficulties of placing personal change in an organizational setting.

<sup>&</sup>lt;sup>18</sup>Wakin, "Evaluation of Education," p. 13.

Another study that attempted to look at institutes over a period of years was done in Idaho by Martinen.<sup>19</sup> Organized very similarly to the Wakin study, it also evaluated the content of the workshops as well as use that was made following the workshop. The focus of this study dealt with the growth of the individual in terms of his possible increase in educational and professional stature, his mobility due to the workshops, and his effectiveness as a change agent on the curriculum of the school or schools in which he worked. Investigations of private personal use was not applicable. One major difference between the Martinen and Wakin studies was in the content of the workshop. The content of the finance workshop could be broken into smaller selfcontained units whereas the Martinen institutes dealt with larger units which were not as easily adopted because of size and complexity.

Because the individuals could attend more than one of the Idaho workshops in subsequent summers, a comparison was made between those who had attended only one workshop and those who had attended three workshops and earned a degree in the process. Findings indicate that

<sup>&</sup>lt;sup>19</sup>G. D. Martinen, "A Study of the National Science Foundation Summer Institutes in Science and Mathematics Held at the University of Idaho from 1957 through 1964 and Their Impact on the Professional Activities of the Recipients," Dissertation Abstracts (1967), p. 28.

the three-year degree participants were more apt to be stable in their occupational position than were the oneyear participants.

These findings may argue that a single workshop is not sufficient to develop a successful change agent. They may suggest that attendance at a single workshop serves to enhance the person's attractiveness from the view of another school system, in which case his mobility may detract from his effectiveness as a change agent. They may also mean that the individual who attends a workshop sees it as a means of mobility.

A study done of an NDEA-sponsored institute in critical and appreciative reading by Bernyce Edmonds also employed a follow-up evaluation.<sup>20</sup> Its purpose was to study the diffusion of the institute's concepts beyond the participants. This was measured by the number of concepts adopted by colleagues and the number of concepts diffused by the participants. This institute was similar to the Pennsylvania institute in that particular concepts introduced within the institutes could be used by the participants rather than having to treat the entire content as one unit. This also allowed for measuring

<sup>&</sup>lt;sup>20</sup>Bernyce Scott Edmonds, "The Diffusion of Institute Concepts Beyond the Participants of an NDEA Institute in Critical and Appreciative Reading" (Ph.D. dissertation, Michigan State University, 1968).

the diffusion by the participants and the adoption by colleagues of individual concepts, a far easier and quicker task than diffusion or adoption of a total curriculum such as in the Idaho study.

The number of concepts diffused was significantly related to the professional position held, the perception of diffusion responsibility, and the attendance rationale. Edmonds reports that diffusion was minimal for most of the participants because of obstacles over which the institute held little control, such as lack of time and administrative support, changes in school assignments, and lack of planned diffusion strategies. This, too, seems to offer argument for follow-up support by workshop personnel.

#### Summary

The purpose of a workshop is to facilitate learning, growth, and behavior change on the part of the participant. At the same time, it can serve a function as part of the change process in education. Whether a workshop succeeds in its goals is usually determined by an evaluation that examines attitude and knowledge change, evidence of professional growth, and stated intentions of future behavior. The weakness in evaluations arises from the fact that most evaluations have neglected a follow-up study in order to examine the use made of the workshop. Those that have conducted follow-up studies have found discrepancies between expected and actual behavior. They have also found obstacles to successful utilization and dissemination which might be overcome or at least minimized through the use of follow-up support by workshop personnel.

### CHAPTER III

## **RESEARCH PROCEDURES**

### Participant Description

The participants for the College Teacher Workshop were drawn from the population of college and university professors teaching in the sciences or science education, elementary science consultants, or science curriculum supervisors.

While applicants from states other than Michigan were not automatically excluded, preference was given to Michigan persons for several reasons. First, it was hoped that they would be supportive of each other during the year following the workshop. This would require reasonably close geographical proximity. Second, the participants were provided with an opportunity to establish contact with Michigan public schools by conducting a training session during the workshop for elementary teachers in Michigan. From this they were able to establish contact with possible interested clients for the science programs. Third, a newsletter was being published during the year and sent to all elementary

schools in Michigan calling attention to the program and the availability of the workshop participants as consultants. Fourth, the Science and Mathematics Teaching Center planned to coordinate as much as possible the requests that came through them for assistance in finding consultants.

In the literature that was sent out to prospective workshop participants describing the workshop, the goals of the workshop and the expectations for the participants during and after the workshop were explained. It was assumed that an individual applying for admittance to the workshop was in agreement with the goals of the workshop including the planned-for role of the participant during the year following the workshop.

In order to assure greater understanding of the expectations, particularly concerning the post workshop activities, an indication of support was requested from each participant's superior. This support of their employee's attendance at the workshop and subsequent activity as a change agent was in the form of a letter stating that the individual attending would be given encouragement in the form of released time for consulting and implementation activities following the workshop. A letter was received for each participant.

The program was funded for thirty participants. Twenty of the thirty were employed in the state of Michigan. All were involved in science education at a level at least once removed from the elementary classroom teacher. Twenty-one of the thirty were teaching in college: twelve in science education and nine in science subject areas. The remaining nine were employed as science consultants or curriculum supervisors in local school districts. All thirty had graduate degrees, including fourteen with doctorates and the remainder with master's degrees.

Those who taught in colleges or universities did so in institutions ranging from less than 1,000 to over 40,000. The majority worked in institutions from 1,000 to 20,000, while only five worked in institutions over 20,000. The consultants and supervisors served school buildings and school districts with a population ranging from 500 for a K-6 school to more than 20,000 for a K-12 district.

Participants ranged in age from 29 to 60, with the mean age being 41. Thirteen had teaching experience at the elementary level, eleven at the junior high level, thirteen at the senior high, and eighteen in college. Among them they had a total of forty-eight years in public school teaching and seventy in university or

college teaching. Additionally, the ten who were science consultants or coordinators had been in those positions an average of six years.

A general information check list was completed for each participant. A copy of this check list is included in Appendix A.

Figure 3.1 is an overview of the procedures and times of the evaluation of the workshop.

Pre-Workshop	Post-Workshop	Mid-Winter Conference	Spring
Test Instruments Administered	Test Instruments Administered	Personal Interview With Participants	Telephone Interview or Mail Question- naire

Fig. 3.1. Procedure and Times of Workshop Evaluation

Phase I of the evaluation was concerned with the actual activities of the participants during the workshop. For a reporting of results, the reader is referred to the report prepared by D. G. Merkle.<sup>1</sup>

Phase II of the evaluation is reported here in detail. It draws on the results of the workshop

<sup>&</sup>lt;sup>1</sup>D. G. Merkle, "A Leadership Workshop on Elementary School Science: An In-Depth Evaluation" (Ph.D. dissertation, Michigan State University, 1969), pp. 52-77.

Participant Number	Present Position	Degree
Instate		
0000	Science Education	M.A.
1079	Science Coordinator	M.A.
1093	Science Education	M.A.
1097	High School Biology, Department	
2007	Chairman	Μ.Α.
1200	Science Education	Ph.D.
1727	Science Education	Ph D
1911	Science Coordinator	Ph D
2204	Science Coordinator, Elementary	1
2203	Principal	МА
3188	Science Coordinator	MA
3611	Science Education	Ph D
3671	Science Coordinator	м д
3699	Physics, College	Ph D
3854	Science Coordinator	м д
4554	Science Coordinator	M A
5034	Science Education	Ph D
5548	Chemistry, College	Ph D
6378	Chemistry, College	
6567	Physics, College	M.S.
7233	Physical Science, College	Ph.D
8143	Chemistry, College	M.S.
Outstate		
1124	Science Education	Ph.D
1250	Science Education	Ph.D
1831	Science Education	Ph.D.
3398	Science Coordinator	M.S
3459	Science Education	м д
4072	Biology, College	MS
5068	Science Education	Ph.D.
6656	Administration and Science	
0030	Research	Ph.D.
8824	Science Coordinator	Μ.Α.
9365	Science Education	M.S.

TABLE 3.1.--Present position and degree of participants

Participant Number	Years K - 12	Years College
Instate		
0000	10	3
1079	4	0
1093	2	1
1097	8	0
1200	6	4
1727	3	4
1911	0	2
2204	4	0
3188	4	0
3611	7	6
3671	6	0
3699	0	5
3854	5	0
4554	6	0
5034	6	3
5548	0	5
6378	9	6
6567	-	-
7233	0	4
8143	5	5
Outstate		
1124	5	2
1250	0	4
1831	5	2
3398	4	0
3459	6	1
4072	0	8
5068	10	2
6656	0	2
8824	8	0
9365	4	6

TABLE 3.2.--Participant years of teaching experience

evaluation but extends it to apply those results to the activities the participants engaged in following the workshop and the relationship of these activities to the workshop. The evaluation in Phase II concentrated primarily on activities of the participants during the school year following the workshop.

## Phase I Evaluation

The evaluation during Phase I took place at the beginning, during, and at the end of the workshop. At both the start and the close a written evaluation instrument was used. The participants were examined for their knowledge of the AAAS and SCIS elementary science programs as well as their attitudes toward each science program. Difference scores were calculated for each area to show participant change. At the close of each major section of the workshop, an attitude evaluation was also administered. A general evaluation of all phases was made at the close of the workshop. There were five major phases to the workshop: (1) orientation to AAAS and SCIS, (2) practice in laboratory and micro teaching activities, (3) group process centered phase, (4) change agent centered phase, and (5) a three-day workshop for Michigan elementary teachers conducted by the participants.

The participants' knowledge of the elementary science programs was tested using a test entitled

Knowledge of Program Characteristics and Program Implementation Procedures (Appendix B). This instrument assessed the knowledge of the respondent about AAAS and SCIS program. The staff of the workshop felt the questions were valid because they represented the content of the workshop faithfully and proportionately and provided the definition of achievement in the workshop.<sup>2</sup> This instrument was prepared for the workshop, consequently no information as to its reliability was available prior to the workshop.

The participant's attitude toward the science programs was measured on an instrument titled <u>Attitude</u> <u>Towards the AAAS and SCIS Programs and the Content of</u> <u>These Programs</u> (Appendix C). This instrument was used to measure attitude change on the part of the participants using a seven-point scale ranging from very strongly disagree to very strongly agree.

All evaluation instruments were developed by the staff at Michigan State University, either through the Science and Mathematics Teaching Center or the Institute for Extension Personnel Development.

#### Phase II Evaluation

The evaluation during Phase II took place twice: once when all the participants were assembled for a

<sup>&</sup>lt;sup>2</sup>R. C. Ebel, <u>Measuring Educational Achievement</u> (Englewood Cliffs, N.J.: Prentice Hall, Inc., 1965), p. 381.

conference during midwinter and then individually during the spring of that year. (Refer to Figure 3.1.) At the midwinter conference both a written evaluation and a personal interview were conducted.

The written evaluation was a continuation of the evaluation conducted during Phase I. Data were gathered on the knowledge of the two elementary science programs and on attitudes toward the two programs.

The personal interview schedule was designed to investigate a variety of aspects including the amount of self-use of the two programs (Appendix D, Individual Data Questionnaire) and the amount of consulting type activity each of the participants engaged in (Appendix E, Group Data Questionnaire).

The interview was conducted twice: at the midwinter conference and in the spring. During the midwinter conference the interview schedule was given to each participant by the writer. Recall of activities by the participant was made easier by the fact that the participants were aware of the study and the information that would be needed. In addition, an attempt was made to reduce or relieve any performance pressure on the participant either absolutely or relative to other participants, by assuring them of anonymity and by describing the study to them as not attempting any assessment of individual success.

### Testing of the Hypotheses--Phase I

The hypotheses in Phase I were tested using parametric statistics. The following assumptions were made: there was independence of observation; there was a normal distribution in the population on each dependent variable; there was homogeneity of variance.

