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DEVELOPMENT OF INNOVATIVE CARDIAC REHABILITATION INSTRUCTIONAL MATERIALS USING WORD PROCESSING TECHNOLOGIES

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DEVELOPMENT OF INNOVATIVE CARDIAC REHABILITATION INSTRUCTIONAL MATERIALS USING WORD PROCESSING TECHNOLOGIES

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

BY

Joan Ellen Watson, A.A.S., B.S., M.S.

* * * *

The Ohio State University

1983

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Adviser
Educational Foundations & Research
Dedicated to my parents.

Their energies, inspiration and quiet confidence help turn dreams into reality.
I wish to express my appreciation to the many individuals who provided consultation and assistance during this investigation. I am especially appreciative of the guidance, encouragement and friendship provided throughout my doctoral program by Professor John C. Belland, my major adviser. His clear insight, scholarship, and concern for my individual interests contributed a unique dimension to my studies.

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Finally, I am especially grateful to my family. Their continued support, understanding, guidance, encouragement and faith have sustained me throughout my studies.
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CHAPTER I

INTRODUCTION

Rehabilitation of the cardiac patient is a unique health service which seeks to provide the individual the opportunity to realize optimal physiological, psychological, social, and vocational well-being. The purpose of instruction in cardiac rehabilitation is to facilitate learning causing behavior change to enable optimal recovery. There is evidence to suggest that people who participate in cardiac rehabilitation instruction recover faster (Barry, 1972; Wenger, 1981), return to work sooner (Thockloth, 1973; Wenger, 1981), and live longer (Haskell, 1977; Naughton, Bruhn, & Lategola, 1969). Because the field of cardiac rehabilitation instruction is relatively young, the research related to the influence of instruction on recovery is not conclusive. However, the preliminary data available coupled with other less formal observations indicate that cardiac rehabilitation instruction
has beneficial effects (Edgett & Porter, 1980; Fardy, 1980; Rosenberg, 1971; Segev & Schlesinger, 1981; Winslow, 1976).

The pattern of health care for the patient with heart disease, especially myocardial infarction, has changed dramatically in the past decade. It is characterized by an increased rate in returning to normal activities, an increase in recommended physical exercise, earlier discharge from the hospital, and an increasing provision for patient education. While health professionals recognize the obligation to assist each individual to attain the maximal rehabilitative potential as evidenced by the implementation of new programs each year, only a modicum of information is available on instructional design, development, implementation and evaluation of these programs.

Nurses and physicians take seriously each cardiac patient's need to know about: health/illness matters that affect one's life, recovery potentials, life style alterations and means to care for oneself independently. Quality health care presumes the inclusion of patient education, but unfortunately it is not feasible for health professionals to plan and implement individual teaching plans that accommodate each person's need to know. While often effective, the one to one tutorial method of instruction is not efficient in terms of time spent and
cost. The brief instructional encounters between anxious patients and busy health professionals, which are common in today's health care system, do not result in long term retention, and therefore influence behavior inconsistently. Health professionals and patients need well designed instructional systems to provide quality patient education and optimum cardiac rehabilitation.

The planning of instruction in a highly systematic manner uses various forms of theory, data and information at each step of the process. The systematic design of instructional material evolved from the emphasis on systems theory. Various scientific principles are interrelated in order to produce the most effective and efficient instructional situation possible. All the components of the system are considered in relation to each other in a flexible but orderly process, however the use of a systematic approach to design must be balanced continually with individual creative effort.

Health professionals are capable and willing to provide the content recommendations that predict patient learning. However, designing health instruction, including design and production of materials, especially that which produces an individual proclivity for making health decisions, usually is beyond the expertise of most health professionals. While there is little evidence that locally produced materials improve the curriculum, project
participants in the Berman and McLaughlin (1976) study reported locally developed materials were better for their needs than previously used materials. Yet production guides encourage the reader to purchase commercially available materials whenever possible (Media Handbook, 1977). When health professionals identify the desirable patient education content, they often voice the belief and concern that certain methods, problems, treatments and patient types are peculiar to their institution or geographical area. It is this belief that health professionals assert as being most influential in the decision to produce patient education materials locally rather than using those prepared commercially. However, the time and cost of such a project in view of the quality of materials produced portend administrative criticism.

