AN EXPLORATORY STUDY COMPARING CHARACTERISTICS OF INNOVATORS AND NON-INNOVATORS AT A LARGE UNIVERSITY

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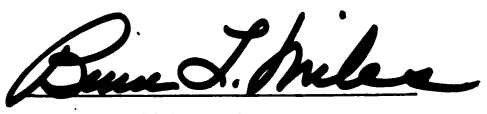

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ABSTRACT

AN EXPLORATORY STUDY COMPARING CHARACTERISTICS OF INNOVATORS AND NON-INNOVATORS AT A LARGE UNIVERSITY

By

Steven Gregory Sachs

This study had two purposes. The first purpose was to identify in a higher education setting, specific characteristics of innovators and their departments which differed from non-innovators and their departments. The second purpose was to validate part of Rogers' and Shoemaker's model which deals with the characteristics of adopters of innovations. Only 18 of the 45 variables from this model were selected for this study.

The variables used in this study were age, status, size of teaching load, specialization of teaching responsibility, fatalism, innovativeness, social participation with departmental colleagues, integration with their social system, cosmopoliteness, information seeking about instruction, knowledge about instructional innovations, opinion leadership, membership in modern and/or integrated system, norms on the importance of teaching, norms on innovativeness, norms on instructional strategies, resources for instructional improvement, and stability of instructional assignments. These 18 variables were represented by 27 different measures.

To identify the differences between innovators and non-innovators, this study used an ex post facto multivariate comparison design. The data were collected through questionnaires distributed

to 345 faculty at Michigan State University. These faculty were divided into three groups for the purposes of analysis. The first group was composed of faculty who had received grants from the MSU Educational Development Program (EDP) for an instructional development project for improvement to an undergraduate course. These were the instructional innovators. The second group was composed of faculty who reported that they had not been involved in an instructional development project during the preceding five years. These were the non-innovators. The third group was composed of faculty who reported that they had been involved in an instructional development project during the past five years, but who had not received EDP support. These were the unsupported innovators.

The data were analyzed by two multiple regression techniques: simple multiple regression and discriminant function analysis. This analysis occured in four parts. First, a regression equation to predict the number of projects an innovator had done was generated from data supplied by the EDP project directors. Second, the same data that were used to generate the first regression equation were used to generate a second regression equation which was to predict a combined measure of success for the innovator's first project. Both of these equations were then analyzed using discriminant function analysis to determine whether they could identify variables which would differentiate between innovators and non-innovators. The third part in the data analysis was the use of a separate discriminant function analysis to identify variables which differentiated between the known innovators (EDP project directors) and the known non-innovators. Finally, the data from the unsupported innovators were

compared with the data from the innovators and the non-innovators.

This four-part analysis yielded information about which variables, acting individually or in combination, were significantly different between innovators and non-innovators, and also provided linear equations for use in future analysis of individual faculty members. Of the 18 variables included in this study, only eight were found to be significantly different between innovators and non-innovators. These were: innovativeness, integration with the social system, cosmopoliteness, information seeking about instruction, opinion leadership, norms on innovativeness, norms on instructional strategies, and stability of instructional assignments.

Major findings. The data analysis provided the following major findings:

1. Innovators differed from non-innovators by showing:
    a. Greater innovativeness
    b. More integration with the social system
    c. Greater cosmopoliteness
    d. Greater information seeking about instruction
    e. Greater opinion leadership change
2. Innovators' perceptions of their departments differed from the perceptions of non-innovators by showing:
    a. Less supportive norms on innovativeness
    b. Less supportive norms on instructional strategies
    c. More stability of instructional assignments

An additional major finding was that there were three distinct groups of faculty: innovators, early adopters, and non-innovators.

As a result of these findings, four conclusions were reached.

These conclusions were:

1. Eight differences can be identified between innovators and non-innovators in terms of personal and social system characteristics.
2. Three groups of faculty can be identified: innovators, early adopters, and innovators.
3. Innovators perceive that their departments do not provide sufficient financial and/or psychological support for instructional innovation.
4. Only a portion of the individual and social system characteristics from the Rogers and Shoemaker model on the diffusion and adoption of innovations appears generalizable to higher education settings.

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By

Steven Gregory Sachs

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CHAPTER I

THE PROBLEM

Introduction

A number of forces have been applying stress to institutions of higher education making it difficult to improve instruction (see Berquist & Phillips, 1975; Brown & Hanger, 1975; Dietrich & Johnson, 1967; Winstead, Draine, & Romine, 1969). Funds for improving instruction and faculty mobility have been declining, making it more difficult to introduce new ideas and techniques into colleges and universities. Demands for accountability and improved curriculum have been increasing. These forces have worked against the success of piecemeal efforts to improve instruction.

In a recent article on faculty development, Berquist and Phillips (1975, p. 178) point out that a comprehensive approach to educational development is needed in higher education to deal with these problems. This comprehensive approach would involve the faculty, the instruction, and the organization simultaneously. The problem with implementing an innovative program of this type, however, is determining how to have the innovation accepted or adopted by the faculty.

Rogers (1968, p. 71) identifies four types of decisions regarding the adoption of innovations which occur in a complex organization such as an institution or higher education. First, there are optional decisions initiated by the individual regardless of the decisions made by colleagues. Second, there are contingent

decisions which require some prior decision to adopt or accent the innovation from the other members of the social system. Third, there are collective decisions which require consensus. Finally, there are authority decisions which are forced on the individual by someone with greater power. Rogers (1968, p. 71) goes on to suggest that one of the reasons that change is slower in higher education than in other fields is that the decisions to adopt innovations are contingent or collective rather than of the optional type.

If a comprehensive approach to educational development (i.e., an innovation) is to be adopted on the basis of optional faculty decisions, it is likely that some faculty might not choose to adopt this innovation and would not participate in the educational development process. It is also likely that those who chose to participate probably differ on important dimensions from those who did not.

Thus a research question of interest to those responsible for the diffusion and adoption of innovators in higher education is: how do innovators differ from non-innovators? In this study, innovators were defined as those who participated in an educational development program based primarily on optional innovation adoption decisions and non-innovators were those who did not participate.

Purpose

This study had two purposes. The first purpose was to identify in a higher education setting, specific characteristics of innovators and their departments which differed from non-innovators and their departments. The second purpose was to validate part of Rogers'

and Shoemaker's model (1971) which deals with the characteristics of adopters of innovations. Validation is necessary since the contribution of data from higher education to the development of this model was extremely limited.

Importance

There are two reasons why identifying how innovators differ from non-innovators is important. First, information about the characteristics of the faculty reached by an educational development program based on optional innovation decisions can be used for the design of long range program evaluation and as a management tool to assist in providing more effective services. Second, it will identify which parts of the model on the adoption of innovations can be used to facilitate adoption of innovations in higher education.

Research on the adoption of innovations process in education has provided incomplete support for the Rogers and Shoemaker model (1971). This problem can be traced to several causes. Much of this research failed to examine the influence of the adopter's social system on the adoption decision, thus overlooking, a large part of the model. Also, this research usually studied adoption by a school rather than adoption by an individual. Finally, most of the research was limited to public schools and did not explore the innovation process in higher education. This study addresses those weaknesses.

Generalizability

Even though this study was exploratory in nature, its findings should apply to other higher education settings other than the one studied. For example, because the research was conducted at a large

university, faculty members may be more similar to colleagues in the same discipline at other universities than like colleagues in different disciplines at their own university. Haines (1974) found differences between disciplines greater than differences between institutions in a study on curriculum and instructional differences.

Another reason that the findings of this study should be generalizable is that the research did not focus on the adoption of a specific innovation, such as computer assisted instruction. Therefore, the findings should be applicable to the adoption of innovations in general where adoption is based on an optional decision.

Finally, the findings from this study can be used to support or refute the generalizations on the characteristics of adopters developed by Rogers and Shoemaker (1971) based on findings from research on the adoption of many innovators in many fields.

Underlying Theory

In their review of the literature, Rogers and Shoemaker (1971, p.61) identify three shortcomings of the existing research on the adoption of innovations in the field of education.

1. Failure to consider communication channels
2. Failure to consider how the social structure acts to impede or facilitate diffusion and adoption
3. Failure to recognize that adoption decisions are generally not optional decisions (i.e., they require approval or prior adoption by others in the social system)

They also point out that the study of diffusion and adoption of innovations in the educational field is one of the weakest areas of

existing research in terms of its contribution to the knowledge about diffusion and adoption.

Traditional studies of the diffusion and adoption of innovations in education such as Brickell (1961) and Miles (1964) have focused mainly on individual variables such as socioeconomic factors, social participation, opinion leadership, etc. The flaw in these studies is that they fail to account for variables in the social system which cause the adopter under pressure to behave in ways not necessarily consistent with his personality. These pressure inducing social system variables include such things as the norms of the system, the decision making structure, style of leadership, etc.

A further weakness of these traditional studies is that the link between the social system and the individual has not been explored. This link involves communication variables such as direction of communication, communication channel usage, adequacy of communication, etc.

A number of researchers have recognized this flaw and begun providing models which take into account more of the elements in the adoption of innovations process (Carlson, 1968; Havelock, 1969; Rogers & Jain, 1968; Sarbaugh & Hawkins, 1973). Yet, the greatest detail in identification of the elements in the innovation model is still provided by Rogers and Shoemaker (1971). Evidence of this is provided by the frequency with which Rogers and Shoemaker are cited as the underlying model for empirical and non-empirical work in this field. Havelock, a prolific writer in the field, goes into great detail; however, it is with reference to research utilization and the importance of the link between research and practice rather than with

the diffusion and adoption of innovations or with the characteristics of innovators.

By combining various descriptions of the innovation adoption process presented by Rogers (Rogers, 1968; Rogers & Jain, 1968; Rogers & Shoemaker, 1971), four interrelated categories of variables can be identified.

1. Individual variables
2. Social system variables
3. Communication variables
4. Consequences of adoption variables

Within each of these categories are a number of variables Rogers and Shoemaker consider most significant in the innovation adoption process; definitions of those variables from the model which are of interest to this study are provided in a later section of this Chapter. The variables in each of the categories of this model are listed below:

I. INDIVIDUAL VARIABLES

1. Socioeconomic

a. Age

b. Education

c. Literacy

d. Status

e. Upward social mobility

f. Size of unit

g. Commercial orientation

h. Attitude toward credit

i. Specialization of operation

2. Personality
    a. Empathy
    b. Dogmatism
    c. Ability to deal with abstraction
    d. Rationality
    e. Intelligence
    f. Attitude toward change
    g. Attitude toward risk
    h. Attitude toward education
    i. Attitude toward science
    j. Fatalism
    k. Achievement motivation
    l. Aspirations
    m. Innovativeness
3. Communication Behavior
    a. Social participation
    b. Integration with social system
    c. Cosmopoliteness
    d. Change agent contact
    e. Exposure to interpersonal communication
    f. Exposure to interpersonal communication
    g. Information seeking about innovations
    h. Knowledge about innovations
    i. Opinion leadership
    j. Membership in modern system
    k. Membership in integrated system

II. SOCIAL SYSTEM VARIABLES

1. Norms
2. Leadership
3. Decision making structure
4. Characteristics of system that affect behavior

III. COMMUNICATION VARIABLES

1. Amount of relevant communication in the system
2. Direction of communication
3. Symmetry of communication flow
4. Channels

IV. CONSEQUENCES VARIABLES

1. Productivity or quality
2. Efficiency
3. Morale
4. Self-renewal

Variable Selection

The selection of variables from the Rogers and Shoemaker model for inclusion in this study was based on three criteria. First, the variable had to be an individual or social system variable; second, it had to be operationalized in such a way that its measure could be based on direct personal experiences or perceptions of the individual; and third, the variable had to be capable of being measured quickly.

Although Rogers and Shoemaker identify four categories of variables only individual and social system variables were included in this study. It would have been inappropriate to include communication variables since the unit of analysis in this study was the

individual, and the unit of analysis for communication variables should be the dyad or social system. Consequences variables were similarily inappropriate since the unit of analysis for these variables should be the social system rather than the individual (Carlson, 1968; Rogers & Jain, 1968).

The measurement of variables was limited to reports of direct personal experiences or perceptions by the respondents. The reason for this limitation was that validated measures did not exist for many of the abstract variables, and the instruments that did exist were often inappropriate for use in higher education settings. Development of these kinds of measures was beyond the scope of this study.

As a third criteria, each variable had to be capable of being measured quickly. Since the emphasis of this study was on breadth rather than depth of analysis and since each faculty member would have a limited amount of time to deal with this study, keeping the measure short and the questions direct would encourage complete responses to more items by a large number of faculty.

Along with these three criteria, two assumptions were made which affected the development of the research instrument used to measure these variables. First, it was assumed that the faculty member would have or be able to remember the information asked for, especially when asked about events within his department. Second, it was assumed that faculty would be truthful and there would be no systematic attempt to bias responses to obtain a future reward or to please the Educational Development Program which was sponsoring a part of this research.

Applying these three criteria, and taking into account the

two assumptions regarding faculty responses, 18 of the 45 variables from the Rogers and Shoemaker model were selected for this study. These 18 variables were: age, status, size of teaching load, specialization of teaching responsibility, fatalism, innovativeness, social participation with departmental colleagues, intergration with their social system, cosmopoliteness, information seeking about instruction, knowledge about instructional innovations, opinion leadership, membership in modern and/or integrated system, norms on the importance of teaching, norms on innovativeness, norms on instructional strategies, resources for instructional improvement, and stability of instructional assignments.

The Research Questions

This study attempted to determine the answers to the following two research questions:

1. On which of the individual characteristics selected for this study do instructional innovators differ from non-innovators?
2. On which of the social system characteristics selected for this study do instructional innovators' perceptions of their departments differ from those of non-innovators?

Innovators vs. Early Adopters

Rogers and Shoemaker (1971, pp. 175-185) makes a distinction between innovators and other adopters of an innovation. They identify five categories, or ideal types, of adopters based on time of adoption: innovators, early adopters, early majority, late majority and laggards.

According to this classification scheme, innovators have

different characteristics than early adopters. The primary differences are that the early adopter has more opinion leadership, is more in line with the norms of the social system, and tends to be less cosmopolite. However, a study by Stern, Craig, LaGreca & Salem (1976) at Ohio State University, failed to find these differences among pioneers, early, and late adopters of an innovation. Even Rogers and Shoemaker are not clear in the distinction between innovators and early adopters when they provide generalizations of research findings (Rogers & Shoemaker, 1971, pp. 352-376). They refer to "earlier" adopters rather than "early" adopters.

In this study, MSU faculty who voluntarily conducted Educational Development Projects (the EDP project directors) were referred to as "innovators". The term innovator was considered comparable to Rogers' and Shoemaker's term "earlier adopters" for several reasons. First, Rogers and Shoemaker blur the distinction. Second, there was no way to measure the time of adoption to determine exactly how soon these individuals adopted an innovation after first becoming aware of it, so the group sampled undoubtedly contained both types. Third, this study did not compare different classes of adopters, but instead, it compared <u>adopters</u> with <u>non-adopters</u>. Since innovators would be more like early adopters than like non-adopters (Stern et al, 1976) making a distinction between innovators and early adopters was not crucial to this study.

However, the use of the label "innovators" for this group was more appropriate and descriptive than the label "early adopters". This is because there have been relatively few faculty supported by EDP, as compared to the total faculty at the University. This agrees

with the definition of innovators being among the first to adopt an innovation. Furthermore, the EDP criteria for selection and support of projects is biased toward those projects which are "innovative" within a given department.

The question of whether EDP project directors were innovators or early adopters is discussed in greater detail as a problem of selection in the section dealing with the research design in Chapter III.

Definitions of Terms

Fatalism. "Fatalism is the degree to which an individual perceives a lack of ability to control his future" (Rogers & Shoemaker, 1971, p. 188).

Integration. "Communication integration is the degree to which the units in a social system are interconnected by interpersonal communication channels" (Rogers & Shoemaker, 1971, p. 188).

Cosmopoliteness. Cosmopoliteness is the degree to which an individual's reference groups, or influences, are from outside the social system. (Gouldner, 1957, p. 290; Rogers & Shoemaker, 1971, p. 189).

Opinion leadership. "Opinion leadership is the degree to which an individual is able to informally influence other individuals' attitudes or overt behavior in a desired way with relative frequency" (Rogers & Shoemaker, 1971, p. 35).

Modern systems. "A modern system is typified by:

1. A generally positive attitude toward change.
2. A well developed technology with a complex division of labor.

3. A high value on education and science.
4. Rational and businesslike social relationships rather than emotional and affective.
5. Cosmopolite perspectives, in that members of the system often interact with outsiders, facilitating the entrance of new ideas into the social system.
6. Empathic ability on the part of the system's members, who are able to see themselves in roles quite different than their own" (Rogers & Shoemaker, 1971, pp. 32-33).

Overview of the Study

The review of related research in Chapter II compares the findings of empirical studies on the diffusion and adoption of instructional innovations in higher education with the findings from a variety of fields and draws implications of this research for the present study.

The methods used to collect and analyze the data from this study are presented in Chapter III. An explanation and rationale for the multi-variate analysis techniques which were used is also provided.

The findings and appropriate discussion are presented in the final two chapters. Chapter IV describes the results of the various multi-variate analyses performed. Chapter V discusses these results and their implications, compares the findings of this study with the findings from the related research presented in Chapter II, draws conclusions and makes recommendations for further research.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

This review of the literature will present research dealing with the characteristics of adopters and non-adopters of instructional innovations in higher education. It will also compare the findings from higher educationa with generalizations from similar research done in many fields. As pointed out in Chapter I, there is not a clear distinction between the terms "innovator" and "adopter". Since most of the literature uses the term "adopter", that term will be used in this chapter. However, the term "innovator" is still most descriptive of the adopters involved in this study.

The review will show that there is a very limited amount of research literature pertaining specifically to the diffussion and adoption of innovations in higher education and even less that deals with the characteristics of adopters and non-adopters of innovations. Furthermore, the research that has been done often fails to deal with the actual adoption of innovations, dealing istead with attitudes toward the specific innovation. In general, the findings from studies in higher education do not provide much support for Rogers' and Shoemakers' (1971) generalizations about the diffusion and adoption of innovations.

Overview of the Literature

The literature dealing with the diffusion and adoption of educational innovations is limited in scope and primarily focused on public school systems. The most extensive review of empirical studies is found in Rogers and Shoemaker (1971). They draw on approximately 1,200 empirical studies to derive 103 generalizations about the process of the diffusion and adoption of innovations. Approximately 1,084 of those studies were available in the Diffusion Documents Center (then at Michigan State University). Rogers and Shoemaker (1971, p.50) indicate that only 71 of these studies dealt with educational innovation, most of which center on the innovation process in the public schools.

Carlson (1968), in addition to Rogers and Shoemaker (1971), points out a number of problems with the existing literature on the diffusion and adoption of innovations. First, many of the studies dealing with educational innovation have lacked rigor making it difficult to rely on the findings that do exist. Carlson goes on to indicate that no one study has examined all the elements of the diffusion and adoption process. Among the elements often omitted in the area of educational innovation research are channels of communication, social structure, and the value systems involved (Carlson, 1968, p. 5). Another problem with the research is that most of it has focused on the local school system rather than on the individual teacher as the unit of adoption (p. 14). Finally, there has been little concern for whether the adoption decision involved in the study was of the optional, contingent, collective, or authority type. Rogers (1968, p. 70) suggests that the type of decision greatly affects the rate of adoption in the social system.

This review will be limited to literature dealing with four-year institutions of higher education since these institutions represent social systems having important differences from the public schools and community colleges on several of the variables of interest in this study. Variables such as size of teaching load, specialization of teaching responsibility, and norms on the importance of teaching may differ among these social systems since faculty responsibilities in terms of teaching, advising, research, and service differ. These factors play an important role in determining the impact of the social system on the diffusion and adoption process (see Carlson, 1968; Rogers, 1968; Rogers & Shoemaker, 1971). Therefore, limiting the review to literature dealing with four-year institutions of higher education will allow the unique effects of the social system on the diffusion and adoption process to be identified.

This review of the literature will also be limited to empirical studies so that the contributions of research on the diffusion and adoption of innovations in higher education can be compared to generalizations drawn from similar research in other social systems (see Rogers & Shoemaker, 1971).

