This is to certify that the

dissertation entitled

A Study Of The Relationship Between Faculty Innovators' Perceptions of Departmental Support And Adoption of Instructional Innovations

presented by

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has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Educational Systems Development

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Date November 11, 1987

A STUDY OF THE RELATIONSHIP BETWEEN FACULTY INNOVATORS' PERCEPTIONS OF DEPARTMENTAL SUPPORT AND ADOPTION OF INSTRUCTIONAL INNOVATIONS

By

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A DISSERTATION

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

DOCTOR OF PHILOSOPHY

Department of Counseling, Educational
Psychology and Special Education
(Educational Systems Development)
College of Education

1987

ABSTRACT

A STUDY OF THE RELATIONSHIP BETWEEN FACULTY INNOVATORS' PERCEPTIONS OF DEPARTMENTAL SUPPORT AND ADOPTION OF INSTRUCTIONAL INNOVATIONS

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The purpose of this study was to find out if there is any relationship between faculty innovators' perceptions of departmental support and adoption (production and use) of instructional innovations at Michigan State University.

The study employed the cross-sectional survey method. The population for this study consisted of all faculty innovators, who developed and used, on a voluntary basis, instructional innovations in their departments during the period of 1975-1979 at Michigan State University. A sample of 65 faculty innovators was drawn by using a simple random sampling technique. Since no standardized instrument for data collection was available, a questionnaire was designed, developed and validated. Copies of the final survey were mailed to the respondents. The data analysis was done on the basis of 52 completed questionnaires. To analyze the data, partial correlation, Pearson's product-moment correlation, zero-order correlation, analysis of variance, frequencies and percentages were used.

Eight null hypotheses were generated to answer the general research question:

> As perceived by faculty innovators, is departmental support related with the degree of

their willingness to develop and adopt instructional innovations at Michigan State University?.

The independent variable of this study was departmental support, which was divided into six types of support, namely, financial, policy, technical, office, colleagues' and chairman's support; and the dependent variable was adoption (willingness to develop and use) of instructional innovations.

Major findings of the study indicate that the respondents did not perceive a significant relationship between financial support and adoption, policy support and adoption, technical support and adoption, and chairman's support and adoption. However they did perceive a significant relationship between office support and adoption, and colleagues' support and adoption. The general conclusion drawn from the findings of this study is that departmental support is not effective in influencing innovation-adoption behaviors of faculty members, especially when they are highly motivated for change. These faculty members usually take their own initiatives to experiment and try new ideas to improve their existing condition.

The findings of this study bring to the fore an important point for those involved in the task of bringing about change or speeding up the process of innovation-adoption,that is, that there are different categories of adopters who differ with regard to their perceptions

and innovation-adoption behaviors. As a result, appropriate strategies need to be considered before making an attempt to influence innovation-adoption behaviors of members of any group or organization.

DEDICATED TO

Human Curiosity To Know The Unknown

ACKNOWLEDGEMENTS

I would like to take this opportunity to express my thanks to Dr. Castelle G. Gentry, my guidance committee chairman and dissertation advisor for his professional help, encouragement and cooperation throughout the planning, writing and preparation of this dissertation. Dr. Gentry's superb advisory and management skills combined with his friendly treatment motivated me to complete this long pending project within a short period of time.

Thanks are also extended to the members of my advisory committee-- Professor Wilfred Veenendaal, Drs. Ben A. Bohnhorst and Jack M. Bain for their encouragement, cooperation, suggestions and expressions of confidence in me during all phases of my doctoral program.

Thanks are also due to Dr. Fred Ignatovich for his comments with regard to my dissertation proposal, and Dr. James L. Page, former chairman of my guidance committee for his continued support, cooperation and encouragement.

I would also like to express my appreciation to Fernanda Verillo for her patience and cooperation in typing the draft as well as the final copy of this dissertation.

Finally, I would like to thank my wife, Sufia; my son, Shafqat, and also other members of my family for their sacrifice, patience, and support which inspired and motivated me to complete this study.

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CHAPTER I

INTRODUCTION

This research study was designed to determine the relationship between departmental support and adoption (willingness to develop and use) of instructional innovations at Michigan State University.

The present chapter provides an introduction to the purpose of the study, elaborates the research problem, discusses the need for the study with special reference to the field of Educational Technology, and brings to the fore the theoretical framework on which this study is based. In addition, it presents the hypotheses to be tested in their theoretical form, and points out the limitations of this study.

The problem

The urgency to improve the quality of education triggered by the launching of the Soviet Sputnik 1 in October 1957 (Brickell, 1961; Johnson, 1963; and Cass, 1964) combined with the pressure from increasing enrollments in educational institutions (Miles, 1964) prompted the need for production and adoption of educational innovations. As a result, over the past several decades a huge investment was

made in terms of money, energy and time to speed up the process of production and adoption of innovations in educational settings. But all these investments could not produce the desired impact. This fact has been very eloquently expressed by Baldridge (1974) in the following words:

> Over the past several decades there has been an enormous amount of research on social innovations and their adoption by organizations. Much of this research has been done in the field of education, and millions of dollars have been poured into developing new curricula, new organizational structures, and new educational technologies. The federal government has spent huge sums of money on educational innovations, especially as reflected in the growth of a nationwide system of educational research and development centers and laboratories. In the early sixties the excitement and fervor about innovation in the educational world spurred hopes for revolutionizing the educational process. Now, in the middle seventies, a deep disillusionment has set in about these educational processes, the chance for reform and the hope that serious transformation will actually occur.
>
> We are presently confronted with the problem that neither the time, nor money expended on innovative educational practices have produced the desired impact.

Using economics terminology Bell (1973) expresses a similar observation. He says that like many types of service organizations, institutions of higher education lag behind most other sectors of the economy in their capacity to improve productivity. One of the reasons for this lag is the fact that colleges and universities are seldom willing to embrace instructional innovations that might increase their efficiency (Carnegie Commission in Higher Education, 1973).

The mid-1970s onwards a number of different forces have been making the improvement of instructions in institutions of higher education more difficult (Berquist and Phillips, 1975; Brown and Hanger, 1975, and Gaff, 1975). While funds for improving instructions have been declining, the demands for accountability and improved curriculum have been on increase.

The slow pace of adoption of innovations, declining funds and increasing demands for accountability and improved curricula in educational institutions bring to the fore the crucial need for better understanding of the process of innovation as a whole. Berquist and Phillips (1975) advocate for a comprehensive approach to deal with these problems. This comprehensive approach would involve the faculty, the instructions, and the organization simultaneously. The need for better understanding of the process of innovation in education is also stressed by David, et al (1982):

> Institutions of higher education must employ innovations or the quality of their programs will probably suffer in the coming decades. If we assume that real resources available for higher education in this and other countries will continue to decline as they have in recent years, then those who have an interest in maintaining the quality of education must develop a better understanding of the innovation process and of the specific behaviors and events in organizations that discourage or encourage the production and adoption of innovations.

The paucity of understanding of the innovation process has been responsible for the lack of well developed theories of innovations, which could help solve problems of change. In spite of hundreds of research articles and studies there

still seems to be a paucity of understanding about the basic diffusion and implementation process (Baldridge, 1974). Baldridge further elaborates by saying that "there is a shortage of usable information for the practical administrator who wants to incorporate innovation into his organization, and who needs to build a flexible, adoptive system that can search for creative solutions to its problems."

This study, therefore, is an attempt to address a small portion of the problem of the paucity of understanding of the educational innovation process, which involves a number of variables whose inter-relationship is essential to cause educational innovations. The findings of this study will, therefore, contribute toward forming a small link in the long chain of efforts to develop well developed theories or comprehensive models of the innovation process with special reference to settings in higher education.

The purpose of the Study

The primary purpose of this study will be an attempt to find out if there is any relationship between the level of departmental support (e.g. funds, graduate and secretarial assistance, supplies, equipment, space, release time, technical and consulting services), and the degree of adoption of instructional innovations by faculty innovators at Michigan State University. For definitions and

subdimensions of independent and dependent variables please see pages 7-8 & 64.

Besides, the study will also investigate the life span and stability of the instructional innovations (projects) and their relationship to departmental support. Life span and stability of the innovations will be considered in terms of their continuation and/or discontinuation, and also in terms of levels of adoption--high/medium/low adoption by innovators.

This study will, therefore, not concern itself with the study of relationships between departmental resources and the diffusion of instructional innovations. The stage of diffusion usually occurs after the adoption of an innovation by an innovator, or after the introduction of an innovation by a change agent into a given system.

Significance of the Study

This study is significant from the point of setting. Most of the earlier studies are related to settings other than education; and those related to education had confined themselves to public schools. Therefore, this study by focusing on this problem in a large university setting (M.S.U.) distinguishes itself from earlier studies.

Another unique feature of this study is that it will examine the relationship between departmental support and the degree of adoption of instructional innovations with regard to innovators who are a highly motivated group

compared to other types or groups of adopters, namely, early adopters, early majority, late majority and laggards. However, it should be noted that in order to achieve symmetry in their classification scheme of adopters (1971), Rogers and Shoemaker suggest to combine innovators and early adopters into one category. This blurs the distinction between innovators and early adopters.

Besides, the findings of this study will help university departments as well as Educational Development Agencies operating in settings of higher education to decide appropriate approaches and strategies to be followed in offering assistance and support to individual faculty innovators to develop and use instructional innovations within the framework of their departments.

Also its findings will be helpful in testing a part of Davis' (1979) model entitled "A Behavioral Change Model with Implications for Faculty Development." And finally this study will be an added effort in the research area of adoption of innovations.

Selection of Setting

The rationale behind selecting Michigan State University as a setting for the study is quite obvious. It should be noted that it was in 1963 that the Educational Development Program (EDP) was started at Michigan State University and the University of Michigan as the pioneer programs for instructional improvements in a systematic

manner. Since 1963 the EDP, MSU has helped scores of faculty members in various departments to design, develop and implement instructional innovation to improve their instructions. Thus, Michigan State University provides opportunities to have access to the kind of data needed for this study.

Definitions and Descriptions of Terms

Innovation: Innovation means an idea, practice, or object perceived as new by an individual (Rogers, 1971), or any change which represents something new to the people being changed (Havelock, 1973).

Innovator: An innovator refers to a social unit which takes voluntary initiatives to develop and use an innovation in a given system or sub-system. For the purpose of this study innovators refers to the Educational Development Program (EDP) project directors or faculty members who voluntarily conducted EDP projects with a view to improving their teaching processes and environments (Sachs, 1976). The only projects or instructional innovations selected and supported by the EDP were those that met its test for "innovativeness" within a given department (Sachs, 1976).

Instructional innovations. Instructional innovations refer to the EDP projects which were designed and developed for the purpose of improving teaching strategies, methods and materials or for the purpose of improving teaching-learning processes at MSU, for example, SLATEs (Structured

Learning and Teaching Environment), competency-based instructional modules, etc.

Adoption: refers to the reported willingness to develop and use an innovation. For subdimensions of adoption, please see Table 3.1.

Organization: The term organization means a group of people working together, under a given structure, to achieve certain goals. For the purpose of this study "organization" means the departments of Michigan State University.

Organizational Support: Organizational or departmental support refers to the financial, policy, technical and office support. Also it refers to support from the colleagues and the chairman of the department. Departmental support, however, does not include support from any sources other than the respective departments of faculty innovators within the framework of Michigan State University. For subdimensions of departmental support, please see Table 3.1.

Theoretical and Conceptual Foundations

There are not as yet well developed theories of innovation in any field and certainly not in education (Meierhenry, 1964). Of course, there have been various attempts in the field of innovation to develop models. But even these models are for the most part either broad generalizations on such a high level that they have little direct value for our understanding of strategies, or they

are very much "micro-oriented" and concerned with specific social factors affected by change (Dalin, 1973). In his review of change models, McClelland (1968) observes:

> It is premature to do more than wish for a general model, let alone a general theory of change and changing. Accordingly, researchers have developed a variety of sub-system models, each of which deals with some aspects of the change process or with some specific settings. Quite understandably they vary widely in comprehensiveness, complexity and elegance.

Havelock, et al. (1971) have identified three broad perspectives, or three schools of thought in relation to the process of innovation:

(1) The Social Interaction Perspective (S-I)

(2) The Research, Development and Diffusion Perspective (RD & D)

(3) The Problem-Solver Perspective (P-S)

It appears from the reports of the Educational Development Program of Michigan State University, that almost all of the instructional innovations initiated in various departments were the results of voluntary efforts by the faculty members called innovators; of course, they took the needed technical support from the EDP or Instructional Media Center, Michigan State University.

Considering the format of voluntary efforts of the innovators to adopt and use new instructional innovations within the framework of their respective departments, the Problem-Solver Perspective or model can provide a better theoretical foundation for the present study.

Referring to the Problem-Solver Perspective Havelock observes:

> "In the Problem-Solver (P-S) Perspective the receiver (an individual or a group) initiates the process of change by sensing a need for change. Once the problem area is identified, the receiver undertakes to alter the situation either through his own efforts, or by recruiting suitable outside assistance. Whereas the receiver in the S-I and RD & D models is passive, the receiver in the P-S model is actively involved in finding an innovation to solve his own problem. Specifically what the new input will be is determined largely by the receiver himself; whether or not this same input could also satisfy the needs of other receivers (i.e., mass diffusion) is not generally considered."

Havelock further adds:

> "Proponents of this school of thought model the process as stages of a cycle typically including the steps of (1) need sensing and articulation, (2) diagnosis and formulation of the need as a problem to be solved, (3) identification and search for resources relevant to the problem, (4) retrieval of potentially feasible solutions and solution-pertinent ideas, (5) translation of this retrieved knowledge into specific solutions or

solution prototypes, (6) behavioral tryout or application of the solution to the need, with evaluation of effectiveness being made in terms of need reduction. Presumably, if the solution does not satisfy the need, the cycle begins again, and continues until, through a series of trials and adaptation efforts, the problem is solved on an adequate and lasting basis.

The problem-solver (P-S) perspective is closely associated with the human relations tradition of planned change and it represents basically a psychological and "user-oriented" approach to problems of D & U (Development and Utilization). In contrast to the more sociological S-I tradition, however, there has been very little solid empirical research based on a P-S approach. This may only be a result of the very recent beginnings of interest, and involvement in the psychological aspects of D & U issues. Nevertheless, there is now a surge of interest evidenced in the establishment of new organizations and units specifically devoted to utilization and in the investment of energies in utilization by such leading human relations specialists as Benne, Lippitt, Miles and Watson. Five very solid points are stressed by P-S

> theorists: (1) that the users world is the only sensible place from which to begin to consider utilization, (2) that knowledge utilization must include a diagnostic phase where user need is considered and translated into a problem statement, (3) that the role of the outsider is primarily to serve as catalyst, collaborator or consultant on how to plan change and bring about this solution, (4) that internal knowledge retrieval and the marshalling of internal resources should be given at least equal emphasis with external retrieval, and (5) that self-initiation by the user or client system creates the best motivational climate for lasting change."

Havelock, on the basis of the three perspectives listed above, has advanced a synthesis, which he has called a "linkage" model. According to Havelock's model (1971), successful innovations depend on the ability of both user groups and resource groups to understand each other and coordinate their behavior for common goals.

A close examination of the P-S model and the linkage model of Havelock indicates that these models are not very specific and clear regarding the various organizational resources. The kinds of organizational resources the P-S model emphasizes are resources of skill and experiences. It does not consider specifically the organizational resources

like funds, services, free-time etc., which are the major concerns of this study.

According to Davis' (1979) model entitled "A Behavioral Change Model with Implications for Faculty Development" there are two sets of variables: individual variables and organizational variables, whose interrelationship is essential to cause instructional innovations within the structures of university departments, mainly relying on the voluntary efforts of the faculty members called innovators.

According to this model the performance of the faculty member related to instructional innovations is directly determined by three broad classes of individual variables:

1. Cognitive dissonance and individual differences among faculty members in levels of achievement motivation which together is called, Energizers of behavior;
2. His Expectations with regard to the outcomes that will result from change, and
3. The change-related skills that the faculty member brings to the situation.

And there are three major classes of organizational variables, which are mediated by the individual variables listed above, and influence the actions of the faculty member indirectly. These are:

1. The Motivators that are used by organization to shape the faculty member's expectations and perceptions,
2. The Role Expectations of the department and institution within which the faculty member operates, and
3. The Resources that are made available by the organization to facilitate change, for example, funds, services, materials, free time, etc.

Research Question

This study attempts to answer the following question: Does departmental support, as perceived by faculty innovators, affect the degree of their adoption (willingness to develop and use) of instructional innovations?

Research Hypotheses

In order to answer the above research question this study formulated the following hypotheses which are listed in theoretical form:

H1: Faculty innovators' perceptions of the degree of financial support from a department will be positively related to the degree of adoption of instructional innovations.

H2: Faculty innovators' perceptions of the degree of policy support from a department will be negatively related to the degree of adoption of instructional innovations.

H3: Faculty innovators' perceptions of the degree of technical support from a department will be positively related with the degree of adoption of instructional innovations.

H4: Faculty innovators' perceptions of the degree of office support from a department will be negatively related with the degree of adoption of instructional innovations.

H5: Faculty innovators' perceptions of the degree of support from colleagues in a department will be negatively related with the degree of adoption of instructional innovations.

H6: Faculty innovators' perceptions of the degree of support from the chairman of a department will be negatively related with the degree of adoption of instructional innovations.

H7: Faculty innovators' perceptions of the degree of the specific supports from a department are related to continuation/discontinuation of instructional innovations.

H8: Faculty innovators' perceptions of the degree of the specific supports from a department will differ with respect to high/medium/low levels of adoption of instructional innovations.

The positive direction predicted in directional hypothesis number 1 was based on the findings of several studies. In the absence of any relevant empirical studies, the directions predicted in directional hypotheses numbers, 2, 3, 4, 5 and 6 were based on personality profiles of innovators (presented in the review of literature section) who are usually highly motivated to experiment and try new ideas to improve their existing conditions with or without support from other sources.