While there is a growing body of professional literature related to the knowledge effect of various patient education programs, information upon which to base the design and local production decisions is scarce. Are locally produced materials more efficient in producing healthy behavior, more cost effective, utilized more by health professionals, attended to more by patients, or more compatible with local health beliefs? "The goal in educational innovation is to design standardized materials, methods, and procedures that can be produced or implemented on a larger scale (therefore at lower unit
prices) without sacrificing a proportionate amount of effectiveness inherent in more individualized, person­alized, and flexible methods and procedures."(Green, 1977)

STATEMENT OF THE PROBLEM

What features of cardiac rehabilitation instructional materials would be altered by local health professionals as they attempt to make those materials responsive to the needs of the patients in their care? Which features would not be altered? Of those features selected for alteration, which changes can be accommodated with word processing technologies? Which features cannot be so accommodated? What are some variables specific to health professionals or health care settings that may predict the degree of adaptation necessary to produce instructional materials that will receive maximal utilization?

PURPOSE OF THE STUDY

The purposes of this study are to explore the feasibility of using word processing technology to produce cardiac rehabilitation instructional materials which are adapted for specific hospitals, and to identify personal and institutional variables significant to that process. These results can be used to assist in instructional design decisions necessary to produce efficient, cost
effective, patient education materials. The study provides a basis for additional inquiry related to the institutional benefits of adapted instructional materials, rate of adoption of adapted materials, and ultimately the efficacy of adapted instructional materials in predicting healthy behavior.

SIGNIFICANCE OF THE STUDY

Cardiac rehabilitation is assuming a more prominent role in the general care of the cardiac patient, and patient education is a significant aspect of the rehabilitative process. Both these concepts are relatively recent influences in cardiac patient care, and consequently are supported by little research and much controversy. Health professionals disagree about the means to influence patients to achieve healthy behavior. There is an acute need for research and theory that provides a broad foundation for decisions in this nascent field of patient education.

Health professionals have an established belief about what illnesses can be prevented, how they are prevented, what illnesses can be treated and what treatment is most effective and efficient. Health professionals exhort these various health messages, predictions and values for the benefit of individuals whenever the timing is deemed appropriate. These instructional events ostensibly are
geared to the individual differences, perceived instructional needs of the recipient, and the peculiarities of the health care system. While many health professionals attempt to provide individualized instruction, their success often is blocked by the absence of instructional design information. There is little evidence available to indicate the effect of various instructional methods on changing health attitudes.

The significance of the study is its potential contribution to an understanding of the design of health instructional materials. The compilation of these data should indicate the feasibility of using word processing technologies in adapting instructional materials for the rehabilitation of cardiac patients in nine local hospitals as well as personal and institutional variables which potentially influence the process.

Once the feasibility of this process is explored and some variables which influence it are ascertained, the criteria by which instructional designers may make decisions have an empirical base and the determinations of patient effect and cost effectiveness naturally can follow. This study provides an initial exploration and description of a complex issue of interest to educators and health professionals. It could result in findings of practical and theoretical significance, providing data which are useful in designing patient education programs.
Since there is little or no data of this nature available, this study may serve as a basis for further investigation in the area of producing adapted instructional materials for patient education programs.

QUESTIONS

The study will address several questions relative to the stated research problem.

1. What is the educational and experiential background of the health professionals who coordinate the cardiac rehabilitation effort in the nine local hospitals?

2. Do health professionals who coordinate the cardiac rehabilitation effort in nine local hospitals have similar priorities in determining content for instructional materials?

3. What are the processes through which the decision to print the adapted materials is made?

4. What is the health professional's perception of the scope of change proposed between the instructional materials produced in this study and those currently in use?

5. What is the health professional's perception of the relative advantage of the proposed instructional materials?
6. What features of cardiac rehabilitation instructional materials would be altered by local health professionals as they attempt to make those materials responsive to the needs of the patients in their care?

ASSUMPTIONS

The study assumes the following:

1. The data from the study will apply also to similar populations.

2. The health care professionals who participated in the study were familiar with their patient population, hospital administrative system, and system of health care.

3. The health care professionals who participated in the study were competent in the area of cardiac rehabilitation.

4. The participants had no previous experience with producing instructional materials adapted in the manner proposed by this study.

5. The booklet produced for this study was a valid representation of the current theory and practice related to cardiac rehabilitation.
LIMITATIONS OF THIS STUDY

This study was delimited by the exploratory nature of the subject area. The purpose of exploratory research is to analyze what exists, rather than test hypotheses. This study was designed to collect a variety of data related to the feasibility of using word processing technology to produce cardiac rehabilitation instructional materials which are adapted for specific hospitals. A purpose of the study was to provide a basis for additional inquiry.

The population studied was limited to all hospitals in Franklin County, Ohio where adults with heart problems are admitted. This population is unlikely to be representative of the larger population (all hospitals) because of the urban nature of Franklin County. The results, therefore are limited to the population studied, and any generalization to hospitals in general must include caution.

