Innovation and diffusion: An identification of three change processes

Kathleen Mary Harrington

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INNOVATION AND DIFFUSION
AN IDENTIFICATION OF THREE CHANGE PROCESSES

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[Signatures]

[Signatures]

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CHAPTER I

INTRODUCTION

Innovation and diffusion are processes often associated with social change. During the past forty years, innovation and diffusion have been the focus of a number of studies which have attempted to explore the mechanisms involved in the diffusion of an idea, or a material object, and the adoption of such an idea or object. For some years efforts at change have been utilized in industry, government, welfare, health and education (Bonnes, Benne, and Chin, 1969: 2). Typical of such efforts at change, and the one that is the subject of this research, is the introduction of a centralized resource center for instructional materials within a county school system.

For most of the innovation/diffusion studies, a diffusion phenomenon was defined as 1) an item, passing through 2) channels, in 3) a social structure, over 4) time (Katz, 1968: 182). Often the item under study was considered to be an innovation, which, according to Homer G. Barnett, "... is any thought, behavior, or thing that is new because it is qualitatively different from existing forms" (1953: 7). The introduction of the instructional materials center was a phenomenon which contained new and old elements of behavior. Instructional materials had been utilized in the school system for many years; however, centralization of materials meant that new behavioral patterns would have to be established before materials could be utilized. In order for the center to be successful its use had to be diffused throughout the school system. Thus, this
phenomenon offered an opportunity for an investigation of the innovation/diffusion process.

In examining previous innovation/diffusion studies it was noted that the findings were not always conclusive or consistent. The comparison of one study with another was often hampered by differing methodological approaches. One outstanding example of this is the fact that the criteria for specifying a basic measure of adoption or acceptance often differs from one study to another. Ryan and Gross (1948) used acceptance (first use) while Katz, Menzel, and Coleman utilized trial dates rather than dates of adoption (Rogers, 1962). It was also discovered that other potential reasons for a lack of consistency among these findings might be a result of divergent theoretical frameworks, or an inadequate diffusion of diffusion research findings between the various social sciences. Everett Rogers has composed a table listing a comparison of diffusion research traditions and the differing types of analysis (Rogers, 1962: 55).

Anthropology, sociology, social psychology, and education are the disciplines most actively involved with innovation/diffusion theory and research. However, almost every behavioral science has some interest in the diffusion of new ideas. Often the methods of data-gathering and analysis differ according to the discipline undertaking the study of innovation/diffusion.(Rogers, 1962). The differing approaches have interfered with or hampered communication between disciplines. The study of innovation/diffusion could be enhanced by increased communication between the various disciplines. To accomplish this, a comprehensive and extensive theoretical framework is needed. One purpose of this
study has been to utilize an existing theoretical framework of change in an analysis of the diffusion of an innovation in order to determine if the framework can provide a more comprehensive explanation for the acceptance of an innovation.

From a sociological perspective, innovation/diffusion studies may be usefully classified under the area of social change since innovations may either be elements that have previously been a part of the social system but are a recombination in a new form, or they are elements totally new to a given system. They may in fact change the social system; especially ones that are deliberately planned to meet an immediate problem with the hope that they can create a change in the situation. Because the instructional materials center was an innovation that was planned and had caused a change in the social system, the theory that was utilized as a framework for this research is concerned with planned change. This theory will be discussed in Chapter II.

THE INSTRUCTIONAL MATERIALS CENTER

Under the Elementary and Secondary Education Act, funds were allotted for innovative programs which would help to improve the basic skills of all children. Educators in Missoula county utilized this educational legislation to develop an instructional materials center. The rationale for the project was the following:

Since no comparable resource center is available and since it is not economically feasible for districts to provide for services, materials, and equipment they indicate is needed to improve their present instruction, the instrumentation of a functional resource center seems to accomplish four
things — 1) it provides a center which can be used not only as a source for dissemination of services and materials, but also as a means of collecting materials, methods, and equipment to be used for the benefit of the county; 2) it provides federal funds to allow immediate purchase of materials, equipment, and services to meet school needs; 3) it serves as a model for the educational community; and 4) it allows implementation of a program which can be maintained at a later date through district participation (Application for Federal Grant: 1969).

The instructional materials center originally served nineteen separate educational units within the county. However, at the time of the study only the Missoula County high schools and District I elementary schools fully participated in the program. The other schools could not afford to continue as federal funds were phased out. For the remaining schools the center provided a library of educational books and magazines; a collection of films and other visual aids; and materials and equipment for the production of instructional materials. The center staff provided various services: they ordered films; provided professional help, both visual and artistic; and disseminated materials to the schools.

STATEMENT OF OBJECTIVES

AND

REVIEW OF THE LITERATURE

As a means of directing this investigation of an instance of planned change, a theoretical model of social change is utilized to identify some salient variables which might be involved in the innovative process. Efforts toward innovation are often a part of planned change. However, not all plans for change are the same and the differing ways of introducing change may lead to differing adoption patterns.
Benne and Chin have categorized attempts at change into three ideal types: rational-empirical, normative-re-educative, and power-coercive (Benne, Benne, and Chin, 1962: 34). An overview of the innovation/diffusion literature provides evidence to support the assumption that many of the previous innovation/diffusion findings can be classified under these three approaches.