Limitations of the Study

Following are the limitations of this study:

This study is limited in scope and coverage. It is confined to only Michigan State University, and it will cover only those instructional innovations which were

developed and put into practice during the period of 1975-1979. As a result, its findings cannot be applicable in situations other than described in this study.

The study is limited to the measurement of perceptions of faculty members as innovators. According to Rogers, studies done to date on perceptions of innovations and their rate of adoption show some serious weaknesses. The very nature of perceptions being fluid makes the problem of measurement elusive. In order to minimize the gravity of this problem Rogers has suggested that perceptions be gathered at a time close to innovation decision time, prior to adoption. But in this study data were collected after decisions about adoption of innovations.

This study is further limited in scope in the sense that it is impossible to have an exhaustive list of all the subdimensions of variables related with organizational resources. Therefore, this study considers only those subdimensions which are visible and mentioned in research studies, journals, articles, books, etc.

It is worth noting that political variables, usually, play a significant role in the case of adoption-diffusion of innovations in any organization or social unit. This study, however, has not taken into account any variable or set of variables with political overtone.

Needed support for production and use of innovations can be received from or managed through different sources. But it should be noted that this study considers support

only from the respective departments of the respondents within the framework of Michigan State University.

Brief Descriptions of Chapters to Follow

Chapter II provides a review of the literature related with adoption of innovations. Chapter III presents the design of the study, and Chapter IV offers the analysis of data and findings of the study. Chapter V provides a discussion of the findings and offers suspected reasons or explanations for the results obtained. The reason for devoting a separate chapter for this purpose is to keep the data or facts of the study (presented in Chapter IV) separate from biases and interpretations which may arise during the discussion. Chapter VI, as concluding chapter, summarizes the study and presents conclusions, implications and recommendations for further studies or actions.

Summary

This study addresses the problem of paucity of understanding of the innovation process with special reference to settings of higher education. The lack of desired impact in the area of innovation production and adoption inspite of huge investment followed by a gradual decline in funds for innovations, and increasing demands for accountability and improved curricula are some of the factors that create the need for better understanding of the process of innovation. Keeping this in view, the study

attempts to find out if there is a relationship between the level of departmental support and the degree of adoption of instructional innovations by faculty innovators at Michigan State University.

The study is significant from the point of its setting, and the nature of its respondents. By focusing on the adoption of educational innovations in a large university, by concentrating on the highly motivated group of adopters called innovators, and by paying attention to nonstructural organizational resources as independent variables, this study distinguishes itself from earlier ones.

The key terms used in this study have been defined and described for clarity of understanding; and the theoretical and conceptual foundations, on which the study is based, has also been presented in this chapter.

The study has eight main hypotheses, and these hypotheses have been presented in their theoretical form. The study is limited in its scope and coverage, in its measurement of perceptions of respondents in that the measurement is done after a lapse of a considerable period of time, and also in its capacity to have an exhaustive list of all the subdimensions of variables related with departmental support.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

This chapter provides a review of the literature related with the present study. The main objectives of this review are:

(1) To report and review those studies which are similar to the present study, indicating their strengths and weaknesses, and also describing the ways in which their findings might be incorporated or improved with reference to the present study.

(2) To report and review also those studies which have a bearing on the problem under investigation but are not directly related to the topic of this study.

The literature reviewed will not only help illuminate the research problem under investigation, but also help the researchers as well as the readers understand the gradual progress in the field and indicate directions to be considered for future studies. With these aims in view, this chapter will provide the literature review under the following sub-headings:

- Importance of Innovation
- Growth of Innovation Studies

- Major Trends in Innovation Research
- Innovation and Adoption Process
- Factors or Variables Related with Adoption:
  - (1) Individual Variables
  - (2) Innovation Attributes
  - (3) Organizational Variables

Importance of Innovation

We live in a world where everything is changing. This changing nature of our world tempted Heraclitus long ago to remark "you can never step in the same river twice." Due to the changing nature of our world, the topic of innovation has become of crucial importance for effective survival of individuals as well as organizations. As a result, one should not be surprised to find out that the field of innovation has turned into a criss-cross of investigators' efforts from different disciplines: anthropology, sociology, psychology, educational psychology, political science, economics, business, etc.

Growth of Innovation Studies

It is encouraging to note that the volume of literature has grown tremendously over a period of three decades. Havelock (1971) referring to the rate of growth of innovation literature remarks, "In 1954 barely 50 relevant studies appeared in the literature. By 1964 there were nearly 500 annually. Again because of the lag in indexing we

do not have complete data for the years since 1964, but we suspect that the acceleration curve is continuing to rise."

In the past decades there has been a stream of studies on innovation and creativity. But most of these relate to areas other than higher education. There is a very limited amount of research studies in the literature that specifically relate to innovations in settings of higher education (see Reviews of Studies by Rogers and Shoemaker, 1971; and by Havelock, et al, 1971).

The topic of innovation has been studied by investigators from different perspectives. However, there are six approaches usually taken to the study of innovation: (1) products, (2) processes, (3) tasks, (4) persons and (5) environment variables, (6) or the study of some combination of these (Taylor, 1960; Taylor and Barron, 1963).

According to Mohr (1978), throughout the literature, the term innovation has been used to mean either process or a product. Research studies, considering the innovation concept as a process, have focused generally on the behaviors and incidents that occur as some new idea, approach or entity is designed, developed and used by an individual (Rogers and Shoemaker, 1971; Robertson, 1971; and Klonglan and Coward, 1970), or organization (Wilson, 1966; Hage and Aiken, 1970; and Zaltman, Duncan and Holbek, 1973). Research studies, on the other hand, treating the innovation concept as products have generally focused on organizational features and characteristics that are thought to be related

with organizational adoption and use of innovations (Hage and Aiken, 1967; Baldridge and Burnham, 1975; and Moch and Morse, 1977; Rosner, 1968; Mohr, 1969; and Mansfield, 1968).

Major Trends in Innovation Research

A general survey of the research studies done in the field of innovation indicates four major themes that stand out very clearly. These themes are:

(1) Focus on early stages of the development and diffusion cycle.

(2) Focus on a narrow range of innovations.

(3) Focus on individualistic bias in studies.

(4) Focus on organizational variables and features.

Most commentators and developers of models of innovation- diffusion process use simple models with a number of stages. For example, Rogers (1962) outlines the stages as (1) awareness, (2) interest, (3) trial, (4) evaluation, (5) adoption, and (6) discontinuance. Hage and Aiken (1970), and Katz, Levin and Hamilton (1963) have also advocated similar stages. Clark and Guba (1965) too outline the stages of the research and development efforts in similar ways: (1) research, (2) development, (3) diffusion, (4) trial, and (5) adoption.

It seems, therefore, fair to say that the literature on innovation and diffusion has usually focused on the early stages in the cycle--the latter phases or stages, namely, the implementation and structural supports were not attended

to. However, it does not mean that research studies on the latter phases of the innovation cycle were nonexistent.

Another theme that emerges is that the literature has usually focused on a narrow range of technological innovations. In the widely used diffusion studies related to the field of agriculture the innovations studied had several common characteristics, for example, they were highly technical and their effectiveness was proved before it was diffused, the payoff time was relatively short, their evaluation was easy, and finally the adopter was a single individual or group of individuals, not a complex organization.

Yet another theme that emerges from the literature is that most research on innovation focus not only on a limited kind of technical inventions, but also concentrate narrowly on factors causing individual users to adopt or reject that innovation. Referring to this individualistic bias in innovation research Baldridge writes:

> Usually in these studies the dependent variable concerns individual adopters: Will mothers adopt birth-control pills, will natives substitute a steel ax for their traditional stone one? Sometimes the rate of adoption among a group of people is the dependent variable: how fast will individual with X characteristic adopt the innovation when compared with individuals with Y characteristics? Not surprisingly, the independent factors that are supposed to produce the behavior are typically individualistic. For example, are the adopters younger or older, traditional or modern, rich or poor, opinion leaders or followers, of high social status or low, at the center of a communication network or isolated? (e.g. see Rogers and Shoemaker, 1971, and Rogers' review, 1962).

> In few cases are complex organizations and their problems treated in the diffusion literature, despite the fact that most major policy inventions being diffused today are used by complex organizations rather than individuals. Educational inventions, community action projects, new technologies in industry, and new health delivery systems are examples of social inventions that are primarily adopted by complex organizations, not by individuals. Unfortunately, the literature on innovation provides little help in this area. In fact, Rogers' monumental study (1962) of innovation summarized the research conclusion in 52 major propositions-- not one referred to a complex organization as the innovation adopter or to organizational features as independent variables affecting the process (Baldridge, 1974).

After reviewing a number of studies related with organizational change that had focused on individual level variables, Katz and Khan (1966) make the following discouraging statement:

> In short, to approach institutional change solely in individual terms involves an impressive and discouraging series of assumptions--assumptions which are too often left implicit. They include, at the very least: the assumption that the individual can be provided with new insight and knowledge; that these will produce some significant alteration in his motivational pattern; that these insights and motivations will be retained even when the individual leaves the protected situation in which they were learned and returns to his accustomed role in the organization; that he will be able to adapt his new knowledge to that real-life situation; that he will be able to persuade his coworkers to accept the changes in his behavior which he now desires; and that he will also be able to persuade them to make complementary changes in their own expectations and behavior.
>
> The weakness in this chain becomes apparent as soon as its many links are enumerated. The initial diagnosis may be wrong; that is, the inappropriate behavior may not result from lack of individual insight or any other psychological shortcomings. Even if the initial diagnosis is correct, however, the individual approach to organizational change characteristically disregards the long and

> difficult linkage just described. This disregard we have called the psychological fallacy.

Hage and Aiken (1970) also express a similar observation:

> The results of our study clearly suggest that structural properties were more highly associated with the rate of program change than attitudes toward change. This implies that the structure of an organization may be more crucial for the successful implementation of change than the particular blend of personality types in an organization.

Gaynor (1977) too views the emphasis on the individuals as adopting unit as a major weakness in the studies related with innovation and change. He remarks that "persons operating as members of organizations are simply not as free as independent entrepreneurs (e.g., farmers and physicians) to implement significant innovations entirely on their own initiative. They are free to propose innovations than they are to implement them." (p. 12)

The fourth theme that emerges from the literature is that a gradual shift, away from the themes mentioned earlier, is taking place, and many researchers have already started focusing more upon organizational variables and features.

Studies focusing on early stages of the innovation process, studies focusing on a narrow range of technological innovations, and studies focusing on individuals as adopting units are no doubt useful for our understanding of how innovations are developed and diffused. But unless those innovations are structurally, financially and politically

supported within the organization, they are likely to die on the vine (Baldridge, 1974). "In short, we need more information and research on a variety of problems in the actual implementational phases: (1) What kinds of rewards structures are necessary to support the innovation? (2) What kinds of political coalitions are needed to give the innovation viability? (3) What kinds of authority structure still support the innovation rather than undermine it? (4) How should the new program be financed? (5) How can the innovation be evaluated as to its effectiveness? It is obvious that the very asking of these questions raises a series of problems that have received little attention in the literature," Baldridge added (p. 7).

The shift of attention to organizational variables and features will be very helpful for better understanding of innovation process within educational and complex organizations. Baldridge (1974) provides the following reasons in support of this idea:

> First, technology in education is much more complicated, for it depends heavily on professional judgment, creative insight, and practical experience. The technology is of a professional rather than a narrowly technical nature. Second, the results from educational technology rarely, if ever, have a short turnaround time in which the innovation's effectiveness can be evaluated. Instead it takes months, years, and even decades to determine whether the educational process has been strengthened by the innovation. Third, educational innovations are extremely difficult to evaluate. The decisions of the farmer or the doctor are simpler to make than those of the teacher. If the grain grows or if the medicine cures the ailment, the farmer and the doctor know that their innovations are working, but how does a teacher

> know whether students have learned social studies better under the new system? Finally, the adopter of the innovation in education is almost always a complex organization--a school district, college or university department within a school, or some educational committee. The complexity of the decision process and the multiple chains of command necessary to implement a decision makes the diffusion of educational innovation an entirely different enterprise from the simple one-man adoption of a new seed, drug or piece of equipment.

Innovation-Adoption Process

The adoption of innovation process is actually a type of decision making. Referring to the adoption process Morris (1966) points out:

> A strategy for interaction is in essence, a strategy of decision making. Decision making lies at the very core of innovation and is essential to the rational strategy for moving innovation from idea to reality, from paper to people . . . It (decision making) must be an integral part of the strategy in all stages of the innovation and in determining the changes that innovations will generate.

March and Simon (1958) also hold a similar notion about the adoption process. According to them the innovative processes are closely related to the various intellectual processes referred to by psychologists as problem solving, productive thinking, creative thinking and invention.

It is worth noting that the adoption process is different from the diffusion process. The stage of diffusion actually occurs after the adoption of innovations by the initiators. Rogers and Shoemaker (1971) have indicated the difference between these two processes in the following way:

> The innovation-decision process is the mental process through which an individual passes from first knowledge of an innovation to a decision to adopt or reject and to confirmation of this decision. The process should be distinguished from the diffusion process by which new ideas are communicated to the members of a social system. The major difference between two processes is that diffusion occurs among the units in a social system, whereas innovation- decision making takes place within the mind of an individual.

Recognizing that all decision-making situations do not have the same parameters, Rogers (1968, p. 71) has identified four types of decisions regarding the adoption of innovations in complex organizations like institutions of higher education. They are: optional decisions, contingent decisions, collective decisions and authority decisions. Optional decisions are initiated by individuals regardless of the decisions made by colleagues. Contingent decisions require some prior decisions from other members of the system to adopt or accept the innovation, whereas the collective decisions require consensus. Authority decisions are those decisions which are forced on the individual by someone with greater power.

The Educational Development Program (EDP) at Michigan State University, which was established in 1963 as a pioneer program in instructional improvement, relied on voluntary faculty initiatives to bring about instructional innovations (EDP Report No. 9; Spring 1977). Under such an approach the individual faculty member feels the need for change, decides to do something about it, and finally takes steps to introduce new ideas or objects to effect the desired change.

This approach is, therefore, considerably different from the more traditional approaches in which a change agent from outside the system or department identifies a need and attempts to persuade the faculty member to adopt a particular innovation to meet that need.

Those individual faculty members who feel the need for improving their instructional strategies, methods, materials, etc., and actually take actions to change the existing conditions, are, in the words of Rogers and Shoemaker, called innovators, and in the words of Steiner, creative individuals. Rogers and Shoemaker (1971, pp. 175-185) have identified five categories of adopters based on time of adoption, namely, innovators, early adopters, early majority, late majority and laggards.

It should be noted that in order to achieve symmetry in their classification of adopters Rogers and Shoemaker suggest that innovators and early adopters be combined into one category. This blurs the distinction between innovators and early adopters. The use of the label "innovators" is considered more appropriate for this study because the population for this study consisted of those faculty members, who, on a voluntary basis, designed, developed and used instructional innovations to improve their instructions. These instructional projects were new and improved methods for solving instructional problems (EDP Report No. 9, 1977).

Profile of an Innovator

With regard to the characteristics of adopters categorized as "innovators" it is helpful to look at the work of Rogers. Research studies of farmers, school administrators, industrial firms and aborigines indicate that innovators are not always the most respected members of their social systems (Rogers, 1965). Rather these individuals are considered to be adventuresome, starry-eyed, or experimenters. They deal with ideas and activities that are avant-garde, hazardous, rash or risky. They are usually able to understand complex technical ideas and products, and are not disturbed by repeated failures. They are usually young, have high social status (including education, prestige and income), rely on impersonal and cosmopolitan sources of information, exert opinion leadership, and are regarded by their peers as being deviant and unusual individuals (Rogers, 1965).