Most of the hospitals in the study were of the large, medical center type. While they were not all university associated teaching facilities, most had ready access to the benefits of a teaching institution. The health care professionals in the study had experience in preparing local instructional materials that ranged from merely using or adapting commercial materials to complete local production of materials. The idea of adapting instructional materials was new to all participants. Yet,
because of unusual previous experience in producing materials, there was no parity of comfort with the concept. It is unlikely that this sample represents the larger population of hospitals.

The nature of the instructional materials studied further limited this study. The booklet was designed for use with patients requiring cardiac rehabilitation following an acute myocardial infarction. Although the content was geared to in-hospital patients, it was written so as to be useful also to out-patients and families. There are few illnesses which require the degree of rehabilitation demanded by heart disease. Therefore, it is not unusual that health care personnel acknowledge the need for instructional programs for these patients.

**DEFINITION OF TERMS**

The following definitions are used in this study.

**Health Care System**—The total resources that a society distributes in the organization and delivery of health services. An organized effort on the part of a variety of health care professionals to achieve health goals related to maintaining or restoring health is implied.
Adapted Instructional Materials—Teaching tools which incorporate the unique concerns of specific health care organizations.

Innovation—An idea perceived as new by an individual which when adopted produces change.

Instructional Systems Design (ISD)—The way in which the instructional message is manipulated in the design and production process to influence the learning from that material (Allen, 1975)

Local Production—The design and preparation of instructional materials at the level of intended use. The individuals in the local situation who actually will use the materials contribute to the production of instructional materials.

Not Invented Here Syndrome—Individual and organizational attitudes which imply that if a product was not designed and produced locally it can not be useful in the local environment.
Planned change—A process by which new ideas are created or developed, communicated, and either adopted or rejected. Planned change is a conscious, deliberate, collaborative effort to improve the operations of a human system through knowledge utilization. The system may be a self-system, social system, or cultural system. (Bennis et al. 1976 p. 4)

Utilization—The manner in which instructional materials are integrated into the total instructional system.

SUMMARY

Education is an important part of cardiac rehabilitation. By studying the design of instructional materials for that educative process, health professionals can begin to understand the effects of learning on the rehabilitation process. This study provides an initial exploration of the process of producing a patient education booklet which could be adapted for different rehabilitation programs and hospital settings.
CHAPTER II

REVIEW OF RELATED LITERATURE

Production of instructional materials involves physiological, psychological, social and economic factors which are functionally interrelated. After intensive review of related literature, several categories of literature emerged as having the most direct influence on adapting instructional materials for cardiac rehabilitation: instructional systems development, the process of innovation adoption, and local materials production and utilization.

The setting of most of this literature reviewed involves the educational efforts related to school systems. While there are distinct differences between the hospital system and the school system, there also are similarities. Daft and Becker (1978, pp. 204-208) used the factors of goals, technology and personnel to draw similarities in the innovation process between schools and hospitals. They advocate that their strategies for innovation can be effective in any not-for-profit organization where college-trained individuals populate the core
technology and follow relatively clear goals to provide specialized services to the public.

The most obvious and possibly strongest similarity between the hospital system and the school system is the fact that health professionals involved in patient education must act in the role of teachers. This similarity in view of the dearth of literature related to the hospital system warrants a review of the school system literature. However, the findings may be misleading because of the different context, despite the similarities between the two systems. Until concepts and theories can be tested and embedded in the context of the health care system, the findings must be treated with caution.

INSTRUCTIONAL SYSTEMS DESIGN

The models for instructional design arose out of the systems theory emphasis of the 50's which was particularly prevalent in military training, business and industry. Engineers, psychologists, and systems designers from outside the field of education have been major forces in applying the system concept to education. (Kemp, 1977 p. 7) The shift of interest from learning theory to the systematic design of instruction for particular learning tasks was evident in the proliferation of programmed instruction during this time. The essence of instructional systems design models is that the instructional
materials are recycled through the development phase until learner performance meets the specified criteria. Designers can set a design objective, which describes the kind of acceptable evidence of a successful system operation, and work until the learner is able to achieve at the intended level (Gagne & Briggs, 1979, p. 21). Numerous ISD models appear in the literature. Their similarities and differences have been classified by Andrews and Goodson (1980).

Glaser (1965) described the basic four-step model from which a variety of models have been derived. Glaser's steps include:

1. Analyze the behavior to be learned and specify the student performance that represents competence,
2. Identify the student entry characteristics,
3. Design the instructional materials, and
4. Evaluate student performance.