Among the problems encountered in reviewing the literature to identify specific findings from higher education is that the major references in the field (Brickell, 1961; Miles, 1964; Rogers, 1962; Rogers & Shoemaker, 1971) either fail to provide empirical data which can be used to draw generalizations or fail to identify the findings unique to higher education.

Brickell limits discussion of higher education to its influence on the diffusion and adoption process in the public school

system. Miles put together a series of 25 papers from a seminar involving the faculty of Columbia University. Ten of these were case studies of particular innovations and provided little evidence from which to draw meaningful generalizations applicable to the study of innovators in higher education. An additional nine papers dealt with research and theory, reporting on studies in public school systems or on evaluation of the effectiveness of particular innovations. The remaining six papers dealt with the American educational system and fail to shed any direct light on the process of the diffusion and adoption of innovations in higher education.

Rogers, both in his 1962 book and his 1971 book with Shoemaker, fails to separate the findings from either education or higher education from the findings from other disciplines and cultures in the process of deriving generalizations from empirical data.

Organization of the Review

This review will be divided into four sections. The first section will describe research on characteristics of adopters and non-adopters of innovations. The second section will examine studies dealing with attitudes toward innovation rather than the actual adoption of innovations. The third section will present several studies related to the variables of this study, but which did not differentiate between adopters and non-adopters of innovations. The final section will compare this review with the generalizations Rogers and Shoemaker have drawn from the research of many fields.

Studies of Adopters and Non-adopters

It was possible to locate reports on only two studies which compared actual adopters of an innovation with non-adopters. A study of ten departments in science and engineering at Ohio State University (Stern et al., 1976) studied the characteristics of users of a new mechanized information center who were compared with a group of non-users (adopters and non-adopters) in terms of cosmopoliteness, attitudes toward change, professional background, scholarly productivity, age, rank, years with degree of years at Ohio State. However, they did find that adopters sought more reinforcement from their peers. This was the case in both the adopter's professional and friendship networks. They also failed to find any significant differences between different classes of adopters based on time of adoption (pioneer, early, late).

Mitchell (1970) used a different unit of analysis in a study of curriculum innovation at Northern Michigan University. He examined the social system before and after the introduction, adoption, and partial discontinuance of the innovation. He also found that as adoption or acceptance of the innovation increased, integration of the system as indicated by the communication network also increased. He also found that the lack of knowledge and lack of adequate resources and support within the administration contributed to negative attitudes and ultimate discontinuation. This is summed up in one of his concluding generalizations, "An innovation is more likely to be adopted into a complex organizational system, and is more likely to be continued in use after adoption, if it is compatible with the existing norms and operational practices of the system" (p. 222). The adoption

decisions for this innovation, however, were not of the optional type and his findings provide little information about the individual adopter.

Studies of Attitudes Toward Innovation

There were five reports on studies dealing with attitudes or receptivity to adoption rather than with adoption itself. In the Stern et al. study (1976), though, they found that actual adoption of an innovation differed from statements of intention to adopt. In one of the most complete reports, Kazlow and Giacquinta (1974) examined the receptivity of the faculty in a School of Education to a variety of organizational innovations. They used a variety of status and personality measures to explain differences in receptivity. While measures of status accounted for more variance than measures of personality, most of the variance remained unexplained. They also found that receptivity was innovation specific, dependent on the perceived risks associated with adoption. Of all their variables, only differences in academic rank and sex were statistically significant for all innovations, though direction of these differences cannot be determined from the report of their study. Other variables used in their study included administrative rank, level of instruction, tenure, advisement load, research, teaching preferences, number of publications in the past five years, faculty group affiliation (cosmopolitan or local), dogmatism, attitude toward change in work, and related activities. A major limitation in generalizing from this study is that none of the innovations were of the optional decision type. They included such things as student involvement in academic governance,

reorganization of the school into a graduate school, establishment of a university without walls, undergraduate program, etc.

Evans and Leppmann (1968), in a frequently cited book, report on a study on attitudes toward instructional television (ITV) at a State University. They compared the characteristics of pro-ITV faculty with those of anti-ITV faculty. Pro-ITV faculty were found to be more flexible in their attitudes and more concerned with teaching methods. Anti-ITV faculty were found to hold more traditional attitudes, be less willing to support change, and carried larger teaching loads. They also found that those who were generally receptive to new ideas from outside the university were more receptive to ITV. Resistance to ITV appeared greatest in the humanities rather than in technological fields. The disturbing thing about this study is that data in support of most of these findings is not presented in a manner that allows careful scrutiny. It seems that most of the conclusions are attempts to interpret and explain the data. The authors even point out they are describing ideal types rather than actual faculty members.

Demerath and Daniels (1973) in a review of the literature and series of interviews found differences between academic disciplines in terms of receptivity to and interest in electronic innovations. The physical sciences showed most interest while the social sciences and humanities showed the least. It was hypothesized that this difference occurred because of the physical scientists' familiarity with technology as compared with the social sentiment that technology has ruined the environment. While their interpretation may be overstated, they appear to have found some effect due to the differences

between the norms of the various disciplines.

Two studies identified particular attitudes that acted to impede instructional innovation in higher education. These attitudes represent fatalistic beliefs on the part of individual faculty members (see Rogers & Svenning, 1969, p. 280). Neither is reported in any detail and both show very similar results. Cleland (1969) identified seven attitudes that impeded the development of a college level program to train new college and university teachers. The one dealing with instruction was, "College teaching is an art that cannot really be taught, but is something that develops through long practice" (p. 424). Mangano (1973) reports on a study by Lora Robinson that identified three other attitudes relevant to instructional innovation, "Good teachers are born, not made"; "Teaching is an art, not a science"; and "Teaching is something you do, not something you talk about" (p. 208).

Other Studies

There are a number of other studies that deal with the variables involved in the diffusion-adoption process, but which do not make distinctions between adopters and non-adopters. Rogers (1968, p. 71) cites a study at Michigan State University which found faculty members were most knowledgeable about innovations that directly affected them. However, only one of the five innovations was directly related to instruction and the differences in knowledge levels was not made clear. Davis (1965) examined differences between the faculty at private, liberal arts colleges which adopted many innovations (innovative colleges) and those which had not (non-innovative colleges). He found no significant differences in terms of awareness of the innovations or in terms of such individual variables as age, years of service,

and participation in decision making. There were differences, however, between the norms in the two types of colleges as the more innovative colleges were more permissive toward faculty members. It was unclear, though, whether there was any relationship between being on the faculty of an innovative college and being an innovator.

Gouldner (1957) was involved in a slightly different type of study. He was not interested in innovation. Instead, he was studying cosmopoliteness. He identified three characteristics which could be used to differentiate cosmopolitans from locals: loyalty to employing organization, committment to specialized or professional skills, and reference group orientations (p. 290). Most other definitions of cosmopoliteness deal only with reference group orientations (Rogers & Shoemaker, 1971). In a study at a small, private liberal arts college, Gouldner found support for this distinction. Cosmopolitans were low on loyalty to the employing organization, high on committment to specialized skills, and likely to use outside reference group orientation. Cosmopolitans in his study were more likely than locals to get most of their intellectual stimulation from sources outside the college. He also found that extreme locals tended to participate in the system more than extreme cosmopolitans, yet those in the middle participated most of all (p. 298).

James (1975) conducted a study involving student evaluations of 268 faculty members in a College of Arts and Sciences. The evaluations were provided by 7,901 students. There were significant differences between tenured and non-tenured faculty (non-tenured receiving better ratings) and between academic ranks (associate professors receiving the highest ratings). Even though there was no

direct evidence linking these findings to innovation, they point out potential differences related to status which may have been due to innovation (since improved teaching could be a goal of innovation).

The final group of three studies to be dealt with in this review identify differences between academic disciplines (Haines, 1974; Lewis, 1967; Peters, 1972). All three studies dealt with faculty perceptions of their curriculum. Haines found differences in terms of the perceived importance of different types of uses of cognitive information when the faculty were divided into three disciplines: humanities, social sciences, and natural sciences. Lewis added a forth discipline - engineering - and looked at attitudes toward what the university should offer and the perceived importance of various faculty activities (teaching undergraduates, teaching graduates, and research). He was able to find consistent differences between the humanities and engineering in terms of what the university should offer. However, differences between the various activities were not well supported and the findings in terms of the disciplines science and social science were very inconsistent. Peters used a more complex design and found faculty from engineering, agriculture, chemistry, and math identified with a more structured curriculum while faculty from english, speech, education, and psychology identified with a less structured curriculum. History, government, business management, accounting, and economics fell between the two extremes. The findings that show differences between disciplines may be due to inherent differences in the subject matter or due to differences between the social systems. There has been a significant amount of research on diffusion and adoption of ideas within the social systems of disciplines (see Crane, 1972) which

indicates that there are communication relationships within academic disciplines composed of departments at different universities that go beyond the relationships that exist among departments of the same university, e.g., the utilization of previous work (often an innovation) is governed by the norms of the "invisible college" (a communication network linking members of an academic discipline) rather than by the norms of an academic department at a single university (p. 83).

Comparison with Findings from Other Fields

The research findings relating diffusion of innovations in a variety of other fields are summarized in the generalizations presented by Rogers and Shoemaker (1971, pp. 347-385). For each of the variables included in this study, the appropriate generalization will be presented along with an indication of the support for it which comes from empirical studies in higher education. The variables will be grouped in the four categories Rogers and Shoemaker use to classify the individual and social system variables of interest to this study: socioeconomic variables, personality variables, communication behavior variables, and social system variables.

Socioeconomic Variables. Four variables are included in this category: age, status, size of teaching load, and specialization of teaching responsibility. The generalizations of research findings indicate the following relationships for adopters and non-adopters (or later adopters in Rogers and Shoemaker terminology).

"Earlier adopters are no different than later adopters in age."

"Earlier adopters have higher social status than later adopters."

"Earlier adopters have larger sized units (farms, and so on) than do later adopters."

"Earlier adopters have more specialized operations than later adopters."

Five of the studies from higher education deal with socio-economic variables (Davis, 1965; Evans & Leppmann, 1967; James, 1975; Kazlow & Giacquinta, 1974; Stern et al., 1976). The two studies dealing with age found no significant difference between adopters and non-adopters. Three studies dealt with an optional decision finding no significant differences based on status measured by academic rank, while the two other studies found significant differences based on rank or tenure. One study found the faculty with negative attitudes toward an innovation had a larger teaching load. Finally, one study looked at level of instruction (undergraduate or graduate instruction) and teaching preferences and found no significant differences between faculty in terms of receptivity to innovations. With the exception of age, there is scant support from higher education for the generalizations concerning socioeconomic variables, and there appears to be evidence contrary to the generalization that earlier adopters have larger sized units.

Personality Variables. Two variables are included in this category: fatalism and innovativeness. The generalization for fatalism is,

"Earlier adopters are less fatalistic than later adopters."

Two studies from higher education (Cleland, 1969; Mangano, 1973) identify specific fatalistic attitudes which have acted to impede innovation. This lends support to the generalization concerning fatalism.

There is no generalization for innovativeness because innovativeness is

"the degree to which an individual is relatively earlier

in adopting new ideas than other members of his social system" (Rogers & Shoemaker, 1971, p. 175).

The generalizations deal with the characteristics of early adopters (more innovative) as compared to later adopters (less innovative). No studies were located which looked specifically at differences in overall innovativeness among adopters and non-adopters or early and late adopters. Rogers (1962, p. 188) points out that it may be valuable to have an individual's self-rating of innovativeness since the individual may be acting in accord with that perception of himself.

Communication Behavior. Seven variables are included in this category: social participation with departmental colleagues, integration with their social system, cosmopoliteness, information seeking about instruction, knowledge about instructional innovations, opinion leadership, and membership in modern or integrated systems. The generalizations from research findings indicate the following relationships for adopters and non-adopters.

"Earlier adopters have more social participation than later adopters."

"Earlier adopters are more highly integrated with the social system than later adopters."

"Earlier adopters are more cosmopolite than later adopters."

"Earlier adopters seek information about innovations more than later adopters."

"Earlier adopters have greater knowledge of innovations than later adopters."

"Earlier adopters have a higher degree of opinion leadership than later adopters."

"Earlier adopters are more likely to belong to systems with modern rather than traditional norms than are later adopters."

"Earlier adopters are more likely to belong to well integrated systems than are later adopters."

Six of the studies from higher education deal directly with communication behavior variables (Davis, 1965; Demerath & Daniels, 1973; Evans & Leppmann, 1968; Gouldner, 1957; Kazlow & Giacquinta, 1974; Stern et al., 1976). One study looked at part of the social participation dimension, participation in decision making, and found no significant difference between faculty at innovative or non-innovative colleges. Three studies looked at the individual's integration with the social system. When the measure involved reinforcement from peers, there appeared to be a significant difference with adopters seeking more reinforcement; when the measure was years of service, there was not a significant difference. Three studies looked at cosmopoliteness, one found those with pro-adoption attitudes were more cosmopolite while the other two found no significant differences. There were no studies that examined information seeking about instruction, knowledge about instructional innovations, or opinion leadership as they apply to adopters and non-adopters. One study did find, however, that faculty tend to be more knowledgeable about innovations that affect them. Three studies found differences between academic disciplines even though the studies were not directly related to innovation (Haines, 1974; Lewis, 1967; Peters, 1972). These studies suggest there might be differences among discipline-oriented social systems. Only the generalization dealing with integration with the social system is

supported by the research from higher education, and that occurs only when the measure of integration involves reinforcement.

Social System Variables. Two variables are included in this category: system norms and characteristics of the system. There is only one generalization that deals with social system variables,

> "System effects may be as important in explaining individual innovativeness as such individual characteristics as education, cosmopoliteness, and so on."

Four studies deal specifically with system effects (Davis, 1965; Demerath & Daniels, 1973; Mitchell, 1970; Rogers, 1968). Two of the studies point out the effects of characteristics of the system which indicate differences among discipline-oriented social systems also support to this generalization (Haines, 1974; Lewis, 1967; Peters, 1972). This generalization appears to be well supported by the research from higher education.

Summary

This review of the literature has presented the research dealing with the characteristics of adopters and non-adopters of instructional innovations in higher education. It has also compared these findings from higher education with generalizations from similar research done in many fields. The review showed that there are very few studies dealing with the characteristics of adopters and non-adopters, and the research suffers from a lack of rigor and specificity with regard to the difference between attitudes toward an innovation and adoption of that innovation, as well as with regard to the type of adoption decision required by the innovation. It was also shown that none of the studies dealt with all the variables involved in the

diffusion and adoption process.

Since there were so few studies from higher education, it is dangerous to generalize too far beyond them. However, they appear to support Rogers' and Shoemaker's (1971) generalizations concerning differences in age, fatalism, integration with the social system, effects between earlier adopters and later adopters. In addition, there is some evidence that the generalization concerning size of unit reversed for higher education.

Implications for This Study

There are six implications from the research for this study. First, the study should compare actual adopters or innovators with non-innovators since the actual adoption of an innovation may differ from statements of intention to adopt. Second, there is insufficient evidence from higher education to warrant discarding Rogers' and Shoemaker's model. Third, a study which looks at a large number of variables is called for since the diffusion and adoption process involves many variables which seem to be capable of differentiating between innovators and non-innovators. Fourth, the adoption decisions involved in the study should either be limited to a single type or else clearly separated since the type of decision affects the rate of adoption in the social system. Fifth, the study should involve faculty from a variety of disciplines rather than just one department, college or discipline since there appear to be differences among disciplines which could affect the diffusion and adoption process. Finally, the study should be conducted with rigor and reported with sufficient clarity to allow others to derive meaningful conclusions from it.

CHAPTER III

DESIGN OF THE STUDY

Introduction

To identify the differences between innovators and non-innovators, this study used an ex post facto multivariate comparison design (see Campbell & Stanley, 1963; Kerlinger & Pedhazur, 1973), utilizing data collected after the significant event has occurred (in this case, instructional innovation) to identify significant relationships between variables. It differed from true experimental research by its lack of controlled conditions. It is an appropriate design in this case, however, since it was not possible to control or manipulate all the factors or develop measures to establish a direct cause-effect relationship.

The most obvious weakness of this design is that causes cannot truly be assigned and significant relationship may be masked by uncontrolled phenomenon. Furthermore, the analysis procedures used have the potential of identifying spurious relational patterns with little or no reliability or validity. None the less, the exploratory nature of this study warranted use of this design.

The data were collected through questionnaires distributed to 345 faculty at Michigan State University. These faculty were divided into three groups for the purposes of analysis. The first group was composed of faculty who had received EDP grants for an instructional development project for improvement to an undergraduate course. These were the instructional innovators. The second group was composed of

faculty who reported that they had been involved in an instructional development project during the past five years, but who had not received EDP support. This group of unsupported innovators represented another group of innovators which could be used to confirm any differences found between the EDP-supported innovators and the non-innovators.

The data were analyzed by two multiple regression techniques: simple multiple regression and discriminant function analysis. Multiple regression analysis is a method of multivariate data analysis which can be used to identify the effects of two or more independent variables, acting individually or in combination, on a dependent variable (see Kerlinger & Pedhazur, 1973, pp. 2-80; Kim & Kohout, 1975, pp. 320-367). While either analysis of variance of multiple regression analysis can be used when the independent variables are categorical, multiple regression analysis is the only appropriate method of analysis when:

> "1. The independent variable is continuous
>
> 2. The independent variables are both continuous and categorical
>
> 3. All frequencies are unequal and disproportionate
>
> 4. Studying trends in data: linear, quadratic, and so on" (Kerlinger & Pedhazur, 1973, p. 114).

Since the variables in this study were both continuous and categorical, multiple regression was an appropriate method of analysis. Discriminant function analysis is a special form of multiple regression analysis. It is a method for distinguishing between two or more groups on the basis of discriminating variables. This is accomplished by forming one or more linear equations (functions) of the discriminating variables. These functions can then be used either for classification of individuals

to the groups or for analysis of the multivariate relationships between the variables (see Kerlinger & Pedhauzur, 1973, pp. 336-347; Klecka, 1975; Tatsuoka; 1971).

This analysis occurred in four parts. First, a regression equation to predict the number of projects an innovator had done was generated from data supplied by the EDP project directors. Second, the same data that were used to generate the first regression equation were used to generate a second regression equation which was to produce a combined success measure for the innovator's first project. Both of these equations were then analyzed using discriminant function analysis to determine whether they could identify variables which would differentiate between innovators and non-innovators. The third part in the data analysis was the use of a separate discriminant function analysis to identify variables which differentiated between the known innovators (EDP project directors) and the known non-innovators. Finally, the data from faculty who had been involved in instructional development or instructional innovation projects without EDP support were compared with the data from the innovators and the non-innovators.

This four-part analysis yielded information about which variables, acting individually or in combination, were significantly different between innovators and non-innovators, and also provided linear equations for use in future analysis of individual faculty members. Each variable that was useful in distinguishing between innovators and non-innovators was included in these linear equations, and their coefficients could be used to determine their relative importance in making the distinction, provided there are no problems with high intercorrelations among the variables.

The Research Design

The design of this study may be illustrated as follows with O's representing the time period covered by the questionnaire used in this study, X's representing the time of instructional innovation, and T's representing the time of data collection.

Innovators	O	X	T
Unsupported Innovators		X	OT
Non-innovators			OT

Threats to internal validity may come from several areas. Since the instructional innovators will be recalling conditions in a different time period than the non-innovators, maturation effects may affect the two groups differently. An indication of the influence of maturity was provided by analysis of the responses to several questionnaire items comparing the individual's level of activity with that of five years previously. Large differences in activity levels would signify that maturity had a significant effect on any between group difference found.

Selection may also pose problems for this study. The EDP project directors represented a self-selected sample since they choose to seek EDP support for instructional innovation through their own initiative. Furthermore, only a certain number were supported from those applying. EDP projects are selected for support on the basis of four general criteria: number of students affected, use of an experimental or innovative approach, generalizability, and capability for evaluation (Educational Development Program, 1975, pp. 7-8). This suggests that the EDP project directors may not be like other

instructional innovators such as those represented in the group of faculty in this study who reported participating in an instructional development project without EDP support. Analysis of the differences between these two groups of innovators will indicate the influence of selection on any differences found between innovators and non-innovators.