Steiner's summary of findings (1965) dealing with creative individuals also highlight similar attributes of such persons. Besides the characteristics or attributes that usually mark the creative individual as deviant, Steiner also identifies the following attributes: conceptual fluency, ability to produce a large number of ideas quickly, originality in generating unusual ideas, ability to separate source from content in evaluating information, motivated by a deep interest in the problem faced and willing to follow the problem wherever it leads. Over and above, he suspends

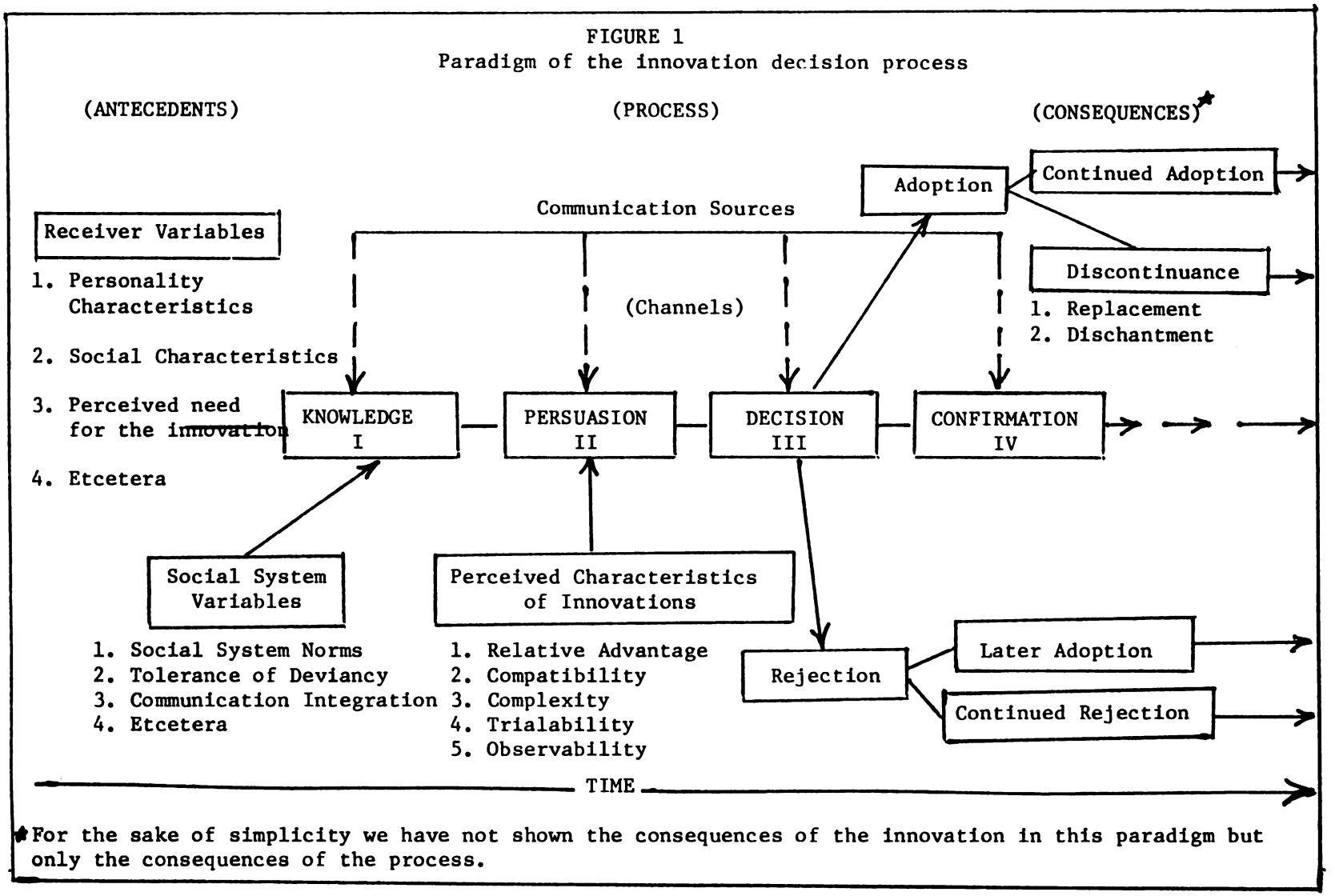
judgment and avoids early commitment, he is less authoritarian, he accepts his own impulses and is playful and undisciplined in his explorations, he exercises independence of judgment and is not prone to conformity; and while he has a rich and even "bizarre" fantasy life, he has a superior reality orientation (Steiner, 1965).

Thus it seems that such an individual is the antithesis of the so-called "organization man." It is quite obvious that such an individual would face great difficulty in conforming to the routine demands of educational settings. Davis, et al., (1976) found that a number of instructional innovators at Michigan State University consciously violated the role expectations of their colleagues and played the part of "dissatisfied mavericks."

However, these "unsatiated souls" do not innovate and adopt new ideas or products without being influenced by the nature and characteristics of the innovation and the organization or system within which they operate.

This suggests that there are a number of factors apart from the individual variables that influence the innovation-adoption process in real-life situations. This is more true when innovations are considered in educational settings or complex organizations. Figure 1 presents the paradigm of the innovation-decision process (Rogers and Shoemaker, 1971) which indicates variables that affect the individual as he/she considers a particular innovation.

FIGURE 1
Paradigm of the innovation decision process



*For the sake of simplicity we have not shown the consequences of the innovation in this paradigm but only the consequences of the process.

A glace at this paradigm shows that it has three main parts: antecedents, process, and consequence.

Antecedents part includes all variables that are present in the situation prior to the initiation of the innovation, for example, the individual personality characteristics, the individual's social characteristics, and the intensity of the individual's perceived need of the innovation.

The process part of the paradigm is affected by several variables, namely, social system variables, communication sources, and the perceived characteristics of the innovation.

The third and final part of the paradigm labeled as "consequence" refers to actions following the decision taken by the individual to adopt or reject the innovation.

This paradigm of Rogers and Shoemaker focuses on the individual as adopting unit. But there are cases where organizations are found as adopting units, for example, a school system adopts a new curriculum. In the words of Rogers and Shoemaker this process is called the collective innovation decision-making process. Rogers and Shoemaker have proposed a descriptive model to describe this process. This model, illustrated in Figure 2 represents the ways in which a social organization collectively adopts an innovation.

Figure 2
Paradigm of the collective innovation decision-making process.

1. STIMULATION of interest in the need for the new idea (by stimulators)

2. INITIATION of the new idea in the social system (by initiators)

3. LEGITIMATION of the idea (by power-holders or legitimizers)

4. DECISION to act (by members of the social system)

5. ACTION or execution of the new idea

The collective innovation decision-making process is usually conceived as five or more steps or subprocesses from original realization of a need, to the new idea (stimulation), to final action or carrying out the new idea in the social system, but it should be generally applicable to most other types of social systems, such as bureaucracies, committees, and families.

For a better understanding of this process, the stages in the model are briefly described as:

1. Stimulation. At this stage someone becomes aware of the need for a certain innovation within a social system or organization. This person is the stimulator(s), who is more often an outsider to the system, or else a cosmopolite member who has been exposed to external forces through his social relationships in other systems.

2. Initiation. At this stage usually by a small number of individuals, who are called initiators, an innovation is introduced in the system. These initiators are very much oriented to change, and they may include the original stimulator(s). At this point alternative means of meeting

one of the system's needs are explored, and interest develops in a particular innovation.

3. Legitimation. It refers to the decision to adopt or reject the innovation by those in authority called legitimizers. In most systems these legitimizers possess both formal as well as informal symbols of social status and respect. They are expected to make decisions on the basis of what is good for the entire organization or system. In most cases when this role is not effectively performed they lose their authority.

4. Decision. This stage refers to a state where the members of the social system decide to act. In order to enable them to act they must be allowed to express their preferences in the choice process, or in other words they must be allowed to participate in the decision-making process. This participation may occur through a survey, a referendum, a petition or a public meeting. Satisfaction with and acceptance of a collectively taken decision regarding innovations is positively related to the degree of participation by members of the social system.

5. Execution. It refers to the stage when the decision taken is put into action. This final activity is often delegated to individuals with lower status and less power by those in authority.

Rogers and Shoemaker have indicated that these stages may not always occur in sequence. However, they think that

most adoption will take place according to the sequence outlined in this model.

Other Change Models

After reviewing the various efforts by a number of researchers Havelock et al. (1971) has identified three broad perspectives or three schools of thought with regard to phases of change:

(1) The Social Interaction Perspective (S-I)

(2) The Research, Development and Diffusion Perspective (RD & D), and

(3) The Problem-Solver Perspective (P-S).

The Social Interaction model is based largely on studies done in the field of rural sociology. These studies deal with the process by which an innovation is adopted either by an individual or by a group, once the innovation has already become available to potential adopters. Referring to this model Havelock, et al. write:

> Since theorists of this school are not concerned with the process by which the innovation is made available, they stipulate that the initial stage in the change sequence occurs when the potential receiver becomes aware of the innovation (which may be either a product or a procedure). Subsequent stages describe a sequence of increasing psychological and behavioral involvement, including interest and information seeking, evaluation, trial and adoption (or rejection). Of special interest to this school are the sources of information which appear to be most influential at each stage of the adoption process (Havelock, et al., 1971).

The second model entitled "The Research, Development and Diffusion" describes the stages of change as: design,

invention, or discovery of an innovation. The design stage activities are performed by specialists outside the client system. Unlike the S-I model, the primary focus of the RD & D theorists generally remains on the effort of the sender, and secondary attention is given to the receiver, who is the main focus of the S-I theorists. The particular emphasis of this school is on the great amount of effort put in at each of the stages of research, development and diffusion. This, therefore, suggests the presence of ample financial, technical and organizational resources.

The Problem-Solver approach includes studies with focus on the efforts of a receiver in solving his/her own particular problem. In this model the change sequence is set into action when the receiver (an individual or a group) becomes aware of a need or when he/she desires an improvement in his/her current situation. According to this model, after the stage of diagnosis, the receiver must identify a solution and make plans to implement it, usually with support from someone outside his/her system. Stages commonly described in this model are: problem awareness, diagnosis, search and selection of solution, planning for implementation, installation and evaluation, stabilization, and possible diffusion to other groups.

Considering the strengths and weaknesses of these perspectives or models, Havelock et al., (1971) have tried to bring these three viewpoints together in a single perspective that includes the strongest points of each. This

perspective is called the "Linkage" model (see Havelock, et al., 1971; pp. 11-15 to 19). Seven "general factors" have been identified by Havelock, et al. (1971, pp. 11-20 to 31) in the process of knowledge dissemination and utilization. The factors are: (1) Linkage, (2) Structure, (3) Openness, (4) Capacity, (5) Reward, (6) Proximity and (7) Synergy. The above perspectives or models are, however, not very clear and specific about various organizational resources. The kinds of organizational resources the P-S model emphasizes are resources of skill and experiences. It does not consider specifically the organizational variables or resources like funds, services, free-time, office supplies, etc., which are the major concerns of the present study.

Davis (1979) has offered another model entitled "A Behavioral Change Model With Implications for Faculty Development," which is also an attempt to describe the process of innovation. According to this model, there are two sets of variables, namely, individual and organizational variables whose interrelationship is essential to cause instructional innovations within the frameworks of university departments. This model emphasizes the voluntary efforts of the faculty members, called innovators, to produce and adopt instructional innovations with a view to improving the instructional processes (for more information regarding this model see pp. 13-14 of Chapter I).

Factors or Variables Related with Adoption

A quick survey of the literature shows that there are a number of variables or factors that are positively related with adoption of innovations. These factors can be categorized as:

1) Individual Variables
2) Innovation Attributes
3) Organizational Variables

1) Individual Variables: A large number of studies have been done to find out the relationship between individual characteristics and the degree of adoption. Rogers and Shoemaker's (1971) review of literature indicates that studies focusing on individual variables are typically individualistic. For example, researchers used individual characteristics like young or old adopters, traditional or modern, rich or poor, opinion leaders or followers, and high social status or low.

On the basis of their review, Zaltman, et al. (1977) point out a number of individual characteristics in school organization that are positively related with the degree of adoption of innovations. The characteristics are: innovativeness, teaching style, teaching environment, degree of interaction, cosmopolitan/local orientation, source of satisfaction, nature of motivation to work, willingness to take risk, authority to act and participate, openness of interpersonal relationships, awareness of developments in

the profession, feelings of efficacy, and source of information.

Kazlow and Giacquinta (1974) studied the receptivity of the faculty in a school of education to a number of organizational innovations. They used a variety of status and personality measures to determine differences in the degree of receptivity. Of all the variables studied, they found only academic rank and sex were significantly related.

Hearn (1973) found that the tendency of a member of staff to innovate could be positively related to its degree of cosmopolitanism, travel experiences, experience in other school systems, and record of attendance in professional sessions outside the state.

Davis' (1965) findings showed no significant differences in terms of awareness of innovations or in terms of age, years of service and participation in decision-making.

Davis (1979) points out three broad classes of individual variables: energizers, expectations, and skills. According to him at least two different types of variables energize a faculty member's search behavior and cause it to persist. They are cognitive dissonance (Festinger, 1957), and the achievement motive. Expectations refer to an individual's assessment of the outcomes that will result from change, whereas Skills suggest the possession by a faculty member of relevant skills needed to implement and innovate successfully.

2) Innovation Attributes: Apart from individual variables there are innovation attributes which have received attention of the researchers as factors related with the adoption. Several lists of innovation attributes have been compiled by researchers. The well-known list is the one compiled by Rogers and Shoemaker (1971). According to this list the innovation attributes or characteristics are:

(1) Relative advantage

(2) Compatibility

(3) Complexity

(4) Trialability

(5) Observability

The above attributes when operationalized on the basis of generalizations presented by Rogers and Shoemaker (1971) generate a long list of variables with special reference to innovations in educational settings (Moallemian, 1984).

Chin (1974) offers 19 attributes of innovations. They are:

(1) Cost--financial

(2) Cost--social

(3) Return on the investment-short term/long term

(4) Efficiency--time saving, ability to reach desired ends, and relief from present state.

(5) Perceived Risk

(6) Communicability--clarity of results, transformation

(7) Compatibility with existing activities

(8) Complexity

(9) Perceived relative advantages, including visibility

(10) Structural radicalness

(11) Terminality--time period for repeating cycle

(12) Reversability

(13) Divisibility of innovation practice

(14) Commitment required

(15) Publicness vs. privateness

(16) Adoption variables such as decision-making bodies needed

(17) Susceptibility to successive modification

(18) Gateway ability--opening the gate for other innovations.

(19) Ego involvement

The most important characteristics of innovations, according to Hall and Kester (1974) are:

(1) Installation and maintenance cost

(2) Availability of dollars for installation

(3) Quality of staff needed to install and operate the innovation

(4) Space required for the innovation

(5) Lead time necessary for adequate installation

(6) Sources of dollars needed for operation.

(7) Hardware required for the innovation

(8) Complexity of the innovation.

A quick glace at the lists of attributes of innovation listed above indicates that they have many common attributes. However, the generalizations offered by Rogers and Shoemaker (1971) related with the attributes of innovations favor the attributes, namely, relative advantage, compatibility, trialability, observability and also complexity as factors significantly related with adoption of innovations. Moallemian (1984) found relative advantage and trialability significantly related to the degree of acceptance of instructional innovations by the faculty members at Michigan State University.

3) Organizational Variables: In addition to the innovation attributes, there are characteristics of an organization or system, in this case departments, that go a long way in influencing the innovative behaviors of the innovators. Emphasizing the importance of organization in relation to innovation Havelock (1971, p. 6-37) remarks:

> Organizations play a vital and pervasive role in dissemination and utilization process. Most new knowledge originates in organizational settings; most knowledge is processed by organizations; most knowledge is transmitted by organizations and through organizations and by people who are living in an organizational environment.

Various structural features of organizations, namely, size, degree of decentralization, specialization, etc. were found related with the adoption of innovations (Moch and Morse, 1977; Baldridge and Burnham, 1975; Hage and Aiken, 1967). Other organizational characteristics identified as predictors of innovation are: formality, complexity, breadth

of organizational goals and absence of dominance by a single professional ideology (Hage and Aiken, 1967; Mayer and Denton, 1963). Also wealth and resources were found as strong correlates of innovation (Mansfield, 1963; Mytinger, 1965; Hage and Aiken, 1967; Eisenstadt, 1963; Rogers, 1962).

Besides the above mentioned organizational variables some investigators have focused on nonstructural variables and suggested that these variables may be correlated with the tendency to produce, adopt and implement innovations, including slack resources (Cyert and March, 1963; Rosner, 1968), strength of obstacles and the resources for overcoming them (Mohr, 1969), and risk and rate of return (Mansfield, 1968).

Carter in his study done in 1966 came up with the findings that adoption of innovation is more likely when funding is more loosely controlled (when there are easy criteria for funding) and when the organizational environment is adoptive rather than authoritarian.

Gross, Giacquinta and Bernstein (1968) found a positive relationship between degree of availability of required materials and equipment and implementation of a major innovation in an elementary school.

Davis (1979) points out that there are other sets of organizational variables that seem to have an influence on the innovative behaviors of the innovators in various university departments. He categorizes these variables into three groups: organizational reward system, role

expectations of the organization, and resources available for innovations.

Through the reward system, a department can influence the innovative behaviors of the faculty members. Rewards are, generally, of two types: intrinsic rewards and extrinsic rewards. Intrinsic rewards refer to those payoffs or satisfactions that arise directly from creating and implementing a particular instructional innovation. These rewards come usually from the sense of accomplishment, and faith in one's abilities. Thus, these types of rewards are mostly controlled by the innovators. Extrinsic rewards, on the other hand, are controlled by the organization or department. Usually they are of two types: system rewards and reward for certain performances. Examples of system rewards are fringe benefits, leaves, etc., and rewards for certain performances refer to salary increases, royalties, and promotions.

The faculty members operate within the framework of certain departments. Every department, like any system, expects its faculty members to behave in certain ways. These prescribed ways of behaving are in accordance with the norms and values of the supra-system, or the environment in which the department functions. Unless a department is "innovative" or "creative" in nature, it will not tolerate deviations from prescribed ways of organizational behaviors. Members not conforming to prescribed roles will be branded insubordinates, harmful, and will be flushed out.

It is, however, interesting to note that "faculty members at Michigan State University, as well as other similar large universities, have relatively more autonomy to decide on the content of their courses, and how they should be taught, so long as the courses conform to the descriptions in the catalogues and the resources are at hand." (Davis et al., 1980)

Once a faculty member has decided to develop and use an instructional innovation to improve his teaching, he finds himself faced with the need of getting necessary resources. These resources are, usually funds, services, supplies, free time, etc. "Such resources are generally under the control of the department, not the individual faculty member, and the way in which these resources are managed has a profound impact on the motivation of faculty and their ability to implement their ideas" (Davis, 1979). Importance of organizational resources (like financial support, graduate and secretarial assistance, technical and professional support and needed facilities) in relation to the adoption of innovation has been emphasized by Miles (1964, p. 635) and Diamond et al. (1975, pp. 17-26).

Summary

The literature related to the adoption of innovations has been reviewed under the following sub-headings: (1) Importance of Innovations, (2) Growth of Innovation Studies,

(3) Major Trends in Innovation Research, and (4) Factors Related with Adoption of Innovations.

The review indicates that the field of innovation has become a common ground for investigation by researchers and scholars from different disciplines. In the past decades there has been a stream of studies on innovation and creativity. But most of these relate to areas other than higher education. The topic of innovation has been examined from different perspectives. But two perspectives stand out prominently. The term "innovation" has been used in most cases, either to mean process or a product.