The instructional design plan developed by Kemp (1977) is designed to answer three questions which comprise the essential elements of instructional technology:

1. What must be learned? (objectives)
2. What procedures and resources will work best to reach the desired learning levels? (activities and resources)
3. How will we know when the required learning has taken place? (evaluation)
Kemp's plan consists of eight parts:

1. Consider goals, and then list topics, stating the general purposes for teaching each topic.

2. Enumerate the important characteristics of the learners for whom the instruction is to be designed.

3. Specify the learning objectives to be achieved in terms of measurable student behavioral outcomes.

4. List the subject content that supports each objective.

5. Develop pre-assessments to determine the student's background and present level of knowledge about the topic.

6. Select teaching-learning activities and instructional resources that will treat the subject content so students will accomplish the objectives.

7. Coordinate such support services as budget, personnel, facilities, equipment, and schedules to carry out the instructional plan.

8. Evaluate student's learning in terms of their accomplishment of objectives, with a view to revising and reevaluating any phases of the plan that need improvement.

Kemp claims this is a flexible process which allows the designer to sequence the process in any order. There is an interdependence among the eight steps such that decisions at one step may affect other steps.

The Gagne and Briggs (1979) model developed from Gagne's learning theory (1977) identifies both the environmental conditions necessary to produce learning and the internal processing conditions required of the
learner. All the components of the system are considered in relation to each other in a flexible but orderly process (Briggs, 1977). Optimal systems development is a total instructional effort which according to Gagne and Briggs cannot be confined to one individual teacher. Their Stages In Designing Instructional Systems reflect this philosophy.

System Level
1. Analysis of Needs, Goal and Priorities
2. Analysis of Resources, Constraints, and Alternate Delivery Systems
3. Determination of Scope and Sequence of Curriculum and Courses; Delivery System Design

Course Level
4. Determining Course Structure and Sequence
5. Analysis of Course Objectives

Lesson Level
6. Definition of Performance Objectives
7. Preparing Lesson Plans (or modules)
8. Developing, Selecting Materials, Media
9. Assessing Student Performance (Performance Measures)

System Level
10. Teacher Preparation
11. Formative Evaluation
Instructional systems design (ISD) models have been criticized for being more theoretical than practical. The theory includes a description of a series of steps which, when executed in sequence, result in predictable learning outcomes (Dick, 1981). There are few investigations based on this theory possibly because such a study would require a highly complex, somewhat unrealistic design. Comparison between design models is difficult because few designers are competent in the use of more than one design. Yet, asking designers to maintain objectivity while designing the same materials more than once is not feasible. In addition, once a designer becomes accustomed to a design model, the process is internalized. The validity of a study which then asks a designer to design materials without using the model is subject to serious question. As a result of these logistical dilemmas, the area of systematic design of instruction remains largely untested.

A second weakness in ISD models is a lack of attention to humanistic goals of the designers, teachers or students (Briggs, 1982). It is not clear how specific objectives, media selection or any stage of instructional design contributes to attainment of long-term goals.
Individual factors of creativity, self esteem, independence, or confidence are among the humanistic features largely ignored in ISD models. Solomon's (1979) use of symbol systems encourages designers to include mental states and mental processes in instructional design. Gagne (1980) advocates attention to the emerging area of metacognition, defined as the knowledge that learners may acquire about their own learning processes, predicted outcomes and methods of monitoring learning activities. While it is not explicitly discussed, the research of both Solomon and Gagne is at least tangential and possibly inclusive of some of the humanistic factors necessary in an holistic approach to instructional design.

A third source of criticism toward ISD models is that recent research on teacher planning suggests that teachers rarely proceed in a systematic manner when planning instruction (P. Taylor, 1970; Yinger, 1979; W. Taylor, 1981; Kerr, 1981). Design models specify the order and manner in which instruction ought to be designed, yet Kerr (1981) was possibly the first to study the process teachers actually use in creating instructional materials. He found serious discrepancies between how educators are taught to design materials and how they actually proceed. A spurious assumption from Kerr's study would lead to the conclusion that these practices reflect what teachers should be doing simply because they represent what
teachers are doing. The critical issue then, is whether there are ISD models which are flexible enough to allow for designer creativity while maintaining a systematic approach toward predictable learning outcomes?

The ideal ISD model is one that balances the systematic design of instruction with individual creative effort. Belland's (1981) ISD model (Figure 1) is similar in its components to other models presented. However, in contrast to other models, he advocates designer flexibility in moving through the system as well as the capability to process more than one stage at a time. Belland has combined current research on instructional design and teacher planning to present an ISD model that allows for individual creativity while preserving the systematic design context.