There was considerable interaction among participants between the pre- and post-tests. However, the observations were written and separate.

The normal distribution is not critical for a sample of this size, as evidenced by Hays.<sup>3</sup> He argues that the F test is sufficiently robust to be used without questioning the assumption of normal distribution for a sample with the number of participants in this workshop.

The hypotheses tested were as follows:

#### Hypothesis 1:

There will be a significant increase in knowledge concerning the topics of the Workshop.

## Hypothesis 2:

There will be a significant positive change in attitude toward the AAAS and SCIS programs over the course of the workshop.

<sup>&</sup>lt;sup>3</sup>William L. Hays, <u>Statistics for Psychologists</u> (New York: Holt, Rinehart and Winston, 1963), p. 332.

#### Hypothesis 3:

There will be a significant increase in the participants' scores on the measure for group-process skills due to activities of the workshop.

#### Hypothesis 4:

A significant increase in knowledge of change agent skills will be measured.

### Hypothesis 5:

A significant positive correlation will exist between knowledge of the programs and attitude towards the activities of the workshop.

## Hypothesis 6:

A positive correlation will exist between attitude towards the two elementary science curricula and attitude towards the workshop.

### Hypothesis 7:

There will be a correlation between the increase in knowledge concerning program topics and the increase in attitude scores towards the two elementary science curricula.

## Hypothesis 8:

There will be a significant positive relationship between the satisfaction of perceived needs scores and the participants' attitude towards AAAS and SCIS curricula as measured at post-workshop and midwinter conference.

## Assessing the Post-Workshop Activities--Phase II

Objective I had thirteen questions designed to provide information. The questions yielded seven major items upon which data were gathered. Questions:

- How many contacts did the participants make concerning AAAS, SCIS, or both?
- 2. Was there a relationship between the role of the participant and the number of contacts?
- 3. How many people were involved in the contacts concerning AAAS, SCIS, or both programs?
- 4. Was there a relationship between the role of the participant and the total number of people involved in the contacts?
- 5. Was there a relationship between the geographic location of the participant and the number of contacts?
- 6. Was there a relationship between the number of contacts and the time of contact?
- 7. Was there a relationship between the role of the participant, the number of contacts, and the time of contact?
- 8. Was there a relationship between the number of people involved in the contacts and the time of contact?

- 9. Was there a relationship between the role of the participant, the number of people involved in the contact, and the time of the contact?
- 10. Was there a relationship between the number of contacts and the purpose of the contacts?
- 11. Was there a relationship between the purpose of contact and the time of contact?
- 12. How much self-use did the participants make of the science programs?
- 13. Was there a relationship between the role of the participant and the amount of self-use?

Data were gathered on the following:

- 1. The number of contacts made.
- 2. The number of people contacted.
- 3. The subject of the contact: AAAS, SCIS, or both.
- 4. The purpose of the contact: to create awareness; to create awareness for decision-making; to assist in decision-making; to give pre- or inservice training.
- 5. The time of contact: post-workshop to midwinter conference or midwinter conference to summer.

- The role of the participant: science educator, curriculum coordinators, or science subject specialist.
- The geographic location of the participants: Michigan Resident or out-of-state resident.

Objective II related the participant attitude and knowledge to participant activity and generated the following six questions and subsequent hypotheses.

Questions:

- What was the relationship between participant attitude and amount of change agent activity?
- 2. What was the relationship between participant knowledge and amount of change agent activity?
- 3. What was the relationship between participant attitude and self-use of the workshop content?
- 4. What was the relationship between participant knowledge and self-use of the workshop content?
- 5. What was the relationship between participant attitude and when he started change agent activity?
- 6. What was the relationship between participant knowledge and when he started change agent activity?

# on the above questions:

## Hypothesis 2:1:

The amount of change agent activity is positively correlated to the attitude toward AAAS and SCIS when knowledge is held constant.

### Hypothesis 2:2:

The amount of change agent activity is positively correlated to the knowledge of AAAS and SCIS when attitude is held constant.

### Hypothesis 2:3:

The amount of self-use is positively correlated to the attitude toward AAAS and SCIS when knowledge is held constant.

## Hypothesis 2:4:

The amount of self-use is positively correlated to the knowledge of AAAS and SCIS when attitude is held constant.

### Hypothesis 2:5:

The immediacy of change agent activity is positively correlated to the attitude toward AAAS and SCIS when knowledge is held constant.

### Hypothesis 2:6:

The immediacy of change agent activity is positively correlated to the knowledge of AAAS and SCIS when attitude is held constant.

The hypotheses in Phase II were tested using Pearson partial correlation coefficients.<sup>4</sup> This was

<sup>4</sup>Ibid., pp. 509-10.

determined to be the most effective test as it would control by holding constant the effects of a third variable on the dependent variable.<sup>5</sup> In this way a measure of the correlation between attitudes and change agent activity and between knowledge and change agent activity could be found.

The significance of the partial correlation coefficients was checked using an F table at the 0.05 level of significance, thereby needing a correlation of .43 for significance.<sup>6</sup>

Objective III did not require statistical analysis, but was based on information derived from Objectives I and II.

The following questions were phrased:

- Can institutional criteria be developed for selection of workshop participants?
- 2. Can the post-workshop role of a participant be as a change agent?
- 3. What guidelines should be established for evaluating future workshops?
- 4. What role should workshop sponsors have during the year following the workshop?

<sup>&</sup>lt;sup>5</sup>Ibid., p. 574.

<sup>&</sup>lt;sup>6</sup>Helen M. Walker and Joseph Lev, <u>Statistical</u> <u>Inference</u> (New York: Holt, Rinehart & Winston, 1953), pp. 251-343.

## Summary

This study reports the investigation of the activities of thirty participants in a Leadership Workshop on Elementary School Science conducted by the Science and Mathematics Teaching Center at Michigan State University and funded by the National Science Foundation. Data were gathered during and after the workshop through the use of tests and interview schedules. Data were analyzed using partial correlation coefficient techniques.

### CHAPTER IV

## **RESEARCH FINDINGS**

The purpose of this chapter is to present the data and pertinent statistical analysis. The data are presented for each question or questions within each objective.

## Objective I

## Objective I:

To examine the participant activity during the year following the workshop.

## Question 1.1

How many contacts did the participants make concerning AAAS, SCIS, or both?

TABLE 4.1.--Number of contacts by specific content of the meeting

	AAAS	SCIS	Both	Total	
Number of Contacts	110	71	101	282	

As Table 4.1 indicates there was a total of 282 separate contacts made concerning the science programs. The largest number of contacts was made where the subject matter dealt exclusively with the AAAS science program. This was followed by those contacts that dealt with both AAAS and SCIS and lastly those contacts that dealt exclusively with SCIS.

#### Question 1.2

Was there a relationship between the role of the participant and the number of contacts?

	AAAS	SCIS	Both	Total
Science Educators (12)	38	33	24	95
Science Subject Teachers (9)	12	8	9	29
Curriculum Coordinators (9)	60	30	68	158

TABLE 4.2.--Number of contacts by specific content by role of participants

Table 4.2 shows that curriculum coordinators accounted for the largest number of contacts (158) while science subject teachers made the fewest number (29). The Science Educators with three more participants than the Science Subject Teachers accounted for three times as many contacts as the Science Subject Teachers. The Curriculum Coordinators with the same number of participants
as the Science Subject Teachers accounted for five times as many contacts.

# Question 1.3

How many people were involved in the contacts concerning AAAS, SCIS, or both programs?

TABLE 4.3.--Number of people involved in the contact by specific content of the meeting

	AAAS	SCIS	Both	Total
Number of People Contacted	1260	1046	3134	5440

The number of people reached, of course, far outnumbered the number of contacts. The 282 contacts (Table 4.1) resulted in 5440 people being exposed to AAAS and/or SCIS. The largest number of people reached were in meetings concerning both AAAS and SCIS.

#### Question 1.4

Was there a relationship between the role of the participant and the total number of people involved in the contacts?

TABLE 4.4.--Number of people involved in the contact by specific content of the meeting by role of participants

	AAAS	SCIS	Both	Total	
Science Educators (12)	449	499	742	1690	
Science Subject Teachers (9)	184	109	278	571	
Curriculum Coordinators (9)	627	438	2114	3179	

As can be observed from Table 4.2 and 4.4 the largest number of contacts and people reached was by the Curriculum Coordinators. This large difference is in part explainable by the fact that change agent activity is considered to be part of their job. However, when the data are analyzed further, an interesting aspect occurs. Over 60 per cent of the curriculum coordinators' change agent activity took place within the geographical boundaries defined by his employment responsibility.

TABLE 4.5.--Amount of change agent activity by curriculum coordinators by geographical area of employment

	Number of Contacts			
	Within Geographical Area of Employment	Outside Area of Employment		
Science Curriculum Coordinators	92	66		

With this breakdown it became apparent that the widest geographic spread of information and assistance came from science educators rather than curriculum coordinators. The Science Educators were employed on a university level and did not have a responsibility for curriculum development or improvement with any specified school systems or schools. Thus, they had no geographical area defined by their employment responsibility. This wider spread is partially explained by the comparative ease with which the college employed personnel were able to do consulting work as compared to the participants employed by school districts. However, one curriculum coordinator conducted two workshops, one at a national convention and another at a regional educational convention, accounting for the widest geographical dissemination by an individual.

Question 1.5

Was there a relationship between the geographic location of the participant and the number of contacts?

TABLE 4.6.--Amount of change agent activity by geographiclocation of the participant

	Number of Partici- pants	Percentage of Participants	Number of Contacts	Percentage of Contacts
Michigan Residents	20	678	228	81%
Out-of-State Residents	10	33%	54	19%

The Michigan residents accounted for a larger number of contacts than would be expected. Several explanations dealing with change theory can be developed. One, the Michigan residents were closer geographically and consequently were able to be supportive of each other. Two, Michigan residents enjoyed the support of the Science and Mathematics Teaching Center, its resources, credibility, and staff. Three, the mini workshops held for elementary school teams in Michigan helped to create initial awareness, established contacts for the participants, and may have served to heighten the credibility of individual participants. The mini workshops also resulted in thirty-six requests for AAAS workshops and twenty-seven requests for SCIS workshops. These factors could be capitalized on by Michigan residents only. Four, the newsletters that were sent out had the widest dissemination in Michigan. Five, the stature and credibility of the Science and Mathematics Teaching Center and Michigan State were presumed to be higher in Michigan than in the other states represented.

### Question 1.6

Was there a relationship between the number of contacts and the time of contact?

	Number of Contacts			ts	
	AAAS	SCIS	Both	Total	
Post-Workshop to Midwinter	65	27	63	155	
Midwinter to Summer	45	44	38	127	

TABLE 4.7.--Number of contacts by specific content by time of contact

The total number of contacts decreased as the year progressed. Participants gave a variety of reasons for this: (1) the population of school systems not contacted by the midwinter conference was smaller; (2) the interest of school systems was lower since curriculum decisions are normally made in the Fall or the first of the year; (3) the available time for change agent activity by the workshop participants was decreasing. Comments from the participants indicated that the initial flurry of requests for consultants decreased as did the initial enthusiasm for engaging in change agent activity. Additionally, participants who had not already encountered institutional resistance from their employers for the amount of time their change agent activity was taking, began to do so shortly after the midwinter conference.

The one exception to the decreasing number of contacts across time was with the SCIS science program. The number of contacts for this program increased from twenty-seven to forty-four.

There appear to be two possible major reasons for this. One, the preference of the participants for one or the other of the science programs changed during the year as reported in the following table:

TABLE 4.8.--Elementary science program preferred by participants

SCIS	Prefer AAAS	Prefer Both	Prefer Neither
12	13	4	1
15	11	3	1
	12 15	Itelef Itelef   SCIS AAAS   12 13   15 11	InterestInterestInterestSCISAAASBoth1213415113

By the time of the Midwinter conference, AAAS had lost two solid supporters and one who had liked both AAAS and SCIS. In the meantime SCIS had gained three additional supporters. One individual still refused to like either one.