The review points out the difference between the adoption and diffusion processes. The major difference between these two processes is that diffusion occurs among the units in a social system, whereas adoption (innovation-decision) takes place within the mind of an individual. Different models of the innovation-adoption were mentioned, described and highlighted in this chapter. It appears from the review of the literature that a different approach is being emphasized in model-building. This approach advocates the study of individual variables, innovation attributes and organizational variables simultaneously as a process. Earlier models have studied individual, innovation and organizational variables separately without paying any attention to their interrelatedness.

Four major themes have emerged from the review of the literature. Each theme has its focus on a particular aspect

of innovation-adoption process. The first theme consists of those studies which focuses on early stages of the development and diffusion cycle. These studies did not pay attention to the latter phases of the cycle, namely, the implementation and structural support of innovations. The second theme relates to those studies whose focus was on a narrow range of technical innovations. The third theme points out individualistic bias in studies. These studies focused on individual as an adopting unit. The final theme which emerged from the review of the literature refers to a gradual shift, away from earlier themes mentioned above, to a new area of emphasis, i.e. organizational variables.

Factors related with the adoption of innovations, as revealed by the review of the literature, can be categorized as follows: (1) Individual variables, (2) Innovation attributes, and (3) Organizational variables. Some of the individual variables were found significantly related with the degree of adoption of innovations. They are: sex, rank, cosmopolitanism, innovativeness, nature of motivation to work, willingness to take risk, openness, awareness development, skills needed to change etc. In the category of innovation attributes, relative advantage, trialability, compatibility, complexity and observability were positively related with the degree of adoption. Studies focusing on organizational variables and features were few in number. However, the findings of these studies indicated that size, degree of centralization, specialization and formalization,

complexity, wealth, funds, and availability of materials and equipment were positively related with the degree of adoption of innovations.

CHAPTER III

DESIGN OF THE STUDY

Introduction

This chapter provides a description of the research design of the study. It discusses the methods of research employed, presents the hypotheses to be tested, specifies and describes the population for the study and spells out the sampling procedures with justifications. Also it offers information about the data collection instrument--its selection, design and development, and its reliability and validity. In addition, this chapter furnishes information about data collection method and procedures, and also statistical techniques and procedures used to analyze and interpret data.

Research Design

This study employs a cross-sectional survey method. One reason for using this method as opposed to a panel, trend or cohort method is that the study examines the problem at one point in time. Furthermore, the cross-sectional method is good for exploring relationships between or among variables, which is precisely the intent of this research. Besides, a

cross-sectional survey method is less costly and less time-consuming than other kinds of survey methods (Babbie, 1973).

Hypotheses

The general hypothesis of this study is based on the following question:

> As perceived by the selected faculty innovators, is departmental support related to their willingness to develop and use instructional innovations at Michigan State University?

In chapter I, hypotheses to be tested have been listed in their theoretical form, therefore, it is appropriate to state the hypotheses here in their null form.

Null Hypotheses

Following are the null hypotheses:

HO.1: Faculty innovators' perceptions of the degree of financial support from a department will not be related to the degree of adoption of instructional innovations.

HO.2: Faculty innovators' perceptions of the degree of policy support from a department will not be related to the degree of adoption of instructional innovations.

HO.3: Faculty innovators' perceptions of the degree of technical support from a department will not be related to the degree of adoption of instructional innovations.

HO.4: Faculty innovators' perceptions of the degree of office support from a department will not be related to the degree of adoption of instructional innovations.

HO.5: Faculty innovators' perceptions of the degree of support from colleagues in a department will not be related to the degree of adoption of instructional innovations.

HO.6: Faculty innovators' perceptions of the degree of support from the chairman of a department will not be related to the degree of adoption of instructional innovations.

HO.7: Faculty innovators' perceptions of the degree of the specific supports from a department are not related to continuation/discontinuation of instructional innovations.

HO.8: Faculty innovators' perceptions of the degree of the specific supports from a department will not differ with respect to high/medium/low levels of adoption of instructional innovations.

Areas and Sources of Literature Searched

A quick review of the literature related to innovation and adoption indicates that the field of innovation has become a criss-cross of investigators' efforts from different disciplines (e.g., anthropology, sociology, psychology, educational psychology, political science, economics, business, etc.).

In order to find out studies done in the area of organizational or departmental resources/supports and adoption of instructional innovations in colleges and universities, computer search was done of two different sources, namely, Educational Resources Information Center (ERIC) and Dissertation Abstracts International at Michigan State University Library. Only one entry, closely related with the present study could be found, and when the efforts were put in to get that study it was learned that the study was taken out of the shelf recently by its author.

In addition to the computer search, a manual search of relevant journals and books was done which helped identify a number of related studies and articles.

Population and Samples

The population for this study consists of all faculty members (also called EDP project directors) who developed and used, on a voluntary basis, instructional innovations in their departments during the period of 1975-1979 at Michigan State University. These faculty members are referred in this study as "innovators" because they, on a voluntary basis, designed, developed and used instructional innovations, which were new to them, to improve their teaching-learning processes. The Educational Development Program (EDP) of Michigan State University selected and supported only those projects which met its test of "innovativeness." The EDP policy in this regard reads as follows:

> The project must evidence an experimental or innovative approach to curriculum and/or instruction, EDP does not seek to promulgate traditional procedures but instead seeks new and improved methods of solving instructional problems (EDP Report No. 9, 1977).

These innovators or EDP project directors are mentioned along with the descriptions of their projects in the annual reports of the Educational Development Program, Michigan State University for the years 1975-1979.

A sample of the directors of these projects are the respondents for this study. In order to include only one

director from each project, the following criteria were used:

1. Each project director must be a faculty member in an academic program at Michigan State University with teaching as the primary responsibility. It should be noted that some of the directors are not faculty members and some of them are not primarily involved in teaching.
2. Where possible, the major project director from each project was included in the sampling frame. If the major director was for some reason not available, then the next faculty member listed for the project was included, and so on.

During the period under study, a total of 180 Educational Development Program (EDP) projects or instructional innovations were reported. Out of these 180 projects, 50 were excluded (because 25 were continuations of previous projects, and the other 25 projects had directors involved in more than one project at a time) before a sample of 65 projects was drawn for this study.

Sampling Design

The study used simple random sampling to draw the needed subjects from the identified population. Numbers were assigned to the elements within the sampling frame, and a table of random numbers was then used to draw the sample. The reasons for using simple random sampling were:

(1) The Educational Development Program (EDP) list provides the names, addresses and the descriptions of the projects completed by the faculty innovators. In other words, the EDP list provides a complete listing of the population for this study which is a must for the use of simple random sampling. There is no such list existing in different departments.

(2) Since the list was already available it saved time, energy, and money.

(3) The units in the population were assumed to be reasonably homogeneous or of the same size i.e. all of them were faculty innovators and not other types of adopters as indicated in the literature.

(4) The EDP list of faculty innovators was compiled in a way that was more appropriate for the use of simple random sampling than systematic random sampling in the sense that if systematic random sampling was used, there was likelihood of ending up with more samples from one or a few departments.

It seems desirable to say a few words about why stratified sampling was not used in this study. The reasons were:

(1) The different departments did not have a list or record of faculty innovators. In order to develop a list additional time, money and energy were needed.

(2) Stratified sampling is used to draw a sample from a population when the population is divided in categories in terms of certain characteristics. So in order to avoid bias samples are drawn from each category, and these samples are homogeneous within each category and heterogeneous between the categories. In this study samples to be drawn from the EDP list were all faculty innovators with common characteristics.

Instrumentation

The instrument used for data collection was a mailed questionnaire with a 5-point Likert scale (Appendix A). The

questionnaire is perhaps the most commonly used research device for data collection. The use of the questionnaire in research has a number of advantages and some disadvantages.

Advantages and Disadvantages of Questionnaires

(a) The most obvious benefit that one can get from using the questionnaire is cost. The expense of printing or producing questionnaires and distributing them to a large number of respondents is considerably less than that of interviewing similar numbers of respondents (Benson, 1946; Moser and Kalton, 1971).

(b) Interviewers have always faced difficulty in contacting interviewees who are not available. A mailed questionnaire does not face such problems (Seitz, 1944).

(c) It provides ease in completing. Respondents may complete it as slowly or as rapidly as they please (Cahalan, 1951; Jahoda, 1962).

(d) It is less biased in the sense that it helps avoid contamination from those conducting the research (Jahoda, 1962).

(e) It provides ease in tabulating. Most questionnaires consist of objective questions which can be arranged to facilitate either machine scoring or keypunching (Berdie & Anderson, 1974).

(f) It provides uniformity in presenting questions. All respondents who receive questionnaires receive the same

questions in the same format with the same accompanying materials (Berdie & Anderson, 1974).

(g) Questionnaires may also help maintain anonymity, which sometimes plays a very important role in getting a high rate of responses.

In spite of all these advantages there are disadvantages to using questionnaires. Some of the disadvantages are listed below:

(a) A common problem in research using a questionnaire is the low rate of response (Benson, 1946; Robinson, 1952).

(b) Due to the nature of questionnaire, the ways to check the reliability and validity of questionnaire items are limited (Phillips, 1941; Scott, 1961).

(c) Some experts think that many people are prejudiced against questionnaires either because they receive so many (Norton, 1930) or because they believe the questionnaire method of obtaining data is a disreputable, unscientific method (Clausen & Ford, 1947).

(d) Researchers cannot be sure who completed the returned questionnaires (Moser & Kalton, 1971). As a result the responses may not, in some cases, be the responses desired.

Questionnaire Design and Development

A search of the relevant literature in the area of study indicated that no standardized questionnaire, for example, Organizational Climate Description Questionnaire

(OCDQ) (Halpin and Croft, 1963) was available. This necessitated the design and development of a new data collection instrument for the purpose of this study. In order to do it a number of steps were taken.

First of all a number of questions were generated in the light of hypotheses listed in the proposal. Independent and dependent variables of the study were operationalized which facilitated the generation of questions with one variable for each question and scale. Special efforts were made to avoid words with double meanings, ambiguity, emotional overtones, double negatives, and also abbreviated words. Only those questions were included in the questionnaire which were discriminating, clear, brief and relevant to the hypotheses.

There are several scales that are used in survey research for measuring the intensity of respondents' agreement or disagreement with a given statement, for example, Likert Scale, Bogardus Scale, Thurstone Scale and Guttman Scale. For the purpose of this study Likert Scale (5-point) was used to get the response from the respondents. The reasons for using the Likert Scale were higher reliability and fewer items (Moser and Kalton, 1972), unambiguous ordinality of response categories, and straightforward method of index construction (Babbie, 1973).

In the Likert format basically the respondents are presented with statements in the questionnaire and are asked

to indicate whether they "strongly agree," "agree," "disagree," "strongly disagree," or are "undecided."

However, following the principles of Likert scale construction some positive, some negative, and some neutral questions or statements were used on the questionnaire. And in the final form of the questionnaire, questions were mixed so that one group of questions will not remain in one place.

Instrument Testing

"No one wishes to expend all his allotted resources only to discover that he has failed to achieve his objectives due to some unforeseen error" remarks Babbie (1973). This statement brings to the fore the importance of testing in research.

The pre-test of the data collection instrument used in this study was considered of utmost importance. Since the questionnaire used to collect data was designed and developed, it was necessary to find out whether the questions on the questionnaire were clear and meaningful from the respondents' point of view, and whether the questions were able to elicit and measure the information desired. In order to achieve these objectives, first of all a number of questions were generated in the light of hypotheses by consulting the relevant literature, fellow researchers and faculty members. Special efforts were given to the sentence construction, wording and phrasing of questions in the questionnaire.

All the generated questions then submitted to a panel of 10 faculty EDP directors who were selected from the population for this study using the random sampling technique in the same way as was done in drawing the needed number of samples for the study. These 10 EDP directors who were not included in the final research samples were given the initially developed questionnaire along with the definitions of variables to be measured for judgment on validity of the questions, and were asked to rate the items or questions on a scale of 1 to 5. According to Moser (1971) the assessment of content validity is essentially a matter of judgment; the judgment may be made by the surveyor or, better yet by a team of knowledgeable judges engaged for the purpose. Items with the highest scores were selected and adopted for the revised instrument. This new questionnaire was tried on the group of 10 EDP directors mentioned above to assess its clarity of items and instructions, and also to find out the time that a respondent would usually take to complete the questionnaire. The results of this small scale trial suggested modifications of some items for greater clarification and better understanding. These activities culminated in a 34- item questionnaire for data collection for this study (Appendix A).

The questionnaire was also checked for reliability. Reliability, while not the most important facet of measurement, is still extremely important. In a way, this is like the money problem: the lack of it is the real problem.

High reliability is no guarantee of good scientific results, but there can be no good scientific results without reliability (Kerlinger, 1964; p. 455). There are various methods for determining reliability, e.g. test-retest, parallel - forms, split-half and internal consistency methods. Considering the 5-point scale used in the questionnaire, the Coefficient Alpha formula developed by Cronbach was used to obtain estimates of internal consistency or reliability (Mehrens and Lehmann, 1978). The total estimates for the 30 items measuring independent and dependent variables of this study was .92, which is considered very high.

Data Collection

The data collection from the subjects selected was done through a mailed questionnaire with cover letters mentioning the titles of projects about which they were asked to respond. A self-addressed and stamped envelope was sent with the questionnaire. Also in order to maintain anonymity, no identification marks whatsoever were used on the questionnaires. To reduce the cost of follow-up mailings, and to avoid frustration and displeasure of those who would send the completed questionnaires in the first phase, a self-addressed and stamped postcard, with one of the mailing labels affixed to the reverse side of the card, was also sent to each respondent with the questionnaire. Through the cover letter respondents were assured of anonymity, and

requested to complete and return the questionnaire and the postcard. Receipt of the postcard indicated that the questionnaire was returned, but which questionnaire was whose could not be known.

A 3-week cutoff point was used for the return of the completed questionnaires from the respondents. Out of 65 respondents 46 returned the completed questionnaires and the postcards in the first round. After one week, a follow-up effort was made through telephone calls to those who did not send the completed questionnaire in the first round. These respondents were identified through the help of the postcard method used. Telephone calls were made only to those respondents who did not send the postcards. This motivated more respondents, and as a result, 6 more completed questionnaires were received.

Three more completed questionnaire were received after November 15, 1985; but they were not included for data analysis due to their late arrival. Thus, during the period from October 15, 1985 to November 15, 1985 a total of 52 questionnaires were received with no missing data. In terms of percentage the rate of return was 80 percent, which was considered very good for this study. According to Babbie (1973), a response rate of at least 50 percent is adequate for analysis and reporting; a response rate of at least 60 percent is good; and a response rate of 70 percent or more is very good.

As soon as questionnaires came they were given identification numbers, and dates of receipt were recorded. A chart was used for this purpose (see Appendix B).

Variables

The list of independent and dependent variables with their subdimensions or subscales is provided in Table 3.1.

Rate of Return

In order to get an appropriately high rate of return the following measures, as suggested by Berdie and Anderson (1974), were taken:

(1) Courteous and appealing cover letter with a formalized approach was used (Appendix C).

(2) Respondents were assured of anonymity.

(3) The length of the questionnaire was kept short so that the respondents would not have a negative feeling toward it.

(4) Self-addressed and stamped envelopes were used for the return of the completed questionnaires.

(5) One follow-up effort was made to collect data from those who did not respond in the first place.

(6) Special care was given to the typing, quality of paper and final production of questionnaires.

Permission to Collect Data on Campus

According to the Michigan State University ordinance it is necessary for researchers to get the permission from their programs' chairpersons and the University Committee on Research Involving Human Subjects, before collecting data

Research Involving Human Subjects, before collecting data

Table 3.1

List of Independent and Dependent Variables

Independent Variables	Dependent Variables
A. FINANCIAL SUPPORT 1. Funds for production materials (software) 2. Funds for equipment needed (hardware)	G. ADOPTION (willingness to develop and use) 1. Positive attitude toward similar innovation. 2. Desire to build similar innovation 3. Desire to implement innovation in practice
B. POLICY SUPPORT 1. Tenure for innovation 2. Promotion 3. Salary-raise 4. Release-time 5. Royalties 6. Travel 7. Use of students for tryouts 8. Space	H. LIFE/STABILITY 1. Continuation 2. Discontinuation 3. High Adoptability 4. Medium Adoptability 5. Low Adoptability
C. TECHNICAL SUPPORT 1. Consultation services 2. Services in handling equipment 3. Professional services for production/implementation 4. Graduate assistant's services	
D. OFFICE SUPPORT 1. Supplies 2. Secretarial services (typing, filing, recording, accounting, communication, etc.)	
E. COLLEAGUES' SUPPORT 1. Appreciation for the innovation 2. Expression of willingness to try.	
F. CHAIRMAN'S SUPPORT 1. Expression of interest in innovation 2. Supportive of change	

from human subjects on campus. This was successfully accomplished.

Statistical Measures and Analysis

The purpose of this study was to find out the relationship, if any, between the departmental support and the degree of adoption (the degree of willingness to develop and use) of instructional innovations by the faculty innovators at Michigan State University.

To test hypotheses 1 through 6, means were computed on the items related to adoption, financial, policy, technical, office, colleagues' and chairperson's support. These means were then used as scores in partial correlation analysis. This technique helped examine the explanatory power of each of the six types of departmental support on adoption, while statistically controlling the effects of the other types of departmental support.

The reason for using correlation techniques is that they are powerful techniques for finding relationships between and among variables. That is why in the literature of change and innovation zero-order correlation and partial correlation analysis are the most frequently used measurement techniques. Borg and Gall (1979) observed that:

> In studies that are primarily concerned with measuring relationships, various types of correlation coefficients are employed for statistical analysis. Correlational techniques that compare scores for one independent variable with the dependent variable and ignore the influence of other variables upon the one being compared are called zero-order correlations. A

> variety of zero-order correlational techniques are appropriate for different kinds of data normally collected in educational research . . . In some relationship studies the investigator wishes to study relationship between one of the independent variables and the dependent variables while holding constant or removing the effect of other variables . . . Under these conditions a technique called partial correlation is employed.