INNOVATION

Research in the area of diffusion of innovations today represents one of the largest single concentrations of interdisciplinary behavioral science research. These disciplines include: anthropology, rural sociology, medical sociology, education, communications, and marketing. This research tradition dates back to the 1930's, most notably to the Ryan and Gross (1943) investigation of the diffusion of hybrid corn in Iowa. The studies of the diffusion of innovations increased from
Figure 1. ISD Model
about 100 publications in 1952 to over 3000 in 1980. Most of these studies were centered around the classical diffusion model which contains the following elements:

1. the innovation, defined as an idea perceived as new by an individual,
2. which is communicated through certain channels,
3. over time,
4. among members of a social system (Rogers and Shoemaker, 1971, p. 18). The diffusion process is defined as the process by which the acceptance of an innovation is spread by communication to members of a social system over a period of time (Schiffman & Kanuk, 1978, p. 402-403). An innovation may be a new product, new service, new idea or new practice. Communication may be accomplished through mass media, salesmen, or informal conversations.

Characteristics of Innovations

Rogers & Shoemaker (1971) identified five characteristics of innovations that were important in explaining the rate of adoption:

1. Relative Advantage. The degree to which an individual perceives an innovation to be better than previous ideas.

2. Compatibility. The degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of the receivers.

3. Complexity. The degree to which an individual perceives an innovation to be difficult to understand and use.
4. Trialability. The degree to which an innovation may be experimented with on a limited basis prior to implementation.

5. Observability. The degree to which an innovation is visible to others.

Allan and Wolf (1978) studied data obtained through interviews in educational settings alone. The 100 most innovative subjects were rated on the five attributes of innovation adoption identified by Rogers and Shoemaker. With the exception of complexity, these attributes were not found to be significant in this sample, leading to the conclusion that educational settings are unique in regard to innovations. The authors acknowledged a distinct need for further research.

Berman & McLaughlin (1976) identified similar characteristics of innovations in their study of the "scope of change." They claimed it is the scope of proposed change\(^1\) which greatly affects implementation outcomes. Four dimensions, centrality, nature of change, complexity and consonance, were identified to describe the varying degree of change required by the projects in the Rand sample. These dimensions are not easily measured, resulting in at best tentative conclusions on the part of Berman & McLaughlin.

Centrality involves whether an innovation was perceived as central to the district's priorities or ancillary. They found that the more central an innovation
was, the more likely it was to be continued by the district using its own resource. Projects that required teacher change and extra effort were difficult to implement and generally did not adhere to the initial project design. Complexity in terms of a comprehensive innovation that spanned many grade levels was very difficult to implement. It was perceived by project participants as being unsuccessful, and was unlikely to be continued. The idea of consonance indicated that if the values and goals implicit in a project's design were not congruent with those of project participants, the innovation was likely to be either symbolically implemented or not implemented at all.

Planned Change

Planned change as defined by Chin and Benne (1976) involves attempts to bring about change which is conscious, deliberate, and intended, at least on the part of one or more agents related to the change attempt. The product of a planned change effort is the attainment of a predetermined objective within a specified context of space and time. Three types of change strategies are suggested. The first and probably the most common in this country are the Empirical-Rational strategies. Underlying these strategies is the fundamental assumption that people are rational and once a rational self-interest is revealed
to them they will follow it. It is assumed that the proposed change will be adopted if it can be shown by the proposer that the participants will benefit from the change (Chin & Benne, 1976, p. 23).

The second group of strategies proposed is the Normative-Reeducative. The assumption here is that patterns of action and practice are supported by sociocultural norms and by commitments on the part of individuals to these norms. Change will occur only as the persons involved are brought to change their normative orientations to old patterns and develop commitments to new ones. The changes include: changes in attitudes, values, skills, and significant relationships, not just changes in knowledge, information, or intellectual rationales for action and practice (Chin & Benne, 1976).

The third group of strategies is based on the application of power—Power Coercive. The process of influence involved is that of compliance of those with less power to the plans, directions, and leadership of those with greater power (Chin & Benne, 1976). The power may take the form of legitimate authority as is frequently evidenced in hospital situations.
Innovation Adoption

All organizations do not respond in the same way to changes in their environment. One hypothesis to account for this variation is the development of structural mechanisms which provide access to information about the change. A number of studies have indicated that persons who are well integrated into social and/or professional networks tend to be more likely to respond to changes in their environments than their less well-integrated counterparts. Coleman et al. (1966) found that physicians who were most integrated into their collegial networks were most likely to be early adopters of a new drug. Becker (1970) studied public health administrators and concluded that those who were more exposed to cosmopolitan sources of information were likely to be adopters of innovative public-health programs. Kimberly (1978) reported that the greater the extent of hospital integration into informational environments, the more likely it will be to adopt innovations.