The majority of the studies of innovative change have assumed what Benne and Chin called "rational-empirical" approaches to change. Although a variety of specific strategies fall under this approach, "... the rationale underlying most of these is an assumption that men are guided by reason and that they will utilize some rational calculus of self-interest in determining needed changes in behavior" (Benne, Benne and Chin, 1962: 35). The introduction or conception of most innovations assumes this type of reasoning. Thus, scientific investigation develops innovations which should meet the needs of a specific population. Then, change agents attempt to introduce the innovation in a demonstration setting. This approach assumes that since individuals are guided by reason, they will adopt the innovations that have been designed to meet their needs. This reasoning is based on several assumptions. First of all, it assumes that the innovation is beneficial to adopters. Secondly, individuals should have to make a rational choice based upon their self-interest (which is usually the innovators' perception of their self-interest). Since the innovation has been designed to aid certain individuals, the individuals within that group who did not adopt would probably be considered to be uninformed about the innovation. Finally, it is assumed that as soon as they are informed, holdouts will eventually adopt
and it is just a matter of time until they do.

Within the literature on innovation, evidence of this type of reasoning is reflected in a preference for focusing attention upon the adopter (Rogers, 1962). If the innovation has been rationally planned to meet the needs of the population, then the acceptance should be just a matter of time. Thus, many studies proceed as if adoption is the end of the process. However, several researchers have reported, and speculated on the reasons for non-adoption, or discontinuances, even though these were not the original focus of their research. Perhaps because non-adoption is not the main focus of the investigation, most researchers fail to examine the reasons behind non-adoption. In several instances the researchers have failed to differentiate whether or not the person has simply failed to use the innovation (e.g., because he is uninformed, or because he has had a bad experience with a similar item), or if the individual has actively and deliberately rejected the innovation because he has found that it does not meet his needs. If researchers do look for the reasons behind non-adoption, rejection is still explained by the rational or irrational actions of the potential adopters. Few researchers examine the limitations of the innovation itself. For instance, women may discontinue using oral contraceptives because of adverse side effects. The innovation was effective in solving the problem of unwanted children but it would not be the best solution for some women.

Some reasons for non-adopting may not be directly associated with the innovation. Utilizing the same example of oral contraceptives, we may be influenced by the Catholic Church’s ban on all forms of artificial contraception and thus non-use would not be directly related to the
effectiveness of the contraceptive.

There are also some instances of adoption which do not fall into the rational-empirical approach. The reasons for adopting are not rationally related to the effectiveness of the innovation. Brandner and Kearsley's study (1954), along with several other studies, suggests that rational-empirical processes are not the only ones involved in change. Many of these studies are readily classified under the second change strategy discussed by Benne and Chin - the normative-re-educative approach. This approach stresses what might be called a sociological view of man. "Patterns of action and practice are supported by socio-cultural norms and by commitments on the part of individuals to these norms" (Benne, Benne and Chin, 1962: 34).

The findings of communication studies of innovations demonstrate that some individuals display a desire for social support when accepting new ideas (Rogers and Beal, 1958: 329). When comparing the results of two diffusion studies, Kats found late adopters did not lack knowledge concerning the innovation; instead, the studies showed that interpersonal communication was an important influence in legitimizing the use of the innovation (Kats, 1968: 182). Behaviors were not based solely on the rational pursuit of self-interest; where the norms of the informal group favored innovation, and where the innovator was well integrated into his group, the innovation was accepted.

When utilizing this change strategy, researchers look beyond the relationship between innovation and adopter and consider the habits and values of the individual. On the socio-cultural level, one would look
for changes in normative structures and institutionalized roles and relationships. The influence of any variable thought to "cause" adoption is tempered by the response of the individual and his social groups. Hence the "two-step flow of communication" seems to be operating. This communication theory was hypothesized from a 1944 study by Lazarsfeld, Berelson and Gaudet. Katz found that the original theory was oversimplified but there was evidence that the social group supports or does not support innovative "risks" (Katz, 1968: 179).

The third approach that Leme and Chin identify, the power-coercive, is concerned with the effects of economic and political sanctions upon the acceptance of innovations. Most bureaucratic structures utilize some form of power-coercive sanctions to introduce change. The anthropological literature on diffusion/innovation is full of references to instances where change failed because it was attempted by individuals who tried to impose change upon a social system with which they were not completely familiar (Rogers, 1962).

Legislation has played an important role in achieving changes in institutional life. At times it imposes changes upon the individual. The busing of students to achieve racial integration is an example of this power-coercive approach. This type of change process was also evident in the introduction of the instructional materials center, the innovation examined in this study. The creation of the center was the result of funds made available by legislation concerning the improvement of

1It may be mentioned here that anthropology has done extensive research on innovation. However, this research has usually been involved with the introduction of advanced technology into underdeveloped countries. This differs from the type of innovation that is being reported.
of educational facilities. The decision to implement the program was the result of action taken by the school board. The teachers and principals had been consulted but the final decision was not left up to them. This caused resentment among individuals who were asked to participate in a program they had not planned.

As I have mentioned before, the three change approaches are ideal types. They have been referred to as strategies because Benne and Chin felt that these three ideal types could and have been utilized in deliberate planned change. However, in this study they are considered to be approaches that could have been consciously or unconsciously utilized. As such, they are viewed as potential influences upon behavior. In any given instance of planned change there will probably be a mixture of these approaches. Planners may attempt to deliberately follow one approach. However, it is likely that a target population will be exposed to a variety of influences associated with their use or non-use of some innovation. The acceptance of certain innovations in agriculture provides examples of situations where a mixture of influences has been present. In such instances, early adopters report more influences from impersonal sources (rational-empirical) while late adopters are influenced by neighbors (normative-re-educative). As more individuals successfully adopt a new crop, economic pressures (market competition) may convince non-adopters to accept (Brandner and Kearl, 1954: 288-94).
THE PROBLEM

Because previous studies of innovation/diffusion research seem to suggest that elements of the three ideal types of change set forth by Benne and Chin might be present in situations of change, it seems plausible that one or more of these types of change influences could be identified in a situation where a change was being introduced. There is also the possibility that the type of influence utilized might have some effect upon the actual adoption of the innovation. The present study is not utilizing the three approaches as strategies but as three analytically distinct change processes. That is, in a given case of change, the influence related to "use" may be classified according to these three ideal types. They do appear logically exhaustive but more importantly they refer to three distinct social processes that may influence adoption.