Mortality of respondents may also threaten validity because there may have been a differential loss of respondents among the groups. For example, the EDP-supported innovators may have felt a greater obligation to respond than those faculty not supported by EDP, and they may have biased their responses based on gratitude for the support of their innovation activities. In addition, a number of instructional innovators had left the campus and may not have had an equal opportunity or felt an equal obligation to respond as those still on campus. To the extent possible, identical procedures were followed in the collection of data and subsequent follow-up to encourage participation with all groups. However, those who had left the university received no follow-up. Since there were a number of factors which could not be controlled in this study, the results should be viewed as exploratory rather than definative.

Research Questions

To answer the question raised in Chapter I of this study, "How do innovators differ from non-innovators in terms of 18 selected variables", this study will address two research questions:

1. On which of the following characteristics do instructional innovators differ from non-innovators?
    a. Age

b. Status

c. Size of teaching load

d. Specialization of teaching responsibility

e. Fatalism

f. Innovativeness

g. Social participation with their social system

h. Integration with their social system

i. Cosmopoliteness

j. Information seeking about instruction

k. Knowledge about instructional innovations

l. Opinion leadership

m. Membership in modern and/or integrated systems

2. On which of the following characteristics do instructional innovators' perceptions of their departments differ from those of non-innovators?

a. Norms on the importance of teaching

b. Norms on innovativeness

c. Norms on instructional strategies

d. Resources for instructional improvement

e. Stability of instructional assignments

Operational Definitions

With only a few exceptions, as noted in the forthcoming section on item selection, there was little guidance available from past research. As a result, there were often several different ways to operationalize the variables of interest in this study. Each operationalization highlighted a different dimension of the variable. Therefore, for some of the variables in this study, more than one

operationalization or measure is provided.

Each measure will be used separately in the analysis. However, in the event that these different measures are highly intercorrelated with one another (.8 to 1.0), only those not highly intercorrelated will be used in the final analysis (see Kim & Kohout, 1975, p. 341). The names and descriptions of the measures used in this study to operationalize the variables are as follows:

Age. AGE was a self-report by respondents.

Status. Two measures were used for this variable: RANK and TENURE. Each was a self-report by respondents.

Size of teaching load. Two measures were used for this variable: COURSES and TEACHING TIME. Courses was a self-report of the number of different courses taught by the respondent. Teaching time was a self-report of the percentage of time devoted to teaching and indicated the size of teaching responsibility as measured by time as compared to other activities.

Specialization of teaching responsibility. Three measures were used for this variable: TEACHING ISOLATION, TEACHING SPECIALIZATION, and TEACHING IMPORTANCE. Teaching Isolation was a self-report on whether the respondent teaches unique or specialized courses--courses not taught by other faculty members. Teaching Specialization was a combined measure of the number of courses taught and the uniqueness of those courses. A respondent is less specialized as the number of non-unique courses increases. Teaching importance was a self-rating of the relative importance of teaching compared to other activities. A respondent whose primary responsibility (speciality) was teaching would rate teaching as an important activity compared to

other activities such as research.

Fatalism. Two measures were used for this variable: TEACHER FATALISM and STUDENT FATALISM. Teacher Fatalism was measured by a self-rating of agreement with a fatalistic statement about good teachers. Student Fatalism was measured by a self-rating of agreement with a fatalistic statement about good students. The more fatalistic the individual, the greater the agreement with fatalistic statements.

Innovativeness. INNOVATIVENESS was a self-rating on a scale from Rogers as described in the section on item selection. This scale provided an indication of when the respondent was most likely to adopt an innovation compared to colleagues.

Social participation with departmental colleagues. PARTICIPATION was a self-report of the amount participation by the respondent in departmental meetings, seminars, social events, etc.

Integration with the social system. Three measures were used for this variable: YEARS AT MSU, LOCAL INFORMATION, and LOCAL STYLE. Years at MSU was a self-report which represented the potential for forming the informal communication links necessary to be integrated with the social system. Local information was a self-report of the frequency of use for local sources of information (those from within the social system). A more integrated individual would make more use of local information sources. Local Style was a self-rating of the influence from various local sources on the respondent's teaching style. A more integrated individual would have greater local influence.

Cosmopoliteness. Two measures were used for this variable: COSMOPOLITE INFORMATION and COSMOPOLITE STYLE. Cosmopolite Information was a self-report of the frequency of use for cosmopolite sources of

information (sources from outside this social system). A more cosmopolite individual would make more use of cosmopolite information sources. Cosmopolite Style was a self-rating of the influence from various cosmopolite sources on the respondent's teaching style. A more cosmopolite individual would have greater cosmopolite influence.

Information seeking about instruction. INFORMATION SEEKING was a measure of the frequency of use for both local and cosmopolite information sources.

Knowledge about instructional innovations. KNOWLEDGE was a self-rating of the amount of knowledge about instructional innovations possessed by the respondent.

Opinion leadership. Two measures, based on scales from Rogers described in the section on item selection, were used for this variable: OPINION LEADERSHIP and OPINION LEADERSHIP CHANGE. Opinion Leadership was a self-rating of the respondent's own credibility as a source of information. Opinion Leadership Change was a comparison of Opinion Leadership over time.

Membership in modern and/or integrated systems. ACADEMIC DISCIPLINE was a classification of the respondent into one of three disciplines as described in the section on item selection.

Norms on the importance of teaching. TEACHING VALUE was a rating of the respondent's perception of the importance or value of good teaching for promotion or other rewards within the department. Since norms tend to follow values, the more value placed on teaching, the stronger the possibility that the norms also support good teaching.

Norms on innovativeness. FACULTY REACTION was a report on the reaction of faculty in the department to discussions about instructional

innovation. If the norms did not support innovation, the reaction would probably be negative.

Norms on instructional strategies. TEACHING MODELS was a report on the number of different teaching models used by colleagues in the department. If the norms supported a variety of teaching models, the number reported would be higher than if there were only a few "accepted" models.

Resources for instructional improvement. RESOURCES was a rating of the perceived adequacy of resources available in the department for use in improving instruction.

Stability of instruction assignments. TEACHING STABILITY was a report on the frequency of changes in instructional assignments within the department.

Population and Sample

The population under investigation was comprised of faculty at Michigan State University. Two samples were selected. The first sample, the instructional innovators, included all EDP project directors identified in Reports 3-8 of the Educational Development Program at Michigan State. This included projects which took place between 1970 and 1975. The second sample was comprised of a random sample of the teaching faculty from throughout the University, which was later divided into two groups: unsupported innovators and non-innovators.

Selection of the EDP project directors was based on the following criteria. First, the project director must have been listed in one of the six EDP reports as having received funds in support of a project. (All projects reported represented efforts which

had a direct influence on the instructional process in an undergradute course or curriculum.) Second, the EDP project director must have been a faculty member in an academic program whose primary responsibility was not instructional development. Third, the EDP project director must have been an assistant, associate, or full professor in the tenure stream at the time of the project. All EDP project directors who did not meet these three criteria were eliminated from the study, e.g., those involved in faculty or organizational development, or those who were only of instructor rank. This sample was composed of 90 faculty members.

The random sample of teaching faculty was selected from the latest faculty roster of the university. Any faculty members who had been EDP project directors at any time or whose primary responsibility was instructional development were eliminated. Selection of these faculty was based on the following criteria. Each faculty member selected must have been an assistant, associate, or full professor in the tenure stream at the university. They must not have held administrative responsibility above that of department chairman. They must have been at the university for at least two years. Finally, they must have taught at least two courses, at least one of which was an undergraduate course, during the academic year as identified in the official schedule of courses for 1975-76. A random sample of 250 faculty members was selected to ensure at least 10 respondents for each variable, based on a return of 70-75% of the questionnaires (see Allen, no date).

Instrumentation

Questionnaire development and distribution. Two questionnaires were developed based on the operational definitions of the variables of interest in this study. Questions on the instrument sent to the EDP project directors asked that their responses be based on the time prior to their first EDP project, even if in the case of multiple projects the first project occurred before 1970. The instrument also contained items dealing with information outside the realm of this study which was for use by the EDP staff (see Davis, Abedor & Witt, 1976). The questionnaire was field tested with several faculty who were familiar with actual EDP projects but were not themselves EDP project directors. Revisions were made before distributing this instrument to faculty. This questionnaire appears in Appendix A.

The second questionnaire was distributed to faculty not supported by EDP. The variables of interest in this study were measured using items identical to those on the first questionnaire with the exception that respondents were asked to base their answers on the preceding year. In addition, there was an item asking if the individual had been involved in an instructional development or instructional innovation project during the past five years, and several items asking for a comparison of their current levels of activity with their levels of activity five years previously. The items on past levels of activity were for use in assessing the impact of maturation. The item on participation in an instructional development project was used to identify non-innovators. There were also several items on teaching style which were not of importance to this study. This questionnaire appears in Appendix B.

The questionnaires were distributed by mail one month apart and were both accompanied by a letter from an Assistant Provost at the University who urged the faculty to participate in the survey. Questionnaires were sent to EDP project directors in March, the others in April. Telephone follow-ups were made to each faculty member who had not responded after ten days. If the faculty member could not be reached, a note was left with their secretary asking the faculty member to response. A second telephone follow-up was made a week later to all those faculty who had still not responded and who had not been spoken to directly in the first follow-up. Identical procedures were used with both questionnaires.

Item selection. A number of questionnaire items were specifically selected based on previous research. Despite the findings of no significant difference found for the variables age and years at the institution, these items were included in this study for comparison with other studies (Stern et al., 1976; Kazlow & Giacquinta, 1974). The item dealing with the teaching models used in the respondent's department was based on the list of teaching models used by the Michigan State University Office of Institutional Research. The items dealing with innovativeness and opinion leadership were taken from self-rating scales used by Rogers (1962, p. 188; Rogers & Shoemaker, 1971, pp. 215-217; Rogers & Svenning, 1969, p. 224). The two items dealing with fatalism were also adapted from a Rogers' scale (Rogers & Svenning, 1969, p. 280) using the findings from Cleland (1969) and Robinson (cited in Mongano, 1973) to provide the fatalistic statement about teachers.

It was not possible to measure the degree of integration or modernness in the various social systems of which the participants were

a part. These measures would have required information from faculty not in the sample to provide an accurate assessment. Previous research suggested that there are systematic differences among academic disciplines (Haines, 1974; Lewis, 1967; Peters, 1972). None of these studies, however, dealt specifically with the diffusion and adoption of innovations. While there was no reason to believe the causes of these differences were either integration or nodernness, both explanations are possible.

For the purposes of this study, three academic disciplines were used to represent social systems which could vary in terms of integration and modernness: natural science, social science and humanities. If innovators and non-innovators differed in terms of academic disciplines, it would indicate that some factor(s) in the nature of the social system were important (such as integration or modernness). If a significant contribution was not found, then the findings from the other variables dealing with the social system must be examined to judge whether the selection of social systems was inappropriate or whether social system factors, such as integration or modernness, were not significant. The distribution of colleges to the academic disciplines was as follows:

Natural Science

Agriculture and Natural Resources

Engineering

Human Medicine

Lyman Briggs (a residential natural science college)

Natural Science

Veterinary Medicine

Social Science

Business

Communication Arts and Sciences

Education

James Madison (a residential social science college)

Social Science

Urban Development

Humanities

Arts and Letters

Human Ecology

Justin Morrill (a residential liberal arts college)

University College (the undergraduate basis education college)

The other items used on the questionnaires asked for reports or ratings of conditions in the respondent's department.

Reliability and Validity

It was not possible to conduct a test of reliability of the instrument used in this study. Such reliability tests as test-retest and equivalent form, could not be used since access to the respondents was limited to one administration of the questionnaire. Such tests as split-half or inter-item consistency were inappropriate since the instrument used in this study did not attempt to measure a single trait and the number of items which could be included on the instrument was limited (see Anastisi, 1954; pp. 94-117; Kerlinger, 1964, pp. 429-443).

The validity of the instrument was measured by the ability of the various discriminant function analyses to correctly classify

innovators and non-innovators. Anastasi refers to this as "empirical validity" (1954, p. 127). This type of validity compares the individual's score (in this case, the regression or discriminant score) with some criterion which is a direct measure of the characteristic the instrument is attempting to predict (in this case, group membership).

Data Analysis

Overview. The data was coded and keypunched, and then analyzed using the MSU CDC 6500 computer and the Statistical Package for the Social Sciences (SPSS) Multiple Regression and Discriminant Function Analysis programs. This analysis was to determine whether innovators and non-innovators differed, on which variables they differed, and to identify combinations of variables that maximally separated the EDP project directors from the other faculty members.

The following assumptions were made regarding the data in this analysis:

1. The data followed a multivariate normal distribution
2. There were equal variance-covariance matrices
3. Each faculty member provided an independent response
4. There was no systematic loss of respondents

Klecka (1975, p. 435) points out, however, that the discriminant function analysis technique is very robust and the assumptions pertaining to the distribution and variance-covariance matrices do not have to be strictly adhered to.

Development of multiple regression equations. Multiple regression analysis provides the best linear equation to explain the data. It controls for confounding factors so that the contribution of a

variable or set of variables can be isolated, and it provides information on relationships among the variables. In line with previous research, a linear model was assumed for this study. This assumption was based on a discussion by Rogers and Svenning (1969, p. 57) about the model for this study. They point out, "There is little reason to anticipate curvilinear relations among variables; and in fact, such relationships are not encountered when the variables are checked empirically."

The data from the EDP project directors were used to generate two multiple regression equations. One attempted to predict the number of EDP-supported projects conducted by an individual because if the innovators who did one project were more like the non-innovators than like the innovators who did many projects, then the regression equation might be composed of those variables on which innovators and non-innovators differed.

The second regression equation attempted to predict a combined measure of project success because if less successful innovators were more like non-innovators than like more successful innovators, then the regression equation might be composed of variables, other than the ones used to compute the combined success score, on which innovators and non-innovators differed. The combined measure or project success was based on whether the results of the innovation were still in use; whether the EDP project director considered the project worth the effort, would be willing to do another project, tried other innovations since the project, saw increases in student learning and attitudes, and along with his colleagues, considered the project a success.

Each of the two regression equations could be used to compute a regression score for each respondent. The regression score was computed by using each individual's responses as the values for the variables in the regression equation.

To determine if innovators and non-innovators actually differed on the variables in the two regression equations a discriminant function analysis of the regression scores produced by each regression equation was used. This analysis procedure attempts to classify the respondents into two groups--in this case, innovators and non-innovators--by comparing the individual's regression score with the regression scores of other individuals in the two groups. The ability of this procedure to separate the known innovators, the EDP project directors, from the known non-innovators provided a test of whether the variables in each regression equation represented variables on which innovators differed from non-innovators.

Direct comparison using discriminant function analysis. Data from the EDP project directors and the non-innovators were also compared directly, without using an intermediate regression equation to identify variables which differed between the two groups. Instead of using a regression score based on an equation generated to predict some characteristic of innovators, such as number of projects done or a combined measure of success, the direct use of discriminant function analysis involved generating a regression equation (function) which predicted which group an individual belonged to. Those variables which are included in this function (the discriminant function) are those variables which differentiate between the two groups: innovators and non-innovators. If this procedure could identify the unsupported

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innovators as belonging to a single group, empirical validity of its findings would be established.

Using the two regression equations to identify the variables which differed between innovators and non-innovators has a major advantage over the direct use of discriminant function analysis. Since the regression equations were generated using only the data from the EDP project directors, their validity and the validity of the variables to predict between innovators and non-innovators can be established by classification of a known group of non-innovators, those who reported not being involved in an instructional development or instructional innovation project. However, since using discriminant function analysis directly requires that both innovators and non-innovators be used to generate the discriminant function, reclassifying either of the groups on the basis of this discriminant function does not provide an unbiased test of its predictive validity. Using the discriminant function to classify the unsupported innovators does provide a test, though there is no way to determine in advance whether this group should be classified as innovators, non-innovators, or neither.

Summary

This study used an ex post facto multivariate design to identify the differences between innovators and non-innovators. The data were collected by questionnaires distributed to: EDP project directors from the past six years who have been involved in instructional development projects for the improvement of an undergraduate course, and a randomly selected sample of 250 faculty who had not been involved with EDP supported projects.

These 250 faculty were later separated into two groups based on their responses to an item concerning their involvement in instructional innovation. Those that reported no involvement in instructional development or instructional innovation were classified as non-innovators. Those that reported that they had been involved in instructional development or instructional innovation without EDP support were used to test the predictive validity of the findings and provide an indication of the bias due to selection. All of the non-EDP supported faculty were asked several questions to identify the possible impact of maturation on the findings.

The data were analyzed by several multiple regression techniques: simple multiple regression and discriminant function analysis. These procedures yielded information about which variables were significantly different between the two groups. The following two sections describe the specific procedures used in the multiple regression and discriminant function analyses performed in this study. The reader may skip these sections and proceed directly to Chapter IV without any loss in continuity.

Multiple Regression Analysis

This discussion of the procedures used to conduct the multiple regression analysis will describe four aspects of the analysis. First, the appropriate tests of significance will be described. Second, the criteria and process for including variables in the regression equation will be presented. Third, the procedures used to deal with missing data will be described. Finally, the relationship between the variance explained in the sample and the variance explained in the population will be indicated.

Significance tests. Two tests of significance were used for the multiple regression equations (Kim & Kohout, 1975). The first tested the goodness of fit of the linear equation. When this test is statistically significant, it indicates that the linear relationship between the variables as expressed in the regression equation is not due simply to chance (with a probability of error indicated by the level significance). This involved conducting an analysis of variance for R^2, the amount of variance explained by the regression equation. A univariate F-test was used to test the null hypothesis that the multiple correlation observed was due strictly to chance; that is, $R^2=0$. The appropriate formula for this F-test is:

$$F = \frac{R^2/k}{(1-R^2) \ / \ (N-k-1)}$$

k = number of independent variables, N = sample size,

degress of freedom = k and N-k-1 (p. 335)

The second test of significance involved testing the specific regression coefficients. Only those variables whose coefficients were statistically significant were included in the equation. This required that R^2 be broken down into components attributable to each independent variable in the equation. In this study, the standard regression method of decomposition was used. With the standard regression method, each variable was treated as if it was added in a separate step after the preceding variables were controlled for. Thus, the incremental increase in R^2 is the component of R^2 attributable to that variable. The appropriate test of significance for this regression coefficient is:

$$F = \frac{\text{Incremental increase in } R^2 \text{ due to variable X}}{(1-R^2)\ 1\ (N-k-1)}$$

k = number of independent variables, N = sample size,

degrees of freedom = 1 and N-k-1 (p. 336)

The method of breaking R^2 into components is an accepted method when the relationship among the variables is assumed to be non-causal (p. 336).

Inclusion of variables. An important consideration in building a regression equation is the order in which the variables are included in the equation. In this study, variables were included in single steps with the variable explaining the most variance included first. The variable which explained the greatest amount of variance in combination with the first variable was included second. In other words, the variable that explained the greatest amount of variance unexplained by variables already in the equation was entered in each step. This resulted in a subset of the total number of variables that yielded an optimal prediction equation with as few terms as possible.

Several conditions were used to control this process of inclusion of variables. The regression coefficient had to be significant at the .01 level and the proportion of each variable's variance unexplained by variables already in the equation had to be greater than .001. In addition, it was possible for all variables to be entered in the equation at any step. This ensured that the maximum number of variables would be included (Kim & Kohout, 1975, p. 345).

Replacement of missing data. Only data from EDP project directors who returned complete responses for all the variables of interest in this study were used to generate the regression equations. This insured that partial correlations were computed from the same population. After the regression equations were generated, however,

regression scores were calculated for all respondents. At this time, missing data were replaced by the mean values of the missing variables.

Population variance. The amount of variance explained by regression equation, R^2, is an overestimate of the population R^2. It is affected by a number of factors, among which is the ratio of the number of independent variables to the size of the sample. The formula to estimate the squared multiple correlation in the population from the sample multiple correlation is:

$$(R^2 \text{ (corrected for shrinkage)} = 1-(1-R^2)\ (\frac{N-1}{N-R-1})$$

k = number of independent variables, N = size of both samples, R^2 = sample R^2 (Kerlinger & Pedhazur, 1973, p. 283).