Two, while AAAS appeared to be more traditional and consequently easier to introduce and gain acceptance during the early months of the school year, school systems that had adopted this program were having delivery problems, frustration for which was sometimes vented on the change agent.

Question 1.7

Was there a relationship between the role of the participant, the number of contacts and the time of the contacts?

	Time of Contact		
	Post-Workshop to Midwinter	Midwinter to Summer	
Science Educators (12)	51	44	
Science Subject Teachers (9)	17	12	
Curriculum Coordinators (9)	87	71	

TABLE 4.9.--Number of contacts by time of contact by role of participant

The number of contacts decreased over time. In both time categories the Curriculum Coordinator made by far the largest number of contacts. This is consistent with the results found in Question 1.2 (Table 4.2) and Question 1.4 (Table 4.4). It is also consistent with the data reported in Table 4.5. It is only when the geographical employment area is taken into consideration, that the Science Education participants account for the largest number of contacts over a broad geographic area.

#### Question 1.8

Was there a relationship between the number of people involved in the contacts and the time of contacts?

TABLE 4.10.--Number of people involved in the contact by specific content by time of contact

	Number of People Contacted					
	AAAS	SCIS	Both	Total		
Post-Workshop to Midwinter	840	416	2084	3340		
Midwinter to Summer	420	630	1050	2100		

The total number of people contacted decreased over time. This parallels the decrease in the number of contacts over time (Table 4.7). The reasons advanced for the decrease in the number of contacts applied here also. Additionally, the participants indicated that their contacts had moved from the awareness stage to the decision-making stage, thus requiring fewer people. Many were also in the pre- and inservice stage, also requiring fewer people.

The exception to this decrease was the number of people involved in the SCIS contacts. As previously discussed there was disenchantment with AAAS and subsequent renewed interest in SCIS.

### Question 1.9

Was there a relationship between the role of the participant, the number of people involved in the contact, and the time of contact?

TABLE 4.11.--Number of people involved in the contacts by time of contact by role of participant

	Time of Contact			
	Post-Workshop to Midwinter	Midwinter to Summer		
Science Educators (12)	1004	686		
Science Subject Teachers (9)	351	220		
Curriculum Coordinators (9)	1985	1194		

In both time periods, the Curriculum Coordinators contacted the largest number of individuals. Curriculum Coordinators were more active during the second half of the year than were either of the other two groups during the first half. The Science subject teachers even at their most active time were less active than the other two groups at their least active time.

Question 1.10

Was there a relationship between the number of contacts and the purpose of the contacts?

TABLE 4.12.--Number of contacts by purpose of contact

Number of Contacts
20
129
80
53

There appeared to be four purposes to the contacts: to create awareness, awareness being the end purpose; to create awareness leading to decision-making and possible adoption; to facilitate decision making; and to provide pre- and inservice training.

The first was typified by large audiences, generally of the public interest type such as the PTA. These groups were not concerned about making a decision. The second was typified by groups composed of teachers and/or administrators. These groups intended to make a decision but at some later date. Group contact in these cases was usually preceded by talks with individuals in charge.

The third type of contact was typified by small groups or individuals who were involved in an actual decision-making process. And the fourth was teachers' groups who were already committed to adoption of one of the programs.

The largest number of contacts was reported by the participants to be in the awareness leading to decisionmaking category. The fewest contacts were those that were solely informational in purpose. The participants conducted only fifty-three pre- or inservice training sessions.

### Question 1.11

Was there a relationship between the purpose of the contact and the time of the contact?

The participants reported a sharp decrease in the number of contacts in the awareness (decision-making) category during the second half of the year. There was, however, an increase in contacts related to decisionmaking and pre-/inservice training. In part, this can be explained by the fact that most school systems had been contacted by the time of the midwinter conference decreasing the available population of school districts interested in obtaining awareness information about the

programs. Furthermore, the decision-making process for adoption of new curricula is often closely related to the budget process in most school districts. Preliminary budget preparation is usually a Spring activity, consequently curriculum adoption changes must be made prior to this time.

TABLE 4.13.--Number of contacts by purpose of contact by time of contact

	Number of Contacts			
Purpose	Post-Workshop to Midwinter	Midwinter to Summer		
Awareness (end purpose)	9	11		
Awareness (decision- making)	90	39		
Decision-making	36	44		
Pre-/Inservice	20	33		

# Question 1.12

How much self-use did the participant make of the science programs?

# Question 1.13

Was there a relationship between the role of the participant and the amount of self-use?

	Instances of Self-Use				
	AAAS	SCIS	Both	Total	
Science Educators (12)	0	0	12	12	
Science Subject Teachers (9)	0	0	0	0	
Curriculum Coordinators (9)	0	0	0	0	

TABLE 4.14.--Instances of self-use by specific content by role of participant

As the data show, self-use, as opposed to change agent activity, was nonexistent except in the case of the Science Educators. This is understandable since the Curriculum Coordinators and the teachers in college science departments reported no opportunity to engage in any self-use.

The self-use involved both AAAS and SCIS. Participants reported self-use ranging from a complete restructuring of their undergraduate science teacher education curriculum to the development of self-study courses on the two elementary science curricula for use in science teacher education classes.

# Objective II

# Objective II:

To examine the relationship between participant attitude and knowledge and participant activity.

#### Question 2.1

What was the relationship between participant attitude and amount of change agent activity?

# Hypothesis 2.1:

The amount of change agent activity is positively correlated to the attitude toward AAAS and SCIS when knowledge is held constant.

The Pearson Product Moment Correlation Coefficient between participant attitude and change agent activity was .50.

The partial correlation coefficient for Hypothesis 2.1 positing a relationship between change agent activity and participant attitude with knowledge held constant was .58. Using the F test of significance, Hypothesis 2.1 was accepted at the .05 level and the null hypothesis of no relationship was rejected.

#### Question 2.2

What was the relationship between participant knowledge and amount of change agent activity?

### Hypothesis 2.2:

The amount of change agent activity is positively correlated to the knowledge of AAAS and SCIS when attitude is held constant.

The Pearson Product Moment Correlation Coefficient between participant knowledge and change agent activity was .30. The partial correlation coefficient for Hypothesis 2.2 positing a relationship between change agent activity and participant knowledge of programs with attitude held constant was .21. Using the F test of significance, Hypothesis 2.2 was rejected at the .05 level and the null hypothesis of no relationship was accepted.

# Question 2.3

What was the relationship between participant attitude and self-use of the workshop content?

# Hypothesis 2.3:

The amount of self-use is positively correlated to the attitude toward AAAS and SCIS when knowledge is held constant.

The Pearson Product Moment Correlation Coefficient between participant attitude and self-use was .13.

The partial correlation coefficient for Hypothesis 2.3 positing a relationship between self-use of programs and participant attitude with knowledge held constant was .05. Using the F test of significance, Hypothesis 2.3 was rejected at the .05 level and the null hypothesis of no relationship was accepted.

#### Question 2.4

What was the relationship between participant knowledge and self-use of the workshop content?

### Hypothesis 2.4:

The amount of self-use is positively correlated to the knowledge of AAAS and SCIS when attitude is held constant.

The Pearson Product Moment Correlation Coefficient between participant knowledge and self-use was .26.

The partial correlation coefficient for Hypothesis 2.4 positing a relationship between self-use and participant knowledge with attitude held constant was .28. Using the F test of significance, Hypothesis 2.4 was rejected and the null hypothesis of no relationship was accepted.

#### Question 2.5

What was the relationship between participant attitude and when he started change agent activity?

# Hypothesis 2.5:

The immediacy of change agent activity is positively correlated to the attitude toward AAAS and SCIS when knowledge is held constant.

The Pearson Product Moment Correlation Coefficient between participant attitude and immediacy of change agent activity was .56.

The partial correlation coefficient for Hypothesis 2.5 positing a positive relationship between immediacy of change agent activity and attitude toward programs with knowledge held constant was .63. Using the F test of significance, Hypothesis 2.5 was accepted at the .05 level and the null hypothesis of no relationship was rejected.

# Question 2.6

What was the relationship between participant knowledge and when he started change agent activity?

# Hypothesis 2.6:

The immediacy of change agent activity is positively correlated to the knowledge of AAAS and SCIS when attitude is held constant.

The Pearson Product Moment Correlation Coefficient between participant knowledge and immediacy of change agent activity is .43.

The partial correlation coefficient for Hypothesis 2.6 positing a positive relationship between immediacy of change agent activity and knowledge with attitude held constant was .43. Using the F test of significance, Hypothesis 2.6 was accepted at the .05 level and the null hypothesis of no relationship was rejected.

The hypotheses tested in Objective II are summarized in Table 4.15.

The results of the hypothesis testing indicate that there was a significant relationship between a participant's attitude and the amount of change agent activity and between attitude and immediacy of activity.

		Hypothesis	Significance
2.1	нı	The amount of change agent activity is positively correlated to the attitude toward AAAS and SCIS when knowledge is held constant.	F > .05
2.2	нı	The amount of change agent activity is positively correlated to the knowledge of AAAS and SCIS when attitude is held constant.	N.S.
2.3	Hl	The amount of self-use is positively correlated to the attitude toward AAAS and SCIS when knowledge is held constant.	N.S.
2.4	<sup>H</sup> 1	The amount of self-use is positively correlated to the knowledge of AAAS and SCIS when attitude is held constant.	N.S.
2.5	H1	The immediacy of change agent activity is positively correlated to the attitude toward AAAS and SCIS when knowledge is held constant.	F > .05
2.6	нı	The immediacy of change agent activity is positively correlated to the knowledge of AAAS and SCIS when attitude is held constant.	F > .05

The only instance of a significant relationship between knowledge and activity is in terms of when the participant began his change agent activity.

Table 4.16 presents the data on when the contacts were first made.

TABLE 4.16.--Immediacy of change agent activity by participants

Date of First Contact	Number of Participants
August	3
September	8
October	4
November	3
December	1

Of the remaining participants, six indicated they had their first workshop planned for a later date.

The fact that attitude was correlated to change agent activity while knowledge was not indicates that knowledge by itself is not a predictor of an active or successful change agent. Without a strong positive attitude, the probability of a participant continuing to overcome difficulties, discouragements, and obstacles is lessened.

The correlation of self-use with attitude was severely depressed due to one primary factor: only twelve of the participants, the science educators, had any opportunity to utilize the materials. A partial correlation coefficient between selfuse and attitude and between self-use and knowledge was calculated for those twelve individuals. The partial correlations of self-use and attitude holding knowledge constant was .46 and was significant at the .05 level. The partial correlation coefficient for self-use and knowledge holding attitude constant was .41. However, this was not significant at the .05 level.

The relationship between immediacy and self-use was not examined statistically because of the inability to control crucial variables such as type of course being taught, sequence of materials, and other factors not related to attitude or knowledge concerning the programs. It was felt that the time of introduction would be more a function of the arrangement of course content and not of attitude.

### Objective III

#### **Objective III:**

To develop implications and recommendations for future workshops.

### Question 3.1

Can institutional criteria be developed for selection of workshop participants?

#### Question 3.2

Can the post-workshop role of a participant be as a change agent?

# Question 3.3

What guidelines should be established for evaluating future workshops?

# Question 3.4

What role should workshop sponsors have during the year following the workshop?

A discussion of the questions in Objective III more properly comes in Chapter V, since they are based on the data gathered and results found in Objectives I and II.

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# CHAPTER V

# SUMMARY AND CONCLUSIONS

This chapter has three major parts. In the first part there is a summary of the data and the conclusions and implications based on the data for each question or group of questions in Objective I and II. In the second part of the chapter there is a discussion of Objective III of the study and recommendations in four specific areas related to the workshop and its participants. In the third part, the implications for future studies based on the experiences of conducting this one are discussed.