The problem for this investigation was to determine the extent to which the influences associated with teachers' acceptance or rejection of the instructional materials center could be characterized by the three processes. Further, and more important, an attempt was made to see if any one set of influences predominated. Finally, there was an attempt to identify the conditions under which one set of change influences is more effective than the others. Thus, the study sought to gain new insights into the factors associated with innovation and diffusion by attempting to empirically identify the components of what may be considered three sets of variables related to change.

While it was anticipated that all three types of influences would be present in the introduction and adoption of the instructional materials center, the mixture of influences was not expected to be random.
Accordingly, several hypotheses derived from the diffusion/innovation literature were used to guide the research. The effects of change influences were thought to be reflected in the type of use patterns reported by the teachers. Previous studies reported that early users read more and seek expert outside help (Katz, 1969). This suggests the use of rational-empirical influence. For this study it was hypothesized that:

Early adopters\(^2\) (more than others) would be characterized by rational-empirical influences.

In the same vein, communication studies had shown that interpersonal communication networks influence use, but only after time had passed. This suggests that "late comers" adopt on the basis of the experiences of people known to them. Accordingly, the second hypothesis was:

More than the others, late adopters will be characterized by normative-re-educative influences.

Few of the previous studies have focused upon persons who adopt and then reject the innovation or "experiment". It is possible that adoption is only token and that use was quickly dropped once the attention of the principals and teachers was transferred to other areas. Kelman (1961) has suggested that some conformity to norms may be of this nature. That is, when there is an absence of surveillance, conformity to norms is weakened. This may apply to power-coercive influence in instances where individuals are pressured into new behaviors. Once the pressure is removed, individuals may revert to previous behavior. In the present study it was hypothesized that:

\(^2\)For an explanation of the classification of the adoption categories turn to page 19.
Former users will be characterized by power-coercive influences in the reasons for adoption, more than the others.

As the main targets of the planned change, the teachers are likely to have been exposed to many diverse influences. However, it was expected that the type of influence that characterized their use of the center would be reflected in their reported reasons for utilizing the center. In general, reported use experience was treated as the dependent variable and teachers' perceived sources of influence as the independent variable.
CHAPTER II

RESEARCH PROCEDURE

According to the literature on diffusion, when information about an innovation is introduced into a community, three phases of its diffusion to members of that community can be observed. They are 1) awareness of the information, 2) reaction to the information, and 3) decision leading to the adoption of the innovation. Researchers have either recorded the time at which each individual first receives the information, what his reaction is, and when he adopts the innovation; or they have recorded the individual's responses as he recalls his perceptions of the process. Although the former method is probably preferred, the latter method was used here since the innovation under study was already diffused into the social system at the time the study was made.

The basic data for this investigation was collected from structured interviews conducted among a sample of teachers selected from both the Missoula County High School system and the Missoula District I elementary schools. Utilizing a table of random numbers, a simple random sample of 120 teachers was selected from a total number of 462 teachers. Because of the transfer of five persons, resignations of four, illness of seven and three refusals, the final sample was composed of 101 completed interviews. However, each school was represented by at least three teachers.

Before the interview schedule was constructed, observations were made of the center during in-service training sessions. A trip was made with the director of the center as she made a routine visit to one
of the elementary schools. Also, the investigator had previously spent several hours meeting with and observing activities of the center's staff. A meeting was arranged with the school principals and their cooperation was obtained. The scheduling of interviews with the teachers was arranged by the individual principals of the schools. Thus, the amount of time for the interview and the setting for the interviews varied from school to school. Some principals set aside a room while others directed the interviewer to the teacher's classroom. Some interviews were conducted during a class period, some during the teacher's break and others after school. Most interviews took twenty minutes but some were as short as ten minutes and one lasted an hour and a half.

Questions concerning the teacher's use of the center (see the Appendix) were structured to reveal the history of influence that led to the teacher's utilization of the center. The development of the center involved some changes which suggested that the three change influences might be present. Since the decision to implement the centralization of materials came from the school board rather than agreement from administrators, there seemed to be some initial resistance to the program, especially among the elementary schools. Although the principals are not directly involved in the operations of the center, they could be a potential source of influence upon the behavior of their teachers. The principals were informed of the services offered by the center and some of the principals were on the advisory board. While most of the elementary school principals were concerned about providing materials and equipment for their teachers, they were also concerned about getting the best return on the money they have invested in the center.
If the center did not seem to be worth the investment, its use might not have been encouraged. The enforced establishment of the center and the potential enforced use (or non-use) through the authority structure are suggestive of the power-coercive influence. This influence may have been present during the establishment of the center but other influences probably came into play as the center was utilized.

As I have mentioned, the questions on the interview schedule were designed to gauge the type of influence that contributed to the teacher's use of the center. If the teacher reports using the center because the principal requests its use or if he is pressured by the center staff into using it, then the influence for his use of the center was placed under the power-coercive approach. An example of the type of question that was used on the interview schedule to reflect this influence is, "Has your principal ever requested that you use the center?" (see Appendix).