Discriminant Function Analysis

This discussion of the procedures used to conduct the discriminant function analyses will describe six aspects of the process. First, the method for determining the number of discriminant functions necessary to differentiate between the groups and the nature of the coefficients in the discriminant functions will be described. Second, the process used to classify respondents to groups based on the variables in the regression equations and discriminant functions will be presented. Third, the appropriate tests of significance will be indicated. Fourth, the criteria and process for including variables in the discriminant functions will be described. Fifth, the procedures used to deal with missing data will be presented. Finally, the relationship between the variance explained in the sample and the variance explained in the population will be indicated.

Discriminant functions and coefficients. The maximum number of discriminating functions used to discriminate between groups is equal to one less than the number of groups, so long as there are more independent variables than groups (Klecka, 1975, p. 435). In this study, then, there was one discriminating function generated since there were two groups involved at each stage of the analysis.

The variables used in the discriminating function were standardized, which means that their coefficients in the function are also standardized. This allows these coefficients to be compared to each other since each represents the relative contribution of the variable to the function.

The classification process. The discriminant function(s) are used to calculate discriminant scores by using each individual's responses for the values of the variables in the functions. These scores are necessary to produce the new functions actually used to classify respondents to the groups. Two new regression equations were generated to predict these discriminant scores. These new equations were the classification functions and their coefficients are the classification coefficients. A separate classification function was necessary for each group. Each classification function was used to compute a score for each respondent. The respondent was then assigned to the group whose classification function yielded the highest score for that individual. (An additional adjustment was made in the classification functions to account for the prior distribution of respondents to the two groups.)

Significance tests. The appropriate statistic for discriminant function analysis is Wilks lambda. Wilks lambda is the relationship

between within group variance and total variance and is the most widely used test statistic in multivariate data analysis (Tatsuoka, 1971, p. 40). Wilks lambda is especially suited to cases in which there is more than one dependent variable, however, it can be used in cases with one dependent variable such as this study (Kerlinger & Pedhazur, 1973, p. 352). In multivariate cases, lambda is the equivalent of $1-R^2$. An appropriate test of lambda's significance is Chi Square (Tatsuoka, 1971, p. 430).

The SPSS program provides both the Chi Square test for testing the significance of Wilks lambda considering the effect of the variables taken together, and a univariate F-test of the significance of the difference between the means of each variable taken separately.

Inclusion of variables. As in the development of the multiple regression equations described in the previous section, variables were included in this discriminant function in stepwise fashion. The best discriminating variable was included first, followed by the variable which, combined with the first variable, explained the most variance, and so on.

Several conditions were used to control this inclusion of variables. The test of discrimination used was the multivariate F-ratio of the difference between group centroids, which is the mean value of the discriminant function for each group. The minimum value of this multivariate F-ratio necessary for inclusion of a variable was 1.0. At the same time, the proportion of variance in a variable which was not explained by the variables already in the discriminant function had to be greater than .001.

Replacement of missing data. As in the multiple regression analysis, only respondents who provided complete data for all the variables were used to generate the discriminant function, though all the respondents were included in the classification computations--missing data were replaced by the individual variable means.

Population variance. Also, as in the multiple regression case, it is appropriate to use the formula already provided to estimate R^2 for the population; however, (1-lambda) must be substituted for the value of sample R^2.

CHAPTER IV

RESULTS

Introduction

This study set out to identify the differences between innovators and non-innovators in terms of 18 different variables. These variables involved 27 measures on questionnaires sent to EDP project directors and non-EDP supported faculty at Michigan State University.

As indicated in Chapter III, the data from the questionnaires were analyzed in four parts. First, a regression equation to predict the number of projects an innovator had done was generated from data supplied by the EDP project directors. Second, the same data that were used to generate the first regression equation were used to generate a second regression equation which was to predict a combined success measure for the innovator's first project. Both of these equations were then analyzed using discriminant function analysis to determine whether they could identify variables which would differentiate function analysis to determine whether they could identify variables which would differentiate between innovators and non-innovators. The third part in the data analysis was the use of a separate discriminant function analysis to identify variables which differentiated between the known innovators (EDP project directors) and the known non-innovators. Finally, the data from faculty who had been involved in instructional development or instructional innovation projects

without EDP support were compared with the data from the innovators and the non-innovators to provide information on the effects of selection on the findings of this study.

Three types of tables are used to present the data indicating how innovators differed from non-innovators. First, there are tables containing the results of univariate F-tests on the means of the measures used in this study; Tables 3, 6, and 9. These tables show which individual measures differed between innovators and non-innovators. Second, there are tables of the multiple correlations of the measures included in the regression equations or discriminant functions; Tables 1, 4, 7 and 10. The value of Multiple R or the square root of (1-Wilks lambda) in these tables shows how strong a relationship exists between the measures taken in combination and the value being predicted, e.g., number of EDP projects done or group membership; the value of Multiple R^2 represents the cumulative percentage of the variance being explained when the measures listed to that point are included in the equation or function. The third type of table presents the coefficients for the measures to be included in either the regression equation or discriminant functions; Table 2, 5, 8, and 11.

The results of this study will be presented in the following order. First, an analysis of the questionnaire returns will be reported. Second, the results from the attempt to use multiple regression equations to identify variables which differed for innovators and non-innovators will be described. Third, the results of the direct comparison of innovators and non-innovators using discriminant function analysis will be explained. Fourth, the results of comparisons of the unsupported innovators with both innovators and non-innovators will be

presented to indicate the effects of selection on the findings of this study. Finally, an analysis of the responses by the unsupported innovators and non-innovators to questionnaire items dealing with the effects of maturity will be reported.

Questionnaire Returns

Questionnaires were sent to 80 EDP project directors still on campus and to ten project directors who had left the campus because of retirement or new positions. Seventy-one of the on-campus group (89%) and eight of the off-campus group (80%) returned the questionnaires. From this group of 79 returns, 11 questionnaires had to be ommitted from the analysis since the respondents did not meet the criteria for inclusion in the study, i.e., were of instructor rank. This gave a return rate of 86% based on a maximum of 79 possible returns.

The rank and academic disciplines of the faculty who did not respond were analyzed using Chi Square to determine whether there was systematic bias in the unreturned questionnaires along either of these dimensions. Academic discipline was used rather than academic department to ensure adequate cell sizes since there were so few respondents per department in the original sample. The test for academic ranks gave a Chi Square of 3.916 with two degrees of freedom. This was not statistically significant at $p<.05$. Therefore, there did not appear to be systematic bias with regard to rank or academic discipline.

Questionnaires were also sent to 250 non-EDP supported faculty on campus. Returns were received from 180 faculty (72%). However, the total possible returns (250) was reduced to 232 to account for 11 faculty who were on sabbatical and one faculty member who was in the

hospital at the time of the study. Six of the returned questionnaires had to be ommitted since the respondents did not meet the criteria for inclusion in the study, i.e., did not teach at least two courses. Based on 232 possible returns, 75% were returned.

The rank and departments of the faculty who did not respond were similarly analyzed using Chi Square to determine whether there was systematic bias in the unreturned questionnaire from either of these sources. The test for academic ranks gave a Chi Square value of 12.27 with two degrees of freedom. This was statistically significant at $p<.01$. There were more non-returns from professors and fewer from assistant professors than expected if there had been no bias. The test for departments gave a Chi Square value of 46.00 with 69 degrees of freedom which was not statistically significant at $p<.05$. Therefore, there was bias in the returns from the non-EDP supported faculty on the basis of rank but not on the basis of departments. The effect from this bias should be minimal, however, since there were many individuals of each rank who did respond: 44 professors, 46 associate professors, and 82 assistant professors.

The following sections report the results of various tests run on the data provided by the returned questionnaires. Summary data from the questionnaires returned is reported in Appendix C for the EDP project directors, Appendix D for the non-innovators, and Appendix E for the unsupported innovators.

Regression Equation to Predict the Number of Projects

A regression equation was generated to predict the number of projects done by an innovator which might identify a combination of measures which differed for innovators and non-innovators. Twenty-two

of the 27 measures met the criteria for inclusion in the regression equation, and together they explained 67% (Multiple R^2) of the variance found among the innovator group in terms of the number of EDP projects done. An analysis of variance of this value of Multiple R^2 gave an $F = 2.3657$, with 22 and 26 degrees of freedom, which was statistically significant at $p<.02$. This statistical significance indicates that the relationship among the measures specified by the equation was not due strictly to chance. The correlation matrix used in the generation of this regression equation appears in Appendix C.

Table 1 shows the multivariate correlations of each of the measures included in this regression equation. The value of Multiple R^2 is the cumulative amount of variance accounted for by the measures combined with one another. This table also shows the value of the change in Multiple R^2 associated with each measure and indicates which of these changes are statistically significant and not due strictly to change.

Only the five measures shown in Table 1 which accounted for statistically significant changes in Multiple R^2 were included in the equation used to compute regression scores on which classification of innovators and non-innovators would be based, since the effect of the other variables on the equation was due to chance ($p<.10$). These five measures accounted for 46% of the variance among innovators in terms of the number of EDP projects done (Multiple R^2); their coefficients appear in Table 2.

The 46% of the variance explained by these five measures gave an overestimate of the amount of population variance explained. The amount of variance in the population explained after the appropriate

correction for shrinkage was only 40%.

This regression equation, however, did not provide information on which measures and their related variables differed for innovators and non-innovators because when the regression scores for each individual were computed and analyzed using discriminant function analysis, only 15 of the 68 known innovators (22%) were classified as innovators. The rest were classified as non-innovators. This indicates that the measures in the regression equation did not differentiate between innovators and non-innovators even though they did predict the number of EDP projects done by an innovator.

Table 1

Multiple Correlations of Variables in Regression Equation to Predict the Number of Projects

Variable	Multiple R	Multiple R^2	Multiple R^2 Change
Knowledge	.4944	.2444	.2444*
Cosmopolite Style	.5543	.3073	.0629*
Opinion Leadership Change	.6019	.3623	.0550*
Age	.6502	.4228	.0605*
Innovativeness	.6808	.4635	.0407*
Local Information	.6996	.4895	.0260
Teaching Percent	.7074	.5004	.0109
Teaching Models	.7216	.5207	.0203
Tenure	.7317	.5354	.0147
Teaching Stability	.7476	.5590	.0235
Resources	.7551	.5702	.0112
Local Style	.7623	.5811	.0109
Teaching Fatalism	.7700	.5929	.0118
Student Fatalism	.7770	.6038	.0109
Academic Discipline	.7820	.6115	.0078
Cosmopolite Information	.7869	.6192	.0077
Faculty Reaction	.7899	.6239	.0047
Teaching Specialization	.7924	.6280	.0041
Courses Taught	.8000	.6399	.0120
Teaching Isolation	.8153	.6648	.0249
Rank	.8160	.6658	.0011
Participation	.8166	.6669	.0010

*Significant $p<.10$ N = 49

Table 2

Unstandardized Regression Coefficients to Predict the Number of Projects

Variable	Coefficient
Knowledge	.4493
Cosmopolite Style	-.1007
Opinion Leadership Change	.6182
Age	-.0444
Innovativeness	-.3502
(Constant)	-2.0423

Regression Equation to Predict a Combined Success Score

A regression equation was also generated to predict a combined success score for the first EDP project done by an innovator. Twenty-four of the 27 measures met the criteria for inclusion in this equation, and they accounted for 51% of the variance found among the innovator group. However, an analysis of variance gave an F of .9600, with 25 and 23 degrees of freedom, which was not statistically significant at $p<.10$. Since this lack of significance indicates that the relationships among the measures specified by the regression equation was due primarily to chance, further analysis was not warranted.

Discriminant Function Analysis to Discriminate Between Innovators and Non-innovators

The discriminant function analysis provided both univariate and multivariate tests to discriminate between innovators and non-innovators. The univariate tests, F test between the means on each measure taken individually, will be presented first, then the multivariate tests which indicated the relative importance of the variables taken in combination will be reported.

The statistical significance of this discriminant function was established by a Chi Square test of Wilks lambda which gave a Chi Square value of 97.3869 with 24 degrees of freedom. This was statistically significant at $p.<.001$ and indicates that the relationship among the variables specified by the function was not due to chance.

The univariate F-tests identified 11 measures whose means differed for innovators and non-innovators. These measures represented the following individual variables: innovativeness, integration with social system, cosmopoliteness, information seeking about instruction, and opinion leadership; and the following perceptions of their departments: norms on innovation, norms on instructional strategies, and stability of instructional assignments.

Multivariate analysis of the differences between these two groups indicated that all of these variables, with the exception of integration with the social system, were important in differentiating between innovators and non-innovators when the other variables were controlled for. It is worth noting that innovativeness and norms on instructional strategies accounted for 44% of the total variance explained.

This analysis also showed that specialization of teaching responsibility had an influence on the relationship among the other variables, even though it does not differ between innovators and non-innovators.

Analysis of the directions of the differences between innovators, and non-innovators showed that EDP project directors, the innovators, had more innovativeness, more cosmopoliteness, more integration with the social system, more information seeking about instruction, and more opinion leadership change than the non-innovators. The non-innovators, on the other hand, came from social systems which tended to more supportive of innovation and initially had more opinion leadership than the innovators. (Even though the results for integration with the social system were mixed, use of local Information sources is a more direct operationalization than Years at MSU and provides a more statistically significant difference.)

Table 3 shows the means of the measures for innovators and for non-innovators along with the values of the F-tests of the differences between the two means. The differences between the means of seven of the 27 measures were statistically significant at $p<.01$ and an additional 4 were statistically significant at $p<.05$.

Table 3

Univariate F Tests of Variable Means
for Innovators and Non-innovators

Variable	Innovators Mean	Non-innovators Mean	F
Teaching Models	4.37	6.41	43.4247**
Innovativeness	1.60	2.74	37.4729**
Cosmopolite Style	10.02	7.29	14.1159**
Local Information	3.77	2.91	10.7379**
Information Seeking	8.90	7.03	8.6778**
Opinion Leadership Change	3.15	2.76	8.6635**
Faculty Reaction	3.90	4.52	7.0071**
Opinion Leadership	.50	.71	5.0668*
Years at MSU	9.71	13.00	5.0060*
Cosmopolite Information	5.13	4.12	4.4886*
Teaching Stability	3.29	3.95	3.9848*
Resources	2.67	3.19	3.7565
Tenure	.65	.81	3.5065
Age	41.40	44.98	3.3383
Local Style	7.38	8.40	3.3025
Knowledge	4.17	3.71	2.7101
Teacher Fatalism	2.88	3.34	2.4459
Courses Taught	3.65	4.19	2.2449
Teaching Isolation	.27	.36	1.0802
Academic Discipline	1.94	1.79	.8635
Student Fatalism	3.54	3.81	.5855
Rank	4.10	4.22	.5733

Table 3 (continued)

Variable	Innovators	Non-innovators Mean	F
Teaching Percent	59.17	56.55	.4130
Participation	5.73	5.86	.3518
Teaching Value	3.88	3.97	.0684
Teaching Importance	5.10	5.16	.0482
Teaching Specialization	7.69	7.66	.0031

*Significant $p<.05$

**Significant $p<.01$

N = 110

Degrees of Freedom 1, 108

The multivariate tests required that a discriminant function be generated to discriminate between innovators and non-innovators. Table 4 shows the multiple correlations of each measure with group membership coded as a dummy variable (innovator or non-innovator) resulting from this discriminant function. It also shows the statistical significance of the change in Multiple R^2. Twenty-four of the 27 measures met the criteria for inclusion in this function, and together they explained 63% of the variance among innovators and non-innovators.

The first eight measures in Table 4 provided incremental changes in Wilks lambda, which is related to Multiple R^2 (Multiple R^2=1 Wilks lambda), that were statistically significant at $p<.01$ indicating that their contribution to the function was not due to chance. In combination, these eight measures accounted for 60% of the variance between innovators and non-innovators. It was inappropriate to

consider the three additional measures which provided incremental changes in Wilks lambda significant at only p<05 since teaching specialization was highly correlated with teaching isolation (.86). This leads to problems of intercorrelation in the analysis. Furthermore, these three measures only accounted for an additional 2% of the variance.

The amount of variance in the sample explained by the eight measures which provided statistically significant (p<.01) incremental changes in Wilks lambda gave an overestimate of the population variance. The amount of variance in the population explained after correction for shrinkage was 57%.

Table 4

Multiple Correlations Among Variables in Discriminant Function to Discriminate Between Innovators and Non-innovators

Variable	Wilks lambda	Multiple R^2 (1-lambda)	Multiple R^2 Change
Teaching Models	.7132	.2868	.2868**
Innovativeness	.5599	.4401	.1533**
Information Seeking	.5207	.4793	.0392**
Opinion Leadership	.4824	.5176	.0383**
Opinion Leadership Change	.4471	.5529	.0353**
Teaching Stability	.4336	.5664	.0135**
Teaching Isolation	.4164	.5836	.0172**
Teaching Importance	.4027	.5973	.0137**
Teaching Specialization	.3941	.6059	.0086*
Cosmopolite Style	.3858	.6142	.0083*

Table 4 (continued)

Variable	Wilks lambda	Multiple R^2 (1-lambda)	Multiple R^2 Change
Faculty Reaction	.3804	.6196	.0054*
Local Style	.3767	.6233	.0037
Courses Taught	.3723	.6277	.0043
Academic Discipline	.3710	.6290	.0013
Teaching Value	.3700	.6301	.0010
Teaching Percent	.3692	.6308	.0008
Cosmopolite Information	.3685	.6315	.0007
Student Fatalism	.3679	.6321	.0006
Teacher Fatalism	.3673	.6327	.0006
Resources	.3669	.6331	.0004
Participation	.3667	.6333	.0002
Knowledge	.3666	.6334	.0001
Age	.3665	.6335	.0001
Rank	.3664	.6336	.0001

*Significant $p<.05$

**Significant $p<.01$

N = 110

Table 5 shows the discriminant function coefficients for these eight measures when they were the only measures in the function. Since these coefficients are standardized, they represent the relative contribution of each variable to the function, and can be used to compare the contributions among the measures, controlling for the other variables.

To test the ability of these analyses to differentiate between innovators and non-innovators, the classification coefficients shown in Table 5 were used in two functions to compute classification scores for each individual. The classification function which yielded the highest score determined the group to which an individual would be assigned. These classification functions classified 56 of the 68 innovators (82%) and 10 of the 88 non-innovators (11%) as innovators. The remaining faculty were classified as non-innovators.

Discriminant Function Analysis of the Innovators Not Supported by EDP

To determine the impact of selection on the differences found between innovators and non-innovators, five tests were made on the data from those faculty who reported being involved in instructional development or instructional innovation projects without EDP support. These tests involved: using the differences found between innovators and non-innovators represented by the classification coefficients from Table 5 to classify these unsupported innovators as either innovators or non-innovators, using discriminant function analysis to provide univariate and multivariate tests comparing these unsupported innovators with those innovators supported by EDP, and univariate and multivariate tests comparing these unsupported innovators with the non-innovators.

Classifying the unsupported innovators on the basis of the differences between innovators and non-innovators. Using the differences found between innovators and non-innovators (as represented by the classification coefficients in Table 5) would provide information on the effects of selection on the findings. If the unsupported

innovators were classified as innovators, the effects of selection would be small. If the unsupported innovators were not classified as innovators, the effects of selection would be important in the interpretation of the findings from this study.

When the classification coefficients from Table 5 were used to classify the unsupported innovators as either innovators or non-innovators, only 22 of the 86 (26%) were classified as innovators. This compares with the 82% of the EDP project directors which were classified as innovators. Therefore, the unsupported innovators are not like the EDP supported innovators in terms of the eight measures in Table 5.