An individual's decision about an innovation is not an instantaneous act, but rather a process that occurs over a period of time and consists of a series of actions. Odiorne (1981, p. 28) claims most people are favorable toward those changes they have caused to happen because they are adapting over time as the change is created.
Rogers & Schoemaker's model of the innovation-decision process is composed of four stages:

1. Knowledge  The individual is exposed to the innovation's existence and gains some understanding of how it functions.

2. Persuasion The individual forms a favorable or unfavorable attitude toward the innovation.

3. Decision The individual engages in activities which lead to a choice to adopt or reject the innovation.

4. Confirmation The individual seeks reinforcement for the innovation-decision he has made, but he may reverse his previous decision if exposed to conflicting messages about the innovation.

House (1976) identified nine propositions that determine whether or not an innovation is accepted and successful:

1. Innovation diffusion depends on face-to-face personal contact.

2. Two of the major determinants of face-to-face personal contact—and hence of innovation diffusion—are transportation routes and organizational structure.

3. The superintendent and his top staff play a key role in introducing innovations into their districts, since they have the most outside contact.
4. The politics of the central office staff play a key role in promoting or inhibiting an innovation within the district.

5. The successful implementation of an innovation ultimately depends on whether an internal advocacy group is formed around it.

6. The teacher has very limited access to new ideas and innovations.

7. There are few tangible incentives for a teacher to engage in innovation.

8. What is rational for the teacher may not be rational for the administrator or reformer, and vice versa.

9. Innovation can be enhanced by increasing interpersonal contact and by restructuring incentives within the school district.

These propositions were tested by Foster & Richardson (1980) in the context of the Florida Linkage System. They concluded: direct personal contact of local entrepreneurs and internal advocacy groups, moral and technical support by the district administration, access to interpretive information about new ideas and teaching programs, and faculty acceptance of an innovation were found to be highly important aspects of success. Teacher involvement and ownership were suggested as remedies for lack of tangible incentives for teachers to engage in innovations. Faculty acceptance of a new program to resolve a particular instructional problem was the highest single factor related to project success. The opportunity to participate in the evaluation of alternative solutions was a key factor in determining faculty acceptance.
Havelock (1973 p. 10) posited that user initiated change is likely to be stronger and longer-lasting than change initiated by outsiders. In order for innovation implementation to be successful, he believes user involvement and commitment are vital. Involvement and commitment can be supported by a sensitivity to user needs and demand. Based on the examination of 560 innovations in industry, Myers and Marquis (1969) concluded that recognition of demand for an innovation is a more frequent predictor of successful adoption than recognition of technical potential.

When an innovation is a new product, one must consider the meaning of new to the individual. People tend to cooperate with changes only when they participate and believe the change has some benefit to them (Daft & Becker, 1978 p. 146). Newness is based on the consumer's perception of the product, rather than on its physical features or market realities (Schiffman & Kanuk 1978, p. 405). Mass media can be a very influential factor in establishing the newness of a product. "Consumers who perceive that little or no risk is associated with the purchase of a new product are much more likely to purchase it than consumers who perceive a great deal of risk" (Schiffman & Kanuk 1978, p. 421)

The propensity to adopt innovations (innovativeness) may be highly related to organizational and environmental
factors. In Corwin's (1975) study involving 131 schools, characteristics of teachers were found to explain 12 percent of the variance in innovativeness. The number of teachers having a master's degree was an important variable. Daft and Becker (1978) studied 13 innovative high schools, and suggested that among the organizational and environmental factors related to innovativeness was staff professionalism. These studies are consistent with Havelock's (1969, pp. 6-15) contention that knowledge input to the organization can be facilitated by increasing a sense of professionalism. An individual with strong professional ties has an interest in pursuing that specialty field, which often simulates a strong organizational commitment.

Acting under the assumption that school districts innovate yet do not change in significant ways, Berman and McLaughlin (1979) explored such behavior in terms of organizational dynamics. They examined responses of five school districts to internal and external pressure for change and concluded:

1. The adoption of an innovation can serve as a defense mechanism for school districts in their need to respond to the uncertain environment.

2. During implementation, an innovation is adapted so that it reinforces rather than replaces existing organizational patterns.

3. The same organizational conditions perpetuate the illusion that change is occurring.
Therefore, adaptation without improving or significantly changing performance can be viewed as part of a mechanism whereby school districts maintain the status quo (Berman & McLaughlin, 1979).