The major advantage of correlational research is that the investigator can explore a wide variety of different relationships in the same study (Isaac and Michael, 1971). But, it should be noted that this technique is not free from limitations. The limitations, according to Isaac and Michael (1971), are:

(1) It only identifies what goes on with what - it does not necessarily identify cause and effect relationships.

(2) It is less rigorous than the experimental approach because it exercises less control over the independent variables.

(3) It is prone to identify spurious relational patterns or elements which have little or no reliability or validity.

(4) The relational patterns are often arbitrary and ambiguous (P. 21).

To test hypothesis number 7 a series of analyses of variance were conducted. In addition to a series of analyses of variance a Scheffe post hoc test was used with regard to hypothesis number 8. The Scheffe post hoc test helped to observe which specific support had a significant effect as a

source of variation with regard to three levels of adoption: high, medium and low. These three groups or levels of adoption were determined on the basis of scores on sub-variables of adoption. Scores were collapsed as follows:

5 - 9	Low adoption
10	Medium adoption
11 - 17	High adoption

The data for this study were collected with the help of a scaled questionnaire. The respondents were asked to indicate the degree of their agreement or disagreement regarding financial, policy, technical, office, colleagues', chairperson's support, and adoption (willingness to develop and use) of instructional innovations. The responses were on a 5-category response format, based on subdimensions of independent and dependent variables.

Numerical weights were assigned to each of the 5-response categories in a way that the higher the score the greater the adoption (willingness to develop and use), financial, technical, policy, office, colleagues' and chairperson's support. The weights (except for item numbers 6 and 12) were as follows:

Strongly agree	(SA) = 5
Agree	(A) = 4
Neutral	(N) = 3
Disagree	(D) = 2
Strongly Disagree	(SD) = 1

For item numbers 6 and 12 reverse weights were used (Appendix D).

Presentational Format for Findings

Tables and charts were used to present the findings of the study. Also, for easy communication, the results of the study were expressed in simple narrative form using only percentages and frequencies.

Summary

This study is designed to find out the relationship between departmental support and adoption (willingness to develop and use) of instructional innovation by the faculty innovators at Michigan State University.

The study uses a cross-sectional survey method. There are eight hypotheses that were tested.

The population for this study consisted of all the Educational Development Program (EDP) project directors who volunteered to develop and use instructional innovations at Michigan State University during the 1975-1979 period. All the EDP project directors were faculty members in different departments. By using random sampling techniques, a sample of 65 EDP project directors was drawn for the study.

The instrument for data collection was designed, developed, and tested. It used a 5-point Likert scale.

The data collection was done through mail questionnaires. One follow-up effort was made to collect

data from those who failed to return the completed questionnaires within the time limit mentioned in the cover letters. Anonymity of the respondents was maintained, but the maintenance of anonymity posed a problem for follow-up efforts to collect data from nonrespondents in that the follow-up letters are sent to all the respondents. Those who have already returned the questionnaires in the first place may feel frustrated and displeased when they receive follow-up letters. Therefore, to avoid such frustration and displeasure, and also to reduce the cost, a postcard method was used. By the end of the data collection period a total of 52 completed questionnaires were received for analysis. The rate of return in terms of percentage was 80 percent.

Statistical techniques used to treat and analyze data included mean, zero-order correlation, partial correlation, analysis of variance, F test, Scheffe post hoc test, frequencies and percentages. For easy communication, findings of the study were presented in a simple narrative form using frequencies, percentages, tables, lists and charts.

CHAPTER IV

ANALYSIS OF DATA AND FINDINGS

This chapter contains information regarding the data used in analysis, statistical techniques and programs used to analyze the data collected, and the findings of the study. Also, a brief summary is added to provide a precise and quick understanding of this chapter.

Out of the 65 randomly selected respondents, a total of 55 (84.6%) returned completed questionnaires. But only 52 (80%) questionnaires were used as a basis for this analysis, because the remaining 3 questionnaires came too late. As a result, they could not be included for data analysis.

The data were analyzed on the CDC 7000 computer at the Michigan State University Computer Laboratory.

To analyze the data the statistical measures used were: Pearson product-moment correlation, partial correlation, zero-order correlation, analysis of variance, F test, Scheffe post hoc test, frequencies and percentages. The Statistical Package for Social Sciences (Nie, et al., Version 9) was used for computer programs.

For effective and quick communication of the results of this study, the findings are reported under four sub-headings:

1) Results of Hypotheses Testing
2) Results Related to Relationships Between Sub-variables and Adoption.
3) Other Minor Findings
4) Summary

Results of Hypotheses Testing

To test the hypotheses 1 through 6, partial correlation analysis was used. In partial correlation analysis, the relationship of each independent variable, with adoption was measured while controlling or holding the other variables constant. For example, the relationship between financial support and adoption was measured by controlling other independent variables, namely, policy support, technical support, office support, colleagues' support and chairman's support, and so on.

The results of hypotheses tested are given below:

Hypothesis 1

> Faculty innovators' perceptions of the degree of financial support from a department will be positively related to the degree of adoption of instructional innovations.

Table 4.1 shows partial correlation between financial support and adoption.

The partial correlation of -.0246 is not significant at the .05 level of confidence or significance, and, therefore, hypothesis number one was not supported. Therefore

perceptions of financial support is not significantly related to adoption.

Hypothesis 2

> Faculty innovators' perceptions of the degree of policy support from a department will be negatively related to the degree of adoption of instructional innovations.

Table 4.1 shows the result of partial correlation between policy support and adoption. The partial correlation of -.0427 is not significant at the .05 level of significance. Therefore, the hypothesis number two was not supported. It means the perception of the relationship between policy support and adoption is not significant.

Hypothesis 3

> Faculty innovators' perceptions of the degree of technical support from a department will be positively related to the degree of adoption of instructional innovations.

The data presented in Table 4.1 indicate that the partial correlation of -.0459 was not significant at the .05 level of significance. As a result, hypothesis number three is not supported. The data do not show a significant relationship between perception of technical support and adoption.

Hypothesis 4

> Faculty innovators' perceptions of the degree of office support from a department will be negatively related with the degree of adoption of instructional innovations.

Table 4.1 shows that the partial correlation of .3772 was significant at the .05 level of significance. As a result, the null hypothesis is rejected, but the alternate

hypothesis is not supported, because it is contrary to prediction made in the directional hypothesis. Thus, there was no evidence to support the directional hypothesis number four listed above.

Hypothesis 5

> Faculty innovators' perceptions of the degree of support from colleagues in a department will be negatively related with the degree of adoption of instructional innovations.

Table 4.1 indicates the result of partial correlation analysis with regard to a perceived relationship between colleagues' support and adoption. The partial correlation of .3511 is significant at the .05 level, as a result, the null hypothesis is rejected, but hypothesis number 5 was not supported because the alternate was contrary to prediction made in the directional hypothesis listed above.

Hypothesis 6

> Faculty innovators' perceptions of the degree of support from the chairman of a department will be negatively related with the degree of adoption of instructional innovations.

The data presented in Table 4.1 show that the partial r of .0974 is not significant at the .05 level of significance. As a result, there is no evidence that hypothesis number 6 presented above is supported or confirmed. Thus, there is no significant relationship between the perceptions of a chairman's support and adoption of instructional innovations.

Table 4.1
Relationship Between Different Types of Departmental Support and Adoption
(N = 52)

Types of Support	Partial r	P
Financial Support	-.0246	.435
Policy Support	-.0427	.388
Technical Support	-.0459	.380
Office Support	.3772*	.004
Colleagues' Support	.3511*	.008
Chairman's Support	.0974	.257

* Significant at .05 level.

Apart from partial correlation, which was used to find out the relationship between one independent variable and adoption (dependent variable) while controlling or holding the other independent variables constant, zero-order correlation coefficients were computed to observe the relationship between each independent variable and the dependent variable (adoption) without controlling statistically the effects of other independent variables. The results of zero-order correlation also helped to know whether the independent variables are independent or interrelated. Table 4.2 presents the intercorrelation matrix for the seven variables of the study.

Table 4.2
Zero-order Correlation Coefficients Matrix
(N = 52)

Variables	1	2	3	4	5	6	7
1. Adoption	1.00						
2. Financial Support	.3257*	1.00					
3. Policy Support	.4289*	.5400	1.00				
4. Technical Support	.3383*	.5786	.5670	1.00			
5. Office Support	.4966*	.2871	.5222	.4532	1.00		
6. Colleagues' Support	.5331*	.5602	.6130	.4557	.3341	1.00	
7. Chairman's Support	.3876*	.6168	.6321	.6374	.2819	.5994	1.00

* Significant at .05 level.

The data presented above indicate that the relationship between each independent variable and adoption (dependent variable) without controlling the effects of other independent variables of the study, is positive and significant at .05 level.

Relationships Between Sub-variables and Adoption

For the purpose of measurement each variable was operationalized or broken down into a number of measures/ sub-variables or subdimensions. Table 3.1 in Chapter III presents all variables with their subdimensions.

Pearson product-moment correlation was used to find out the relationship between each sub-variable and adoption.

Financial Support: Three measures or subdimensions were used for financial support: funds for production materials, funds for needed equipment, and funding source information. Table 4.3 shows the correlations of these subdimensions with adoption with their relative significance levels.

Table 4.3
Correlation Between Sub-variables of Financial Support and Adoption
(N = 52)

Sub-variables	Correlation with Adoption	Significance
1. Funds for purchase of production materials	-.3127	.012
2. Funds for needed equipment	-.1283	.182
3. Funding Source information	-.3274	.009

Policy Support: Eight measures or subdimensions were used for having a composite measure of policy support variable. They are: salary raises, released-time, official assignments, tenure award, travels, royalties, promotions, space and other facilities. Table 4.4 presents the data indicating the correlations of these subdimensions or sub-

variables with adoption along with their respective significance levels.

Table 4.4
Correlation Between Sub-variables of Policy Support and Adoption
(N = 52)

Sub-variables	Correlation with Adoption	Significance
1. Salary raises	-.2958	.017
2. Released-time	-.1127	.213
3. Official assignments	-.1607	.128
4. Tenure award	-.3448	.006
5. Travels	-.3015	.015
6. Royalties	-.1780	.103
7. Promotions	-.3152	.011
8. Space and other facilities	-.3503	.005

Technical Support: Technical support consisted of three subdimensions, namely, graduate assistant help, equipment handling service and consulting services. Table 4.5 indicates the correlations of these subdimensions with adoption with their respective significance levels.

Table 4.5
Correlation Between Sub-variables of Technical Support and Adoption
(N = 52)

Sub-variables	Correlation with Adoption	Significance
1. Graduate Assistant help	-.1542	.137
2. Equipment handling services	-.3072	.013
3. Consulting services	-.3152	.011

Office Support: Office support involved only two subdimensions or measures: secretarial assistance and office supplies. Table 4.6 lists these two subdimensions with their correlations with adoption along with their respective significance levels.

Table 4.6
Correlation Between Sub-variables of Office Support and Adoption
(N = 52)

Sub-variables	Correlation with Adoption	Significance
1. Secretarial assistance	-.4924	.001
2. Office supplies	-.4431	.001

Colleagues' Support: This independent variable was composed of two measures, namely, positive perception, and willingness to develop and use such projects. Table 4.7 provides the data indicating the correlations between these measures and adoption with significance levels.

Table 4.7
Correlation Between Sub-variables of Colleagues' Support and Adoption
(N = 52)

Sub-variables	Correlation with Adoption	Significance
1. Positive perception	-.4471	.001
2. Willingness to develop and use such project	-.3892	.002

Chairman's Support: This independent variable was operationalized or broken down into six sub-variables or measures with a view to having a composite measure of chairman's support. They are: freedom to innovate, expression of interest, seek out and try ideas, use of students for tests, project experimentation, and demonstration of appreciation through talks. Table 4.8 shows the relationship between these sub-variables and adoption with their respective significance levels.

Table 4.8
Correlation Between Sub-variables of Chairman's Support and Adoption
(N = 52)

Sub-variables	Correlation with Adoption	Significance
1. Freedom to innovate	-.0277	.423
2. Expression of interest	-.3734	.003
3. Seek out and try ideas	-.4673	.001
4. Use of students for tests	-.1347	.171
5. Project experimentation	-.2256	.054
6. Appreciation by talks	-.3638	.004

Frequencies and Percentages of Responses

The questionnaire used to collect the data consisted of 34 statements or items. Respondents were asked to respond on a 5-point (strongly agree, agree, neutral, disagree and strongly disagree) Likert scale. The numbers and percentages of the responses related to different types of departmental support (independent variables) and adoption (dependent variable) are presented in Table 4.9 as a further breakdown of the findings. For example, with regard to the statement: "My department provides funds needed to buy supplies/ materials for the project," 1.9% strongly agreed with the statement, 50.0% agreed, 23.1% disagreed, 11.5% strongly disagreed while 13.5% were neutral, and so on.

Table 4.9
Frequencies and Percentages of Responses
(Total Respondents = 52)

Sub-Variable	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
A - 1	(1)*1.9	(26)50.0	(7)13.5	(12)23.1	(6)11.5
A - 2	(4) 7.7	(20)38.5	(9)17.3	(18)34.6	(1) 1.9
A - 3	(1) 1.9	(16)30.8	(15)28.8	(14)26.9	(6)11.5
B - 1	(4) 7.7	(21)40.4	(12)23.1	(8)15.4	(7)13.4
B - 2	(1) 1.9	(13)25.0	(13)25.0	(11)21.2	(14)26.9
B - 3	(2) 3.8	(13)25.0	(3) 5.8	(27)51.9	(7)13.5
B - 4	(3) 5.8	(21)40.4	(12)23.1	(8)15.4	(8)15.4
B - 5	(2) 3.8	(19)36.5	(15)28.8	(11)21.2	(5) 9.6
B - 6	(1) 1.9	(21)40.4	(14)26.9	(12)23.1	(4) 7.7
B - 7	---	(2) 3.8	(19)36.5	(14)26.9	(17)32.7
B - 8	(5) 9.6	(30)57.7	(9)17.3	(8)15.4	---
C - 1	(4) 7.7	(16)30.8	(8)15.4	(18)34.6	(6)11.5
C - 2	(2) 3.8	(22)42.3	(16)30.8	(10)19.2	(2) 3.8
C - 3	(2) 3.8	(12)23.1	(16)30.8	(18)34.6	(4) 7.7
D - 1	(4) 7.7	(38)73.1	(5) 9.6	(4) 7.7	(1) 1.9
D - 2	(4) 7.7	(39)75.0	(6)11.5	(3) 5.8	-----
E - 1	(2) 3.8	(27)51.9	(22)42.3	-----	(1) 1.9
E - 2	(1) 1.9	(12)23.1	(22)42.3	(13)25.0	(4) 7.7
F - 1	(18)34.6	(30)57.7	(1) 1.9	(2) 3.8	(1) 1.9
F - 2	(5) 9.6	(16)30.8	(11)21.2	(14)26.9	(6)11.5
F - 3	(8)15.4	(18)34.6	(14)26.9	(8)15.4	(4) 7.7
F - 4	-----	(5) 9.6	(13)25.0	(22)42.3	(12)23.1
F - 5	(7)13.5	(32)61.5	(3) 5.8	(6)11.5	(4) 7.7
F - 6	(1) 1.9	(5) 9.6	(10)19.2	(27)51.9	(9)17.3
G - 1	(11)21.2	(31)59.6	(7)13.5	(2) 3.8	(1) 1.9
G - 2	(5) 9.6	(29)55.8	(11)21.2	(6)11.5	(1) 1.9
G - 3	(9)17.3	(32)61.5	(6)11.5	(4) 7.7	(1) 1.9
G - 4	(11)21.2	(36)69.2	(5) 9.6	-----	-----
G - 5	(14)26.9	(34)65.4	(4) 7.7	-----	-----

A = Financial Support; B = Policy Support; C = Technical Support; D = Office Support; E = Colleagues' Support; F = Chairman's Support and G = Adoption. * Numbers of respondents are shown in parentheses ( ).

Hypothesis 7

Faculty innovators' perceptions of the degree of the specific supports from a department are related to continuation/discontinuation of instructional innovations.

To test hypothesis number 7 a series of analyses of variance were conducted to find out the effects of different types of support, namely, financial, policy, technical, office, colleagues' and chairman's support with respect to the continuation vs. discontinuation of the projects.

The results of data analysis indicated that out of six types of departmental support (Financial, policy, colleagues' technical, office and chairman's support), only colleagues' support was perceived as a significant factor by the respondents with regard to the continuation/ discontinuation status of their instructional projects. Table 4.10 presents the data.

Table 4.10
Analysis of Variance Results Comparing Discontinued and Continued Project Groups in Terms of Colleagues' Support

Groups	Number	Mean	S.D.	F	P(F)
Discontinued	26	5.11	1.77	4.79*	.033*
Continued	26	5.92	1.47		

* Significant at .05 level.

It appears from Table 4.10 above that the F value of 4.79 is significant at the .05 level of significance.

Hypothesis 8

Faculty innovators' perceptions of the degree of the specific supports from a department will differ with respect to high/medium/low levels of adoption of instructional innovations.

In addition to a series of analyses of variance, a Scheffe post hoc test was used with regard to hypothesis number 8. The Scheffe post hoc test helped to observe which specific supports had a significant effect as a source of variation with regard to three levels of adoption: high, medium and low. These three levels of adoption were determined on the basis of scores on sub-variables of adoption. Scores were collapsed as follows:

5 - 9	Low adoption
10	Medium adoption
11 - 17	High adoption

After analysis of the data it emerged that financial support, office support, colleagues' support and chairman's support were perceived by the respondents of this study as significant factors in creating impacts on low, medium and high levels of adoption of instructional innovations.

Table 4.11 reports an F value of 5.299, which is significant at the .05 level, and the Scheffe post hoc test indicates that high and medium levels of adoption differ significantly at .05 level with regard to financial support.