Table 5

Discriminant and Classification Coefficients to Discriminate between Innovators and Non-innovators

Variable	Standardized Discriminant Function Coefficient	Unstandardized Classification Function Coefficient	
		Innovators	Non-innovators
Teaching Importance	.2504	2.9258	3.3576
Teaching Models	.8829	1.4208	2.5333
Innovativeness	.5599	3.7053	4.9012
Teaching Stability	.3891	1.7878	2.3238
Teaching Isolation	.3346	5.1766	6.9050
Opinion Leadership Change	-.4046	7.0328	5.6883
Information Seeking	-.5445	.5846	.2018
Opinion Leadership	.4000	-2.8198	- .8473
(Constant)		-30.138	-37.590

Comparison with EDP-supported innovators. The differences between the EDP-supported innovators and the unsupported innovators could be identified using discriminant function analysis in the same manner was done to identify the differences between innovators and non-innovators. This analysis provided both univariate F-tests between means and multivariate tests. The multivariate tests indicated which measures were most important in differentiating between EDP-supported innovators and unsupported innovators, when the other measures were controlled for.

The univariate F-tests identified seven measures whose means differed between the two groups. These measures represented the following variables: fatalism, innovativeness, cosompoliteness, opinion leadership, norms on instructional strategies, resources for instructional improvement, and stability of instructional assignments.

Multivariate analysis of the differences between these two groups indicated that fatalism, innovativeness, opinion leadership and the perception of norms on instructional strategies were important in differentiating between EDP-supported innovators and unsupported innovators, when other variables were controlled for.

Differences in the norms on instructional strategies were most important in differentiating between the two groups of innovators (accounting for 28% of the total variance), as was the case in differentiating between innovators and non-innovators (where it accounted for 29% of the total variance). This analysis also showed that two individual variables, information seeking about instruction and knowledge about instructional innovations, had an influence on the relationship among the other variables, even though they did not

differ between the two types of innovators.

Analysis of the directions of the differences between EDP-supported innovators and non-innovators showed that EDP-supported innovators had more innovativeness and more cosmopoliteness than the unsupported innovators. The unsupported innovators were more fatalistic, had more opinion leadership, and came from departments which tended to be more supportive of innovation.

The results of the univariate F-tests are shown in Table 6. Seven measures were identified with statistically significant differences between the means at $p<.05$. Of these seven, four were significant at $p<.01$.

Table 6

Significant Univariate F Tests of Variable Means for EDP-Innovators and Unsupported Innovators

Variable	EDP-Innovators Mean	Unsupported Innovators Mean	F
Teaching Models	4.37	6.56	43.9152**
Opinion Leadership	.50	.83	15.4371**
Innovativeness	1.60	2.13	10.1344**
Resources	2.67	3.38	7.2560**
Cosmopolite Style	10.02	8.25	6.4511*
Teacher Fatalism	2.88	3.52	4.8527*
Teaching Stability	3.29	3.98	4.5331*

*Significant at $p<.05$
**Significant at $p<.01$
N = 115
Degrees of Freedom 1, 113

The multivariate tests comparing EDP-supported innovators with unsupported innovators were conducted using discriminant function analysis. A discriminant function was generated which explained 51% of the variance between these two groups of innovators and gave a Chi Square that was statistically significant at $p<.001$, indicating the relationship among the variables specified by the function was not due to chance.

Only the first seven measures included in this function, as shown in Table 7, provided an incremental change in Wilks lambda significant at $p<.05$. These seven measures accounted for 44% of the total variance, and were the only measures used in the classification functions derived from the discriminant scores, since the contributions of the other variables were not significantly different from chance. The discriminant and classification coefficients for these variables are shown in Table 8.

The classification functions classified 46 of the 68 EDP-supported innovators (68%) and 14 of the 70 unsupported innovators (20%) as innovators. When the non-innovators were classified using these functions, only 5 of the 90 non-innovators (6%) were classified as innovators. All others were classified as non-innovators. Even though these classification functions were less able to correctly classify innovators and non-innovators than those based on Table 5 using the discriminant function analysis of EDP-innovators and non-innovators, they do indicate that the differences found between EDP-supported innovators and non-innovators were valid, since a large proportion of each group could be differentiated from the other group.

Table 7

Significant Multiple Correlations Among Variables in the Discriminant Function to Discriminate Between EDP-Innovators and Unsupported Innovators

Variable	Wilks lambda	Multiple R^2 (1-lambda)	Multiple R^2 Change
Teaching Models	.7201	.2799	.2799**
Opinion Leadership	.6656	.3344	.0545**
Innovativeness	.6337	.3663	0319**
Opinion Leadership Change	.6115	.3885	.0222**
Information Seeking	.5852	.4148	.0263**
Student Fatalism	.5714	.4286	.0138*
Knowledge	.5571	.4429	.0143*

*Significant at p<.05

**Significant at p<.01

N = 115

Table 8

Discriminant and Classification Coefficients to Discriminate Between EDP-Supported Innovators and Unsupported Innovators

Variables	Standardized Discriminant Function Coefficients	Unstandardized Classification Function Coefficients	
		EDP-Supported Innovators	Non-Supported Innovators
Knowledge	-.2537	1.7170	1.4024
Teaching Models	.9840	.7655	1.6098
Innovativeness	.2584	2.7102	3.2064
Student Fatalism	.2757	1.3336	1.6001
Opinion Leadership Change	-.3601	7.2255	6.3154
Information Seeking	-.2443	.8378	.7147
Opinion Leadership	.5827	-1.7141	.4915
(Constant)		-24.471	-27.292

Comparison with non-innovators. Just as was done in the previous analyses, the differences between the unsupported innovators and the non-innovators could be identified using discriminant function analysis. In this case, only four measures whose means differed between the two groups were identified by the univariate F-tests (see Table 9). The measures represented the following variables: innovativeness, information seeking about instruction, integration with the social system, and opinion leadership.

Table 9

Significant Univariate F Tests of Variable Means for Unsupported Innovators and Non-innovators

Variable	Unsupported Innovators Mean	Non-innovators Mean	F
Innovativeness	2.13	2.74	10.93044**
Information Seeking	8.94	7.03	10.2393**
Local Information	3.75	2.91	10.6138**
Opinion Leadership Change	3.02	2.76	3.9899*

*Significant at $p<.05$

**Significant at $p<.01$

N = 121

Degrees of Freedom 1, 119

The multivariate analysis between the two groups provided a discriminant function that gave a Chi Square which was statistically significant at $p<.001$ and indicated that innovatives, integration with the social system, and opinion leadership were important in differentiating

between the unsupported innovators and the non-innovators when the other variables were controlled for. However, it should be pointed out that only 30% of the variance between the two groups was explained using all the measures in this study; and, when only those four variables which provided a statistically significant change in Multiple R^2 ($p<.05$) were considered, only 19% of the total variance was explained. The results of this multivariate analysis are shown in Table 10.

Table 10 also shows that in addition to innovativeness, integration with the social system, and opinion leadership, specialization of teaching responsibility had an influence on differentiating between the two groups even though it did not differ between the groups.

Table 10

Significant Multiple Correlations Among Variables in the Discriminant Function to Discriminate Between Unsupported Innovators and Non-innovators

Variable	Wilks lambda	Multiple R^2 (1-lambda)	Multiple R^2 Change
Innovativeness	.9159	.0841	.0841**
Local Information	.8595	.1405	.0564**
Teaching Isolation	.8360	.1640	.0235*
Opinion Leadership Change	.8145	.1855	.0215*

*Significant at $p<.05$

**Significant at $p<.01$

N = 121

Analysis of the directions of the differences between the unsupported innovators and the non-innovators showed that the supported innovators had more innovativeness, more information seeking about instruction, more integration with the social system, and more opinion leadership than the non-innovators.

When the four measures providing statistically significant changes in Multiple R^2 were used in the classification functions, 60 of the 84 unsupported innovators (71%) and 31 of the 88 non-innovators (35%) were classified as innovators. When the EDP-supported innovators were classified using these functions, 51 of the 68 EDP-innovators (75%) were classified as innovators. All others were classified as non-innovators. The discriminant and classification coefficients for these measures are shown in Table 11. Since over 70% of both the EDP-supported innovators and the unsupported innovators were classified as innovators, and only 35% of the non-innovators were classified as innovators, it shows that the two groups of innovators are more like each other than they are like non-innovators.

Table 11

Discriminant and Classification Coefficients to Discriminate Between Unsupported Innovators and Non-innovators

Variables	Standardized Discriminant Function Coefficients	Unstandardized Classification Function Coefficients	
		Unsupported Innovators	Non-innovators
Innovativeness	.5982	2.6659	3.1991
Teaching Isolation	.4290	- .3887	.4897
Opinion Leadership Change	-.3894	6.2498	5.7468
Local Information	-.6391	2.0453	1.6303
(Constant)		-16.041	-14.776

Effects of Maturation

The effects of maturation on the findings of differences between innovators and non-innovators were indicated by analyzing the responses to four items provided by the non-EDP supported faculty. These items asked for a comparison of the individual's current levels of activity or current conditions with the levels five years previously.

Table 12 shows the responses to these items. In all categories, the predominant response was that activities or conditions were the same as five years previously. A Chi Square test of the percentage of respondents indicating a difference (in either direction) was not statistically significant at $p<.05$. Therefore, the same overall amount of change was reported for all four categories. This test is shown in Table 13.

Table 12

Comparison of Current Activities with Five Years Previously

Activity/Condition	Amount Compared with Five Years Ago		
	Less	Same	More
Information Seeking	27(16%)	96(57%)	46(27%)
Teaching Importance	24(14%)	102(61%)	41(25%)
Participation in Department	13(8%)	126(75%)	28(17%)
Positive Reaction of Faculty to Innovation	23(14%)	110(66%)	33(20%)

Table 13

Chi Square Test of Percent of Faculty Reporting Change in Current Activities

Activity/Condition	Expected %	Observed %
Information Seeking	35.25	43
Teaching Importance	35.25	39
Participation in Department	35.25	25
Positive Reaction to Faculty to Innovation	35.25	34

Chi Square = 5.13

When the total changes (in either direction for all categories was computed for each respondent, the mean number of activities or conditions which had changed for each respondent was 1.43 with a standard deviation of 1.00.

These findings suggest that while there has been some change during the past five years, it has not been in any one direction (more or less of an activity or condition), nor has it appeared to be sufficient to base the findings of this study on the effects of maturation.

Major Findings

The data analysis showed that eight of the 18 characteristics studied differed between innovators and non-innovators. It was found that:

1. Innovators differed from non-innovators by showing:
    a. Greater innovativeness
    b. More integration with the social system
    c. Greater cosmopoliteness
    d. Greater information seeking about instruction
    e. Greater opinion leadership change
2. Innovators' perceptions of their departments differed from the perceptions of non-innovators by showing:
    a. Less supportive norms on innovativeness
    b. Less supportive norms on instructional strategies
    c. More stability of instructional assignments

An additional major finding was that there were three distinct groups of faculty: innovators, unsupported innovators, and non-innovators.

Summary

Identifying variables which differed for innovators and non-innovators using multiple regression equations to predict the number of EDP projects done by an innovator or a combined score of

project success did not prove useful. While a statistically significant regression equation was generated to predict the number of EDP projects done, the relationships among the variables represented in it could not be used to differentiate between innovators and non-innovators. It was not possible to generate a statistically significant regression equation to predict a combined score of project success.

Discriminant function analysis, however, identified eight characteristics which differed for innovators and non-innovators. These characteristics were: innovativeness, integration with the social system, cosmopoliteness, information seeking about instruction, opinion leadership, norms on innovation, norms on instructional strategies, and stability of instructional assignments.

The innovators had more innovativeness, cosmopoliteness, integration with the social system, information seeking about instruction, and opinion leadership change than the non-innovators.

When the unsupported innovators were compared with both the EDP-supported innovators and the non-innovators, it was found that there were fewer differences between the unsupported innovators and the non-innovators than between the unsupported innovators and the EDP-supported innovators.

The effect of maturation due to the difference in time periods on which responses were based appeared to be small since most of the non-EDP supported faculty indicated that the current levels of activity or conditions were about the same as five years previously.

The specific measures identified by discriminant function analysis whose means were significantly different for innovators and non-innovators ($p<.05$) were: Teaching Models, Innovativeness, Cosmopolite Style, Local Information, Information Seeking, Opinion Leadership Change, Faculty Reaction, Opinion Leadership, Years at MSU, Cosmopolite Information, and Teaching Stability.

Eight measures were also identified which, in combination, explained 60% of the variance between innovators and non-innovators in the sample. This represents 57% of the variance in the population. These eight measures were: Teaching Models, Innovativeness, Information Seeking, Opinion Leadership, Opinion Leadership Change, Teaching Stability, Teaching Isolation, and Teaching Importance. The classification functions using these eight measures correctly classified 82% of the innovators and 89% of the non-innovators.

EDP-supported innovators were also compared with unsupported innovators to identify the effects of selection on the findings. Seven measures were identified whose means were significantly different between the two groups of innovators ($p<.05$). These seven measures were: Teaching Models, Opinion Leadership, Innovativeness, Resources, Cosmopolite Style, Teacher Fatalism, and Teaching Stability. In addition, seven measures were identified which, in combination explained 44% of the variance between EDP-supported and unsupported innovators. These measures were: Teaching Models, Opinion Leadership, Innovativeness, Opinion Leadership Change, Information Seeking, Student Fatalism, and Knowledge.

There were fewer measures that differed between unsupported innovators and non-innovators than between unsupported innovators and

EDP-supported innovators. Only four had means that were significantly different between unsupported innovators and non-innovators ($p<.05$): Innovativeness, Information Seeking, Local Information, and Opinion Leadership Change. Only four measures produced significant incremental changes in Wilks lambda ($p<.05$); in combination they explained 19% of the variance. These four measures were Innovativeness, Local Information, Teaching Isolation, and Opinion Leadership Change.

CHAPTER V

SUMMARY AND DISCUSSION

Introduction

The purpose of this study was two-fold: first, it was to identify how innovators differed from non-innovators, and second, it was to identify how innovators' perceptions of their departments differed from those of non-innovators. These differences were to be examined in terms of 27 measures representing 18 characteristics selected from the Rogers and Shoemaker (1971) model on the diffusion and adoption of innovations.

Questionnaires were sent to a sample of 90 EDP project directors, the innovators, and 250 non-EDP supported faculty, the unsupported innovators and the non-innovators. Data from the questionnaires were analyzed using multiple regression and discriminant function analysis to identify those variables which differed, individually or in combination with other variables, between innovators and non-innovators.

Of the two types of analysis used in this study, only discriminant function analysis was able to identify characteristics which differed between innovators and non-innovators. The multiple regression equation to predict the number of projects done by an individual was statistically significant, but was not useful for identifying differences between innovators and non-innovators. It was not possible to generate a statistically significant multiple regression equation to predict a combined measure of project success

for an individual's first EDP project.

The discriminant function analyses identified eight of the 18 characteristics from the Rogers and Shoemaker model which differentiated between innovators and non-innovators, providing answers to the two research questions raised in Chapter III. Furthermore, it was discovered that the two types of innovators (EDP-supported and unsupported) were not alike. The differences between the two groups of innovators were consistent with Rogers' and Shoemaker's distinctions between innovators and early adopters. In this study, the EDP-supported innovators had the characteristics of innovators, while the unsupported innovators had the characteristics of the early adopters.

As a result of the analyses done in this study, four conclusions were reached:

1. Eight differences can be identified between innovators and non-innovators in terms of personal and social system characteristics.
2. Three groups of faculty can be identified: innovators, early adopters, and non-innovators.
3. Innovators perceive that their departments do not provide sufficient financial and/or psychological support for instructional innovation.
4. Only a portion of the individual and social system characteristics from the Rogers and Shoemaker model on the diffusion and adoption of innovations appears generalizable to higher education settings.

Each of these four conclusions will be dealt with separately in this chapter. The data and rationale supporting each conclusion will be

presented, along with a discussion of its implications.

Conclusion No. 1

Eight differences can be identified between innovators and non-innovators in terms of personal and social system characteristics.

Discriminant function analysis of the data from this study identified eight of the 18 characteristics from the Rogers and Shoemaker model which differentiated between innovators and non-innovators. This provided answers to the research questions raised in Chapter III. The data analysis indicated that:

1. Innovators differed from non-innovators by showing:
   a. Greater innovativeness
   b. Greater integration with the social system
   c. Greater cosmopoliteness
   d. Greater information seeking about instruction
   e. Greater opinion leadership change
2. Innovators' perceptions of their departments differed from the perceptions of non-innovators by showing:
   a. Less supportive norms on innovativeness
   b. Less supportive norms on instructional strategies
   c. More stability of instructional assignments

The multivariate analysis of the data indicated that the two most important characteristics in differentiating between innovators and non-innovators were innovativeness and norms on instructional strategies. Together they accounted for 44% of the total variance between innovators and non-innovators when the other variables were controlled for.

An indication of the usefulness of the differences identified between innovators and non-innovators was also provided by the multivariate analysis. This analysis made it possible to combine the eight characteristics which differed between innovators and non-innovators to classify the respondents into the two groups, as well as classify the group of unsupported innovators (early adopters). This classification provided a test of the validity of the findings. The test correctly classified 82% of the innovators, 89% of the non-innovators, while 74% of those who claimed to be innovators, without EDP support, were classified in a single group (as it turns out, they were classified as non-innovators).

There may have been other differences between innovators and non-innovators which went unidentified because of two reasons: Imprecision of the measures used and homgeneity of the university. For example, the measures of teaching specialization were ambiguous and partially misleading since they did not ask the respondent to provide a detailed response. The measure of participation asked for a single self-report on the sum of all types of participation in the department and was too general to provide differentiation between respondents. The selection of academic discipline as the measure of membership in a modern and/or integrated system appeared to be inappropriate since it did not differ for innovators and non-innovators while other social system variables did, i.e., the variables dealing with social system norms.

The measures of fatalism may also have been to imprecise to identify differences among the groups. While fatalism differed between innovators and early adopters, different fatalism measures were significant in the univariate and multivariate tests. Since only two

fatalistic statements were used, the various dimensions of fatalism may not have adequately been measured. It is also possible, however, that the non-innovators did not differ in fatalism from the innovators, but for other reasons (e.g., support and resources from the social system) chose not to innovate.

Homogeneous characteristics of the university may have combined with the measures of several variables to mask differences between innovators and non-innovators. For example, the university may be fairly homogeneous with regard to size of teaching load and norms on the importance of teaching. No differences were found in this study; though, had more sensitive measures been used which indicated differences between innovators and non-innovators, these differences may not really have been large enough to be meaningful. In a similar fashion, the values of the faculty may be homogeneous with regard to knowledge about instructional innovations and the importance of status. Respondents may not have been able to clearly identify how much they actually knew about instructional innovations since they may have perceived that they were expected to know a great deal while the measure used in this study did not provide a standard with which a comparison could be made.

The lack of difference in terms of status may reflect another characteristic of the university: the university may not place great value on status as measured by tenure or academic rank.

There were mixed results with respect to integration with the social system. Non-innovators had more years at MSU; yet, innovators used more Local Information sources. The exact relationship of Years at MSU with integration with the social system is not clear.

It was intended to represent the potential for becoming integrated, though it potentially could have also represented the potential for forming cosmopolite sources of information, being affected by the norms of the social system, becoming an opinion leader, etc. Use of local information sources, however, is a more direct measure of integration with the social system; and since it represented a more statistically significant difference between innovators and non-innovators, it was used as the measure of integration with the social system.

Even though differences were found for only eight characteristics, this study was able to account for 60% of the variance within the sample of innovators and non-innovators (which is equivalent to 57% of the variance in the population). Rogers and Shoemaker (1971, pp. 191-192) summarize 36 multiple correlation studies of innovativeness, primarily involving farmers in the U.S. and abroad (none dealt with innovation in educational systems). Of these 36 studies, only eight were able to explain more variance. Four of these studies were able to explain this amount of variance with eight or fewer variables. One study explained 81% of the variance using four variables; however, the other three studies only explained approximately 64% of the variance using five or six variables. The three studies that used more variables explained from 68.9% to 87.5% of the variance using from 27 to 51 variables.

Implications of conclusion 1. There are two implications of being able to identify these eight differences between innovators and non-innovators. First, this information can be used to predict whether an individual is more likely to be an innovator, early adopter, or a

non-innovator. Second, this information can be used to devise strategies to increase the adoption of innovations.

Using the procedures described in Chapter III for combining the eight characteristics into classification functions, individuals can be identified as more likely to be innovators, early adopters, or non-innovators. The appropriate values for the variables in these classification functions can be obtained by having the individual respond to the measures appropriate to teach variable as indicated on the questionnaires in Appendices A and B.