Miles (1964, p. 636) indicated that instructional materials aid the diffusion of educational innovations. He suggested the reasons include: the relative degree of ease with which they can be designed and altered to fit the demands of the teaching situations; their retention of substantial integrity when used by a wide variety of teachers in different situations; and the existence of a wide range of competence among teachers makes routinized procedures—including instructional materials—an inevitable part of an educational system. The utilization of instructional materials may be an important factor in educational innovation. Lolley (1980) hypothesized that part-time teachers would utilize instructional materials differently than full-time teachers. He found no significant difference between full and part-time teachers in their utilization of instructional materials. Speculation about the differences between teaching methods of full- and part-time health professionals is common, yet few if any studies exist on the topic.
Rate of Innovation Adoption

Many investigators ultimately are interested in the rate of adoption of innovations. This information could be most useful to any individual attempting to introduce an innovation. Based on a study of 95 local health officers in three states, Becker, (1970) concluded the speed with which public health innovations are adopted by health officers depends on their location in the communications network of their group, their cosmopolitanism, their reliance on outside sources of scientific information, and certain background factors in their training. He recommends a strategy for early adoption of innovations in a health care setting: one can hasten initial adoption of innovations by exposing opinion leaders as early as possible to sources of information, by increasing the prestige value of the programs involved and by facilitating the communication of the adoptions made by the opinion leaders to other health professionals linked through a communications network (Becker, 1970).

Counte (1973) studied practicing physicians' responses to an innovative medical education program. He concluded that social integration and cosmopolitanism under certain conditions can have independent effects on the initial receptivity toward innovation in this population. On the basis of content analyses of research publications in the Diffusion Documents Center at Michigan
State University, Rogers & Schoemaker (1971, pp. 185-9) make 32 generalizations about early adopters of innovations. Earlier adopters:

- are no different from later adopters in age.
- have more years of education than do later adopters.
- are more likely to be literate than later adopters.
- have higher social status...
- have a greater degree of upward social mobility
- have larger sized units
- are more likely to have a commercial economic orientation
- have a more favorable attitude toward credit
- have more specialized operations
- have greater empathy
- are less dogmatic
- have a greater ability to deal with abstractions
- have greater rationality
- have greater intelligence
- have a more favorable attitude toward change
- have a more favorable attitude toward risk
- have a more favorable attitude toward education
- have a more favorable attitude toward science
- are less fatalistic
- have higher levels of achievement motivation
- have higher aspiration
have more social participation

are more highly integrated with the social system

are more cosmopolite

have more change agent contact

have greater exposure to mass media communication channels

have greater exposure to interpersonal communication channels

seek information about innovations more

have greater knowledge of innovations

have a higher degree of opinion leadership

are more likely to belong to systems with modern rather than traditional norms

are more likely to belong to well integrated systems.

Rarely have studies identified individual or organizational characteristics prior to initiation of the innovation. It is possible that the success associated with an innovation changes the social climate as well as the reverse.

Reinvention

Scholars who were investigating the diffusion of innovations in public or private organizations began to voice criticism of diffusion research in the early 1970's (Rogers, 1976). Factors important for innovation in one study can be found less important, not important or
inversely important in another study (Downs & Mohr, 1976). Another of the critics advocated a turn away from the highly-structured and quantitative methods of studying the correlates of innovativeness, to more qualitative, hypothesis-generating approaches (Rogers & Adhikarya, 1979).

Although Miles (1964 p. 42) called for researchers in the early 60's to study the questions: "What kinds of revision are typically made in incorporated innovations? and what seems to cause these characteristic changes?", it is only recently that the concept of reinvention has been added to the innovation process. "Re-invention is the degree to which an innovation is changed by the adopter in the process of adoption and implementation after its original development" (Rogers & Adhikarya, 1979 p. 75). Research on diffusion of innovations prior to this time has for the most part ignored the idea of reinvention. While adopters often claimed an individualized utilization of an innovation, reinvention usually was treated as noise in the data analysis.

The concept of reinvention acknowledges that an individual or organization will treat an innovation as a composite of ideas, and it is permissible and even encouraged that some be adopted, some rejected and others changed. "...A critical component of successful innovation is its continual technological improvement and
adaptation to an increasing variety of uses, leading to adoption by an increasingly wider range of places, persons or organizations" (Brown, 1981, p. 283). The notion of reinvention was recognized by the Rand Study: "We found that the same innovation typically was implemented differently in different school districts, and in different classrooms within the same school. Moreover, 'packaged' projects, which prescribed procedures for teachers and project directors in ways that precluded the innovation's adaptation to the local setting, typically could not be implemented effectively" (Berman & McLaughlin, 1978).

The innovation process was revised by Rogers and Adhikarya (1979) to reflect reinvention research.

The revised stages include:

1. Agenda-setting: The definition of general organizational problems that may create a perceived need for innovation.

2. Matching: A problem from the organization's agenda and an alternative solution (that is, an innovation) are brought together and consideration is given to their fit.