The purpose of this study was to assess the postworkshop activities of participants who attended a workshop about two elementary science programs. The thirty individuals were participants in a Leadership Workshop on Elementary Science, held at Michigan State University and conducted by the Science and Mathematics Teaching Center. The participants who were expected to act as change agents during the year following the workshop were science curriculum coordinators, science educators, and college science teachers.

This study attempted to assess the activities of the participants during the year following the workshop. Objective I, designed to assess the amount and types of activity in which the participants engaged, generated thirteen questions. Objective II attempted to relate the participant's change agent activity with his knowledge of the two science programs and his attitude toward the science programs and generated six questions and hypotheses. It also related the participant's self-use of the elementary science programs to his knowledge and attitude. Objective III was designed to combine the data in Objective I and II to generate recommendations for future workshops.

The data were gathered through the use of questionnaires administered twice during the school year to determine the number of change agent activities, the number of people contacted, the purpose of the contact, and the time of the contact. The hypotheses in the study were stated in correlational form and were analyzed using partial correlation coefficients.

# Summary, Conclusions, and Implications of the Data

# **Objective I**

The first objective of the study was to examine the participant's activity during the year following the workshop. This objective generated thirteen

questions based on the number of contacts, the role of the participant, the time of the contact, and the purpose of the contact.

#### Question 1.1

How many contacts did the participant make concerning AAAS, SCIS, or both? (Table 4.1, page 60)

#### Question 1.2

Was there a relationship between the role of the participant and the number of contacts? (Table 4.2, page 61)

#### Question 1.3

How many people were involved in the contacts concerning AAAS, SCIS, or both programs? (Table 4.3, page 62)

### Question 1.4

Was there a relationship between the role of the participant and the total number of people involved in the contacts? (Table 4.4, page 62)

#### Question 1.5

Was there a relationship between the geographic location of the participant and the number of contacts? (Table 4.6, page 64)

# Summary

The participants reported a total of 282 contacts involving 5,440 people. While the largest number of contacts were in AAAS (110), the greatest number of people reached was reported to be in meetings where the agenda included a discussion of both AAAS and SCIS (3,134).

The most active people were the nine curriculum coordinators (158 contacts and 3,179 people). The least active were the nine science subject specialists (29 contacts and 571 people). The 12 science educators (95 contacts and 1,690 people) were in the middle with fewer contacts and people reached than curriculum coordinators, but more than science subject specialists.

The interviews with the participants indicated a possibility that a large number of contacts made by the science curriculum coordinators was in their own geographical area of employment. Consequently, a breakdown was done of contacts for coordinators: within their own geographical area of employment and outside this area. This analysis showed that 92 of the 158 contacts made by the coordinators was in their own geographical employment area. Only 66 of their contacts were outside of their own area. When this is used as a basis to compare to the amount of change agent activity by Science Educators (95 contacts) the Curriculum Coordinators are seen as less active on a broad geographical area.

Since preference to enroll in the workshop had been given to Michigan employed residents a breakdown was also made on the amount of contacts made by Michigan residents (20) as opposed to non-Michigan residents (10).

Michigan residents did, in fact, make more contacts (228) than did nonresidents (54). Based on the number of Michigan residents, the number of contacts was larger than expected.

# Conclusions and Implications

A conclusion can be drawn from the data that interest was focused on both programs rather than either one individually. It may imply that participants were, in general, interacting with audiences who did not initially feel they had sufficient knowledge about either of the two programs to make a choice and were using the expertise of the participants to gain that information.

Participant preference for one or the other of the programs did not appear to be a factor in the amount of change agent activity by specific content, since the participants split almost equally on their preference. It may have accounted for, however, the increase in the number of SCIS contacts during the second half of the year as it coincided with the shift of three people to preferring the SCIS elementary science program.

Another conclusion from the data is that there was a relationship between the occupational role of the participant and the number of contacts made and the number of people contacted. As outlined in Chapter III, the participants were from three major roles: the

Science Educator, usually employed by a university; the Science Subject Specialist, also employed by a university; and the Science Curriculum Coordinator, generally employed by one or more school districts.

If the purpose of a workshop were to train individuals as change agents to operate primarily outside of their own geographic area, the data indicate that science educators would be more likely to fulfill that role. Science subject teachers of the three groups should perhaps be the last choice as participants, since those in this workshop accounted for the fewest contacts.

The physical location of the participant appears to be a factor in the extent of change agent activity. One can conclude from the data that those in close geographical contact with workshop sponsors and with each other are apt to be more active than those who are separated from the sponsors by wide geographical distances. This is in line with the literature on change, which supports the contention that the confirmation stage utilizing support from workshop personnel in the change process is crucial to continued holding of a decision or use of an idea.

#### Question 1.6

Was there a relationship between the number of contacts and the time of contact? (Table 4.7, page 65)

#### Question 1.7

Was there a relationship between the role of the participant, the number of contacts, and the time of contact? (Table 4.9, page 67)

#### Question 1.8

Was there a relationship between the number of people involved in the contacts and the time of contact? (Table 4.10, page 68)

#### Question 1.9

Was there a relationship between the role of the participant, the number of people involved in the contact, and the time of the contact? (Table 4.11, page 69)

### Summary

Except for SCIS, there was a decrease in the number of contacts from the first half of the year to the second. This decrease was in total contacts, contacts involving AAAS exclusively, and contacts involving both AAAS and SCIS. Participants indicated there were fewer interested school systems that had not already been contacted. They also indicated that they were encountering increased resistance to their external activities from their employers. The number of people represented by these contacts also decreased in all categories except SCIS, which increased from the first to the second half of the year.

Separating the participants by their roles did not affect this pattern of decreasing activity. None of the groups showed an increase in activity from the first half to the second half of the year. However, the curriculum coordinators were more active in the second half of the year for their total contacts than were either of the other two groups in the first half of the year.

### Conclusions and Implications

From the data a conclusion can be drawn that there is a relationship between the number of contacts and the time of the contact and for the number of people contacted and the time of contact. The decrease in the number of contacts and people contacted over time for all three groups of participants implies that participants are going to be less active as a group in the second half of the year than they are during the first half of the year following the workshop. This may be partially explained by the shift in the type of contact during the year. It may also be due to the amount of enthusiasm and commitment not remaining constant over the year. That is, the participants may burn themselves out through the amount and intensity of their early contacts. It may imply that the importance of follow-up by workshop sponsors will increase as the year progresses, if, in fact, workshop sponsors are able to give renewed impetus to participant effort.

The increase in SCIS contacts runs counter to the decreasing number of contacts from the first half of the year to the second. The data do not account for why this happened. SCIS probably would have decreased except for the dissatisfaction that developed among the participants for AAAS due to serious supply problems on the part of the AAAS publishers. Additionally, if the participants were growing tired of their role as change agents because of the repetitive nature of their subject matter, they may have welcomed an increased emphasis on SCIS. However, there are no data to support this.

#### Question 1.10

Was there a relationship between the number of contacts and the purpose of the contacts? (Table 4.12, page 70)

# Question 1.11

Was there a relationship between the purpose of contact and the time of the contact? (Table 4.13, page 72)

#### Summary

The number of contacts divided into four types: awareness as an end purpose; awareness leading to decision-making; decision-making; and pre- or inservice training.

The largest number of contacts (129) was for awareness leading to decision-making. The fewest number was for awareness as an end purpose. The participants were involved in the actual decision-making process for eighty of the contacts.

The purpose of the contacts shifted from the first half of the year to the second. The largest number of contacts during the first part of the year was informational in nature--either as an end purpose or leading to decision-making. During the second half of the year the focus seemed to shift to decision-making and pre- and inservice training. However, the category of awareness as an end purpose also increased, but only from nine to eleven.

# Conclusions and Implications

A conclusion from the data is that the largest number of contacts will be informational in purpose. A conclusion can also be drawn that participants must be ready to shift their attention to consolidation of impact during the second half of the year, i.e., they must be prepared to spend an increasing amount of their time with systems that are in the decision-making stage and training stage. It appears that school systems may be less interested in unfamiliar ideas during the second part of the year, prefering to consolidate their information and make decisions during that time.

### Question 1.12

How much self-use did the participants make of the science programs? (Table 4.14, page 73)

#### Question 1.13

Was there a relationship between the role of the participant and the amount of self-use? (Table 4.14, page 73)

# Summary

The participants made very little use of the science programs themselves. Only the science educators whose roles included teaching about new science programs made any use of the material learned.

# Conclusions and Implications

There was definitely a relationship between the role of the participant and amount of self-use of the information. The results imply that those who could make use of the data, science educators, generally did so. Since most of the participants were not in a position to use the information, this may not be a concern that should be primary to this kind of a workshop.

# **Objective II**

The purpose of the second objective was to relate participant attitude and knowledge to the participant activity. The objective generated six questions and hypotheses. The hypotheses were in correlational form and were analyzed using partial correlation coefficients.

#### Summary

Three of the partial correlations were significant at the .05 level of significance. Three were not.

Results were as follows:

# Hypothesis 2.1:

There was a significant relationship between amount of change agent activity and participant attitude when knowledge is held constant.

# Hypothesis 2.2:

There was no significant relationship between the amount of change agent activity and participant knowledge when attitude is held constant.

# Hypothesis 2.3:

There was no significant relationship between the amount of self-use and participant attitude when knowledge is held constant.

# Hypothesis 2.4:

There was no significant relationship between the amount of self-use and participant knowledge when attitude is held constant.

# Hypothesis 2.5:

There was a significant relationship between the immediacy of change agent activity and participant attitude when knowledge is held constant.

#### Hypothesis 2.6:

There was a significant relationship between the immediacy of change agent activity and participant knowledge when attitude is held constant.

Since the correlation between the amount of selfuse and participant attitude was so low, an additional analysis was run. Based on the reported data that indicated only the science educators engaged in any self-use of the materials, a partial correlation was run using self-use and attitude and self-use and knowledge for the science educators alone. These were .41 for self-use and knowledge (not significant) and .46 for self-use and attitude (significant at the .05 level).

# Conclusions and Implications

Since there was a significant relationship between an individual's attitude and the amount of his change agent activities, a conclusion can be made that workshop personnel or others interested in training change agents should pay particular attention to the attitudes the participants develop during a training session. According to the data this may be more important than the amount of knowledge an individual has. The data indicate that this relationship existed for participants who engaged in change agent activity and for those who made use of the programs for themselves. There was not a significant relationship between change agent activity and the amount of knowledge. However, amount of knowledge was correlated with immediacy of activity. The data support the conclusion that over a long period of time attitude is more important than knowledge, but in a short period of time, knowledge also plays a critical role. It is possible that the amount of change agent activity is related to a person's confidence in his ability to conduct change agent activity and that this confidence is enhanced initially by a high degree of knowledge about the subject matter. However, this possibility was not examined in this study.

# **Objective III**

#### Question 3.1

Can institutional criteria be developed for selection of workshop participants?

Based on the data, several criteria and recommendations can be developed. First, as the data indicate, an individual's occupation should be taken into consideration. In this study those individuals who were in roles that already focused on introducing people to new programs or training people to implement new programs accounted for more of the change agent activity. Curriculum coordinators were most active and should be given greatest preference if one is concerned with reaching the largest number of people. If one is concerned about reaching people over the widest geographical area possible, first preference should probably be given to Science Educators.

Second, the amount of freedom that an individual will have to carry out post-workshop expectations must be considered. In this study, participants reported an increasing amount of employer resistance to these activities. The type of resistance was difficult to confirm since participants perceived it only in subtle forms. This problem had been anticipated and previous to the workshop each employer had submitted a letter indicating an understanding of the post-workshop role of the participant and that adequate released time for post-workshop activities would be given. However, it appears that employers did not have an adequate perception of the amount of time involved.

Future workshop sponsors might consider specifying in detail the nature and extent of the commitment to released time. They also might consider ways to involve the employing institutions in the planning and operation of the workshop and post-workshop activities in order to increase institutional commitment. The alternative seems to be to give minimal consideration to institutional commitment and focus on the individual and his previous

record of the time he has been able to give to activities outside his institutional role.