It should be noted that the center was originally established to improve the educational opportunities of children within the county. This initial objective of the program suggests that a rational-empirical approach was attempted by the planners of the center. That is, they obtained information from educators and designed the center to meet the established needs. Rational-empirical elements are apparent in the communication procedures of the center. The center attempted to inform teachers through information bulletins, television, advertising, and in-service training. Also, the emphasis upon dissemination characterizes the center as an information service. With this approach having been consciously or unconsciously utilized, it is a potential influence on the teacher's use of the center. Thus, if teachers responded to questions
on the interview schedule that reflected the fact that they used the center because they found it to be informative, helpful to teaching, or because it was the best source available, they were considered to be influenced by elements of the rational-empirical approach. Affirmative answers to such questions as "Do you find the center to be the most efficient source available?" would be suggestive of this influence (see the Appendix for these questions).

Sources of normative-re-educative influences for all the schools are librarians, secretaries, and fellow teachers. The librarians are aware of the services offered for the teachers. Thus, they are in a position to advise or recommend materials or services. If the individual reported that he uses it because his fellow teachers do, or because the librarians encourage him to use it, the influences that he reported were classified under the normative-re-educative approach. "Have you ever ordered materials because a fellow teacher suggested them?" is an example of this type of question.

It has been mentioned that the center was also involved in the promotion of self-produced materials. Getting teachers involved in providing solutions to their needs is a part of the center's operation which implies a mixture of these influences. In-service training sessions and school visits by the center directors promoted personal contact with the teachers. The high schools were involved in a program of individualized instruction which utilized self-produced materials. In this situation the principal or fellow teachers could have encouraged the use of the center (normative-re-educative influence). The teachers were required
to attend the in-service sessions so there was some element of the power-coercive influence. Some teachers felt that their self-produced materials were better than the standard materials so they produced materials for rational-empirical reasons. There seems to be a mixture of influences in this area of center use.

In the interview schedule a number of questions representing each approach were combined with questions on the teacher's background and questions relating to general use patterns. The first reported instance of consistent utilization of the center was considered to be adoption of the innovation. To simplify the analysis of the adoption of the innovation, use categories were determined from reports of actual and intended behavior. That is, the teachers were asked when they first used the center, how many times they used it, and if they were going to continue to use it.

In evaluating the responses to the questions, use was regarded as the dependent variable while questions regarding the three change approaches were the independent variables. A cross tabulation of the variables was performed to test the hypotheses. The results of this analysis are discussed in Chapter III.
CHAPTER III

DATA ANALYSIS

In this chapter evidence of the three change approaches is examined in an actual case of innovation. The innovation was the introduction of a centralised source for instructional materials which provided materials and equipment to high school and elementary school teachers. In order to determine the teacher's feelings and actual use with respect to this innovation, an interview schedule was developed. Questions were constructed to reflect evidence of the ideal-typical change influences examined in this study. As I have stated, the dependent variable was the initial and continued use of the center. Other questions, reflective of the change approaches, were examined as indicators of the type of influence that resulted in the use of the center. The procedure for analysis was the computation of a measure of association for the questions concerning the change strategy and the use patterns. In addition to the measure of association, chi square was utilized as a test of significance.

According to previous studies, certain characteristics mark individuals who adopt early as compared to those who adopt later. Since these individuals reflected different use patterns, it is thought that the type of influence that is related to adoption would also differ. This dependent variable (use) is examined by correlating it with a sequence of questions reflecting rational-empirical influences; a sequence of normative-re-educative questions; and a sequence of power-coercive
questions. Some individuals, non-adopters, were not asked all the questions since many of the questions referred to experiences involved in utilization of the center. Thus, the number of cases available for analysis varies from table to table.

In chapter II it was mentioned that the use categories were derived from a question that asked when the teacher first used the center. The teachers who used the center during the first year and a half of its operation, or (if they entered the school system at a later date) those who used it when they started to teach, are considered Early Adopters. Those who used it after the first year and a half of its operation are Late Adopters. Those who did not use it at all are Non-adopters. Finally, individuals who had previously used the center but who had reported that they would not use it again were considered to be Former Users.

The first potential influence to be examined is the rational-empirical influence. In previously reported studies, individuals who adopted early read more and actively sought outside help. This type of behavior seemed to reflect a rational-empirical emphasis. As mentioned in Chapter I, it was hypothesized for this study that:

Early adopters (more than others) would be characterized by rational-empirical influence.

The responses to the questions are presented in the following tables (each table contains chi square and Tau, treating the row variable as dependent). Table I presents the data from the question, "Do you feel the center has complete and up-to-date materials?" The categories of non-users and former users are not included in these tables because there were too few non-users and the category of former user did not
pertain to the first two hypotheses.

Table 1.—Is the Center Complete And Up-To-Date And First Use of Center (percent distribution).

<table>
<thead>
<tr>
<th>First Use</th>
<th>Complete And Up-To-Date</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Early</td>
<td>84</td>
<td>55</td>
</tr>
<tr>
<td>Late</td>
<td>16</td>
<td>45</td>
</tr>
<tr>
<td>Total (no. cases)</td>
<td>(55)</td>
<td>(31)</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 8.39, \text{ df} = 1, p > .01 \]

*excludes 12 no data cases and 3 non-adopters

The perception of the center as being complete and up-to-date is significantly related to use. That is, of those who feel it is up-to-date 84 percent are early adopters compared to 55 percent of those indicating the center is not up-to-date.

Related to the preceding question is another question that is concerned with the teacher's perception of the center as the best source. A high percentage of both early- (83 percent) and late- (80 percent) adopters reported that it was the best source (data not shown). However, many teachers qualified this question with the statement that it was the only source of instructional materials so this question might also contain elements of power-coercive influence since all materials were sent to the center and teachers had few alternate sources.
The next rational-empirical question was designed to gauge the influence of communication media on teachers. Table 2 shows that ordering of materials by using the newsletter is significantly related to use at the .05 level. However, the measure of association is low although the direction of the relationship is in the predicted direction.