Table 4.11
Analysis of Variance Results Comparing High, Medium and Low Adoption in Terms of Financial Support

Levels	Number	Mean	S.D.	F	P(F)	Scheffe difference
Low	13	9.08	2.78	5.299*	.008	
Medium	26	8.00	2.30			
High	13	10.62	2.06			High>Medium

* Significant at .05 level.

With regard to office support, Table 4.12 below reveals that the F value of 3.381 is significant at the .05 level, and the Scheffe post hoc test shows a significant difference between high and low levels of adoption.

Table 4.12
Analysis of Variance Results Comparing High, Medium and Low Adoption in Terms of Office Support

Levels	Number	Mean	S.D.	F	P(F)	Scheffe difference
Low	13	3.69	1.32	3.381*	.042	
Medium	26	4.42	1.21			
High	13	5.00	1.41			High>Low

* Significant at .05 level.

It is evident from the data presented in Table 4.13 that the F value of 9.725 is significant at the .05 level,

while the Scheffe test shows a significant difference between high and low levels of adoption with regard to colleagues' support at the .05 level. In other words, the difference of impact of colleagues' support is more prominent between high and low levels of adoption.

Table 4.13
Analysis of Variance Results Comparing High, Medium and Low Adoption in Terms of Colleagues' Support

Levels	Number	Mean	S.D.	F	P(F)	Scheffe difference
Low	13	4.69	1.60	9.725*	.003	
Medium	26	5.34	.75			
High	13	6.69	1.44			High>Low

* Significant at .05 level.

Perception of the chairman's support was also found as a significant source of variation with regard to the levels of adoption. The F value of 3.885 is significant at the .05 level, and according to the Scheffe test a significant difference exists between high and low levels of adoption at the .05 level. Table 4.14 presents the data.

Table 4.14
Analysis of Variance Results Comparing High, Medium and Low Adoption in Terms of Chairman's Support

Levels	Number	Mean	S.D.	F	P(F)	Scheffe difference
Low	13	15.77	4.62	3.885*	.027	
Medium	26	16.58	2.91			
High	13	19.34	3.52			High>Low

* Significant at .05 level.

Other Minor Findings

The findings with regard to the length of time the instructional innovations or projects were in active use in different departments are presented in Table 4.15. The table, for example, indicates that 5.8 percent or 3 instructional projects out of the total of 52 were in active use for less than one year, and so on.

Out of 52 projects or instructional innovations, 26(50%) were discontinued, and 26(50%) were reported to be in use.

There was only one open-ended question on the questionnaire, and the purpose of this question was to probe the specific causes of discontinuation of projects, if any. Analysis of the data from this question provided the following reasons for discontinuation of the projects: curriculum revision/change, course no longer offered, lack

of enrollment, lack of department's encouragement, change in students' background, change of duties, and change in personnel teaching the course.

Table 4.15
Numbers and Percentages of Projects in Terms of Length of Time in Use.

Length of Time	Number	Percent
Less than one year	3	5.8
1 - 2 years	3	5.8
2 - 3 years	8	15.4
3 - 4 years	7	13.5
4 - 5 years	11	21.0
5 or more years	20	38.5
	52	100.00

The data further showed that 27 or 51.9% of the projects have undergone major changes while 25 or 48.1% were in use without undergoing any major changes since their initiation.

Summary

Out of the 65 randomly selected respondents, a total of 55 returned completed questionnaires. But only 52, out of the 55 returned questionnaires, were used for the data analysis; the remaining 3 questionnaires could not be included for the purpose of analysis because of their late arrival.

To test hypotheses 1 through 6, partial correlation was used. The results show that hypotheses one, two, three and six were not supported. In the cases of hypotheses four and five, although the null hypotheses were rejected, the corresponding research hypotheses could not be supported or confirmed because the alternates were contrary to predictions made in the directional hypotheses. Table 4.16 below summarizes the results for hypotheses tested by partial correlation.

Table 4.16
Results of Hypotheses Test

Hypothesis Number	Independent Variables	Types of Relationships with Partial r	Results*
1.	Financial Support	Negative (-.0246)	Not Significant
2.	Policy Support	Negative (-.0427)	Not Significant
3.	Technical Support	Negative (-.0459)	Not Significant
4.	Office Support	Positive (+.3772)	Significant
5.	Colleagues' Support	Positive (+.3511)	Significant
6.	Chairman's Support	Positive (+.974)	Not Significant

* Significant at .05 level.

Apart from partial correlation, which was used to determine the relationship between one independent variable

and adoption (dependent variable) by controlling the effects of other independent variables of the study, zero-order correlation coefficients were computed to observe the relationship between each independent variable and adoption (dependent variable) without controlling the effects of other independent variables. The results showed positive and significant relationships between each independent variable and adoption. In addition they indicated that independent variables are not independent but interrelated.

To provide a further breakdown of the findings a number of tables were presented in this chapter showing the relationships between sub-variables of each independent variable and adoption with their respective significance levels. Also to furnish the readers with yet further details of the findings, responses of the respondents expressed on the Likert scale were presented in a tabular form in terms of frequencies and percentages. In the case of hypothesis number 7, the results of analysis of variance showed that only colleagues' support had a significant effect on continuation/discontinuation state of the projects. With regard to hypothesis number 8, the results of analysis of variance indicated that financial support, office support, colleagues' support and chairman's support had significant effects on low, medium and high levels of adoption.

Other minor findings of this study presented in this chapter relate to the length of time of projects in use, numbers and percentages of continued/discontinued projects,

and projects which have undergone major changes and projects which are in use without undergoing any major changes since their initiation. The findings related with the specific causes of discontinuation of projects indicated that curriculum revision/change, lack of encouragement from departments, lack of student enrollment, change in duties and lack of funds were the main causes of discontinuation of some of the projects.

CHAPTER V

DISCUSSION OF FINDINGS

Introduction

This chapter presents the results of the study briefly, provides a discussion of the findings, and offers suspected reasons or explanations for the results obtained. This chapter helps separate the data or facts (presented in Chapter IV) from biases and interpretations which may arise during the discussion.

Findings And Suspected Reasons

In order to discuss the results of the study, and offer suspected reasons for unexpected results, the findings are presented very briefly with reference to hypotheses numbers.

Hypothesis 1

The results of the data analysis did not support hypothesis number one. The findings indicate a negative relationship between perceptions of financial support and adoption (willingness to develop and use) of instructional innovations by the faculty innovators at Michigan State University.

The literature review has mentioned a few studies showing a positive and significant relationship between funds and adoption of innovations. Even simple logic seems to suggest the same. But this study offers different findings. Some of the possible reasons for this, may be, due to the extent of funds or financial support, not loosely controlled or easily available funds, and the nature and personality traits of the adopters. If an innovation requires a small dollar investment, it is likely that the adopter, who is highly motivated to bring about a change, may not perceive the need for such funds as being important. On the contrary, if the funds necessary to produce the innovation is larger than what an adopter can handle by his own money with ease, it is obvious that in such situations he will perceive the need for such funds as being important.

Carter (1966) found that adoption of innovation is more likely when funding is loosely controlled (when there are easy criteria for funding). When funds are not easily available or when one has to go through a lot of hassle to get funds, it is quite likely that an adopter requiring a small amount of money for his innovation, will negatively perceive the need for such funds.

Another reason why the respondents of this study perceived no significant relationship between financial support and adoption, is perhaps the personality traits or individual variables of the respondents. The respondents of this study were not the average or normal faculty (whose

behaviors can be more readily effected by rewards and incentives). They were a highly motivated group of adopters who according to Rogers and Shoemaker (1971) love to experiment and try new ideas or build and use innovations by spending their own money, even in the face of repeated failures. Adopters in this category are less likely to perceive a significant relationship between funds and adoption, especially when their innovations do not involve a big chunk of money.

Hypothesis 2

Hypothesis number two was also not supported. This means that no significant relationship was found between perceptions of policy support and adoption of instructional innovations by faculty members.

The literature search did not indicate any empirical studies emphasizing a significant relationship between policy support of an organization and adoption of innovations. But a few authors of articles and books, mentioned in the literature review, have expressed their opinions emphasizing a meaningful relationship between policy support and adoption (Davis, 1979; Diamond, et al. 1975). This study shows a negative relationship between perceptions of policy support and adoption of instructional innovation which is in tune with the prediction made in the research hypothesis. The reason for predicting a negative relationship was based on the assumption of unique

personality characteristics of the respondents of this study who were not the average or normal adopters, rather a special group of adopters (innovators) who are highly motivated for change. It is very likely, therefore, that an innovator will not consider policy support as an important factor influencing his willingness or decisions to develop and use instructional innovations as long as the innovation does not affect others in the organization or the organization itself. It should be pointed out that faculty members at Michigan State University enjoy a great deal of autonomy in relation to their teaching, which allows them to experiment and try new ideas without creating conflicts with either their colleagues or the administration.

Hypothesis 3

The results of the study did not produce evidence supporting hypothesis number three. No significant relationship was found between perceptions of technical support and adoption of instructional innovations by the faculty members at Michigan State University.

In fact the study showed a negative relationship between technical support and adoption, while a positive relationship was suspected on the basis of the fact that technical skills and knowledge are acquired through long and hard professional training. But it seems that this logic does not apply for those who are highly motivated to experiment, who try new ideas readily, and who are anxious

to bring about changes in their environment. The personality profiles of innovators or creative individuals developed by Rogers (1971) and Steiner (1965), indicate that these individuals are adventuresome, experimenters, risk-takers, and usually able to understand complex technical ideas and products.

Hypothesis 4

Hypothesis number four was also not confirmed. Although the null hypothesis number four was rejected, the alternate could not be accepted because it was contrary to the direction indicated in the directional hypothesis. However, the findings of the study showed a significant relationship between office support and adoption of instructional innovations. It means the faculty innovators perceived office support (typing, filing, recording, communication services) as an important factor related with their adoption-behaviors. A negative relationship was predicted in the research hypothesis considering the not-very-technical nature of office support. But the findings of the study show a positive and significant relationship. The suspected reason for such perception of the respondents, may be due to the fact that, traditionally, office support is readily available, and not something that faculty have to regularly seek out.

Hypothesis 5

The results of the data analysis showed a positive and significant relationship between perceptions of colleagues' support and adoption. Although the null hypothesis was rejected, the alternate could not be accepted because it was contrary to the prediction or direction expressed in the directional hypothesis. As a result, the research hypothesis was not confirmed.

Considering the unique personality characteristics of the respondents of this study, it was assumed that they would not perceive the support from their colleagues as a significant factor influencing their adoption-behaviors. But this assumption was not validated by the findings of this study. One possible explanation for this, may be the difference in ranks of the respondents which was not attended to in this study. Junior faculty members, being more concerned with tenure and promotion may perceive colleagues' support as an important factor.

Hypothesis 6

The findings of this study showed a positive but not significant relationship between the perceptions of support from the chairman of a department and adoption (production and use) of instructional innovations by faculty members at Michigan State University.

A negative relationship was predicted in hypothesis number 6. The reasons for this assumption were: the unique personality characteristics of the respondents, the autonomy of faculty members in the area of instruction, and the nature and size of the instructional innovations.

It appears from the personality profiles of innovators that they are highly motivated to try new ideas to improve existing conditions, and are not disturbed by repeated failures. They are also not prone to conformity. Therefore, it is likely that they will not perceive support from their immediate supervisors (chairmen) as an important factor influencing their adoption - behaviors, especially when they have a good deal of autonomy to try new ideas to improve their instructional processes, and when the instructional innovations are such in nature that they do not create any conflict with their departments' policies and structures.

With regard to the positive perception of chairman's support by the respondents of this study, it is suspected that the adoption-behaviors of the faculty innovators will greatly vary with their respective ranks. Junior faculty members may perceive a chairman's support more important because of their concerns for tenure and promotion. It should, however, be noted that this study did not examine the issue from the standpoint of ranks of the respondents.

Hypothesis 7

The results with regard to hypothesis 7 showed that out of six types of departmental support (Financial, policy, technical, office, colleagues' and chairman's support), only colleagues' support was perceived by the respondents as a significant factor with regard to the continuation/ discontinuation status of their instructional projects.

It appears from the results of hypothesis 7 that faculty members, who designed, developed and used instructional innovations in different departments at Michigan State University, value their colleagues' support with regard to their decisions to continue or discontinue their innovative projects. Such behaviors of the respondents can be explained on the basis of Reference Group Theory, which suggests that individuals' behaviors are influenced, to a great extent, by the norms, expectations etc. of the group to which they belong.

Hypothesis 8

The findings related to hypothesis 8 indicated that out of six types of departmental support (Financial, policy, technical, office, colleagues' and chairman's support), only financial, office, colleagues' and chairman's supports were perceived by the respondents as significant factors in influencing high, medium and low levels of adoption of instructional innovations.

Of the three levels of adoption (high, medium and low), high and low levels of adoption differed significantly in respect of office, colleagues' and chairman's support; whereas, high and medium levels of adoption showed a significant difference with regard to financial support from a department. Why the levels of adoption differed significantly in respect of these types of departmental support is not clear. However, it should be noted that since the respondents of this study were reasonably homogeneous, the difference between different levels of adoption was not very sharp. Studies with heterogeneous respondents may indicate a sharper difference in the levels of adoption of instructional innovations.

Other minor findings of the study indicated that 26(50%) out of 52 projects were discontinued and 26 (50%) were in active use. The main reasons for discontinuation of instructional innovations offered by the respondents were: curriculum revision/change, course was dropped, decrease in students enrollment, lack of departmental encouragement, change in students' background, change of duties, and change in personnel teaching the course. The study further revealed that out of 52 projects, 27 (51.9%) projects have undergone major changes while 25(48.1%) projects were in use without undergoing any major change since their initiation. The possible reasons for projects not undergoing major changes since their initiations may be due to the absence of formal curriculum change, quality design and development of

projects, absence of change in personnel teaching the course and in background of the students.

Summary

The findings of the study showed a negative relationship between perceptions of financial support and adoption (willingness to develop and use) of instructional innovations by the faculty members at Michigan State University. A positive relationship between these two variables was predicted. The suspected reasons for a negative perception of financial support in relation to adoption, may be due to the extent of financial support, nature of availability of funds, and the personality characteristics of the respondents.

With regard to policy support and adoption, the results indicated a negative relationship, which was in tune with the prediction made in the research hypothesis. The reasons for predicting a negative relationship were based on several factors: the unique personality characteristics of the respondents, the size and nature of instructional innovations, and the autonomy enjoyed by the respondents in the area of teaching.

The study revealed a negative relationship between technical support and adoption, while a positive relationship was suspected on the basis of the assumption that technical skills and knowledge are usually acquired through long and hard professional training. But the

findings of the study suggest that this simple logic may be applicable in respect of average individuals, and not individuals who are highly motivated to do something to improve their existing conditions.

A positive and significant relationship was found between perceptions of office support and adoption, while a negative relationship was suspected between these two variables. The reason why respondents perceived office support as an important factor in relation to their adoption-behaviors may be the fact that traditionally, secretarial assistance is readily available, and is not something that faculty members have to regularly seek out.

The study also showed a positive and significant relationship between perceptions of colleagues' support and adoption, which is contrary to the prediction made in the hypothesis. It is not clear why the faculty innovators, who 'consciously violate the role expectations of their colleagues' (Davis, et al., 1976) perceived colleagues' support as an important factor influencing their adoption-behaviors. One possible explanation for this may be found in the difference in ranks of the respondents. Junior faculty members with concerns of tenure and promotion may perceive colleagues' support as a significant factor.

With regard to the perceptions of chairman's support and adoption the findings indicated a positive but not significant relationship. A negative relationship between these two variables was predicted. This prediction was based

on several factors: the personality traits of the respondents, the instructional autonomy enjoyed by faculty members, and the size and nature of instructional innovations. The positive perception of a chairman's support by the respondents may be explained in terms of differences in their ranks, which was not examined in this study. Junior faculty members concerned with tenure and promotion are likely to perceive chairman's support as an important factor influencing their adoption-behaviors.

The study further showed that colleagues' support had a significant effect on continuation/discontinuation status of the instructional innovations; whereas financial, office, colleagues' and chairman's supports, created significant impacts on low, medium and high levels of adoption. Other minor findings of the study showed the frequencies and percentages of continued/discontinued projects, and of projects which have undergone major changes along with those which have not undergone any major changes since their initiation.

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter is divided into two sections. The first section summarizes the study; and the second section presents conclusions, implications, and recommendations for future studies or actions.

Summary of the Research Study

Over the past several decades a huge investment was made in terms of money, energy and time to speed up the process of production and adoption of innovations in educational institutions. But not all of these investments have produced the desired results. One may advance several reasons for this slow pace of adoption of innovations. The literature reviewed in Chapter II points out the lack or paucity of understanding of the innovation-adoption process in educational settings as the main concern. Therefore, the need for better understanding of the process of innovation as a whole is of great importance. The process of innovation-adoption can be related to departments within the framework of a university, where change involves faculty, the department, and the educational innovations. A

better understanding of these separate components of the process, as well as in relation to each other within the framework of a system, is needed to explain the process of production and adoption of educational innovations, especially in institutions of higher education. This study has addressed a small portion of this problem.

The purpose of this study was to find out if there is any relationship between faculty innovators' perceptions of the level of departmental support (e.g. funds, space, supplies etc.) and the degree of production and adoption of instructional innovations at Michigan State University.

The study used the cross-sectional survey method to find out the answer to the research question:

> As perceived by the selected faculty innovators, is departmental support related with the degree of their willingness to develop and use instructional innovations at Michigan State University?