The third criteria would be to give consideration to the geographic location of the participants relative to each other and relative to the institution sponsoring the workshop. Those in this workshop who were in close proximity did engage in more activity than those who were not.

### Question 3.2

Can the post-workshop role of a participant be as a change agent?

The data indicate that all participants engaged in some change agent activity. Thus, it is possible for a workshop participant to assume this role. Based on this study, the conclusion can be reached that the extent of a participant's change agent activity is influenced by at least four factors discussed earlier: his attitude toward the programs, his geographic location, the nature and extent of institutional support, and his occupational role. The question more properly may be one of <u>will</u> he assume this role and the data support an affirmative answer to this question as well.

# Question 3.3

What guidelines can be established for evaluating future workshops?
During the course of this evaluation and analysis of data, it became clear that the complexities of evaluating and documenting the long-term effect of a workshop are numerous. This study focused on documenting the extent of change agent activity and made an assessment of the relationship of change agent activity to participant attitude and knowledge.

The following could also be considered for inclusion in future workshop evaluations:

1. Development of change agent performance expectations. At the present time there is little information available to indicate how much activity is reasonable to expect. If this were calculated in some manner previous to the postworkshop experience it might serve three purposes: (1) to act as one self-selection criterion for individuals applying to a workshop; (2) to provide institutions with some indication of their expected level of commitment; and (3) to serve as one base against which post-workshop activities could be measured. The use of this would have to be carefully considered on a case-by-case situation since, in some instances, it might create a ceiling level beyond which participants would not feel inclined to go.

- 2. A compilation and assessment of a participant's previous record of change activity. Baseline data about a participant's previous amount and types of change agent activity would allow for judgments concerning the impact of the specific workshop. It might also serve to indicate whether the workshop trained new change agents or re-directed the activities of existing change agents.
- 3. Measures of institutional commitment. Future evaluations might develop measures of institutional commitment that could be used both prior to a workshop and during the post-workshop experience. This might help to explain the amount of participant activity.
- 4. Change agent role self-perceptions by participants. There was some indication from comments made by the participants that their perception of themselves as change agents or nonchange agents may have influenced their activity. Although it was assumed that all those who applied were aware of the workshop expectations for them, the assumption that participation meant acceptance of that role may not have been totally founded.

5. Documentation of specific types of change agent activity. This would be especially helpful when the unit of adoption ranges from a total school system to individual classes and the decisionmakers may not be the same as those who are responsible for implementation. Since in a case such as this one the adoptor may be an institution rather than an individual, there is greater potential for the change agent to exert influence at multiple points during the change Thus, particular attention could be process. paid to the role of the change agent in securing adoption by examining at what point he entered the institutional change process, at what point or points he was most utilized, and at what point or points he was most effective.

There does not appear to be any question as to whether post-workshop experiences should be evaluated. They should. The question is more properly one of how complex and extensive the evaluation can be given limited human and financial resources.

### Question 3.4

What role should workshop sponsors have during the year following the workshop?

The role of the workshop sponsors should not end at the close of the workshop. It would seem that there

is the necessity for the participants to continue to receive support during the year as some of them did following this workshop. While there are constraints on workshop sponsors similar to those on the evaluators, i.e., available time and money, consideration should be given to alleviating these as much as possible in order to maximize the continued influence of the workshop effect. This would allow sponsors to be supportive through frequent communications with participants. Through conducting periodic meetings of participants, the opportunity for support among participants and between participants and sponsors would be facilitated. It is possible that sponsors should consider assuming a role of coordinating all change agent contacts in order to equitably distribute requests for services and to insure a reasonable coverage of all geographic areas. The coordination role would also provide a mechanism for recognizing and solving problems shared by change It would allow for the change agents to speak agents. with one voice through the sponsors' coordinating role.

### Implications from the Study

Based on the experiences gained by conducting this study several recommendations, not specifically related to this study, can be offered.

First, for systematic evaluation of workshops that attempt to train change agents there may be a need

to consider the advisability of conducting longitudinal studies that last several years. Since school systems tend to make institutional rather than individual decisions, the process can consume more time than simply one year. When the decision involves a set of concepts or activities such as a total curricular program, the decision process and the adoption process may be a prolonged one.

Second, future studies may wish to consider an analysis of the effectiveness of a change agent from the perspective of his base of power. With the exception of the change agent activity in this study done by curriculum coordinators within their own geographical area of employment, all activity took place outside the normal base of power for the participant. It may be helpful to focus on the reaction to and the use made of an individual operating within his own school system where he has an established base of power as opposed to operating in a school system other than his own where his base of power is external. The study should include an assessment of the type and extensiveness of the involvement including both formal and informal interactions. It might also include a comparison of the relative success of a number of types of change agents, e.g., commercially funded, federally funded, state funded, and so forth as to their credibility and effectiveness due to their base of power.

Third, future studies concerned with the implementation of curricular programs might do well to compare the program as conceived by its developers, the program explained by the change agent, and the program finally adopted. Since very few programs seem to survive in a classroom exactly as intended, information on the transformation may be of use in further assessing the role and impact of the change agent.

Fourth, future studies need to look at the consequences of change agent activity on the consumer recipients. This needs to be done in two ways. Evaluations need to focus on the effect of the new curriculum on the organization, the teacher, and the students. Resultant changes in teacher behavior and in student outcome need to be assessed. The other consequence that needs to be addressed is the teacher. Most evaluations focus on the product and ignore or treat secondarily the characteristics of the teacher that facilitate or inhibit decisionmaking or adoption.

While all studies focusing on the change process or curricular adoption develop their own focus, utilizing the above recommendations could assist in the further development of the body of knowledge about both the role and the impact of the change agent.

APPENDICES

## APPENDIX A

# GENERAL INFORMATION CHECKLIST

# APPENDIX A

		DO NOT W	RITE
		THESE SP.	ACES
Name		<b>1 -</b> 5	
Age Date		6 - 7	
Sex		8	
Marital Status		9	
1. Education			
Major Degree	Year Ins	titution 10 11 12 - 1 14 - 1	3 5
		16 17 18 - 1 20 - 2	9 1
		22 23 24 - 2 26 - 2	5 7
2. Experience	Years Numbe	r of Locations	
Public School - Elementar	У	28 29	
Public School - Jr. High		30 31	
Public School - Sr. High		32	
College		34	
Industry			
Present position		38	

# GENERAL INFORMATION CHECKLIST

3.	Your present position:	
	a. Teaching responsibility for 1967-68 (excluding summer)% of time	39
	b. If college teacher, please name the course	
	credit hours course	
		40 - 41
		42 - 43
		44 - 45
		46 - 47
	<pre>c. If not college, which grade level did you teach?</pre>	48 - 49
	d. Research responsibility% of time	50
	e. Administrative responsibility% of time	51
	f. Other% of time	
	Specify	52
4.	Professional organizational memberships	
	AAAS	53
	AERA	54
	NARST	55
	ACS	56
	AAPT	57
	AGS	58
	AIBS	59
	Other (please specify)	
		60
		61

5. What teacher education institutions are available in your area?

how many?

	_a. state-supported schools	62
	_b. private institutions	63
6.	Which school districts have indicated interest to you in improving their science instruction? (These are groups of teachers with whom you might work)	
	District	
		64

For each district you have indicated above please fill out Appendix A.

DO NOT WRITE IN THESE SPACES

Fill out this form for each school district you listed on question #6 of the GENERAL INFORMATION CHECKLIST.

Date	e			
1.	Your	Name	1 -	5
2.	Name	of District	6 -	15
3.	Appro	oximate Size (Student population)	16	
<del></del>	a.	less than 5,000		
	_b.	5,000 - 10,000		
	_c.	10,000 - 50,000		
	d.	more than 50,000		
	_e.	unknown		
4.	Stude	ent-Teacher Ratio	17	
	a.	less than 20:1		
<del></del>	_b.	20-25:1		
	_c.	25-30:1		
	_d.	30-35:1		
	_e.	more than 35:1		
	_f.	unknown		
5.	Perce	entage of elementary teachers with B.A. or B.S.	18	
<del></del>	a.	less than 50%		
	_b.	51% to 80%		
	_c.	more than 80%		
	_d.	unknown		

6.,	Perc	centage of elementary teachers with M.A.	19
<del></del>	a.	less than 20%	
	b.	21% - 50%	
	c.	more than 50%	
	d.	unknown	
7.	Ave	rage number of students per elementary school	20
	a.	less than 400	
	b.	400 - 600	
	c.	601 - 800	
	d.	more than 800	
	e.	unknown	
8.	Num	per of elementary schools in district	21
	a.	less than 5	
	b.	5 - 10	
	c.	11 - 20	
	d.	21 - 40	
	e.	41 - 60	
	f.	more than 60	
	g.	unknown	
9.	Per	pupil - per year expenditure for science	22
	a.	less than \$1	
	b.	\$1 - \$2	
	c.	\$2 - \$3	
میں بی اور	d.	more than \$3	
	e.	unknown	

10. Ratio of supervisors, coordinators, and other 23 resource people to elementary teachers 1:20 a. 1:60 b. 1:100 c. d. unknown 11. Annual scheduled inservice time 24 less than 3 hours a. 3-12 hours b. 13-30 hours c. d. more than 30 hours Student population (socioeconomic level) 25 12. predominately lower class (more than 75%) a. predominately middle class (more than 75%) b. predominately upper class (more than 75%) с. mixed-full range d. e. unknown 13. Median age of elementary teachers 26 less than 25 a. b. 25 - 30c. 31 - 40đ. unknown 14. Median years teaching experience of elementary teachers 27 less than 5 a. b. 6 - 10c. more than 10

\_\_\_\_d. unknown

15.	Number of contacts you've had with this district	28
	_a. none	
	_b. 1 - 3	
	_c. 4 - 6	
<del>e <u>11</u>65 ***</del> ****	_d. more than 6	

APPENDIX B

KNOWLEDGE OF PROGRAM CHARACTERISTICS AND PROGRAM IMPLEMENTATION PROCEDURES INSTRUMENT

#### APPENDIX B

#### NUMBER

DIRECTIONS: Multiple Choice. Choose the best answer.

- 1. Which of the following persons is the project director of AAAS?
  - A. Robert M. Gagne
  - B. Robert Karplus
  - C. John R. Mayor
  - D. Charles Walcott
  - E. Jerrold R. Zacharias
- 2. Which of the following persons is the project director of SCIS?
  - A. Robert M. Gagne
  - B. Robert Karplus
  - C. John R. Mayor
  - D. Charles Walcott
  - E. Jerrold R. Zacharias
  - 3. The grade levels to be included in Science--A Process Approach are:
    - A. K-16
    - B. K-12
    - C. K-8
    - D. K-6
    - E. 1-6
- 4. The grade levels to be included in the SCIS curriculum are:
  - A. K-16
  - B. K-12
  - C. K-8
  - D. K-6
  - E. 1-6
  - 5. The main funding agency for AAAS is:
    - A. American Association for the Advancement of Science
    - B. National Science Foundation

Number\_\_\_\_\_

	C. National Science Teachers Association D. United States Office of Education E. University of California
6.	The main funding agency for SCIS is:
	A. American Association for the Advancement of Science
	B. National Science Foundation C. National Science Teachers Association
	D. United States Office of Education E. University of California
7.	The current publishing agency (if any) for AAAS is:
	A. Holt, Rinehart, Winston B. Harcourt Brace and World
	C. Rand McNally
	D. Raytheon E. Xerox
8.	The current publishing agency (if any) for SCIS is:
	<ul> <li>A. Holt, Rinehart, Winston</li> <li>B. Harcourt, Brace and World</li> <li>C. Rand McNally</li> <li>D. Raytheon</li> <li>E. Xerox</li> </ul>
9.	The approximate cost of a complete set of AAAS materials per class (30 students) in grade one is:
	A. \$450 B. \$350
	C. \$250 D. \$150
	E. \$50
10.	The approximate cost of SCIS materials per class (32 students) in grade one is:
	A. \$450 B. \$350 C. \$250 D. \$150 E. \$50