Table 2.—Ordered Materials Because Recommended In Newsletter And First Use of Center (percent distribution).

<table>
<thead>
<tr>
<th>First Use</th>
<th>Order by Newsletter</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Early</td>
<td>73</td>
<td>67</td>
</tr>
<tr>
<td>Late</td>
<td>27</td>
<td>33</td>
</tr>
<tr>
<td>Total (no. cases)</td>
<td>(60)</td>
<td>(30)</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 4.327, \text{ df } = 1, \ p > .05 \]

_\text{excludes 5 no data cases and 6 non-adopters}_

Two other rational-empirical questions (data not shown) dealt with efficiency and time saving. Efficiency was based on the performance of the center while time saving was connected to the use of the materials. There is a problem with these questions since they contain compound goals for the teacher. Time saving and efficiency may appear to be similar but there is efficiency in the sense of saving time and efficiency in the sense of appropriateness of the material. To check the appropriateness of the material a high percentage of both early and late adopters (73 percent) preferred materials. In a sense this would not
save time for them. Those aspects of rational-empirical influence were unrelated to first use. However, there does seem to be a slight tendency for early adopters to be influenced by this rational-empirical reasoning. According to this data, one can observe a slight tendency for the data to be in the direction proposed by the first hypothesis. That is, early adopters are more apt to be influenced by rational-empirical elements.

A second set of questions included in the interview schedule was designed to assess the normative-re-educative influences. This influence deals with the effect of other people's experiences upon our own behavior. In other words, some people may adopt on the basis of experiences of people known to them. Thus, personal contact with the teacher, consulting with fellow teachers, ordering materials on the other teachers' or the librarians' suggestions would all be sources of normative-re-educative influence. Accordingly, the second hypothesis deals with this influence.

More than others, late-adopters will be characterized by normative-re-educative influence.

Tables 3 and 4 show that late adopters are influenced by their fellow teachers to a slightly greater extent than are early adopters. For table 3 there is a 7 percentage point difference favoring late adopters being positively influenced and the same percentage point difference favoring early adopters not being influenced. In table 4 the percentage point difference is 5 points but in the same direction as in table 3. The data is not statistically significant but it can be observed that there is a slight tendency for the data to be in the predicted directions. The tables are presented on the following page.
Table 3.—Did You Consult With Other Teachers And First Use of the Center (percent distribution).

<table>
<thead>
<tr>
<th>First Use</th>
<th>Consult With Teacher</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Early</td>
<td>70</td>
<td>77</td>
</tr>
<tr>
<td>Late</td>
<td>30</td>
<td>23</td>
</tr>
<tr>
<td>Total (no. cases)</td>
<td>(69)</td>
<td>(22)</td>
</tr>
</tbody>
</table>

*excludes 9 no data and 1 non-adopter

Table 4.—Do You Order On Teacher's Recommendations And First Use of the Center (percent distribution).

<table>
<thead>
<tr>
<th>First Use</th>
<th>Order On Teacher's Recommendation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Early</td>
<td>70</td>
<td>75</td>
</tr>
<tr>
<td>Late</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Total (no. cases)</td>
<td>(63)</td>
<td>(28)</td>
</tr>
</tbody>
</table>

*excludes 10 no data cases

Two other normative-re-educative questions (data not shown), "Do most teachers you know use it (the center)?" and "In general are they..."
satisfied with the center?", did not support the hypothesis. Neither question showed a significant relationship between first use and the teacher's perception of other teachers' use and satisfaction with the center; but more surprisingly, early adopters rather than late adopters had a tendency to report affirmatively to the questions. There could be a number of explanations for this tendency. Early adopters may not have as much contact with other teachers and presume that because the center is being used that others are satisfied with it. Early adopters may associate with other early adopters who have used the center for some time and who may be committed to the center because they have invested time and energy into using it. Or late adopters were not "sold" on the center so they took longer to adopt and they perceive others as feeling the same way. These explanations are not presented to rule out the fact that the hypothesis was clearly not supported; however, they should be considered as factors that might have been but were not measured by the research instrument.

One final normative-re-educative question, "Does the librarian suggest materials from the center?", partially supports the hypothesis. Late adopters report normative-re-educative influence from librarians but so do early adopters. It is interesting to note that non-adopters do not report any influence from librarians (see table on following page).

A final test of the first two hypotheses was accomplished by developing a table of affirmative answers of both rational-empirical and normative-re-educative questions for early and late adopters. Table 6 represents all those who answered "yes" to all rational-empirical questions and "yes" to all normative-re-educative questions.
Table 5.—Uses The Librarian Suggest Materials From The Center And First Use of Center (percent distribution).

<table>
<thead>
<tr>
<th>First Use</th>
<th>Librarian Suggest</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Early</td>
<td>71</td>
<td>68</td>
</tr>
<tr>
<td>Late</td>
<td>29</td>
<td>21</td>
</tr>
<tr>
<td>None</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Total (no. cases)</td>
<td>(51)</td>
<td>(39)</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 7.272, df = 2, p = .03 \]

*excludes 11 no data cases

There is a low cell frequency in this category but it was included to show the negative response of the non-adapters.

Table 6.—Affirmative Responses for All Rational-Empirical And Normative-Re-Educative Questions And First Use of Center (percent distribution).