The population for this study consisted of all faculty innovators (also called EDP project directors) who developed and used, on a voluntary basis, instructional innovations in their departments during the period of 1975-1979 at Michigan State University. A sample of 65 EDP project directors was drawn by using simple random sampling technique. Since no standardized instrument for data collection was available, a questionnaire with a 5-point Likert scale was designed, developed and validated. Copies of the survey were mailed to the respondents of this study. Out of the 65 randomly selected respondents, 55 completed and returned the

questionnaires. But only 52 questionnaires were used for the data analysis because the remaining 3 were late in arrival. The data collected were analyzed using partial correlation, zero-order correlation, Pearson's product-moment correlation, analysis of variance, F test and Scheffe post hoc test, frequencies and percentages.

In order to answer the broad research question of this study, eight null hypotheses were tested. Findings of this study are based on the analyses of the perceptual responses of the respondents. The faculty innovators did not perceive any significant relationship between financial support and adoption; policy support and adoption; technical support and adoption and chairman's support and adoption of instructional innovations. However, the findings showed significant relationship between office support and adoption; and colleagues' support and adoption of instructional innovations, but the related hypotheses could not be supported or confirmed because the alternates were contrary to the predictions made in the directional hypotheses.

Besides, out of six types of departmental support (Financial, policy, technical, office, colleagues' and chairman's support) only one, that is, colleagues' support, was found to have a significant effect on continuation/ discontinuation of the projects. With regard to departmental support and levels of adoption the findings indicated significant impacts of financial, office, colleagues' and

chairman's support on low, medium and high levels of adoption of instructional innovations.

Other minor findings of the study showed that out of 52 innovative instructional projects 26 (50%) were discontinued and 26(50%) were in active use. The important causes for discontinuation of the projects indicated by the respondents were: curriculum revision/change, course no longer offered, lack of enrollment of students, lack of departmental encouragement, change in students' background, change of duties, and change in personnel teaching the course. The study further revealed that out of 52 projects, 27(51.9%) projects have undergone major changes while 25(48.1%) projects were in use without undergoing any major changes since their initiation.

This study is subject to several limitations. The study was done at Michigan State University (MSU) and its respondents were the faculty members or Educational Development Program (EDP) project directors who, on a voluntary basis, designed, developed and used the instructional innovations in their respective departments during the period of 1975-1979. Thus its findings can not be generalized beyond the situations mentioned above. It is worth noting that the study did not include all types of educational innovations within the framework of institutions of higher education, rather it concentrated on only those instructional innovations which were reported in the annual reports of the EDP at MSU during the 1975-1979 period

(Appendix E provides a list of the respondents with their instructional innovations). Another limitation of the study relates to the fact that its findings are based on the analysis of the perceptions of instructional innovations developed and used by the respondents during the period of 1975-1979, and not on objective data. Besides, the list of sub-variables of the independent variables, namely, financial, policy, technical, office, colleagues' and chairman's support, which was generated on the basis of the indications found in the literature, and also through consultations can, by no means, be treated as exhaustive.

Conclusions, Implications and Recommendations

In this section, for clarity and better understanding, results are repeated in brief with reference to each hypothesis, corresponding conclusions are drawn, implications are given for those involved in the task of facilitating the innovation-adoption process, and, finally, recommendations are made for future studies or actions.

Results for Hypothesis No. 1

The results indicated that the respondents of this study did not perceive a significant relationship between financial support from their departments and adoption of their instructional innovations.

Conclusion: The conclusion that emerges from this finding is that hypothesis number one was not supported and

that departmental support is not effective in influencing innovation-adoption behaviors of highly motivated faculty members, who usually take their own initiatives to improve their instructions.

Implication: Although extrinsic rewards (e.g., financial support) do not seem effective with regard to highly motivated adopters especially when financial support needed for innovations is small, intrinsic rewards may profitably be used to effect the innovation adoption process. By creating conditions which help maximize intrinsic rewards, a change agent can influence innovation-adoption behaviors of highly motivated adopters.

Recommendation: It is recommended that studies be done to find out the impacts of extrinsic and intrinsic rewards on innovation-adoption behaviors of different types of adopters, namely, innovators, early adopters, early majority, late majority, and laggards in institutions of higher education.

Studies are also needed to examine the effect of the extent of financial support needed to produce and use instructional innovations on different types of adopters who significantly differ in respect of their personality traits.

Results for Hypothesis No. 2

The analysis of the data related to hypothesis no. 2 indicated that the respondents of this study did not perceive policy support from their departments as a

significant factor with regard to their innovation-adoption behaviors.

Conclusion: The corresponding conclusion is that hypothesis number 2 is not supported and departmental policy in terms of promotion, salary raises, tenure awards, etc., is not effective in influencing innovation-adoption behaviors of highly motivated individuals.

Implication: A change agent should, however, note that policy support from a department may become a significant factor if instructional innovations are such that they create conflicts with a department's policies and procedures, and if the adopters are not highly motivated individuals.

Recommendation: Some innovations do create conflicts with existing policy, procedure and structure of an organization because of their size, complexities and nature. So it would be desirable to find out whether the perception of policy support differs with size, complexity and nature of innovations, and also with different types of adopters.

Results for Hypothesis No. 3

The study showed that the respondents perceived no significant relationship between technical support and adoption of instructional innovations.

Conclusion: Hypothesis number 3 was also not supported. Therefore, technical support from a department is not effective in influencing innovation-adoption behaviors of

faculty members in different departments at Michigan State University.

Implication: It should, however, be noted that the technical support variable, like any continuous variable, has levels of technical complications. Technical support involving not very high level of technical skills and expertise may not be perceived as an important factor by highly motivated group of adopters, who are usually exposed to new ideas and skills through various sources, and who are also quick in grasping and acquiring such ideas and skills. Technical support, however, can be profitably used by change agents as a facilitating factor especially with regard to highly motivated adopters.

Recommendation: Since there are different levels of technical skills or support with different levels of complications, it would be interesting to undertake studies to find out how technical support with varying degrees of complications is perceived by different types of adopters in relation to their innovation-adoption behaviors.

Results for Hypothesis No. 4

The findings of this study revealed a significant relationship between perceptions of office support and adoption of instructional innovations by the respondents.

Conclusion: The corresponding conclusion is that the directional hypothesis could not be confirmed because the alternate was contrary to the prediction made in the

research hypothesis. However, office support is very effective in influencing innovation-adoption behaviors of faculty members in different departments.

Implication: Although why office support was perceived a very significant factor, in relation to innovation-adoption behaviors, is not clear, office support can be profitably used by change agents in influencing innovation-adoption behaviors of faculty members.

Recommendation: It would be useful to research the reasons why office support is perceived as a significant factor by faculty members with regard to their innovation-adoption behaviors.

Results for Hypothesis No. 5

The analysis of the data showed that a significant relationship exists between perceptions of colleagues' support and adoption of instructional innovations.

Conclusion: On the basis of the result, although the null hypothesis is rejected, the corresponding research hypothesis could not be confirmed because the alternate was contrary to the prediction made in the directional hypothesis. However, since a significant relationship does exist between perceptions of colleagues' support and adoption, it can be suggested that colleagues' support will be effective in influencing innovation-adoption behaviors of faculty members in different departments.

Implication: Professionals engaged in instructional development can, therefore, profitably use colleagues' support in effecting the process of innovation.

Recommendation: Since there are different types of adopters with different characteristics, it would be helpful for change agents to know whether different types of adopters perceive colleagues' support differently with regard to their innovation-adoption behaviors.

Results for Hypothesis No. 6

The study did not indicate a significant relationship between perceptions of a chairman's support and adoption of instructional innovations.

Conclusion: The corresponding conclusion is that hypothesis number 6 was not supported, and therefore, support from a chairman of a department will not be effective in influencing innovation-adoption behaviors of faculty members, especially those who are highly motivated.

Implication: However, a change agent should note that a chairman's support may not be a significant factor for highly motivated faculty members, but it may be an important factor for those who are not highly motivated. Also a chairman's support may be a crucial factor when instructional innovations conflict with existing policy, procedure and/or structure of a department. In such situations a chairman's support may be viewed as a

significant factor for successful production and continued use of instructional innovations.

Recommendation: Studies are needed to find out whether the perception of a chairman's support in relation to adoption of instructional innovations differs with differences in professorial ranks, adopter categories, and innovation characteristics (e.g., innovations creating conflicts with existing policy, procedure, etc., and innovations creating no conflicts at all).

Results for Hypothesis No. 7

Out of six types of departmental support (i.e., financial, policy, technical, office colleagues' and chairman's support), only colleagues' support was found to have a significant impact on continuation/discontinuation status of instructional projects.

Conclusion: The conclusion drawn from this finding is that colleagues' support is effective in influencing the decisions of the respondents with regard to continuation and discontinuation of their instructional projects.

Implication: A change agent engaged in the task of facilitating the innovation-adoption process may use colleagues' support in his efforts to institutionalize innovations.

Recommendation: Further investigations should be made to examine the effect of colleagues' support on

institutionalization of innovations with regard to the size and complexity of innovations.

Results for Hypothesis No. 8

Out of six types of departmental support, only financial, office, colleagues' and chairman's supports were perceived by the respondents as significant factors in influencing high, medium and low levels of adoption of instructional innovations.

Conclusion: Financial, office, colleagues' and chairman's support can be effective in influencing levels of adoption of instructional innovations.

Implication: Agencies or change agents trying to influence levels of adoption among adopters can profitably use these types of support from a department.

Recommendation: Since the respondents of this study were reasonably homogeneous, it would be interesting to know whether the effects of financial, office, colleagues' and chairman's supports on levels of adoption differ in respect of different types of adopters.

Additional Suggestions and Recommendations

In addition to the above recommendations which are directly related with the findings and conclusions of this study, the following suggestions and recommendations are given which are based on topics generated by this study.

As there are different types of adopters, there are also different types of organizations. It would, therefore, be helpful for a change agent, involved in activities directed toward facilitating the innovation-adoption process, to know how innovation-adoption processes differ with different types of organizations: business, government, institution of higher education, and so on.

One of the objectives of this study was to test a part of Davis' (1979) model related with organizational resources and adoption of instructional innovations in settings of higher education. The findings of this study did not support the assumptions expressed in the model with regard to departmental support as a significant factor in influencing innovation-adoption behaviors of faculty members. This raises questions about these assumptions, which requires further investigation.

This study drew its sample from only one university (Michigan State University), and examined only those instructional innovations reported in the annual reports of the Educational Development Program of Michigan State University during the period of 1975-1979. Therefore, in order to further validate the findings of this study, and to generate more generalizable data, studies are needed using larger samples, different types of educational innovations designed, developed and used at different institutions of higher education.

Since independent variables of this study were not only independent, but also significantly interrelated, it is suggested that further efforts should be made to assess the strengths of interrelatedness of independent variables and to determine the combined effect of these variables on innovation-adoption behaviors of different types of adopters.

The findings of this study are based on the analyses of data related to respondents' perceptions of what happened from 7-11 years ago. A lapse of a long period of time always raises questions as to the quality and accuracy of perceptual data. Though none of the respondents of this study expressed any problem in completing the questionnaire, it should not be forgotten that the data collected were limited to perceptions. To avoid this weakness, future studies need to be done on the basis of more objective data, e.g., records.

In order to have a better understanding of the process of innovation-adoption, it is desirable to study the components of the process, namely, organization, innovations and adopters in interaction with each other as a system. This may require studies combining several research methods, e.g., survey, experimental, case study and ethnography. The need to combine methods of research is increasingly being recognized and attended to by researchers these days to study complicated social problems and phenomena.

Summary

This concluding chapter is divided into two sections: summary of the study; and conclusions drawn from the findings with implications, and recommendations for further study or action.

The summary section provides a brief background of the problem, highlights the purpose and value of the study, describes the design and limitations of the study, and finally presents the findings of the study.

The second section of this chapter presents the results for each hypothesis of this study, provides corresponding conclusions with implications involved, and finally offers recommendations for future study or action.

APPENDIX A

THE QUESTIONNAIRE USED FOR THE STUDY

QUESTIONNAIRE

DIRECTIONS: For each of the following items, please indicate on the 5-point scale your degree of agreement or disagreement by circling one of the five indicators. Please note that the terms "the project," "EDP project," "my project" and "innovation" all refer to the EDP project mentioned in the cover letter.

If you:	Strongly agree, circle SA	(SA) A N D SD
	Agree, circle A	SA (A) N D SD
	are Neutral, circle N	SA A (N) D SD
	Disagree, circle D	SA A N (D) SD
	Strongly disagree, circle SD . . .	SA A N D (SD)

ITEMS:

1. I perceive that colleagues in my department consider my project a success . . . . . SA A N D SD

2. As a result of my project my colleagues have indicated willingness to try to develop and use instructional innovations in their respective areas. . . . . SA A N D SD

3. I think my colleagues in the department feel that they have sufficient freedom to initiate innovations . . . . . SA A N D SD

4. My department chairperson shows interest in my project by talking about it to other faculty members . . . . . SA A N D SD

5. In general my department may be characterized as exhibiting eagerness to seek out and try new ideas. . . . . SA A N D SD

6. My department prohibits the use of small number of students for the purpose of prototype tests. SA A N D SD

7. There is no institutional barrier that prevents experimentation with my project. . . SA A N D SD

8. After assessing possible merits and demerits of my project I am willing to be involved in another such project . . . . . SA A N D SD

9. My department considers innovative efforts directed toward the instructional process, for salary raises. . . . . SA A N D SD

10. If I had a chance to do a similar project in another department, I would follow the same procedures used in this project . . . . SA A N D SD

Please continue on page 2

11. My department provides released-time to design/ develop instructional projects . . . . SA A N D SD

12. My official assignments left me with inadequate time to devote to my project . . . SA A N D SD

13. My department considers innovative efforts toward the instructional process, for promotion. SA A N D SD

14. My department provides funds needed to buy supplies/materials for the project . . . SA A N D SD

15. My department considers innovative efforts toward the instructional process, for awarding tenure . . . . . SA A N D SD

16. My department encourages travels needed for exposure to new ideas or projects. . . . SA A N D SD

17. My department helps exploring possibilities for marketing the end product and getting royalties out of it . . . . . SA A N D SD

18. My department makes available information regarding funding sources for instructional innovations . . . . . SA A N D SD

19. My department provides funds for the purchase of equipment needed to implement and use the project . . . . . SA A N D SD

20. Graduate assistants' help is available in my department for development of instructional innovations . . . . . SA A N D SD

21. Space and other facilities needed for my project are available in my department . . . SA A N D SD

22. Secretarial assistance is available in my department for my project . . . . . SA A N D SD

23. Office supplies needed are available in my department for my project . . . . . SA A N D SD

24. My department helps in providing services for handling instructional equipment needed to use my project . . . . . SA A N D SD

25. If I could develop another such project I would definitely put it into practice. . . SA A N D SD

Please continue on page 3

26. My department makes efforts to obtain consulting services needed to design and develop the project from Instructional Media Center, Educational Development Program, etc. . . SA A N D SD

27. My chairperson often talks about instructional innovations in our faculty meetings . . . SA A N D SD

28. My project represents an improvement in educational practice in my department . . . SA A N D SD

29. Implementing projects like this at MSU could constitute an improvement in its educational practices. . . . . SA A N D SD

30. My completed innovation is continuing as initially planned. . . . . SA A N D SD

FOR THE FOLLOWING ITEMS, PLEASE CHECK THE APPROPRIATE SPACE:

31. Have there been any major changes in the project since its initiation?. . . . . Yes | |

No | |

32. Is the project discontinued? . . . . . Yes | |

No | |

33. How long has the project been in use in the department?. . . . . .

Less than 1 year | |

1-2 years | |

2-3 years | |

3-4 years | |

4-5 years | |

5 or more years | |

34. In case your project has been discontinued, please mention the major causes briefly.

_____

_____

Thanks for your cooperation.

APPENDIX B

THE CHART USED TO MONITOR RETURNS OF QUESTIONNAIRES

MONITORING CHART

Identifying Number	Date Questionnaire Mailed	Date Completed Questionnaire Received	Follow-Up(F.U.)	
			F.U.1	F.U.2

APPENDIX C

COVER LETTER ACCOMPANYING QUESTIONNAIRE

COVER LETTER

October 15, 1985

Address

Dear Dr. . . .

I need your help in completing the data collection phase of my doctoral dissertation in Educational Systems Development at the College of Education, Michigan State University.

The purpose of this study is to find out if there is any relationship between departmental support and the adoption of instructional innovations by faculty innovators at Michigan State University.

You are among the 65 highly regarded faculty innovators who have been randomly selected from the list of the Educational Development Program (EDP), Michigan State University. Your response, therefore, is of great value for the study.

Only about 15 minutes are needed to complete the questionnaire, and your cooperation in this regard will greatly help me in completing my Ph.D. program at Michigan State University.

Please complete the attached questionnaire and return it in the enclosed self-addressed and stamped envelope. Please respond to the statements and the questions on the questionnaire with reference to your innovative project mentioned below:

Project's name

To maintain complete anonymity no name or identification mark of any kind has been used on the questionnaire. The enclosed postcard is used as a further effort to ensure anonymity, and also to help reduce the cost of follow-up mailings, if needed. Please return the completed questionnaire as well as the self-addressed postcard through mail by November 4, 1985.

In case you have any question regarding this study please call me at 355-2993/355-9627 or Dr. Castelle G. Gentry at 353-7863.

Thank you very much for your help and cooperation.

Sincerely,

(M. Noorul Hussain)
1540F Spartan Village, E. Lansing, MI 48823

APPENDIX D

QUESTIONNAIRE ITEMS WITH THEIR CORRESPONDING VARIABLES

and

SCALE AND WEIGHT ASSIGNMENT

QUESTIONNAIRE ITEMS AND VARIABLES

Variables	Item Numbers
Financial Support	14, 18, 19
Policy Support	9, 11, 12, 13, 15, 16, 17, 21
Technical Support	20, 24, 26
Office Support	22, 23
Colleagues' Support	1, 2
Chairman's Support	3, 4, 5, 6, 7, 27
Adoption	8, 10, 25, 28, 29
Life/Stability	30, 31, 32, 33, 34

SCALE AND WEIGHT ASSIGNMENT

For item numbers: 1 to 5; 7 to 11; 13 to 30 weights were assigned as follows:

Strongly Agree	=	5
Agree	=	4
Neutral	=	3
Disagree	=	2
Strongly Disagree	=	1

For item numbers 6 and 12 weights were reversed.