Identifying whether an individual is more likely an innovator, early adopter, or a non-innovator should be useful in program evaluation and management because it makes it possible to determine whether effort and resources are being spent on the target audience--innovators, early adopters, or non-innovators. Since early adopters are more integrated with their social system than innovators, it could also be useful to differentiate between these two groups.

It is also possible to use the information about how innovators differ from non-innovators to devise strategies to increase the adoption of innovations. This use is based on two assumptions which need further testing. The first assumption is that there is a cause-effect relationship between the variables identified in this study as differentiating between innovators and non-innovators and an individual becoming an innovator or early adopter. The second assumption is that making individuals more like innovators or early adopters will increase the adoption of innovations.

The strategies to increase the adoption of innovations attempt to make everyone's characteristics similar to the characteristics of

innovators or early adopters in terms of the variables in this study which differed between innovators or early adopters and non-innovators. For example, since innovators sought more information about teaching and learning than non-innovators, a strategy might be devised which rewards or encourages information seeking by individual faculty. Another strategy might be to make information seeking easier by increasing the number of magazines or newsletters circulated to faculty.

Conclusion No. 2

Three groups of faculty can be identified: innovators, early adopters, and non-innovators.

Discriminant function analysis comparing the unsupported innovators with both the EDP-supported innovators and the non-innovators indicated that the two groups of innovators were not alike. These two groups differed in terms of fatalism, innovativeness, cosmopoliteness, opinion leadership. With respect to perceptions of their departments, the innovators differed from the early adopters by showing less supportive norms on instructional strategies, fewer resources for instructional improvement, and more stability of instructional assignments. These differences were confirmed by the results of the classification of respondents by means of the multivariate analysis. This classification assigned 68% of the EDP-supported innovators to one group and 80% of the unsupported innovators to a second group.

The differences between the two groups of innovators can be explained in terms of differences Rogers and Shoemaker identify between innovators and early adopters. The description of innovators indicates that they are more innovative and cosmopolite, seek more

information, and are less a part of their social system than other adopters (1971, p. 183). Early adopters are described by Rogers and Shoemaker as:

> . . . more integrated a part of the local social system than are innovators. . . . This adopter category, more than any other, has the greatest degree of opinion leadership in most social systems. . . . (p. 184)

The unsupported innovator appears more integrated in his social system, at least in terms of opinion leadership which is related to such integration according to Rogers and Shoemaker, and that social system appears to provide support for that individual in terms of both norms and resources which support innovation. It may be the interaction of these factors (which differ between the EDP-supported innovators and the unsupported innovators) with the two other important factors (information seeking about instruction and knowledge about instructional innovations) which keep the "early adopters" (unsupported innovators) from being innovators.

Since the early adopters were not identical with the innovators, the early adopters were compared to the non-innovators using discriminant function analysis. This analysis indicated that only four of the variables used in this study differed between early adopters and non-innovators: innovativeness, information seeking about instruction, integration with the social system, and opinion leadership. The early adopters had more of each of these characteristics.

This analysis also indicated that information seeking about instruction was not an important difference, but that an additional variable, specialization of teaching responsibility, was. This latter variable represents in part, the relationship between the individual and the social system (an individual who is not specialized may share

teaching responsibilities for certain courses with others in the social system).

The differences found between the early adopters and the non-innovators further support identification of the unsupported innovators as early adopters rather than innovators. The early adopters differed from the non-innovators on four of the same variables that differed between the innovators and the non-innovators--the most important of these, as indicated by the multivariate analysis, being innovativeness. Furthermore, the additional variable which entered into this multivariate relationship between non-innovators and early adopters involved the social system, while the additional variables in the multivariate relationship between innovators and early adopters involved personal characteristics. This is consistent with the Rogers and Shoemaker generalization that social system effects may be more important in explaining the differences between adopter categories than individual characteristics of the adopters (see the discussion of Rogers' and Shoemaker's generalizations in Chapter II). In this case, there is a greater difference between the non-innovator category and the innovators or early adopters than between the two caregories of innovators (innovators and early adopters.)

Multivariate analysis showed that over 70% of both the innovators and the early adopters could be classified in the same group and 65% of the non-innovators classified in a separate group. Combined with the classification results, this confirms the existence of three distinct groups of faculty: innovators, early adopters and non-innovators.

Implications of conclusion 2. One of the implications of

Conclusion 2 is that it provides a cross-check for identifying whether an individual is an innovator and less integrated in his social system, an early adopter and more highly integrated in his social system (in terms of opinion leadership), or a non-innovator.

There is a second implication of this conclusion: an educational development program based on optional decisions to adopt innovations does not reach a wide cross section of the faculty. In Chapter I it was suggested that all faculty might not choose to participate in an educational development program which was based on optional decisions to adopt innovations. (This is the type of EDP activity in effect at MSU.) It turns out that a program of this type, which relies on the individual faculty member to seek it out for support, did not reach a wide cross section of the faculty since it generally did not reach those faculty who were most integrated in their social systems and/or who were opinion leaders, and it did not reach those least integrated in their social system--the non-innovators. Therefore, the effects of the projects in such a program would be less likely to influence faculty members not involved in the project and would be less likely to spread rapidly throughout the institution--especially to those not well integrated within that institution.

It should be pointed out, however, that there are indications that the opinion leadership of an innovator increases following the adoption of an innovation. This change suggests that over a <u>longer</u> period of time the innovators would have an influence on their colleagues. The nature of this influence and how long it takes to develop remain unclear.

A third implication of this conclusion focuses on ways to

increase the adoption of innovations. Two of the ways to increase this adoption are: 1) make the individuals more like innovators, and 2) make the individuals more like early adopters (since both innovators and early adopters adopt innovations more readily than non-innovators). The implication from this conclusion is that it is not always necessary to make an individual like an innovator. When it is possible to change the social system's norms and resources to more supportive of innovation, adoption of innovations will probably be more widespread and will not require outside support. In this case, EDP effort should be directed to making individuals more like early adopters--increasing their opinion leadership, integration with the social system, cosmopoliteness, etc.--than like innovators since innovators are less integrated in their social system and would be less influenced by changes within it.

Where it is not possible to make the necessary changes in the social system or where it is more important to have a few individuals adopt innovations quickly, maintaining the individual's integration with the social system would not be as important. Therefore, making the individual more like an innovator is appropriate. This can lead to faster adoption of innovations, but that adoption would not be as widespread. Such a strategy might be appropriate in situations where one step in changing the norms of the social system in terms of instructional strategies required that new instructional strategies be implemented within the social system. In such a case, making several faculty innovators might be a quick way to introduce these new instructional strategies.

Conclusion No. 3

Innovators perceive that their departments do not provide sufficient financial and/or psychological support for instructional innovation.

This implies that both financial and psychological support are necessary for the adoption of innovations to occur. The innovators had little or no psychological support from within their social systems since the norms of the social systems did not support instructional innovation, and they were apparently not recognized as opinion leaders about instruction. Need for this type of support, however, may account for the innovators being more cosmopolite--making use of outside reference groups for support. Financial support was, of course, provided by EDP. On the other hand, the early adopters came from social systems whose norms and resources supported instructional innovation.

Further evidence of the importance of financial and psychological support comes from the multivariate analysis which showed that these innovators were more integrated with their social systems than non-innovators, but suggests that being integrated in a social system which may have provided psychological support but did not provide resources was not sufficient to bring about the actual adoption of innovations without outside funds.

The most important variables in differentiating between innovators and non-innovators were innovativeness and norms on instructional strategies. A difference in terms of innovativeness merely provides an additional test of validity for this study since it is a measure of when an individual generally adopts innovations

compared to his colleagues. By this definition, innovators in study would have to be more innovative than non-innovators if the groups were correctly selected to represent these two conditions. The importance of norms on instructional strategies is that it represents the influence of the social system on the individual. To innovate in a system which did not have or support a variety of instructional strategies, the innovator had to seek outside financial support (from EDP), be more cosmopolite, and seek more information about instruction.

Implications of conclusion 3. The implication of this conclusion is that to increase the adoption of innovations it is necessary to insure that individuals perceive that there is both financial and psychological support. If this support cannot be obtained from the individual's social systems, it must be provided from outside--using outside funding sources and increasing the cosmopoliteness of these individuals.

Conclusion No. 4

Only a portion of the individual and social system characteristics from the Rogers and Shoemaker model on the diffusion and adoption of innovations appears generalizable to higher education settings.

The findings from this study can be compared to prior research (as discussed in Chapter II) from Rogers' and Shoemaker's generalizations from research in many fields and in terms of prior research from higher education alone. The findings from prior research and from this study will be compared in a side-by-side format to allow easier comparisons.

This comparison shows that there are a number of major discrepancies with the findings from the research in higher education; though this is primarily because there is so little of it. It also appears that only a portion of the rogers and Shoemaker model is appropriate for higher education.

Rogers' and Shoemaker's Generalizations.	This research.
Differences between 17 of the 18 characteristics were found between earlier adopters and later adopters (no difference was found for age).	Differences on eight of the 18 characteristics were found between innovators and non-innovators; and on seven of the 18 characteristics between innovators and early adopters.
A maximum of 88% of the variance was explained, though most studies explained less.	This study explained 60% of the variance.
Earlier adopters had more opinion leadership, positive norms on innovation and instructional strategies.	Innovators had less of all these characteristics than non-innovators, and innovators led early adopters only in terms of cosmopoliteness and innovativeness. (All other differences were in the direction indicated by the model.) This may be due to the innovators' perceiving their social systems as traditional and unsupportive of change.

This study found direct support for those Rogers and Shoemaker generalizations dealing with innovativeness, cosmopoliteness, information seeking, and opinion leadership when innovators and early adopters were compared to non-innovators. There were mixed results with respect to the generalization on integration with the social system but they appeared to support the model. The results on social system characteristics were in the opposite direction from that predicted by the model.

An important reason why only a portion of the Rogers and Shoemaker model was supported by this study is that the cultures on which each was based were different. The Rogers and Shoemaker model was based primarily on data from agricultural innovation studies which were frequently done in less developed or primitive cultures. This study was done in a more modern culture, higher education, which has many differences with the agricultural setting, e.g., level of abstractions dealt with, types of rewards available, ability to delay gratification, etc. Therefore, part of the Rogers and Shoemaker model does not apply in a higher education setting.

There is little overlap or agreement between these findings and the findings of past research from higher education (only the findings with respect to age are consistent among higher education studies). The lack of agreement among the various higher education studies is probably due to the different definitions of "adopters", use of different operational definitions and measures for the variables studied, and different types of innovations studied.

Prior research from higher education.	This research.
Adopters and non-adopters were no different in age and had no difference in years at the institution.	Innovators and non-innovators were no different in age, but non-innovators had more years at MSU.
Adopters were less fatalistic than non-adopters.	Innovators and non-innovators did not differ on fatalism, but innovators were less fatalistic than early adopters.
Adopters were more integrated with their social system than non-adopters.	The results were mixed. Innovators had fewer years at MSU, but made more use of local information. This may be due to different operational definitions of integration with the social system.

adopters had smaller teaching loads; however, these results were questionable.	No difference in teaching loads between innovators and non-innovators.
Differences existed between academic disciplines.	No differences between academic disciplines. The differences observed by prior research were on characteristics not included in this study.

Implications of conclusion 4. There are two implications which result from this conclusion. First, a comprehensive theory is needed to explain how the variables in the model affect the diffusion and adoption of innovations. Second, the results from past research cannot be used to predict which portions of the model which have not been tested are most likely to apply to higher education.

There is not a comprehensive theory which explains why the variables in the Rogers and Shoemaker model fit together. Currently, the primary study and discussion has been on the relationship between the various variables and the adoption of innovations. Little has been presented on the interaction of the variables in the model and how these variables act to "cause" or "inhibit" the adoption of innovations. This makes it very difficult to interpret why this study did not conform to the entire model in this particular setting.

Furthermore, since only 45% of the variables from the model which were tested in this study showed a difference between the innovators and the non-innovators, and since there is not a comprehensive theory to use in explaining why this study did not conform to the entire model, it is difficult to predict which of the other variables from the Rogers and Shoemaker model would apply to higher education. Therefore, it is difficult to draw on the Rogers and Shoemaker generalizations dealing with these other variables in the

design of strategies to increase the adoption of innovations.

Future Research

Three areas of future research are indicated by the results of this study. First, other variables from the Rogers and Shoemaker model should be examined. Second, the effect of EDP support on a department over time should be studied. Third, this study should be replicated with better controls.

Research including other variables. This study omitted communication and consequences variables from the Rogers and Shoemaker model. It also omitted several of the individual and social system variables--especially those relating to attitudes. Further examination of the model is warranted since this study found less than 45% (eight of the 18 characteristics tested) of the model to be applicable to higher education.

Effect of EDP support over time. EDP support may have more effect on the social system than indicated by this study. Innovators were not found to be opinion leaders. However, there was some evidence that they increased their opinion leadership as a result of their innovation. This change may reflect changes in their social system, e.g., the norms that relate to innovation, and suggests that support of an innovator does have an influence on other faculty. The nature of this change in opinion leadership (such as under what conditions it occurs) and its effect on the department needs to be identified.

Replication with better controls. While this study accounted for 60% of the variance between innovators and non-innovators, it should be replicated with better controls. The actual adoption or non-adoption of innovations should be documented. In this study, innovators were selected on the basis of reports of their innovation projects. However, the faculty were initially assigned as unsupported innovators or non-innovators on the basis of self-reports with no attempt to verify whether these reports were accurate. Stern et al. (1976) point out that attitudes toward adoption and actual adoption are not the same. The same problem may exist with self-reports.

Replication is also needed to provide more precise measures of the variables. This could clear-up the problems with several of the variables which were described earlier in this chapter; these were problems which may have resulted in findings of no significant difference between the groups on those variables. More precise measures of the variables could also be used to establish the reliability of the self-reports used in this study. Such measures could take the form of confirmations by colleagues, use of records to verify self-reports, use of observers to record activities over a period of time, etc.

The need for better controls also extends to the design of the study. This study used an ex post facto design--conducting the study after the significant event (innovation) had taken place. Furthermore, this study asked respondents in one group to base their ansers on different time periods than those in other groups. A more controlled design which takes these factors into account would provide a stronger foundation for findings which showed differences between innovators and non-innovators.

Summary

The purpose of this study was two-fold: first, it was to identify how innovators differed from non-innovators, and second, it was to identify how innovator's perceptions of their departments differed from those of non-innovators. The major findings of this study were that there were five characteristics which differed between innovators and non-innovators, and three characteristics which differed between the innovators' perceptions of their departments and those of the non-innovators. Furthermore, there were three distinct groups of faculty: innovators, early adopters, and non-innovators.

A number of implications can be drawn from these findings. First, the differences found between the various groups of faculty can be used to identify whether an individual is more likely to be an innovator, an early adopter or a non-innovator. Second, strategies to increase the adoption of innovations can be based on making individuals more like innovators or early adopters in terms of the variables which differed between these two groups and the non-innovators. Third, EDP activities which are based on optional decisions to adopt innovations do not reach a wide cross section of faculty. Fourth, the adoption of innovations depends on the individual perceiving that there is adequate financial and psychological support for the innovation. Finally, a comprehensive theory is needed to explain how the variables in the Rogers and Shoemaker model on the diffusion and adoption of innovations fit together and interact with each other.

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APPENDICES

APPENDIX A

MICHIGAN STATE UNIVERSITY

Office of the Provost East Lansing - Michigan - 48824

APPENDIX A

(Sent to EDP-Project Directors)

In recognition of our 10th year of operation, we are writing a monograph describing the growth and development of the Educational Development Program (EDP) during the past decade.

The monograph will focus primarily on the types of projects which have been supported and the growth of our instructional support program in response to the changing context at MSU. We would like to include a profile of characteristics of our EDP Project Directors and their departments. In order to construct this profile, we need your help.

Please complete the enclosed questionnaire this week and return it in the enclosed, pre-addressed envelope by campus mail. We are working with an early deadline so a prompt response would be greatly appreciated.

Our pilot tests have shown it will take you approximately 15-20 minutes to complete the questionnaire. I urge you to help us in this important endeavor.

Thank you for your cooperation.

Sincerely,

Robert H. Davis, Assistant Provost
Director, Instructional Development
and Telecommunication Services

mjs

Enclosure

EDP PROJECT DIRECTOR PROFILE

NAME _____

DEPARTMENT _____

COLLEGE _____

DATE OF FIRST EDP GRANT _____

AMOUNT OF FIRST EDP GRANT _____

INTRODUCTION

This questionnaire has been designed to solicit information for our ten-year report on the MSU Educational Development Program. THERE ARE NO RIGHT ANSWERS and ALL RESPONSES WILL BE KEPT STRICTLY CONFIDENTIAL. The data will be reported in summary form only. Please put your completed questionnaire in the enclosed, pre-addressed envelope and return it by campus mail. We need to have all responses in our office no later than March 5th.

The questionnaire deals with three time periods: The YEAR PRIOR to your EDP project, the TIME WHEN YOU BEGAN your EDP project, and the PRESENT TIME. Even though some of the questions ask you to think back a number of years, please try to do so. You will not need to look up or provide large amounts of factual data. Most of the items ask you to select a response which most closely represents how you feel about the item OR which most closely describes what you believe to be the best answer.

We know your time is limited, so the number of items has been limited. It should only take you 15-20 minutes to complete the questionnaire. Because this questionnaire is being sent to a very specialized audience, everyone's response is important. We would greatly appreciate it if you would take time to complete the questionnaire within the next week.

****

1. DURING THE YEAR PRIOR TO YOUR FIRST EDP GRANT, how often would you say you did the following?

   SCALE: 0=Never, 1=Once, 2=Several (2-4 times), 3=Many (5 or more times)

   ____ Attended a workshop, seminar, or meeting about teaching or learning at MSU.

   ____ Attended a workshop, seminar, or meeting about teaching or learning at another university.

   ____ Read a book or journal article about teaching or learning.

   ____ Consulted with an MSU consultant on teaching, learning, evaluation, or media.

   ____ Consulted with colleagues in your college about teaching or learning.

   ____ Consulted with personal contacts at other universities about teaching or learning.

   ____ Other: _____

2. How did you first find out about the EDP program? (Check only your first source of information.)

   ____ A colleague

   ____ Learning and Evaluation Service

   ____ Instructional Media Center

   ____ Instructional Television Service

   ____ EDP literature or staff

   ____ Other (list) _____

3. IN THE YEAR PRIOR TO YOUR FIRST EDP GRANT, how important was teaching compared to your other activities at MSU? (Mark your answer on the following scale.)

   /_____/_____/_____/_____/_____/_____/

   1 2 3 4 5 6 7

   Least important Equally important Most important

4. DURING THE YEAR PRIOR TO YOUR FIRST EDP GRANT, how important would you say good teaching was for promotion, pay raises, or other rewards in your department?

/	/	/	/	/	/	/
1	2	3	4	5	6	7
Not important		Moderately important			Very important	

5. DURING THE YEAR PRIOR TO YOUR FIRST EDP GRANT, approximately what percentage of your time did you spend directly preparing for teaching or actually teaching?

_____%

6. PRIOR TO YOUR FIRST EDP GRANT, how much did you know about new developments in teaching and learning?

/	/	/	/	/	/	/
1	2	3	4	5	6	7
Knew very little					Knew a great deal	

7. EDP project directors have given many reasons for seeking an EDP grant; how influential were each of the following in <u>your</u> decision to seek an EDP grant to improve your course?

Please base your answers on the following scale:

/	/	/	/	/	/	/
1	2	3	4	5	6	7
Not influential			Moderately influential		Extremely influential	

_____ Your department chairman
_____ Your students
_____ Not satisfied with your own teaching
_____ Not satisfied with some aspect of the course
_____ For promotion, tenure, or pay raise
_____ For your personal development
_____ For recognition and status
_____ Increased enrollment
_____ Changes in the subject matter
_____ Changes in the curriculum

8. DURING THE YEAR PRIOR TO YOUR FIRST EDP GRANT, how often would you say you participated in the activities of your department (meetings, seminars, social events, etc.)?