<table>
<thead>
<tr>
<th>First Use</th>
<th>Type of Question</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rational-Empirical</td>
<td>Normative-Re-Educative</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Early</td>
<td>[87]</td>
<td>61</td>
</tr>
<tr>
<td>Late</td>
<td>[13]</td>
<td>39</td>
</tr>
<tr>
<td>Total (no. cases)</td>
<td>(15)</td>
<td>(23)</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 2.94, df = 1, p = .10 \]

*excludes 71 individuals who did not answer yes to all rational-empirical or all normative-re-educative questions.

Note: Percentages in brackets based on N of less than 20.
In table 6 three early adopters and one late adopter answered yes to both types of questions. These individuals either had a tendency to respond affirmatively to all questions or they were affected by both influences. Since there were so few they were included in the analysis. Table 6 indicates that of those individuals who responded affirmatively to rational-empirical questions, a higher percentage of them were early adopters. Early adopters showed a greater tendency to exhibit rational-empirical influences while late adopters exhibited normative-re-educative influence. However, the relationship was not statistically significant so the null hypotheses could not be rejected, although the tendency seemed to be in the direction of the hypotheses. Since only about a third of the teachers did give clear indications of being influenced by either rational-empirical or normative-re-educative influence there may be specific influences predominating at certain times in the adoption process but over time a mixture of influences acts on the individual.

The final hypothesis concerned individuals who had utilised the center but who had decided not to use it again. Unfortunately, while the study was being conducted, the high school administrators decided to close down the center at the end of the school year. So, for about 15 percent of the sample, this question could not be asked. These individuals fell in the "too late" category, that is, too late to be asked if they would use it again since it was being closed down.

According to the final hypothesis:

Former users will be characterized by power-coercive influences in the reasons for adoption, more than others.

However, none of the power-coercive questions proved to be significant.
The strongest relationship obtained was significant at the .10 level of significance. That relationship was between continuing to use the center and using it because it was a legitimate part of the school system.

Although the power-aggressive questions were not significant for former users, other questions were significant. Those who continued to use the center were far more likely to find the center efficient and up-to-date. In both tables 7 and 8 it is shown that those who have

Table 7.--Was the Center Efficient and Continue to Use

<table>
<thead>
<tr>
<th>Continue To Use</th>
<th>Efficient</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
<td>89</td>
<td>[35]</td>
</tr>
<tr>
<td>No</td>
<td>11</td>
<td>[65]</td>
</tr>
<tr>
<td>Total (no. cases)</td>
<td>(53)</td>
<td>(17)</td>
</tr>
</tbody>
</table>

$\chi^2 = 19.95, \ df = 1, \ p = .001 \quad \gamma = .29$

*excludes 13 "too late to answer" cases, 4 don't know, and 13 no data cases.

Note: Percentages in brackets based on N of less than 20.

not found the center to be efficient and up-to-date will not use it. There are a few who do use it who are not satisfied with it but that could be explained by the fact that there were few, if any, alternate sources of materials.
Table 8.---Is the Center Complete and Up-To-Date And Continue To Use The Center (percent distribution).

<table>
<thead>
<tr>
<th>Continue To Use</th>
<th>Complete And Up-To-Date</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>90</td>
<td>76</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>Total (no. cases)</td>
<td>(42)</td>
<td>(70)*</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 12.44, \text{ df } = 1, \text{ p } = .001 \]

*excludes 13 "too late to answer" cases, 5 don't know and 13 no data cases.

Table 9 shows that former users were also disinclined to respond affirmatively to another rational-empirical question; they did not use the

Table 9.--Ordered Materials Because Recommended in Newsletter And Continue to Use Center (percent distribution).

<table>
<thead>
<tr>
<th>Continue To Use</th>
<th>Order by Newsletter</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>84</td>
<td>74</td>
</tr>
<tr>
<td>No</td>
<td>16</td>
<td>26</td>
</tr>
<tr>
<td>Total (no. cases)</td>
<td>(51)</td>
<td>(76)*</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 9.03, \text{ df } = 1, \text{ p } = .001 \]

*excludes 13 "too late to answer" cases and 12 no data cases.
newsletter to order materials as much as those who continued to use the center.

Those who continued to use the center were also about four times as likely to have used the center to produce materials (data not shown). Former users just seemed to be dissatisfied with the center and their dissatisfaction was reflected in their perception of others’ satisfaction with the center. Those were 21 percentage points between those perceiving others as satisfied and those perceiving others as not satisfied. It was in the affirmative for those continuing to use the center and negative for those not continuing to use the center.

In this study none of the null hypotheses was unequivocally rejected. Although many relationships were not statistically significant, much of the data was in the expected direction of the hypotheses. There seems to be a mixture of rational-empirical and normative-re-educative influences present which suggests that further and more definitive research needs to be done. The significance of these findings for former users and an explanation of adoption that includes limitations of the innovation will be discussed in the final chapter.
CHAPTER IV

CONCLUSION

This study has been an effort to look at the process of innovation/diffusion and to determine if certain change influences have played a part in the utilization of this innovation. Of the three hypotheses that were proposed none was supported although the data tended to follow in the direction of the first two hypotheses. That is, early adopters reported more rational-empirical influence and late adopters reported more normative-re-educative influence. There was absolutely no support for the hypothesis that former users would be characterized by power-repressive influence. However, one must be aware of the fact that the survey was conducted as part of a final evaluation for an Elementary and Secondary Education Act Title III project and the teachers might have felt that the evaluation could lead to the continuation of the center. They were also aware of the fact that school principals (especially the elementary) were sensitive about the use or non-use of the center. The teachers may not have been as open since the study was conducted through the school system and could have affected the future of the center.