APPENDIX E

LIST OF INSTRUCTIONAL PROJECTS WITH RESPONDENTS (INNOVATORS)

LIST OF PROJECTS AND RESPONDENTS

Subject Area	Project Title	Project Directors/ Innovators
Agricultural-Technology	Development of mastery learning SLATE's for the Agricultural Technology Soil Science program	Dr. Henry D. Foth* Dr. Paul E. Rieke Mr. Terence H. Cooper
American Thought and Language	Development and utilization of materials for a new interdisciplinary university college course Sex and Sexuality in American Films	Dr. Herbert Bergman*
Anxiety Reduction	Establishment of a behavior treatment program for the alleviation of speech and test anxiety	Dr. David C. Ralph* Dr. Richard K. Russell
Education: Research and Evaluation Training	Implementation of the FEHR Practicum computerized simulation to provide research and evaluation training for Michigan State University faculty and students	Dr. Norman T. Bell*
Food Science and Human Nutrition	Development of a prototype SLATE for teaching students to identify retail and institutional cuts of beef and to state appropriate culinary procedures for each	Dr. James F. Price*
Humanities	Continued development of AV modules on the People's Republic of China	Dr. Joseph J. Lee*

* Respondents.

Humanities	Continued development of reading comprehension AV modules based on the subject assignments in Humanities courses	Dr. F. D. Borrows* assisted by Ms. Elaine E. Cherney
Interpersonal Process Recall (IPR)	Continuation of a test of the feasibility of large scale implementation of IPR training in dormitories on the MSU campus	Dr. Norman Kagan Dr. J. Bruce Burke*
Mathematics	Development of instructional modules for use in Math 081 and 082	Ms. Elizabeth Phillips*
Russian	Development of a programmed audio workbook for teaching listening comprehension of Russian	Dr. Frank L. Ingram*
Sociology	Development of a training program for graduate teching assistants	Dr. William L. Ewens*
University College-Faculty Workshop	The conduct of a two-day workshop for University College faculty on the improvements of instruction	Dr. Leroy A. Olson*
Zoology	Revision of laboratory portion of Fundamentals of Invertebrate Zoology (ZOL 381)	Dr. Ralph A. Pax*
Animal Husbandary	Development of SLATE's for IDC 488--The Impact of Animal Resource Management upon the World's Developing Naitons	Dr. Robert J. Deans*
Civil Engineering Structural Analysis	Development of self-paced mastery model course with computer-generated exams for CE 305-Structural Mechanics I	Dr. James L. Lubkin*
Computer Assisted Graphic Design	The development of an interdisciplinary program in Computer Assisted Graphic Design	Professor Joseph J. Kuszai*
Crop and Soil Science	Development of a laboratory manual for grain grading	Dr. Lawrence O. Copeland*

Engineering	Implementation, evaluation and dissemination of technologically-oriented instructional games (TOIGS) for use in IDC 201-Intro to Environmental Systems	Dr. Ronald C. Rosenberg* Dr. Frederick T. Fink
English as a Second Language	Revision of audio tape recordings for teaching English as a second language	Ms. Wu Yi So*
Fisheries and Wildlife	Development of a SLATE for FW 426-Ecology of Migratory Birds	Dr. Harold H. Price*
Political Science	Production of slides of political cartoons for PLS 430-Seminar in Political Organization and Behavior	Dr. Charles Press*
Chemistry	Identification of learning problems and development of remedial instructional modules for CEM 130, 131-Intro to Chemistry I and II	Dr. Robert N. Hammer*
Computer Science	Development and preliminary evaluation of a section using interactive computing rather than batch processing in a regular structure course environment	Dr. Harry G. Hedges*
Computer Science	Development of a decision table processor to facilitate instruction in problem solving concepts in CPS 110-Intro to Computer Programming	Dr. Herman D. Hughes*
Engineering	Continued development and evaluation of technologically-oriented instructional games (TOIG) for use in IDS 201-Intro to Environmental Systems	Dr. Ronald C. Rosenberg Dr. Fredrick T. Fink*
English: Scientific Writing	Development of a year-long sequence of English courses in Scientific Writing	Dr. E. Fred Carlisle*

Expansion of Nonprint Facilities in the Library	Installation of 3 video-cassette/ITV viewing stations in the MSU library to enable students to view videotapes and closed circuit telecasts of course instruction	Dr. Richard E. Chapin* Dr. Erling S. Jorgenson
Interdisciplinary Humanities Course	Development of an interdisciplinary course entitled, Critique of a Bourgeois Culture	Drs. Duggan, Konvitz, Johnsen, Goodson, Watkins and Koppisch*
Natural Science	Testing of an interactive computer assisted instructional model in Natural Science courses; and development of a computer assisted mathematics remediation program	Dr. Donald J. Weinshank*
Physics	Evaluation of a self-paced mode of instruction in 12 upperdivision Physics courses	Dr. Julius S. Kovacs*
Plant Pathology	Development of SLATE's for teaching Plant Pathology and Plant disease identification	Dr. Joseph M. Vargas, Jr.*
Psychology	Production of audiotapes and written text for PSY 336-Psychology of Social Movements and PSY 437-Psychology of Political Behavior	Dr. Charles F. Wrigley*
Social Studies Education	Development of instructional procedures and materials for Law-focused education for use in ED 325D-Teaching of Social Studies in Elementary Grades	Dr. William W. Joyce*
Sociology	Development of a televised version of SOC 241-Intro to Sociology	Dr. Philip M. Marcus*
Agricultural and Natural Resources Education Institute	Assignment and redesign of Agriculture and Natural Resources Communications (AG401)	Dr. Maxine S. Ferris*

Art History	Design and develop a new painting and drawing course emphasizing techniques used prior to the 20th Century	Dr. Eldon N. VanLiere*
Criminal Justice	Development of a model program for integrating curriculum design with the employment market	Dr. John K. Hudzik*
Dairy Science	Development of a series of slide/tape autotutorial units (SLATE's) for a laboratory in mammary physiology	Dr. H. Allen Tucker* Mr. Duane Kalin
Dairy Science	Continued development of self-instructional modules for Dairy Production(DRY 214)	Dr. Roy S. Emery*
Development Psychology	The development of instructional resources and graduate assistant teacher training for PSY 244: Development Psychology: Infancy-Childhood	Dr. Hiram E. Fitzgerald*
English as a second Language	Developing competency-based and individualized modules for advanced students at the English Language Center	Dr. Paul E. Munsell* Dr. Ralph P. Berrett Mr. M. Kiavash Azima
Geology, Zoology, Entomology	Use of a microscope TV camera and color monitor for teaching microscope concepts to large groups	Dr. F. W. Cambray*
Health, Physical Education and Recreation	Development of a new curriculum in athletic coaching using high-speed films	Dr. Gale Mikles*
Humanities	Development of a course which allowed students to structure their own learning experience	Dr. Margaret W. Grimes*
Humanities	The development of a coresatellite course dealing with the roles and contributions of women in the Humanities	Dr. Jane Karoline Vieth*

Instructional Modules for Applied Physics	Development of self-instructional competency-based learning modules on topics to service upper-division non-physics majors	Dr. Peter Signell*
Interdisciplinary Humanities course	Development of an Interdisciplinary course entitled: Critique of a Bourgeois Culture	Drs. Duggan,* Goodson, Johnsen, Konvitz, Kippisch, Watkins, and Wilkinson
Mathematics	A study of students' thinking processes in solving infinite process problems to provide a basis for curricular revisions in MTH 424	Dr. John J. Masterson*
Natural Science	Production of slide/tape supplements to the basic Natural Science Courses to aid the under-prepared (skills deficient) freshmen with this general education requirement	Dr. Manfred D. Engelmann* Dr. Charles St. Clair
Plant Physiology	Development of pre-lab self-instructional slide/tape modules for Intro to Plant Physiology (BOT 301)	Dr. Kenneth Nadler*
Psychology	Teaching the Pshychotherapy of Psychosis by means of videotaped interviews	Dr. Bertram P. Karon*
Audiology and Speech Science	Classroom and laboratory demonstration of selected auditory phenomena for students of communication disorders	Dr. Michael R. Chial* Dr. Linda L. Smith Dr. Steven C. White
Biochemistry	Development of "compressed" audiotapes in lecture courses	Dr. J. E. Wilson*
Communication	Continued development of videotapes and a new instructional model integrating the videotapes in Communication 100	Dr. Cassandra Book*

Competency Assessment	Planning academic assessment and advising centers for life-long education students	Mary Jim Josephs
Energy: A Thematic Program	Development of an undergraduate Thematic program in Energy and Related Issues	Dr. James J. Gallagher* Dr. Herman Koenig
Fortran Programming	Further development of modularized FORTRAN programming course	Dr. Floyd LeCureux Mr. James Nash*
History	Development of a course on the history of sports in America	Dr. Peter Levine*
Humanities	Development and integration of live musical performances and demonstrations into the humanities curriculum	Dr. Conrad L. Donakowaski*
Mathematics	Development of materials and course procedures to assess the effect of hand-held calculators on student learning and motivation in Mathematics 108 and 109	Dr. Marshall Hestenes* Dr.R.O.Hill,Jr. Ms. Elizabeth Phillips*
Natural Science	Feasibility test of the Sony Betamax system to determine whether such use of video modules on a decentralized basis will result in more flexible scheduling, more faculty use and improved student learning	Dr. Alwynelle S. Ahl* Dr. Helen B. Hiscoe Dr. Donald J. Weinshank
Psychology	Identification and Longitudinal study of highly competent, normal and problem undergraduates	Dr. Gary E. Stollak* Dr. Eileen Thompson Dr. John Hurley Dr. Elaine Donelson
Sociology	Use of films to integrate cross-cultural topics in Sociology	Dr.Bo Anderson*

APPENDIX F

CORRESPONDENCE RELATED TO DATA COLLECTION

PERMISSION ON CAMPUS

June 10, 1985

The chairman
University Committee on Research Involving Human Subjects
238 Administration Building
Michigan State University
E. Lansing, MI 48824

Dear Sir:

I am a doctoral candidate at the College of Education, Michigan State University, and want to do my dissertation research on campus. My dissertation proposal has been approved by my committee, and I need to collect data from 65 MSU faculty members.

It is my understanding that your approval is required prior to the implementation of studies involving campus subjects. Therefore, I request for your permission.

Your prompt action will be very helpful.

Thanking you,

Sincerely,

(M. Noorul Hussain)
1540F Spartan Village
E.Lansing, MI 48823

Enclosures:

1) One copy of dissertation proposal
2) 7 copies of dissertation proposal abstract
3) 7 copies of the questionnaire
4) 7 copies of my advisor's letter

MICHIGAN STATE UNIVERSITY

UNIVERSITY COMMITTEE ON RESEARCH INVOLVING
HUMAN SUBJECTS (UCRIHS)
238 ADMINISTRATION BUILDING
(517) 355-2186

EAST LANSING • MICHIGAN • 48824-1046

September 18, 1985

Mr. M. Noorul Hussain
1540-F Spartan Village
East Lansing, Michigan 48823

Dear Mr. Hussain:

Subject: Proposal Entitled, "A Study of Relationship Between Departmental Resources/Supports and Adoption of Instructional Innovations at MSU"

UCRIHS review of the above referenced project has now been completed. I am pleased to advise that since the reviewers' comments have been satisfactorily addressed, the conditional approval given by the Committee at its September 9, 1985 meeting has now been changed to full approval.

You are reminded that UCRIHS approval is valid for one calendar year. If you plan to continue this project beyond one year, please make provisions for obtaining appropriate UCRIHS approval prior to September 9, 1986.

Any changes in procedures involving human subjects must be reviewed by the UCRIHS prior to initiation of the change. UCRIHS must also be notified promptly of any problems (unexpected side effects, complaints, etc.) involving human subjects during the course of the work.

Thank you for bringing this project to our attention. If we can be of any future help, please do not hesitate to let us know.

Sincerely,

Henry E. Bredeck
Chairman, UCRIHS

HEB/jms

cc: Dr. Castelle G. Gentry

MICHIGAN STATE UNIVERSITY

UNIVERSITY COMMITTEE ON RESEARCH INVOLVING
HUMAN SUBJECTS (UCRIHS)
238 ADMINISTRATION BUILDING
(517) 355-2186

EAST LANSING • MICHIGAN • 48824-1046

August 21, 1985

TO: M. NOORUL HUSSAIN

FROM: HENRY E. BREDECK, CHAIRMAN, UCRIHS

SUBJECT: PROPOSAL ENTITLED "A STUDY OF RELATIONSHIP BETWEEN DEPARTMENTAL RESOURCES/SUPPORTS AND ADOPTION OF INSTRUCTIONAL INNOVATIONS AT MSU"

The above referenced proposal has been distributed for review to a subcommittee of UCRIHS and three of the reviewers made the following comments:

Reviewer #1 -- "The project appears to involve minimal risk but insufficient information was provided to evaluate the proposal. The investigator needs to provide a risk/benefit analysis as well as describe procedures to maintain confidentiality and anonymity. The questionnaire refers to a cover letter but none was included in my materials to review."

Reviewer #2 -- "I am recommending approval of Mr. Hussain's project conditional upon receipt in Dr. Bredeck's office of: 1) acknowledgement of study proposal from current adviser (Dr. Gentry) and 2) a cover letter to be used in distribution of the questionnaire to the 65 of 180 faculty identified by the Educational Development Program as "faculty innovators." It is my understanding that Mr. Hussain's intended cover letter will make it clear that participation in the survey is voluntary and that responses will not be identified by name or code number or other personally identifiable means."

Reviewer #3 -- "I do not image there are any risks associated with this proposed research. However, I am reluctant to conclude that without the PI's addressing the question of risk and the necessity, if any, for a permission form."

We would appreciate your early response to these comments so that we can complete our review of this project.

mt

September 4, 1985

Dr. Henry E. Bredeck
Chairman, UCRIHS
238 Administration Building
MSU Campus

Dear Dr. Bredeck:

With reference to your letter of August 21, 1985 I am presenting the following facts as response to the comments of the members of the Proposal Review Committee:

(1) The cover letter to be used in distribution of the questionnaire to respondents is attached. The draft of this letter has been approved by Dr. Gentry who is my current advisor. This letter will provide in brief the procedures to be followed in maintaining anonymity of the respondents.

(2) I have asked Dr. Gentry yesterday to send a letter directly to your office acknowledging the "Proposal" and indicating his approval of it. Dr. Gentry is currently on vacation. As a result, receipt of his letter by your office may be delayed.

(3) Also attached is a plan for maintaining anonymity of the respondents selected for this study.

I hope these will satisfy the concerns of the members of the Proposal Review Committee.

However, in case more information is needed please feel free to call me at 355-2993/355-9627.

Thanks,

Sincerely,

(M. Noorul Hussain)
1540F Spartan Village
E. Lansing, MI 48823

Proposal Topic: A study of relationships between departmental resources/supports and adoption of instructional innovations at MSU.

The Plan To Maintain Anonymity

From the EDP list of 180 faculty innovators 65 will be selected using random sampling technique as samples for the study. The questionnaires will be sent to respondents through mail with a cover letter explaining the procedure of selection of respondents and indicating the method of maintaining anonymity of respondents (see the attached copy of cover letter).

To maintain complete anonymity no name or identification mark of any kind whatsoever will be used either on the questionnaires or on any accompanying papers.

To reduce the cost of follow-up mailings, to futher ensure anonymity, and to avoid frustration and displeasure of those who would send the completed questionnaires in the first place, a self-addressed, stamped postcard, with one of the mailing labels affixed to the reverse side of it, will be sent to each respondent with the questionnaire. Through the cover letter the respondents will be requested to return the completed questionnaires as well as the enclosed postcards through mail. Receipt of the postcards will indicate that questionnaires were returned, but which questionnaire was whose would not be known.

Proposal Topic: A study of relationships of departmental resources/supports and adoption of instructional innovations at MSU.

MICHIGAN STATE UNIVERSITY

COLLEGE OF EDUCATION · DEPARTMENT OF COUNSELING, EDUCATIONAL PSYCHOLOGY AND SPECIAL EDUCATION

EAST LANSING · MICHIGAN · 48824-1034

June 4, 1985

Dr. Henry E. Bredeck
University Committee on Research
Involving Human Subjects
238 Administration Building
Michigan State University
East Lansing, MI 48824

Dear Dr. Bredeck:

Mr. M. Noorul Hussain, MSU #650038 has had his thesis proposal, "A Study of Relationships Between Departmental Supports and Adoption of Instructional Innovations at MSU," approved by his committee. This involves interaction with MSU faculty members for data.

Sincerely,

James L. Page
Professor
Educational Systems Development

JLP:cd

September 9, 1985

Dr. Henry E. Bredeck, Chairman
University Committee on Research
Involving Human Subjects (UCRIHS)
238 Administration Building
Michigan State University

Dear Dr. Bredeck:

This has reference to your letter dated August 21, 1985 which was addressed to M. Noorul Hussain asking him to provide your office with an acknowledgement of his study proposal by his current advisor.

Since the retirement of Dr. Page, Noorul has been working on his Ph.D. program under my advisement. His Ph.D. dissertation proposal (A study of relationships between departmental resources/supports and adoption of instructional innovations at MSU) approved by the committee of which Dr. Page was the chairman, has also been approved by me.

I have also approved the draft of the cover letter to be used in distribution of the questionnaire. The cover letter provides needed assurances and procedures to be followed in maintaining anonymity of the respondents.

Should you have further questions in this regard, please feel free to call me at 353-0637.

Sincerely,

Castelle G. Gentry
Professor

CGG:cd

LIST OF REFERENCES

LIST OF REFERENCES

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