11. The final commercial edition of AAAS materials that will be commercially available for 1968-69 are: A. Science--A Process Approach Parts I-II only B. Science--A Process Approach Parts I-III only C. Science--A Process Approach Parts I-IV only D. Science--A Process Approach Parts I-VI only E. Science--A Process Approach Parts I-VII 12. The SCIS materials that will be commercially available for 1968-69 are: A. Interaction, Life Cycles, Material Objects, Organism, Relativity, and Subsystems B. Interaction, Material Objects, Organisms, Relativity, and Subsystems C. Interaction, Material Objects, Organisms, and Subsystems D. Interaction, Material Objects, Organisms E. None of the above are correct 13. The AAAS evaluation instruments that will be commercially available for 1968-69 are: A. The "Process Instrument" B. The "Competency Measures" for all grades covered by Science--A Process Approach C. Both the "Process Instrument" and the "Competency Measures" D. No evaluation instrument will be commercially available 14. The SCIS evaluation instruments that will be commercially available for 1968-69 are: A. The "Process Instrument" B. STEP C. The "Content Instrument" D. The "Materials and Interaction" instrument E. No evaluation instrument will be commercially available

	Number
15.	The primary evaluation emphasis of SCIS has been
	on:
	A. Comparing students who have had SCIS with those who have not
	B. A definitive measure of the scientific literacy of the pupils emerging from SCIS courses
	C. Evaluating the program by collecting feedback information from teachers and Trial Center Coordinators
16.	AAAS materials that will be available for teacher workshops in 1968-69 include:
	<ul> <li>A. "Commentary for Teachers"</li> <li>B. "Guide for the Instructor of a Teacher Education Program"</li> </ul>
	C. Both A and B D. None
17.	SCIS materials that will be available for teacher workshop in 1968-69 include:
	<ul> <li>A. SCIS Developmental Skill Commentary</li> <li>B. "SCIS Sourcebook"</li> <li>C. Both A and B</li> <li>D. None</li> </ul>
<u>    1</u> 8.	The major psychological influence on the AAAS program?
	A. Bruner
	C. Piaget
	E. Thorndike
19.	The major psychological influence on the SCIS
	program:
	A. Bruner B. Gagne
	C. Piaget D. Skinner

E. Thorndike

- 20. Piaget's ideas of development have influenced both AAAS and SCIS. Which statement(s) best illustrate this school of thought?
  - A. Development is limited to external situations, and is thereby provoked.
  - B. Children's intellectual capacity passes through a number of qualitatively contrasting stages before adulthood.
  - C. A child's interaction with his environment plays a very significant role in his transition from one stage to another.
  - D. A child can learn any subject matter at any stage of his development.
  - E. Combination of A and B
  - F. Combination of B and C
  - G. Combination of B and D-
- \_21. The AAAS curriculum makes use of hierarchy charts. Which of the following statements about them is most accurate?
  - A. They illustrate the types of skills considered, and the relationships among skills within one process and among the several processes.
  - B. They only illustrate the types of skills considered, and the relationships among skills within one process.
  - C. They only illustrate the types of skills considered in flow chart form.
- 22-23 In comparing AAAS and SCIS approaches to the integration of their curricula, one can find significant differences in emphasis in the three elements: concepts, phenomena, and processes.
  - 22. AAAS is structured on
    - A. Concepts
    - B. Concepts and Phenomena
    - C. Concepts and Processes
    - D. Phenomena
    - E. Processes
  - 23. SCIS is structured on
    - A. Concepts
    - B. Concepts and Phenomena
    - C. Concepts and Processes
    - D. Phenomena
    - E. Processes

- 24. The relative importance of sequencing in the SCIS and AAAS programs:
  - A. Important only in AAAS
  - B. Important only in SCIS
  - C. Important in both
  - D. None are sequenced
- 25. The relative amount of quantitative science incorporated in the SCIS and AAAS programs:
  - A. More quantitative science in SCIS than AAAS
  - B. More quantitative science in AAAS than SCIS
  - C. Both have about the same amount of quantitative science
  - D. Little or no quantitative science incorporated in either program
- 26. The primary objective of each of the exercises in the AAAS curriculum is:
  - A. to gain a better understanding of a science principle
  - B. to gain scientific literacy
  - C. to teach one or more of the processes of science
  - D. the development of competent scientists
  - E. None of the above correct
  - 27. The primary purpose of the SCIS curriculum is:
    - A. the development of competent scientists
    - B. to develop more meaningful science materials for children
    - C. the development of specified process skills
    - D. the development of scientific literacy
    - E. None of the above
- 28.

1.

- 28. By "invention" lesson in SCIS, we mean:
  - A. the children recognize a scientific principle when presented with various examples of a concept
  - B. the children create new solutions to problems
  - C. the teacher introduces the science concept
  - that describes what the children have observed D. None of the above are correct

- 29. In the "discovery" lesson in SCIS:
  - A. experiences are provided that present further examples of a previously described concept
  - B. materials are provided whereby children can arrive at a scientific principle without teacher prompting
  - C. students study the history of famous scientific discoveries
  - D. None of the above are correct
- 30. The average amount of time required to teach each of the AAAS units (e.g., part A) in the elementary schools is about:
  - A. 11-12 months
  - B. 8-10 months
  - C. 5-7 months
  - D. 3-5 months
  - E. 1-2 months
  - \_\_\_\_31. The average amount of time required to teach each of the SCIS units (e.g., Organisms) in the elementary schools is about:
    - A. 11-12 months
    - B. 8-10 months
    - C. 6-7 months
    - D. 3-5 months
    - E. 1-2 months
- 32. The title of the first unit commonly used in SCIS is:
  - A. Interaction
  - B. Material Objects
  - C. Organisms
  - D. Subsystems
  - E. Temperature
  - \_\_\_\_33. The primary emphasis of Part A of the AAAS curriculum is:
    - A. Classifying
    - B. Measuring
    - C. Observing
    - D. Using space/time relationships
    - E. None of the above are correct

- 34. The process(es) dealt with in Part B of the AAAS curriculum:
  - A. Classifying communicating, measuring, observing, using numbers, and using space/time relationships
  - B. Classifying, communicating, measuring, observing, using numbers
  - C. Classifying, communicating, measuring, observing
  - D. Classifying and observing
  - E. Communicating
- 35. As a "laboratory director" in one of the new elementary science curriculums, you can best make use of the technique of asking questions by:
  - A. using them to find out if they remember what you told them yesterday
  - B. using them in order to allow the children to hunt for a predetermined answer

  - C. using mostly "why" questions D. using mostly "hour" questions
- 36. The approximate amount of preparation time needed for teaching a lesson in SCIS is:
  - A. 0 minutes
  - B. 10 minutes
  - C. 30 minutes
  - D. 45 minutes
  - E. 60 minutes at least
  - 37. The amount of time required for preparing a SCIS lesson as compared to that required for preparing a AAAS lesson:
    - A. SCIS required more time
    - B. AAAS required more time
    - C. Both AAAS and SCIS require about the same time

- \_\_\_\_38. In considering the possibility of teacher selfinstruction as a means of gaining the competency required for teaching the new science programs, which statement 'is most accurate?
  - A. Generally, both SCIS and AAAS teaching competency can be gained by teacher self-instruction
  - B. Generally, neither SCIS nor AAAS teaching competency can be gained by teacher self-instruction
  - C. Generally, only SCIS teaching competency can be gained by teacher self-instruction
  - D. Generally, only AAAS teaching competency can be gained by teacher self-instruction
- \_\_\_\_39. The amount of storage space needed to adequately accommodate the AAAS materials for a class of 30 students is:
  - A. five cubic feet
  - B. ten cubic feet
  - C. twenty cubic feet,
  - D. forty cubic feet
- 40. The minimum amount of storage space needed to adequately accommodate the SCIS materials for a classroom of 30 students is:
  - A. five cubic feet
  - B. ten cubic feet
  - C. twenty cubic feet
  - D. forty cubic feet
- 41. What is the intensity of the problems that a third-grade transfer student might encounter upon entering either SCIS or AAAS from some other program?
  - A. Could easily adapt to both SCIS or AAAS
  - B. Could adapt more easily to SCIS than to AAAS
  - C. Could adapt more easily to AAAS than to SCIS
  - D. Would find many adaptation problems in a similar amount in both AAAS and SCIS

- 42. The distribution of content in the AAAS program is approximately;
  - A. Life Sciences 50% Physical Sciences 25% Mathematics 10%
  - B. Life Sciences 25% Physical Sciences 25% Mathematics 10% Other 40%
  - C. Life Sciences 25% Physical Sciences 40% Mathematics 20% Other 15%
  - D. Life Sciences 10% Physical Sciences 75% Other 15%
  - \_\_\_\_43. How do SCIS and AAAS lend themselves to local integration with existing curricula?
    - A. Content and methods can easily be adapted from both SCIS and AAAS
    - B. Content and methods can easily be adapted from SCIS but not from AAAS
    - C. Content and methods can easily be adapted from AAAS but not from SCIS
    - D. Content and methods cannot be easily adapted from either SCIS or AAAS
    - 44. The main purpose of using Mr. O in SCIS is:
      - A. to aid in identifying similarities and differences among animals outside the classroom
      - B. to enable the students to describe properties of an entire organism
      - C. to experiment with, to find the origin of detritus
      - D. to act as a reference frame

- \_45. In studying magnetism a child used an electromagnet to attract some paperclips. Which of the following would best describe the "system" under study?
  - A. Child, electromagnet, and paper clips
  - B. Child and electromagnet
  - C. Electromagnet
  - D. Electromagnet and paper clips
- 46. In SCIS, the purpose for the activity in which the children compare similarly shaped pieces of aluminum, brass, pine, walnut, plexiglass, and polystyrene is:
  - A. to lead to the introduction of the concept of material
  - B. for the identification and naming of two or more characteristics of an object (such as color and texture)
  - C. for the construction and demonstration of the use of a single-stage system for classifying materials
  - D. to gain a better understanding of the concept of inequalities
- 47. In SCIS the investigation of freon was used as a study of a(n)
  - A. material object
  - B. using space/time relationship
  - C. measurement
  - D. subsystem
  - E. system
- 48. In SCIS the "systems" concept is introduced for what primary reason?
  - A. So that the student can better identify differences within a set of similar objects
  - B. So that the student can better identify body movements other than those of locomotion
  - C. So that the student can learn to focus his attention on parts of his environment
  - D. To emphasize the principle of conservation of matter as a conceptual tool for dealing with all natural phenomena

- \_\_\_\_\_49. The measurements, of the earth's magnetism and the relationship of this to map reading is encountered in:
  - 'A. SCIS only
  - B. AAAS only
  - C. Both SCIS and AAAS
  - D. Neither SCIS nor AAAS
- 50. The ordering of clam shells by property, using comparison signs, is encountered in:
  - A. SCIS only
  - B. AAAS only
  - C. Both SCIS and AAAS
  - D. Neither SCIS nor AAAS
  - \_\_\_\_51. The best operational definition of the term "mass" is:
    - A. quantity of matter
    - B. the size of an object whether it is in space or on earth
    - C. that property of an object which determines the amount of acceleration that will be imparted to it by a force of a given magnitude
    - D. that quantity of matter that when acted upon by a force will not change its velocity
  - 52. The use of "models" is found in:
    - A. AAAS only
    - B. SCIS only
    - C. Both SCIS and AAAS
    - D. Neither one
  - 53. The relative amount of reading the fourth grade student is required to do in SCIS, AAAS, and ESS would be:
    - A. more reading in ESS than in SCIS or AAAS
    - B. more reading in SCIS and AAAS than in ESS
    - C. about the same amount of reading in all three programs