/	/	/	/	/	/	/
1	2	3	4	5	6	7

Rarely — Half the time — Almost always

9. PRIOR TO YOUR FIRST EDP GRANT, which of the following teaching models were used in your <u>department's</u> courses? (CHECK ALL THAT YOU RECALL)

____ Lecture
____ Recitation/seminar
____ Laboratory/workshop
____ Independent Study
____ Field Study
____ Practicum (Clearkship-Internship)
____ Tutorial (one-to-one instruction)
____ Audio-tutorial (self-paced instruction using media)
____ Competency-based or mastery programs
____ Other _____

10. IN THE YEAR PRIOR TO YOUR FIRST EDP GRANT, how would you describe the human and material resources in your department available to help faculty members make changes to improve their instruction?

/	/	/	/	/	/	/
1	2	3	4	5	6	7

Extremely scarce — Adequate — More than sufficient

11. PRIOR TO YOUR FIRST EDP GRANT, do you feel you were generally regarded by your colleagues as a good source of information or advice about teaching or learning? ____ Yes ____ No

12. Compared to colleagues in your department PRIOR TO YOUR FIRST EDP GRANT, when were you most likely to adopt an educational innovation, e.g., programmed instruction, mastery learning, SLATEs, etc. (CHECK ONLY ONE)?

Please base your answers to items 13 and 14 on the following scale:

/	/	/	/	/	/	/
1	2	3	4	5	6	7

Hostile — Neutral — Enthusiastic

____ 13. DURING THE YEAR PRIOR TO YOUR FIRST EDP GRANT, when the topic of new curriculum or new teaching methods was brought up, how would you describe the reaction of the faculty in your department?

____ 14. How would you describe the reaction of the faculty in your department to your first EDP project?

15. PRIOR TO YOUR EDP GRANT, how often did teaching assignments change in your department?

/	/	/	/	/	/	/
1	2	3	4	5	6	7

Rarely changed (stayed the same for several years)

Frequently changed (every quarter)

****

ANSWERS IN THE NEXT SECTION SHOULD BE BASED ON THE TIME WHEN YOU BEGAN YOUR EDP PROJECT.

PLEASE ANSWER THE FOLLOWING QUESTIONS BASED ON THE TIME WHEN YOU BEGAN THE EDP PROJECT.

1. Number of years you had been at Michigan State University _____

2. Your faculty rank _____

3. Were you tenured? ____ Yes ____ No

4. Your age _____

5. Your usual yearly teaching load, in student credit hours _____

6. Number of different courses you taught each year _____

7. Which course(s) were a part of your EDP project, e.g., ED882? _____

_____

8. Were you the only one in your department who taught this (these) course(s)? _____ Yes _____ No

9. Approximately how many undergraduate students per year were affected by the EDP project? _____

****

PLEASE ANSWER THE REMAINING QUESTIONS BASED ON THE PRESENT TIME.

1. Approximately what percentage of your time do you spend directly preparing for teaching or actually teaching? _____

2. Do you feel you are generally regarded by your colleagues as a good source of information or advice about teaching or learning?
   _____ Yes _____ No

3. Have you been assigned additional teaching load(s) since your EDP project? _____ Yes _____ No

4. How much have each of the following influenced your teaching scale?

Please base your answers on the following scale?

/	/	/	/	/	/	/
1	2	3	4	5	6	7

Not an influence — Moderately influential — Extremely influential

_____ A former instructor of yours

_____ Colleagues in your department

_____ Colleagues at another university

_____ A consultant on the teaching/learning process (such as someone from the Learning & Evaluation Service, IMC, ITV, etc.)

_____ A book or other publication

_____ Other (list) _____

Please base your answers to items 5 and 6 on the following scale:

/	/	/	/	/	/	/
1	2	3	4	5	6	7

Strongly disagree — Neutral — Strongly agree

_____ 5. Having a "good" class depends primarily on having bright students.

_____ 6. Some people are born to be good teachers; others are not.

7. Is what you developed as a results of the EDP project still being used in your department? _____ Yes _____ No

8. Are you using it? _____ Yes _____ No

9. What changes occurred in the following as a result of your EDP project?

   SCALE: 1=Increased, 2=Decreased, 3=Stayed the same, 4=Don't know

   _____ Enrollment
   _____ Student learning
   _____ Positive student ratings on SIRS or other end-of-term evaluations

Please use the following word scale to answer the remaining items:

SCALE: 1=Definitely not, 2=Porbably not, 3=Probably yes, 4=Definitely yes

_____ 10. Do the faculty in your department consider your EDP project a success?

_____ 11. Do you consider your EDP project a success?

_____ 12. Was your EDP project worth the effort to you?

_____ 13. Would you consider another EDP project?

_____ 14. Since the completion of your EDP project, have you attempted any additional instructional innovation (with or without EDP funds)?

15. Please add any comments you wish to make concerning your EDP project on the back of this form.

THANK YOU for your help on this survey!

APPENDIX B

MICHIGAN STATE UNIVERSITY

Office of the Provost East Lansing - Michigan - 48824

APPENDIX B

(Sent to Non-EDP Supported Faculty)

We are conducting a study on the growth and development of the Educational Development Program (EDP) during the past decade.

Part of this study will focus on a profile of selected characteristics of the entire MSU faculty. In order to construct this profile, your name has been *randomly* selected from the latest faculty list provided by the Provost's Office. We need your help by completing the questionnaire. We know your time is limited so the number of items has been limited. Please take time to complete this questionnaire as soon as possible. Our pilot tests have shown it will only take about 15 minutes.

THERE ARE NO RIGHT ANSWERS and ALL RESPONSES WILL BE KEPT STRICTLY CONFIDENTIAL. You will not need to look up or provide large amounts of factual data. Most of the items ask you to select a response which most closely describes what you believe to be the best answer. The data will be reported in summary form only and will be made available to you after the study is finished.

Please put your completed questionnaire in the enclosed, self-addressed envelope. We need to have all responses in our office no later than April 30.

IF YOU HAVE QUESTIONS CONCERNING THIS SURVEY, PLEASE CONTACT: Dr. Allan Abedor, Assistant Director of the Educational Development Program (353-1695).

Thank you for your cooperation.

Sincerely,

Robert H. Davis, Assistant Provost
Director, Instructional Development
and Telecommunication Services

mjs

Enclosure

FACULTY SURVEY ON INSTRUCTION

NAME _____

DEPARTMENT _____

COLLEGE _____

1. DURING THE PAST YEAR, how often would you say you did the following:

   SCALE: 0=Never, 1=Once, 2=Several (2-4 times), 3=Many (5 or more times)

   _____ Attended a workshop, seminar, or meeting about teaching or learning sponsored by MSU.

   _____ Attended a workshop, seminar, or meeting about teaching or learning sponsored by another university.

   _____ Read a book or journal article about teaching or learning.

   _____ Consulted with an MSU consultant on teaching, learning, evaluation, or media.

   _____ Consulted with colleagues in your college about teaching or learning.

   _____ Consulted with personal contacts at other universities about teaching or learning.

   _____ Other: _____

2. DURING THE PAST YEAR, how important was teaching compared to your other activities at MSU? (Mark your answer on the following scale.)

   /1 /2 /3 /4 /5 /6 /7

   Least important — Equally important — Most important

3. DURING THE PAST YEAR, how important would you say good teaching was for promotion, pay raises, or other rewards in your department? (Mark your answer on the following scale.)

   /1 /2 /3 /4 /5 /6 /7

   Not important — Moderately important — Very important

4. DURING THE PAST YEAR, approximately what percentage of your time did you spend directly preparing for teaching or actually teaching?

_____%

5. AT THE PRESENT TIME, how much do you know about new developments in teaching and learning?

/	/	/	/	/	/	/
1	2	3	4	5	6	7

Know very little — Know a great deal

6. DURING THE PAST YEAR, how often would you say you participated in the activities of your department (meetings, seminars, social events, etc.)?

/	/	/	/	/	/	/
1	2	3	4	5	6	7

Rarely — Half the time — Almost always

7. DURING THE PAST SEVERAL YEARS, which of the following teaching models were used in your <u>department's</u> courses? (CHECK ALL THAT YOU RECALL)

_____ Lecture
_____ Recitation/seminar
_____ Laboratory/workshop
_____ Independent study
_____ Practicum (Clerkship-Internship)
_____ Tutorial (one-to-one instruction
_____ Audio-tutorial (self-paced instruction using media)
_____ Competency-based or mastery programs
_____ Other _____

_____

8. DURING THE PAST YEAR, how would you describe the human and material resources in your department available to help faculty members make changes to improve their instruction?

/	/	/	/	/	/	/
1	2	3	4	5	6	7

Extremely scarce — Adequate — More than sufficient

9. DURING THE PAST YEAR, do you feel you were generally regarded by your colleagues as a good source of information or advice about teaching or learning?

_____ Yes _____ No

10. Compared to colleagues in your department, when are you most likely to adopt an educational innovation, e.g., programmed instruction, mastery learning, SLATEs, etc.? (CHECK ONLY ONE)

_____ Among the very first to try a new idea
_____ Before most others
_____ Just before the average faculty member
_____ Just after the average faculty member
_____ Among the last

11. DURING THE PAST YEAR when the topic of new curriculum or new teaching methods was brought up, how would you describe the reaction of the faculty in your department?

1	2	3	4	5	6	7
Hostile			Neutral			Enthusiastic

12. DURING THE PAST FEW YEARS, how often did teaching assignments change in your department?

1	2	3	4	5	6	7
Rarely change (stay the same for several years)					Frequently change (every quarter)	

13. Number of years you have been at Michigan State University: _____

14. Your faculty rank:

15. Are you tenured? ___ Yes ___ No

16. Your age: _____

17. Number of different courses you teach each year: _____

18. Are you the only one in your department who teaches this (these) course(s)?

_____ Yes _____ No

19. How much have each of the following influenced your teaching style?

Please base your answers on the scale below:

1	2	3	4	5	6	7
Not an influence			Moderately influential			Extremely influential

_____ A former instructor of yours
_____ Colleagues in your department
_____ Colleagues at another university
_____ A consultant on the teaching/learning process (such as someone from the Learning and Evaluation Service, IMC, ITV, etc.)
_____ A book or other publication
_____ Other (list) _____

19. Please base your answers to Questions 20 and 21 on the scale below:

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

_____ 20. Having a "good" class depends primarily on having bright students.

_____ 21. Some people are born to be good teachers; others are not.

22. In general, how do you currently teach? (Please mark each scale.)

1	2	3	4	5	6	7
I primarily lecture						I rarely lecture

1	2	3	4	5	6	7
I use no audio-visual materials						I use many audio-visual materials

1	2	3	4	5	6	7
All students move at the same pace--must take exams at the same time						Students work at their own pace--can take exams when they're ready

23. Compared to colleagues in your department, how would you describe your teaching techniques?

1	2	3	4	5	6	7
Almost identical			About the same			Very different

24. DURING THE PAST FIVE YEARS, HAVE YOU BEEN INVOLVED IN AN INSTRUCTIONAL INNOVATION PROJECT (with or without outside funding)?

_____ Yes _____ No

If yes, please describe nature or goal of the project in a sentence or two:

_____

_____

_____

_____

****

PLEASE BASE YOUR ANSWERS TO THE FINAL FIVE QUESTIONS ON YOUR MEMORY OF CONDITIONS FOUR OR FIVE YEARS AGO.

1. COMPARED TO FOUR OR FIVE YEARS AGO, did you seek more or less information about teaching and learning during the past year?

_____ Sought more information
_____ Sought about the same amount
_____ Sought less information

2. COMPARED TO FOUR OR FIVE YEARS AGO, is good teaching now more or less important for promotion, pay raises, or other rewards in your department?

_____ More important than before
_____ About the same as before
_____ Less important than before

3. COMPARED TO FOUR OR FIVE YEARS AGO, have you participated more or less in the activities of your department (meetings, seminars, social events, etc.) during the past year?

_____ Participated more
_____ Participated about the same
_____ Participated less

4. COMPARED TO FOUR OR FIVE YEARS AGO, was the reaction of the faculty in your department more or less enthusiastic during the past year when the topic of new curriculum or teaching methods was brought up?

_____ More enthusiastic
_____ About the same
_____ Less enthusiastic

5. THINKING BACK FOUR OR FIVE YEARS, do you feel you were then generally regarded by your colleagues as a good source of information or advice about teaching or learning?

_____ Yes _____ No

THANK YOU for your help on this survey!

APPENDIX C

APPENDIX C

SUMMARY DATA FROM EDP PROJECT DIRECTOR QUESTIONNAIRE RETURNS

EDP PROJECT DIRECTOR PROFILE*

*All data are percentages of the total faculty responding to an item. Totals may not add up to 100% due to rounding.

1. Academic Discipline

Natural Science	38
Social Science	29
Humanities	32

2. DURING THE YEAR PRIOR TO YOUR FIRST EDP GRANT, how often would you say you did the following?

	Never	Once	2-4 times	5+ times
Attended a workshop, seminar, or meeting about teaching or learning at MSU.	36	22	25	16
Attended a workshop, seminar, or meeting about teaching or learning at another university.	54	27	15	5
Read a book or journal article about teaching or learning.	5	12	30	54
Consulted with an MSU consultant on teaching, learning, evaluation, or media.	45	13	31	10
Consulted with colleagues in your college about teaching or learning.	9	3	41	47
Consulted with personal contacts at other universities about teaching or learning.	46	13	25	15

Other: _____

3. How did you first find out about the EDP program? (Check only your first source of information).

A colleague	48
Learning and Evaluation Service	5
Instructional Media Center	5
Instructional Television Service	2
EDP literature or staff	27
Other (list) _____	14

4. IN THE YEAR PRIOR TO YOUR FIRST EDP GRANT, how important was teaching compared to your other activities at MSU?

Least important			Equally important		Most important	
1	2	3	4	5	6	7
0	6	10	25	18	15	27

5. DURING THE YEAR PRIOR TO YOUR FIRST EDP GRANT, how important would you say good teaching was for promotion, pay raises, or other rewards in your department?

Not important			Moderately important		Very important	
1	2	3	4	5	6	7
7	13	19	28	13	12	7

6. DURING THE YEAR PRIOR TO YOUR FIRST EDP GRANT, approximately what percentage of your time did you spend directly preparing for teaching or actually teaching?

0-10%	11-20%	21-30%	31-40%	41-50%
3	3	11	6	22

51-60%	61-70%	71-80%	81-90%	91-100%
15	9	15	10	6

7. PRIOR TO YOUR FIRST EDP GRANT, how much did you know about new developments in teaching and learning?

Knew very little					Knew a great deal	
1	2	3	4	5	6	7
3	13	28	16	22	9	8

8. EDP project directors have given many reasons for seeking an EDP grant; how influential were each of the following in your decision to seek an EDP grant to improve your course?

	Not influential			Moderately influential		Extremely influential	
	1	2	3	4	5	6	7
Your department chairman	48	8	16	6	6	6	10
Your students	27	13	10	22	6	13	9
Not satisfied with your own teaching	25	4	10	18	7	22	13
Not satisfied with some aspect of the course	15	0	3	13	10	27	32
For promotion, tenure, or pay raise	68	9	10	10	3	0	0
For your personal development	18	2	7	13	27	21	13
For recognition and status	49	10	13	15	10	3	0
Increased enrollment	47	15	2	10	3	10	13
Changes in the subject matter	53	4	7	7	15	9	4
Changes in the curriculum	49	10	4	10	9	6	12

9. DURING THE YEAR PRIOR TO YOUR FIRST EDP GRANT, how often would you say you participated in the activities of your department (meetings, seminars, social events, etc.)?

Rarely			Half the time		Almost always	
1	2	3	4	5	6	7
0	3	0	13	18	44	19

10. PRIOR TO YOUR FIRST EDP GRANT, which of the following teaching models were used in your department's courses? (Check all that you recall used.)

TOTAL MODELS CHECKED						
1	2	3	4	5	6	7
2	15	19	18	18	16	13

__Lecture
__Recitation/seminar
__Laboratory/workshop
__Independent study
__Field study
__Practicum (Clerkship/Internship
__Tutorial (one-to-one instruction)
__Audio-tutorial (self-paced instruction using media)
__Competency-based or mastery programs
__Other_____

11. IN THE YEAR PRIOR TO YOUR FIRST EDP GRANT, how would you describe the human and material available to help faculty members make changes to improve their instruction?

Extremely scarce			Adequate		More than sufficient	
1	2	3	4	5	6	7
18	37	18	16	8	2	2

12. PRIOR TO YOUR FIRST EDP GRANT, do you feel you were generally regarded by your colleagues as a good source of information or advice about teaching or learning?

Yes	No
49	52

13. Compared to colleagues in your department PRIOR TO YOUR FIRST EDP GRANT, when were you most likely to adopt an educational innovation, e.g., programmed instruction, mastery learning, SLATES, etc. (CHECK ONLY ONE)?

13. (continued)	Yes	No
__Among the very first to try a new idea	47	
__Before most others	39	
__Just before the average faculty	11	
__Just after the average faculty member	3	
__Among the last	0	

14. DURING THE YEAR PRIOR TO YOUR FIRST EDP GRANT when the topic of new curriculum or new teaching methods was brought up, how would you describe the reaction of the faculty in your department?

Hostile			Neutral		Enthusiastic	
1	2	3	4	5	6	7
4	7	18	47	15	4	4

15. How would you describe the reaction of the faculty in your department to your first EDP project?

Hostile			Neutral		Enthusiastic	
1	2	3	4	5	6	7
2	3	9	43	22	15	7

16. PRIOR TO YOUR EDP GRANT, how often did teaching assignments change in your department?

Rarely changed (stayed the same for several years)				Frequently changed (every quarter)		
1	2	3	4	5	6	7
21	25	15	19	9	6	6

PLEASE ANSWER THE FOLLOWING QUESTIONS BASED ON THE TIME WHEN YOU BEGAN THE EDP PROJECT.

1. Number of years you had been at Michigan State University:

1-5	6-10	11-15	16-20	21-25	26-30	31-35
36	20	18	14	9	3	2

2. Your faculty rank:

ASST PROF	ASSOC PROF	PROF
32	24	44

3. Were you tenured?

Yes	No
69	31

4. Your age:

Under 30	30-39	40-49	50-59	Over 60
15	29	31	19	6

5. Your usual yearly teaching load, in student credit hours:

OMMITTED FROM STUDY

6. Number of different courses you taught each year:

1	2	3	4	5	6	7	8
9	16	34	19	12	6	3	2

7. Which course(s) were a part of your EDP project, e.g., ED882?

OMMITTED FROM STUDY

8. Were you the only one in your department who taught this (these) course(s)?

Yes	No
28	72

9. Approximately how many undergraduate students per year were affected by the EDP project?

TOTAL STUDENTS

Under 100	101-200	201-300	301-400
31	22	11	5

401-500	501-600	601-700	701-800
5	6	5	5

801-900	901-1000	Over 1000
3	3	8

PLEASE ANSWER THE REMAINING QUESTIONS BASED ON THE PRESENT TIME.

1. Approximately what percentage of your time do you spend directly preparing for teaching or actually teaching?

0-10%	11-20%	21-30%	31-40%	31-40%	51-60%
3	2	20	10	21	10

61-70%	71-80%	81-90%	91-100%
15	10	7	3

2. Do you feel you are generally regarded by your colleagues as a good source of information or advice about teaching or learning?