The major findings of this study are the following: there was a slight tendency for early adopters to be more influenced by rational-empirical influences, and for late adopters to be influenced by normative-re-educative influence. However, there was evidence that there was probably a mixture of influences operating on both early and late adopters.
What is more interesting is the fact that former users reflected rational-empirical influences in their reasons for not continuing to use the center. They had not found the center to be efficient or up-to-date and they did not use the newsletter to order materials. This leads the researcher to an examination of the innovation itself. When teachers were asked why the center was utilized or why it was not utilized, the strengths and weaknesses of the innovation were enumerated. For most of the teachers, use of the innovation reflected positive elements. It was there to help their teaching, to give them aids that were not available elsewhere. However, the non-use of the center reflected both the limitations of the individual ("He did not know it was there;" "He was lazy"), or the limitations of the center ("One couldn't get what he wanted;" or "He couldn't get it when he wanted it").

The fact that the center was having trouble providing materials when they were needed was documented by the center staff. With most of the elementary schools teaching the same curriculum at the same time, teachers were sometimes disappointed when the films they ordered did not arrive. When they found that they could not depend on the center they had rational-empirical reasons for not utilizing the center.

The innovation itself is the one thing that researchers often fail to consider in their assessment of the adoption process. Rogers (1962: 124) does mention five characteristics of innovation: 1) relative advantage, 2) compatibility, 3) complexity, 4) divisibility, and 5) communicability, but these do not fully take into account the limitations of the innovation as perceived by the adopter. During the diffusion process,
positive as well as negative rational-empirical influences could be received. Also, the innovation is subjected to some degree of consensusual validation in terms of the feasibility of utilizing the innovation. Positive and negative normative-re-educative influences can affect acceptance. If individuals have difficulty in utilizing the innovation, they can change their acceptance of the center and other teachers’ acceptance of the center through their interaction with the other teachers.

The three change influences would appear to be operative in the innovation/diffusion process but more research should be done in this area. For future research it seems that the best way to assess this problem would be to introduce similar innovations in separate populations or non-similar innovations in the same population. Then one could study the ongoing process of diffusion and acceptance to see whether or not it is the innovation itself, or the target population, or perhaps the right influence at the right time that assures the adoption of the innovation.
EPILOGUE

Research often produces results that are both directly and indirectly concerned with the data. The researcher starts learning about the phenomena when he develops the problem to be researched. If he is an inexperienced researcher, as I was, he also begins to learn about the pitfalls and frustrations of doing research. One of the biggest problems with the research that I did was the short length of time I had to develop a research design. Within an eight month period I had to become familiar with the instructional materials center, develop a theoretical framework for the research, construct an interview schedule and do the interviews. Because of the time limitation, the errors made in the research design and in the implementation of the research were not readily amenable to correction.

A second problem that I encountered and one that is probably common to most social research was the initial resistance to the data gathering. Individuals sometimes fear or misinterpret the reasons for doing social research. I became aware of this when I was not permitted to find out just how many teachers had used or had not used the center. Since the center did not keep continuous records of people who used the center, I planned on asking each teacher whether or not he (or she) had used the center, when he had used it, and how often he used it. From this data I wanted to select a stratified random sample (a matched sample of users and non-users). However, since I was conducting this research as a part of a government evaluation of the project, and the findings would be
reported to the school systems, the elementary school principals feared that my results would cause them in an unfavorable light. Since the principals objected to my original plans, I had to redesign my research to produce the type of data collection that would meet with the least resistance.

These problems that I have just mentioned had an indirect influence on the data. Also, the definition of the problem to be researched; the theoretical framework; and the research instrument are other factors that could affect the type and quality of data that is collected. The problem was developed after a few months were spent becoming acquainted with the center and its services. Since the success of the center depended upon the teachers' utilization of the center, their behavior appeared to be the most important variable. As I have mentioned before, I was inexperienced in doing research so I decided to utilize an existing theoretical framework to discover what could have influenced the teachers' behavior.

One of the main problems in testing a theory that has been deduced from varied research findings (and one that has not been empirically tested) is the definition of the theory in empirical terms. That problem is evident in this research. The interview schedule that was utilized had questions that reflected more than one of those change influences. Moreover, a study such as this one is exploratory in nature. This theoretical framework had not been tested before and the development of a research instrument was bound to be imperfect. A structured interview schedule was utilized because it was convenient, easy to process, and
because I was not skilled at doing non-directive interviews. The interview schedule was prepared on a few individuals in the field of education. However, there were still flaws that became apparent after a larger number of individuals were interviewed.

Because of the errors and difficulties that I encountered, I would recommend that future research be conducted in a different manner. I would initially consider utilizing a number of research techniques. First of all, it would be much better to study the innovation at its inception so that one can observe the intent of the planners. The theoretical change framework of Bennis and Chin was based upon the intent of the change agents so it would be important to observe and define the goals of the planners. Also, the introduction of the innovation should be observed to determine if the original goals were accomplished. A definition of what intentions or actions constitute the three change influences could be derived from a panel of "judges". In-depth interviews of the planners and other individuals involved in the innovation and observations of the users' behavior would provide the materials for the judges' decisions. From the behavioral definitions of the influences, interview schedules that reflected the behavioral components of the influences could be administered to both users and non-users. These interviews could be conducted throughout the acceptance period. Individuals' perceptions of and use of the innovation should be recorded over a period of time. Thus, one would have the initial time of adoption, perception of the innovation at inception, and changes in perception over time. The change influences might be more clearly defined and measured if more exact research is done.
APENDIX

The following is an example of the interview schedule used in this study. For the convenience of the reader, the rational-empirical questions are followed by an R; the normative-re-educative questions have an N; and the power-coercive questions are marked with a P.
MISSOULA COUNTY INSTRUCTIONAL MATERIALS CENTER

Interview Schedule for Teachers

Missoula County, Montana

Read to Teacher:

The Instructional Materials Center has been operating within the Missoula County school system for three years. The Institute for Social Science Research at the University of Montana is conducting a study of the Center's operation. Your response to the following questions will aid this study. All individual responses will be held in strict confidence. Your responses will be used for statistical tabulations only.