- 54. The case of the "suffocating candle" was used in AAAS to illustrate what process?
  - A. Observing
  - B. Classifying
  - C. Measuring
  - D. Communicating
  - E. Inferring
  - F. Predicting
  - G. None of the above
- \_\_\_\_55. Where are we most likely to encounter such a drawing?
  - A. AAAS Observation
  - B. AAAS Using space/time relationships
  - C. SCIS Subsystems
  - D. SCIS Relativity





- \_56. The objective most closely associated with this laboratory setup in one of the new elementary science programs is:
  - A. State that if an object does not move, the forces acting upon it must be in balance
  - B. Identify the two-dimensional projections of a given three-dimensional object
  - C. Describe the positions of objects or systems
  - D. Isolate and manipulate groups of objects





- 57. The series of pictures above were used in SCIS to illustrate
  - A. Material Objects
  - **B.** Inventiors
  - C. Measurement
  - D. Relativity
  - E. Interaction

Appendix	AKev

Question	Answer	Question	Answer
1	3	29	1
2	2	30	2
3	4	31	4
4	4	32	2
5	2	33	3
6	2	34	1
7	5	35	4
8	4	<b>36</b> ,	3
9	2	37	1
10	1	38	2
11	3	39	2
12	1	40	2
13	3	41	2
14	5	42	3
15	3	.43	4
16	3	44	4
17	2	45	4
18	2.	46	1
19	3	47	. 4
20	6	48	4
21	1	49	2
22	5	50	1
23	2	51	3
24	3	52	3
25	2	53	1
26	3	54	6
27	4	55	4
28	3	56	2
		57	5

APPENDIX C

ATTITUDE TOWARD PROGRAMS INSTRUMENT

### APPENDIX C

## ATTITUDE TOWARD PROGRAMS INSTRUMENT

### RESEARCH INFORMATION QUESTIONNAIRE

The following questions are designed to measure various items in connection with the institute you are attending. Their use will be for research purposes only, and the results are not intended as a check on your performance during the institute.

On the following pages you will identify yourself by a number that you will be able to remember throughout the conference, as you will have occasion to use the number again in future testing. We suggest that you use your telephone number, since it can readily come to mind if you need it. This cover sheet with your name and the number you have chosen will be torn off and filed for future reference, if needed. The results of this questionnaire will be calculated by number only.

When answering the questions, pick the answer that best fits or best describes your feeling. BE SURE TO ANSWER ALL QUESTIONS.

NAME

NUMBER CHOSEN

(Be sure to put this number in the blank at the top of every page) We are interested in your opinions on the following statements. Below each statement are seven blanks that correspond to various shades of agreement and disagreement. Check the blank that most closely corresponds to your own feeling as you read that statement.

The following is an example of how to answer the questions:

1. Cigarette smoking is harmful to a person's health.

verystronglymoderatelynomoderatelystronglystronglydisagreedisagreeopinionagreeagreedisagreeagreeagreeagree

If you very strongly agree with the statement, you should place an X in the blank labelled "very strongly agree" and your answer should look like this:

very strongly disagree	strongly disagree	moderately disagree	no opinion	moderately agree	strongly agree	very strongly agree
------------------------------	----------------------	------------------------	---------------	---------------------	-------------------	---------------------------

Y

If you moderately disagree with the statement, you should place an X in the blank labelled "moderately disagree" and your answer should look like this:

very strongly	strongly disagree	X moderately disagree	no opinion	moderately agree	strongly agree	very strongly
disagree	5		-		•	agree

CHECK ONLY ONE BLANK FOR EACH QUESTION: ANSWER ALL QUESTIONS.
NUMBER

1. As a taxpayer, I can justify the costs of SCIS being put into the schools because of the gains that will result from the use of these programs.

 VERY
 STRONGLY
 MODERATELY
 NO
 MODERATELY
 STRONGLY
 VERY

 STRONGLY
 DISAGREE
 DISAGREE
 OPINION
 AGREE
 AGREE
 AGREE

 DISAGREE
 DISAGREE
 OPINION
 AGREE
 AGREE
 AGREE

2. As a taxpayer, I can justify the costs of AAAS being put into the schools because of the gains that will result from the use of these programs.

VERY STRONGLY MODERATELY NO MODERATELY STRONGLY VERY STRONGLY DISAGREE DISAGREE OPINION AGREE AGREE STRONGLY DISAGREE AGREE AGREE AGREE AGREE

3. I would recommend SCIS to the schools my children attend (or did attend, or will attend).

VERY STRONGLY MODERATELY NO MODERATELY STRONGLY VERY STRONGLY DISAGREE DISAGREE OPINION AGREE AGREE STRONGLY DISAGREE AGREE AGREE

4. I would recommend AAAS to the schools my children attend (or did attend, or will attend).

VERY STRONGLY MODERATELY NO MODERATELY STRONGLY VERY STRONGLY DISAGREE DISAGREE OPINION AGREE AGREE STRONGLY DISAGREE AGREE AGREE

5. If I had the opportunity to redesign the elementary school curriculum, I would include SCIS in the curriculum.

 VERY
 STRONGLY
 MODERATELY
 NO
 MODERATELY
 STRONGLY
 VERY

 STRONGLY
 DISAGREE
 DISAGREE
 OPINION
 AGREE
 AGREE
 STRONGLY

 DISAGREE
 DISAGREE
 OPINION
 AGREE
 AGREE
 AGREE

6. If I had the opportunity to redesign the elementary school curriculum, I would include AAAS in the curriculum.

VERY	STRONGLY	MODERATELY	NO	MODERATELY	STRONGLY	VERY
STRONGLY	DISAGREE	DISAGREE	OPINION	AGREE	AGREE	STRONGLY
DISAGREE						AGREE

NUMBER

7. The de-emphasis of the teacher as the primary information source of science is a good part of the SCIS science project.

 VERY
 STRONGLY
 MODERATELY
 NO
 MODERATELY
 STRONGLY
 VERY

 STRONGLY
 DISAGREE
 DISAGREE
 OPINION
 AGREE
 AGREE
 STRONGLY

 DISAGREE
 DISAGREE
 OPINION
 AGREE
 AGREE
 AGREE

8. The de-emphasis of the teacher as the primary information source of science is a good aspect of AAAS.

 VERY
 STRONGLY
 MODERATELY
 NO
 MODERATELY
 STRONGLY
 VERY

 STRONGLY
 DISAGREE
 DISAGREE
 OPINION
 AGREE
 AGREE
 STRONGLY

 DISAGREE
 DISAGREE
 OPINION
 AGREE
 AGREE
 AGREE

9. The fact that many traditional concepts are excluded by SCIS is a detraction from that program's quality.

VERY STRONGLY MODERATELY NO MODERATELY STRONGLY VERY STRONGLY DISAGREE DISAGREE OPINION AGREE AGREE STRONGLY DISAGREE AGREE AGREE AGREE

10. The fact that many traditional concepts are excluded by AAAS is a detraction from that program's quality.

 VERY
 STRONGLY
 MODERATELY
 NO
 MODERATELY
 STRONGLY
 VERY

 STRONGLY
 DISAGREE
 DISAGREE
 OPINION
 AGREE
 AGREE
 STRONGLY

 DISAGREE
 DISAGREE
 OPINION
 AGREE
 AGREE
 AGREE

11. Teachers should be able to make the transition from teaching traditional science programs to the teaching of SCIS with little or no difficulty.

VERY STRONGLY MODERATELY NO MODERATELY STRONGLY VERY STRONGLY DISAGREE DISAGREE OPINION AGREE AGREE STRONGLY DISAGREE AGREE AGREE AGREE

12. Teachers should be able to make the transition from teaching traditional science programs to the teaching of AAAS with little or no difficulty.

 VERY
 STRONGLY
 MODERATELY
 NO
 MODERATELY
 STRONGLY
 VERY

 STRONGLY
 DISAGREE
 DISAGREE
 OPINION
 AGREE
 AGREE
 AGREE

 DISAGREE
 DISAGREE
 OPINION
 AGREE
 AGREE
 AGREE

NUMBER

13. The learning of scientific concepts such as conservation of energy should be incidental to the learning of the process approach such as classification and serial ordering.

VERY STRONGLY MODERATELY NO MODERATELY STRONGLY VERY STRONGLY DISAGREE DISAGREE OPINION AGREE AGREE STRONGLY DISAGREE AGREE

14. Scientific concepts appropriate to the age level of the child should receive as much emphasis as the scientific process in the teaching of science.

VERY STRONGLY MODERATELY NO MODERATELY STRONGLY VERY STRONGLY DISAGREE DISAGREE OPINION AGREE AGREE STRONGLY DISAGREE AGREE

15. I would recommend SCIS to most schools.

VERY NO STRONGLY MODERATELY MODERATELY STRONGLY VERY STRONGLY DISAGREE DISAGREE OPINION AGREE AGREE STRONGLY DISAGREE AGREE

16. I would recommend AAAS to most schools.

VERY STRONGLY MODERATELY NO MODERATELY STRONGLY VERY STRONGLY DISAGREE DISAGREE OPINION AGREE AGREE STRONGLY DISAGREE AGREE

17. Which of the two programs do you favor more?

SCIS AAAS

18. Give three concise short reasons for your answer to number 17.

## APPENDIX D

## INDIVIDUAL DATA QUESTIONNAIRE

APPENDIX D

MICHIGAN STATE UNIVERSITY	Interview <u>V</u> S				
RESEARCH QUESTIONAIRE Part. #					
COLLEGE TEACHER WORKSHOP					
MR. R. A. MULLENS					
INDIVIDUAL DATA QUESTIONAIRE					
1. What is the name of an individual you talked to concerning the program?					
2. Were any of the other participants present during this conversation? No YesWho?					
3. How many times have you talked to	this person about the program?				
IF ONE GO TO QUESTION #4; IF	MORE THAN ONE, GO TO QUESTION #7				
4. What was the date of your talk?					
5. How long did your conversation last?					
0-15 min31-45 min. 16-30 min46-60 min.	61-90 min. Over 90 min.				
6 Where did your conversation take place?					
/. What were the approximate dates of	your conversations?				
SHOW DATE AND CONVERSATION ROUBER					
8. Where did your conversations take place?					
9. How long did each conversation last? HARK COHVERSATION # NEXT TO APPROPRIATE TIME?					
-0-15 min. $-31-45$ min.	61-90 min.				
	Uver 30 min.				
10. Hoold you say the conversations were planned or spontaneous?					
11. Who initiated the (1st) conversation?					
l did (GO TO QUESTION #12) Be did (GO TO QUESTION #13)					
IZ. What was your purpose in initiating the conversation?					
والمستحد والمسترك والمستحدين والمحاولين والمحافظات والمترجبات والمعروب والمعروب والمعاوية والمترجبين والمحاوم	المحمد المحمد والمكافر وواد فالمحمد الموجور المحمد المحمد ومعرد المعرد والمحمد				

GO TO QUESTION #15

4. vn 	at was his purpose in s Getting information Setting up an informa	tarting the co	Nersation? Have you followed up on this Yes see inter. #
	Other SPECIFY	worksnop	N No\/hy not?
5. {Ha ;wi	we you had had previous th this person profession	contact onally?	
	YesDescribe briefly	y	an angle ago at the fact and an angle a set and an angle and a set and
 B. \// w1	ich of the following bes th him?	st describes h	nis attitude <u>before</u> your conta
_	Favorable	\!hy?	
-	Unfavorable Extremely Unfavorable Don't Know		
	TO OUESTION #20		· · · · · · · · · · · · · · · · · · ·
GO			