Yes	No
82	18

3. Have you been assigned additional teaching load(s) since your EDP project?

Yes	No
28	71

4. How much have each of the following influenced your teaching style?

	Not an influential 1	2	3	Moderately influential 4	5	Extremely influential 6	7
A former instructor of yours	22	8	6	19	15	17	14
Colleagues in your department	29	15	14	9	12	14	6
Colleagues at another university	47	9	9	11	14	8	3
A consultant on the teaching/learning process (such as someone from the Learning & Evaluation Service, INC, ITV, etc.)	27	11	9	20	14	12	8
A book or other publication	26	12	15	15	14	9	9
Other	74	2	0	2	2	9	12

5. Having a "good" class depends primarily on having bright students

Strongly disagree 1	2	3	Neutral 4	5	6	Strongly agree 7
19	22	26	15	15	2	2

6. Some people are born to be good teachers; others are not.

Strongly disagree 1	2	3	Neutral 4	5	6	Strongly agree 7
20	14	16	14	22	11	3

7. Is what you developed as a result of the EDP project still being used in your department?

Yes	No
78	22

8. Are you using it?

Yes	No
72	28

9. What changes occured in the following as a result of your EDP project?	Increased	Decreased	Stayed the same	Don't know
Enrollment	42	5	35	18
Student learning	70	2	14	15
Positive student ratings on SIRS or other end-of-term evaluations	41	2	21	36

Please use the following scale to answer the remaining items:	Definitely Not	Probably not	Probably yes	Definitely yes
10. Do the faculty in your department consider your EDP project a success?	5	17	54	25
11. Do you consider your EDP project a success?	2	7	15	77
12. Was your EDP project worth the effort to you?	2	3	4	91
13. Would you consider another EDP project?	2	4	22	72
14. Since the completion of your EDP project, have you attempted any additional instructional innovation (with or without EDP funds?	6	4	6	84

COMBINED MEASURES

Teaching Specialization								
			Not Specialized (No. of courses)					
	1/8	2/9	3/22	4/13	5/11	6/5	7/3	8/2
			Specialized (No. of courses)					
	1/2	2/8	3/9	4/6	5/2	6/2	7/0	8/0

Cosmopolite Information	No. of Sources Used						
	0	1	2	3	4	5	6
	3	5	10	15	3	16	15
	7	8	9	10	11	12	13
	16	9	3	0	2	3	0

Local Information	No. of Sources Used						
	0	1	2	3	4	5	6
	5	5	11	21	18	24	9

Information Seeking	No. of Sources Used						
	0	1	2	3	4	5	6
	2	2	0	2	7	13	12
	7	8	9	10	11	12	13
	4	4	9	13	9	13	4
	14	15	16	17			
	0	3	0	3			

Cosmopolite Style	Sum of Influences						
	0	1	2	3	4	5	6
	0	0	0	11	3	5	8
	7	8	9	10	11	12	13
	9	8	6	8	12	6	5
	14	15	16	17	18	19	
	11	3	2	2	2	3	

Local Style	Sum of Influences						
	0	1	2	3	4	5	6
	2	0	9	6	5	0	12
	7	8	9	10	11	12	13
	14	12	6	6	8	11	2
	14	15	16	17	18	19	
	2	0	0	0	0	0	

Opinion Leadership Change (Before and after project or passage of time)	Was an Opinion Leader							
	Yes Before Not After		Not Before or After		Yes Before and After		Not Before Yes After	
	0		18		52		31	
Number of Projects	1	2	3	4	5	6	7	8
	46	25	13	9	2	3	2	2

Combined Success (Possible Range 7-29)	14/2	15/2	16/2	17/2	18/2	19/4	20/7
	21/4	22/13	23/6	24/3	25/9	26/10	27/13
	28/18	29/4					

APPENDIX D

APPENDIX D

SUMMARY DATA FROM NON-INNOVATORS QUESTIONNAIRE RETURNS

FACULTY SURVEY ON INSTRUCTION*

*All data are percentages of the total faculty responding to an item. Totals may not add up to 100% due to rounding.

1. Academic Discipline

Natural Science	43
Social Science	30
Humanities	27

2. DURING THE PAST YEAR

how often would you say you did the following?

	Never	Once	2-4 times	5+ times
Attended a workshop, seminar or meeting about teaching or learning at MSU	55	29	13	3
Attending a workshop, seminar, or meeting about teaching or learning at another university.	81	10	6	3
Read a book or journal article about teaching or learning.	12	12	36	41
Consulted with an MSU consultant on teaching, learning, evaluation or media.	71	15	9	5
Consulted with colleagues in your college about teaching or learning	12	8	33	47
Consulted with personal contacts at other universities about teaching or learning.	47	16	28	9
Other: _____	93	1	1	5

3. DURING THE PAST YEAR,

how important was teaching compared to your other activities at MSU?

Least important			Equally important		Most important	
1	2	3	4	5	6	7
	1	6	26	29	25	13

4. DURING THE PAST YEAR,

how important would you say good teaching was for promotion, pay raises, or other rewards in your department?

Not important			Moderately important		Very important	
1	2	3	4	5	6	7
9	9	22	21	24	10	5

5. DURING THE PAST YEAR,

approximately what percentage of your time did you spend directly preparing for teaching or actually teaching?

0-10%	11-20%	21-30%	31-40%	41-50%
0	3	13	15	20

51-60%	61-70%	71-80%	81-90%	91-100%
16	12	18	3	0

6. AT THE PRESENT TIME,

how much did you know about new developments in teaching and learning.

Knew very little					Knew a great deal	
1	2	3	4	5	6	7
13	13	22	28	17	6	1

7. DURING THE PAST YEAR,

how often would you say you participated in the activities of your department (meetings, seminars, social events, etc.)?

Rarely			Half the time		Almost always	
1	2	3	4	5	6	7
2	4	2	12	18	23	39

8. DURING THE PAST SEVERAL YEARS,

which of the following teaching models were used in your department's courses? (Check all that you recall used.)

TOTAL MODELS CHECKED						
1	2	3	4	5	6	7+
0	2	4	15	19	17	44

__Lecture
__Recitation/seminar
__Laboratory/workshop
__Independent study
__Field study

8. continued

__Practicum (Clerkship/Internship)
__Tutorial (one-to-one instruction)
__Audio-tutorial (self-paced instruction using media)
__Competency-based or mastery programs
__Other _____

9. DURING THE PAST YEAR,

how would you describe the human and material resources in your department available to help faculty members make changes to improve their instruction?

Extremely scarce			Adequate		More than sufficient	
1	2	3	4	5	6	7
11	23	16	31	11	6	2

10. DURING THE PAST YEAR,

do you feel you were generally regarded by your colleagues as a good source of information or advice about teaching or learning?

Yes	No
71	29

11. Compared to colleagues in your department,

WHEN are you most likely to adopt an educational innovation, e.g., programmed instruction, mastery learning, SLATEs, etc. (CHECK ONLY ONE)?

__ Among the very first to try a new idea	10
__ Before most others	30
__ Just before the average faculty	40
__ Just after the average faculty member	9
__ Among the last	12

12. DURING THE PAST YEAR, when the topic of new curriculum or new teaching methods was brought up, how would you describe the reaction of the faculty in your department?

Hostile			Neutral		Enthusiastic	
1	2	3	4	5	6	7
1	5	8	28	40	15	2

13. DURING THE PAST FEW YEARS, how often did teaching assignments change in your department?

Rarely changed (stayed the same for several years)				Frequently changed (every quarter)		
1	2	3	4	5	6	7
7	23	12	22	16	14	7

14. Number of years you have been at Michigan State University:

1-5	6-10	11-15	16-20	21-25	26-30	31-35
22	25	23	12	7	9	2

15. Your faculty rank:

ASST PROF	ASSOC PROF	PROF
25	25	50

16. Are you tenured?

Yes	No
81	19

17. Your age:

Under 30	30-39	40-49	50-59	Over 60
3	34	27	18	17

18. Number of different courses you teach each year:

1	2	3	4	5	6	7	8
5	18	23	19	14	10	2	9

19. Are you the only one in your department who taught this (these) course(s)?

Yes	No
33	67

20. How much have each of the following influenced your teaching style?

	Not an influential			Moderately influential		Extremely influential	
	1	2	3	4	5	6	7
A former instructor of yours	12	6	2	23	16	25	16
Colleagues in your department	18	19	16	26	11	6	5

Colleagues at another university	38	16	7	24	8	7	0
A consultant on the teaching/learning process (such as someone from the learning and Evaluation Service, IMC, ITV, etc.)	71	10	5	11	1	0	1
A book or other publication	38	16	18	16	5	5	2
Other	80			1	3	8	9

21. Having a "good" class depends primarily on having bright students.

Strongly disagree			Neutral			Strongly agree
1	2	3	4	5	6	7
17	15	7	35	16	7	3

22. Some people are born to be good teachers; others are not.

Strongly disagree			Neutral			Strongly agree
1	2	3	4	5	6	7
17	14	12	19	19	14	5

23. In general, how do you currently teach? (Please mark each scale)

I primarily lecture						I rarely lecture
1	2	3	4	5	6	7
24	24	21	22	4	6	0

I use no audio-visual materials						I use no audio-visual materials
1	2	3	4	5	6	7
12	15	10	12	20	22	10

All students at the same pace--must take exams at the same time						Students work their own pace--can take exam when ready
1	2	3	4	5	6	7
46	31	9	5	7	3	0

24. Compared to colleagues in your department, how would you describe your teaching techniques?

Almost identical			About the same			Very different
1	2	3	4	5-	6	7
0	0	3	41	38	14	3

25. DURING THE PAST FIVE YEARS, HAVE YOU BEEN INVOLVED IN AN INSTRUCTIONAL DEVELOPMENT OR INSTRUCTIONAL INNOVATION PROJECT (with or without outside funding?)

Yes	No
0	88

If yes, please describe nature or goal of the project.

PLEASE BASE YOUR ANSWERS TO THE FINAL FIVE QUESTIONS ON YOUR MEMORY OF CONDITIONS OR FIVE YEARS AGO.

1. COMPARED TO FOUR OR FIVE YEARS AGO, did you seek more or less information about teaching and learning during the past year?

Sought more information	Sought about the same	Sought less information
24	64	13

2. COMPARED TO FOUR OR FIVE YEARS AGO, is good teaching more or less important for promotion, pay raises, or other rewards in your department?

More important than before	About the same as before	Less important than before
25	64	11

3. COMPARED TO FOUR OR FIVE YEARS AGO, have you participated more or less in the activities of your department (meetings, seminars, social events, etc.) during the past year?

Participated more	Participated the same	Participated less
15	77	8

4. COMPARED TO FOUR OR FIVE YEARS AGO, was the reaction of the faculty in your department more or less enthusiastic during the past year when the topic of new curriculum or teaching methods was brought up?

More enthusiastic	About the same	Less enthusiastic
14	72	14

5. THINKING BACK FOUR OR FIVE YEARS, do you feel you were then generally regarded by your colleagues as a good source of information or advice about teaching or learning?

Yes	No
63	37

COMBINED MEASURES

Teaching Specialization

Not Specialized (No. of courses)

1	2	3	4	5	6	7
0	9	16	16	10	3	2

8	9
6	2

Specialized (No. or courses)

1	2	3	4	5	6	7	8
5	9	7	3	2	6	0	1

Cosmopolite Information

No. of Sources Used

0	1	2	3	4	5	6	7
8	3	18	18	18	14	6	3

8	9	10	11	12	13
5	6	0	0	0	0

Local Information

No. of Sources Used

0	1	2	3	4	5	6
7	7	26	29	21	9	1

Information Seeking	No. of Sources Used							
	0	1	2	3	4	5	6	7
	5	1	3	8	10	9	13	15
	8	9	10	11	12	13	14	15
	10	9	3	3	7	12	1	0
	16	17						
	0	0						

Cosmopolite Style	Sum of Influence							
	0	1	2	3	4	5	6	7
	0	0	0	22	11	8	13	8
	8	9	10	11	12	13	14	15
	7	10	2	6	4	2	5	0
	16	17	18	19				
	1	0	0	0				

Local Style	Sum of Influence							
	0	1	2	3	4	5	6	7
	0	0	7	2	5	11	7	6
	8	9	10	11	12	13	14	15
	11	19	13	11	7	0	1	0
	16	17	18	19				
	0	0	0	0				

Opinion Leadership Change (Before and after project or passage of time)	Was an Opinion Leader			
	Yes Before Not after	Not Before or After	Yes Before and After	Not Before Yes After
	4	26	60	10

APPENDIX E

APPENDIX E

SUMMARY DATA FROM UNSUPPORTED INNOVATORS QUESTIONNAIRE RETURNS

FACULTY SURVEY ON INSTRUCTION*

*All data are percentages of the total faculty responding to an item. Totals may not add up to 100% due to rounding.

1. Academic Discipline

Natural Science	44
Social Science	29
Humanities	27

2. DURING THE PAST YEAR

how often would you say you did the following?

	Never	Once	2-4 times	5+ times
Attended a workshop, seminar, or meeting about teaching or learning at MSU.	42	22	24	12
Attended a workshop, seminar, or meeting about teaching or learning at another university.	68	22	6	5
Read a book or journal article about teaching or learning.	7	11	36	46
Consulted with an MSU consultant on teaching, learning, evaluation, or media.	45	21	21	13
Consulted with colleagues in your college about teaching or learning.	5	5	22	68
Consulted with personal contacts at other universities about teaching or learning.	30	23	28	19
Other: _____	92	5	0	4

3. DURING THE PAST YEAR, how important was teaching compared to your other activities at MSU?

Least important			Equally important		Most important	
1	2	3	4	5	6	7
0	1	7	27	27	16	23

4. DURING THE PAST YEAR, how important would you say good teaching was for promotion, pay raises, or other rewards in your department?

Not important			Moderately important		Very important	
1	2	3	4	5	6	7
6	15	16	27	16	12	7

5. DURING THE PAST YEAR, approximately what percentage of your time did you spend directly preparing for teaching or actually teaching?

0-10%	11-20%	21-30%	31-40%	41-50%
2	2	11	10	21

51-60%	61-70%	71-80%	81-90%	91-100%
17	9	18	7	4

6. AT THE PRESENT TIME, how much did you know about new developments in teaching and learning?

Knew very little					Knew a great deal	
1	2	3	4	5	6	7
5	15	16	35	19	7	4

7. DURING THE PAST YEAR, how often would you say you participated in the activities of your department (meetings, seminars, social events, etc.?)

Rarely			Half the time			Almost always
1	2	3	4	5	6	7
2	2	0	9	15	43	29

8. DURING THE PAST SEVERAL YEARS, which of the following teaching models were used in your department's courses? (Check all that you recall used.)

__Lecture
__Recitation/seminar
__Laboratory/workshop
__Independent study

TOTAL MODELS CHECKED

1	2	3	4	5	6	7+
1	1	6	8	8	17	58

__Field study
__Practicum (Clerkshop/Internship)
__Tutorial (one-to-one instruction)
__Audio-tutorial (self-paced instruction using media)
__Competency-based or mastery programs
__Other _____

9. DURING THE PAST YEAR, how would you describe the human and material resources in your department available to help faculty members make changes to improve their instruction?

Extremely scarce			Adequate		More than sufficient	
1	2	3	4	5	6	7
7	19	24	23	18	8	0

10. DURING THE PAST YEAR, do you feel you were generally regarded by your colleagues as a good source of information or advice about teaching or learning?

Yes	No
83	17

11. Compared to colleagues in your department, WHEN are you most likely to adopt an educational innovation, e.g., programmed instruction, mastery learning, SLATEs, etc. (CHECK ONLY ONE)?

___Among the very first to try a new idea	23
___Before most others	52
___Just before the average faculty member	18
___Just after the average faculty member	5
___ Among the last	3

12. DURING THE PAST YEAR, when the topic of new curriculum or new teaching methods was brought up, how would you describe the reaction of the faculty in your department?

Hostile			Neutral			Enthusiastic
1	2	3	4	5	6	7
0	6	10	34	33	16	1

13. DURING THE PAST YEAR, how often did teaching assignments change in your department?

Rarely changed (stayed the same for several years)					Frequently changed (every quarter)	
1	2	3	4	5	6	7
6	15	17	15	28	7	11

14. Number of years you have been at Michigan State University:

1-5	6-10	11-15	16-20	21-25	26-30	31-35
25	36	14	10	7	5	4

15. Your faculty rank:

ASST PROF	ASSOC PROF	PROF
26	29	45

16. Are you tenured?

Yes	No
79	21

17. Your age:

Under 30	30-39	40-49	50-59	Over 60
0	37	30	23	11

18. Number of different courses you teach each year:

1	2	3	4	5	6	7	8
6	10	30	24	14	10	4	4

19. Are you the only one in your department who taught this (these) course(s)?

Yes	No
26	74

20. How much have each of the following influenced your teaching style?

	Not an influential			Moderately influential			Extremely influential
	1	2	3	4	5	6	7
A former instructor of yours	12	10	5	19	17	19	19
Colleagues in your department	10	15	14	28	19	12	3
Colleagues at another university	29	23	11	23	3	10	3

A consultant on the teaching/learning process (such as someone from the Learning & Evaluation Service, IMC, ITV, etc.)	47	14	9	16	6	4	5
A book or other publication	25	15	16	26	10	6	3
Other	72	0	0	1	7	9	11

21. Having a "good" class depends primarily on having bright students.

Strongly disagree			Neutral			Strongly agree
1	2	3	4	5	6	7
12	20	13	28	17	4	6

22. Some people are born to be good teachers; others are not.

Strongly disagree			Neutral			Strongly agree
1	2	3	4	5	6	7
15	13	13	23	17	13	6

23. In general, how do you currently teach? (Please mark each scale)

I primarily lecture						I rarely lecture
1	2	3	4	5	6	7
13	18	23	24	16	5	3

I use no audio-visual materials					I use many audio-visual materials	
1	2	3	4	5	6	7
4	7	9	21	22	20	17

All students at the same pace--must take exams at same time				Students work their own pace--can take exams when ready		
1	2	3	4	5	6	7
44	18	14	11	8	4	1

24. Compared to colleagues in your department, how would you describe your teaching techniques.

Almost identical		About the same			Very different	
1	2	3	4	5	6	7
	3	3	17	47	27	4

25. DURING THE PAST FIVE YEARS, HAVE YOU BEEN INVOLVED IN AN INSTRUCTIONAL DEVELOPMENT OR INSTRUCTIONAL INNOVATION PROJECT (with or without outside funding?)

Yes	No
84	0

If yes, please describe nature or goal of the project.

PLEASE BASE YOUR ANSWERS TO THE FINAL FIVE QUESTIONS ON YOUR MEMORY OF CONDITIONS FOUR OR FIVE YEARS AGO.

1. COMPARED TO FOUR OR FIVE AGO, did you seek more or less information about teaching and learning during the past year?

Sought more information	Sought about the information	Sought less information
32	49	20

2. COMPARED TO FOUR OR FIVE YEARS AGO, is good teaching more or less important for promotion, pay raises, or other rewards in your department?

More important than before	About the same as before	Less important than before
24	58	19

3. COMPARED TO FOUR OR FIVE YEARS AGO, have you participated more or less in the activities of your department (meetings, seminars, social events, etc.) during the past year?

Participated more	Participated the same	Participated less
18	75	8

4. COMPARED TO FOUR OR FIVE YEARS AGO, was the reaction of the faculty in your department more or less enthusiastic during the past year when the topic of new curriculum or teaching methods was brought up?

More enthusiastic	About the same	Less enthusiastic
25	61	14

5. THINKING BACK FOUR OR FIVE YEARS, do you feel you were then generally regarded by your colleagues as a good source of information or advice about teaching or learning?

Yes	No
63	37

COMBINED MEASURES

Teaching Specialization

Not Specialized (No. of courses)

1	2	3	4	5	6	7
2	5	21	17	13	8	4

8	9
1	2

Specialized (No. of courses)

1	2	3	4	5	6	7	8
4	5	8	7	1	1	0	0

Cosmopolite Information

No. of Sources Used

0	1	2	3	4	5	6
4	2	7	17	12	17	10

7	8	9	10	11	12	13
13	6	5	2	1	1	1

Local Information

No. of Sources Used

0	1	2	3	4	5	6
2	2	13	35	17	18	12

Information Seeking — No. of Sources Used

0/1	1/1	2/1	3/2	4/4	5/7	6/16
7/8	8/7	9/12	10/7	11/11	12/7	13/10
14/1	15/2	16/1	17/1			

Cosmopolite — Sum of Influence

0/0	1/0	2/0	3/6	4/7	5/5	6/10
7/15	8/16	9/5	10/10	11/5	12/6	13/5
14/4	15/5	16/1	17/0	18/0	19/0	

Local Style — Sum of Influence

0/0	1/0	2/4	3/4	4/5	5/4	6/5
7/7	8/17	9/22	10/17	11/6	12/5	13/3
14/1	15/0	16/0	17/0	18/0	19/0	

Opinion Leadership Change (Before and after project or passage of time) — Was an Opinion Leader

Yes Before Not After	Not Before or after	Yes Before and after	Not Before Yes After
3	15	61	21