Sex: ___ M ___ F

School (Fill in before you start or after you finish)

1. Some background information is needed:

What is your current marital status? Single ____ Married ____
Divorced ____ Widow ____

What is your age? _____

What grade do you teach? _______

What specific subjects do you teach? ____________________________

2. How many years have you been teaching? ______________________

How many years have you been teaching in Missoula? _____________

3. Have you ever heard of the Instructional Materials Center before today? Yes ____ No ____

4. When? ____________________ And how did you first learn about the Center?

______ TV ________ Inservice Training
______ Bulletin ________ Other ________________________________
______ Fellow Teachers ________ Principal
5. Have you ever obtained material and/or equipment from the Center?  
Yes _____ No _____  
*When was the first time you used the Center?  
(month and year)  
*How many times have you used it?  
*Do you plan to use it before the end of the year?  

6. Did anyone influence your decision to use the Center? Yes ____ No ____  
Who or what?  
_____ Principal  
_____ Fellow Teacher  
_____ Center Staff  
_____ Center Newsletter  
_____ Inservice training  
_____ Other  

7. Because it is a "legitimate" part of the school system, do you feel you ought to use it? Yes _____ No _____ (P)  

8. Do you keep informed about materials available at the Center?  
Yes _____ No _____  
How?  
_____ Principal  
_____ Fellow Teacher  
_____ Center Newsletter  
_____ Center Staff  
_____ Other  

(If more than one is mentioned, which is the best one?)  

9. Do you feel the Center has complete and up-to-date materials?  
Yes _____ No _____ Don't know _____  

(R)  

10. How often do you read the Center's newsletter?  
_____ Not at all (if not, why not?)  
_____ Sometimes  
_____ Always  

(R)  

(If haven't used, skip to next question.)  

Have you ever ordered materials because they were recommended in the newsletter? Yes _____ No ____  

11. Do most teachers you know use it? Yes _____ No _____  
In general are they satisfied with the Center? Yes _____ No ____ (N)  
Why?  

12. Do you feel you are expected to use the Center over and above normal preparation time? Yes _____ No _____  

(F)  

*Only Users will be asked these questions.
13. Have you ever visited the Center? Yes ______ No ______ (R)
   Do you stop to browse or do you go for a specific purpose? ____________________________

14. Do you feel that any instructional materials help you save time in
   class preparation? Yes ______ No ______ (R)

15. Does the principal favor the use of instructional materials from
   the Center? Yes ______ No ______ Don't know ______ (N)
   Has he requested that you use them? Yes ______ No ______ (P)

16. Has anyone shown you how to integrate instructional materials
   into your teaching style? Yes ______ No ______
   Who? ____________________________
   Would you like it? Yes ______ No ______

17. What instructional materials and equipment do you have in your
   school? ____________________________
   Do these materials satisfy your needs without having to use the
   Center? Yes ______ No ______ Why? ____________________________

18. Do you feel instructional materials are overemphasized in this
   school? Yes ______ No ______
   Do you feel any pressure to use them? Yes ______ No ______ (P)
   Do you feel any pressure not to use them? Yes ______ No ______

19. Have you had personal contact with any of the staff members of the
   Center? Yes ______ No ______ (N)
   What type of contact and with whom?
   Visit ____________________________
   Demonstration ____________________________
   Ordering Materials ____________________________
   Inservice Training ____________________________
   Other ____________________________

20. Have you had any difficulties in ordering materials from the Center?
   Yes ______ No ______ (If no, have you ever tried? Yes ______ No ______)
   What difficulties? ____________________________

21. If you haven't used the films or materials before, do you presume?
   Yes ______ No ______ (R)
   Do you consult with your fellow teachers about them before you use
   them? Yes ______ No ______ (N)

22. Have you ever ordered materials from the Center because your fellow
   teachers recommended them? Yes ______ No ______ (N)
23. Do you order materials from the Center because you feel it is a part of your duties as a teacher? Yes _____ No _____ (P)

24. Do you use the Center to produce materials that aren't available in your school? Yes _____ No _____

25. Do you think instructional materials are important in helping to present a clear understanding of your subject? Yes _____ No _____ (R)

26. Do you use materials to give yourself a break from teaching? Yes _____ No _____

27. Do you use the Center because it is the best source available for instructional materials (i.e., has the widest range of materials)? Yes _____ No _____ (R)

28. Who does the ordering of materials at your school?
   ______ Teachers
   ______ Secretaries
   ______ Librarians
   ______ Other ____________________________
   ______ Don't know ____________________

29. Does the librarian suggest materials from the Center? Yes _____ No _____
   Do you order the materials she suggests? Yes _____ No _____ (N)

30. Do you use the Center because it is the most efficient service available (i.e., the fastest delivery service)? Yes _____ No _____ (R)

31. How appropriate were the materials you used from the Center to the curriculum you were teaching?
   ______ Didn't fit the subject
   ______ Fit only slightly
   ______ Fit the subject

32. Why do you think teachers use the Center? ____________________________

   Why do you think teachers don't use the Center? ____________________________

33. How do you feel the total program of the Center could have been improved? ____________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
Works Cited

"Application For Federal Grant To Establish, Operate and Maintain A Supplementary Center and Services" Missoula County Resource Center Publication, 1965.