•

Page 3 Part. # Inter. # 1	Page 3 Part. # Inter. # 1-         21. What is his position?         ELENENTARY LEVEL (GO TO QUESTION #25) Teacher Administration SPECIFY Curriculum Super. Other SPECIFY         CONCERNED INDIVIDUAL (GO TO QUESTION #25) 
21. What is his position?         ELEMENTARY LEVEL (GO TO QUESTION #25)	21. What is his position?         ELEMENTARY LEVEL (GO TO QUESTION #25)
CONCERNED INDIVIDUAL (GO TO QUESTION #25) 	CONCERNED INDIVIDUAL (GO TO QUESTION #25)       23. is he a colleague of you
24. Is he utilizing or incorporating any SCIS or AAAS concepts, YesDescribe 	24. Is he utilizing or incorporating any SCIS or AAAS concepts, SCIS or AAAS concepts, GO TO QUESTION #37 25. Is the school system this individual is in, associated with, or con- cerned with using one of the programs? Yes (GO TO QUESTION #26) No (GO TO QUESTION #26) No (GO TO QUESTION #30) Not applicable to this person (END OF QUESTIONAIRE) 26. How long?SPECIFY IN YRS. AND MOS. 27. What grades?
GO TO QUESTION #37 GO TO QUESTION #37 25. Is the school system this individual is in, associated with, or con- cerned with using one of the programs? Yes (GO TO QUESTION #26) No (GO TO QUESTION #26) Not applicable to this person (END OF QUESTIONAIRE) 26. How long? SPECIFY IN YRS. AND MOS. 27. What grades? 28. How was the decision to adopt made? 29. What are the school systems plans for the future? ExpansionDescribe No change Don't Know Reduce or dropIs there anything you can do er are doingg to reverse this?	GO TO QUESTION #37 GO TO QUESTION #37 25. Is the school system this individual is in, associated with, or con- cerned with using one of the programs? Yes (GO TO QUESTION #26) No (GO TO QUESTION #30) Not applicable to this person (END OF QUESTIONAIRE) 26. How long? SPECIFY IN YRS. AND MOS. 27. What grades?
GO TO QUESTION #37 25. Is the school system this individual is in, associated with, or con- cerned with using one of the programs? Yes (GO TO QUESTION #26) Mo (GO TO QUESTION #30) Hot applicable to this person (END OF QUESTIONAIRE) 26. How long?SPECIFY IN YRS. AND MOS. 27. What grades? 28. How was the decision to adopt made? 29. What are the school systems plans for the future? ExpansionDescribe No change Don't Know Reduce or drop the programIs there anything you can do er are doingg to reverse this?	GO TO QUESTION #37 25. Is the school system this individual is in, associated with, or con- cerned with using one of the programs? Yes (GO TO QUESTION #26) No (GO TO QUESTION #30) Not applicable to this person (END OF QUESTIONAIRE) 26. How long?SPECIFY IN YRS. AND MOS. 27. What grades?
25. Is the school system this individual is in, associated with, or concerned with using one of the programs? Yes (GO TO QUESTION #26) No (GO TO QUESTION #30) Not applicable to this person (END OF QUESTIONAIRE) 26. How long? SPECIFY IN YRS. AND MOS. 27. What grades? 28. How was the decision to adopt made? 29. What are the school systems plans for the future? ExpansionDescribe No change Don't Know Reduce or drop the programIs there anything you can do er are doingg to reverse this?	<ul> <li>25. Is the school system this individual is in, associated with, or concerned with using one of the programs? <ul> <li>Yes (GO TO QUESTION #26)</li> <li>No (GO TO QUESTION #30)</li> <li>Not applicable to this person (END OF QUESTIONAIRE)</li> </ul> </li> <li>26. How long?SPECIFY IN YRS. AND MOS.</li> <li>27. What grades?</li> </ul>
26. How long?SPECIFY IN YRS. AND MOS. 27. What grades? 28. How was the decision to adopt made? 29. What are the school systems plans for the future? ExpansionDescribe No change Don't Know Reduce or drop the programIs there anything you can do er are doing to reverse this?	26. How long?SPECIFY IN YRS. AND MOS. 27. What grades?
27. What grades? 28. How was the decision to adopt made? 29. What are the school systems plans for the future? ExpansionDescribe No change Don't Know Reduce or drop the programIs there anything you can do er are doing to	27. What grades?
28. How was the decision to adopt made?   29. What are the school systems plans for the future?   ExpansionDescribe   No change   Don't Know   Reduce or drop   the programIs there anything you can do er are doing to   reverse this?	
29. What are the school systems plans for the future? 	28. How was the decision to adopt made?
Reduce or drop the programIs there anything you can do er are doingg to reverse this?	29. What are the school systems plans for the future? ExpansionDescribe No change
reverse this?	Reduce or drop
reverse this?	the programis there anything you can do er are dongg to
	reverse this?

GO TO QUESTION #35

		Page 4 Part. #
30	Had the opheral suctors made	Inter. # <u>1-</u>
50.	decision to adopt or rejec	or were they activity considering the the program?
	Considering or committee	ed to adoption (GO TO QUESTION #31)
	Committed to reject (	
31.	When is the committment or	consideration for?
32.	What grades?	How was the decision made?
	GO TO QUE	STION #35
33.	Mhy?	
34.	is there anything you can	do or are doing to change this?
35.	Which of the following desc	cribes the administration's attitude toward
	Extremely Favorable	
	Favorable	Why?
	Neutral	
	linfavorable	
	Extremely Unfavorable-	
36.	Which of the following desi	cribes the teachers' attitude toward the
JU.	nrogram?	
•	Extremely Envershie	
	ravorable	
	Neutral	
	Unfavorable	
	Extremely Unfavorable-	ع ط ت <sup>1</sup> 
	Don't Know	
27	Have you talked to any oth	ar individuals or groups who are associated
<i></i>	with this parson?	
	Ver sizes there	inter #
	165Itame .	
	Name	Inter. #
	Name	Inter. 🖡
	No	
38	Do you alan on working with	n other individuals or groups who are
<i></i> ,	associated with this person Yes No	n?
		NHALPE . ASK HADE THERE ANY ATHED INCLUDING &

APPENDIX E

GROUP DATA QUESTIONNAIRE

	MICHIGAN STATE UNIVERSITY	Interview <u>W</u> S		
]	RESEARCH QUESTIONNAIRE	Part. #		
	COLLEGE TEACHER WORKSHOP DR. R. J. MCLEOD MR. R. A. MULLENS GROUP DATA	Interview # <u>G-</u>		
1.	What is the mame and a brief description	of a group you have worked		
	with on either SCIS or AAAS?			
2.	Who is the chairman or head of the group?			
3.	3. Briefly, can you tell me what school system this group is associated			
	with, concerned with, or in?			
4.	is the school system using one of the pro	grams?		
	Yesls this a trial or comple	te adoption? (GO TO #5		
	No (GO TO QUESTION #9)			
5.	How long have they been using it?	SPECIFY IN YRS. OR MOS.		
6.	What grades?			
7.	How was the decision to adopt made?			
8.	What are the school system's plans for theExpansionDescribe	e future?		
	No change			
	Don't Know			
	Reduce or drop the programIs the or are	re anything that you can do doing to reverse this?		
	GO TO QUESTION #	14		

- 9. Had the school system made or were they actively considering the decision to adopt or reject the program?
  - \_\_\_\_\_Considering or committed to adoption (GO TO QUESTION #10) \_\_\_\_\_Committment to rejection (GO TO QUESTION #12)

	Page 2
	Part. #
	Interview # G
10.	When is the committment or consideration for?
11.	What grades?
	GO TO QUESTION #14
<u></u> }2.	Why?
13.	Is there anything you can do or are doing to change this?
14.	Which of the following best describes the administration's attitude
	toward the program?
	Extremely Favorable Favorable Neutral Unfavorable
<b>15.</b>	Which of the following best describes the teacher's attitude toward the program? Extremely Favorable Favorable Neutral Unfavorable
16.	Which of the following best describes the number of people in the group who knew something about the program before your presentation? None SomeWhere did they learn about it? Majority Almost All
	All All All All All All All All

136

	Page 3 Part. # Interview # <u>G</u>
17.	Does this group have a role in the decision-making process?
18.	Have you worked with this group before? Yes (GO TO QUESTION #19) No (GO TO QUESTION #21)
19.	In what capacity did you work with this group before?
20.	What, specifically did you do with them?
21.	Who initiated the meeting? I did (GO TO QUESTION #22) They did (GO TO QUESTION #24)
22.	How did you learn about the group?
23.	Why did you seek out this group to work with them on this program?
	GO TO QUESTION #26
24.	Was this a specific request for you?YesHow did they know that you knew about that you knew about the program?
25.	What was their purpose in contacting you? Information only Set up workshop other SPECIFY
26.	Did any of the other participants work with you on this group? Yes\/ho? Ho

Page 4 Part. # Inter. # <u>G-</u>

- 27. How many times did you or will you have worked with this group on the program IF ONE GO TO QUESTION #28, IF MORE THAN ONE GO TO QUESTION #36, IF CONSECUTIVE DAYS, E.G. WORKSHOP, GO TO QUESTION #36.
- 28. What was the approximate attendance at the meeting? \_\_\_\_\_0-10 \_\_\_\_\_16-30 \_\_\_\_51 and over \_\_\_\_\_11-15 \_\_\_\_31-50

29. What was the date of the meeting?

 30. How long did the meeting last?

 0 - 1/2 Hr.
 1/2 - 2 Hr.

 1/2 - 1 Hr.
 2 - 2 1/2 Hr.

 1/2 - 1 Hr.
 2 - 2 1/2 Hr.

 1 - 1 1/2 Hr.
 2 1/2 - 3 Hr.

 All Day

(IF ON DIVIDING LINE PUT IN LOWER BRACKET)

31. Would you characterize your presentation as Planned or Spontaneous

32. What was the purpose of your presentation? Overview of science programs Training in SCIS Overview of SCIS & AAAS Training in AAAS Overview of SCIS Other--SPECIFY Overview of AAAS

33. Which of the following did you include in your presentation?

Lecture Demonstration Lesson----Did you use children? Yes No Discussion What lesson did you use? Question/Answer Other -LIST What was the reaction of the children? What was the reaction of the observers? 34. Which was the most effective type of presentation?

Why?

		Page 5 Part # Inter. <b>#</b> <u>G</u>
35.	Which of the following best the program after your prese Extremely Favorable Favorable Neutral Unfavorable Extremely Unfavorable Don't Know	describes their attitude to entation? Why?
36.	What was the average attends 0-1016-30 11-1531-50	ance? Over 50
37.	What was/is the approximate	date of each presentation?
38.	How long did each presentat: $\begin{array}{c} 0 & -1/2 \text{ Hr.} \\ 1/2 & -1 \text{ Hr.} \\ 1/2 & -1 \text{ Hr.} \\ 1 & -1 1/2 \text{ Hr.} \\ 1 & -2 \text{ I} \\ 1 & -2  I$	ion last? /2 - 2 Hr. $3 - 3 1/2$ Hr. 2 1/2 Hr. $3 1/2 - 4$ Hr. /2 - 3 Hr. All Day LOWER BRACKET: MARK WITH MEETING
39.	What was the purpose of you Overview of science pro Overview of SCIS & AAAS Overview of SCIS Overview of AAAS	r presentations? gramsTraining in SCIS Training in AAAS OtherSPECIFY
40.	Which of the following did tations?	you include in your presen-
	Lecture Demonstration Lesson Discussion Question/Answer Other LIST	Did you use childrenYes No What lesson did you use?
		Describe the reaction of the children.
		What was the reaction of the observers?

		Page 6 Part # Inter. # <u>G-</u>
41.	Which was the most effectiv	ve type of presentation?
	Why?	
42.	Which of the following best toward the program <u>after</u> est PRESENTATION # 	t describes their attitude ach presentation? MARK WITH why?
43.	Are any members of the group result of your working with	up using the materials as a n them? <u>No Yes</u> How? 
44.	Do you plan on working with YesHow many times? NoWhy not?	
45.	Have you worked with other system?	individuals or group in this
	YesName	Interview #
	Name	Interview #
	Name	Interview #
46.	Do you plan on working with in this system? Yes No	n other individuals or groups
	END OF QUESTI	ONNAIRE. SAY, "ARE THERE ANY
	OTHER GROUPS	YOU HAVE BEEN WORKING WITH?"

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