3. Redefining: The innovation is defined in terms relevant to the particular organization and its perceived problem as the technological solution is modified to fit to these specific conditions.

4. Structuring: Organizational structures directly relevant to the innovation are altered to accommodate the innovation.
5. Interconnecting: The relationships between the innovation and the rest of the organization are clarified, so that the innovation eventually loses its separate identity and becomes an on-going element in the organization's activities.

The problem of continuation of a successful innovation generally is not dealt with in the educational innovation literature. "Depending on what they learn from a project, teachers often modify their classroom activities in idiosyncratic ways as they continue using various aspects of project methods or materials" (Berman & McLaughlin, 1978, p. 6). These alterations/adaptations can be viewed as necessary conditions to continue innovations in deference to individual preference and priorities as well as the fiscal realities of the system. Unlike a new drug or new variety of wheat, an educational innovation tested and developed in other systems, should undergo adaptation during the implementation phase.

There are a variety of factors which have the potential for influencing reinvention. As a result of preliminary studies, Rice and Rogers (1980) speculated that reinvention can be influenced by pride of ownership and reasons of status; lack of information; complex innovation; high scope of change; problems with operational implementation; mismatch in the organizational perceived need; or practitioner resentment against an earlier form of the innovation. Reinvention is seen as a beneficial
addition to the innovation process. The flexibility in the process of adopting an innovation may reduce mistakes, insure a sense of individual ownership, and provide the adaptation necessary to be certain the innovation reflects the local conditions. "The best research and evaluation, whether qualitative or quantitative, suggest that how an innovation is implemented may be as important to outcomes as its initial technology (Berman, 1980).

**Linkage Model**

Havelock and his colleagues at the Center for Research on Utilization of Scientific Knowledge at the University of Michigan began in 1966 to study educational innovation and change. He categorized innovation in education into three orientations: 1) Research, Development and Diffusion; 2) Social interaction; and 3) Problem solving. Havelock then identified a common theme in the various orientations—linkage, from which he developed the Linkage Model. The idea begins with the user as a problem solver. It is crucial to the process of change that the user of information be able to search for and find relevant knowledge that can be applied to the user's problem. He believes this collaboration builds trust (Havelock, 1969, p. 2-35). An effective change process requires linkage to more and more remote sources of assistance. These overlapping linkages ultimately form an extended
chain of knowledge utilization connecting the most remote sources of expert knowledge with the most remote consumers of knowledge (Coulson, 1978 p. 47)

In studying the relationships between knowledge, diffusion, and utilization, Ganz (1980) states creation, diffusion, and utilization processes depend on the extent to which the institutional structure is subject to reform. This, in turn, depends upon the availability, diffusion, and utilization of knowledge. The linkage system between technical change, knowledge processes, and social or institutional changes are known to exist, but their interdependence is yet to be understood.

Havelock and Havelock (1973) suggested that change agents applying this model must draw upon the various orientations in order to adapt to different situations, personalities, systems, and the innovation itself. They provide detailed strategies for change agents based on the following stages of change.

1. Building a relationship
2. Diagnosis
3. Acquiring relevant resources.
4. Choosing the solution.
5. Gaining acceptance.
6. Stabilizing the innovation and generalizing self-renewal.
If innovations are to be implemented with maximum effectiveness, the variation in level of use of particular innovations by individuals must be accounted for and described. The dichotomous measure of innovation adoption, so common to innovation research, inadequately describes the phenomenon and ignores the existence of reinvention. The fact that the decision maker announces an innovation does not guarantee the members of that system will adopt and use it in the same manner. The only way to know whether and how an innovation is being used is to assess each individual's use directly (Hall & Loucks, 1977).

Hall, Loucks, Rutherford & Newlove developed a framework for analyzing innovation adoption which includes six levels of use. The levels are distinct states that represent observably different types of behavior as well as patterns of innovation use. They suggest that individuals reflect different levels of use of an innovation and that they may experience different levels over time as they develop the ability to use the innovation.

Level 0 Nonuse State in which the user has little or no knowledge of the innovation, no involvement with the innovation and is doing nothing toward becoming involved.
<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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<tbody>
<tr>
<td>Level I</td>
<td>Orientation State in which the user has recently acquired or is acquiring information about the innovation and/or has recently explored or is exploring its value orientation and its demands upon user and user system.</td>
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<tr>
<td>Level II</td>
<td>Preparation State in which the user is preparing for first use of the innovation.</td>
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<tr>
<td>Level III</td>
<td>Mechanical Use State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs. The user is primarily engaged in a stepwise attempt to master the tasks required to use the innovation, often resulting in disjointed and superficial use.</td>
</tr>
<tr>
<td>Level IVA</td>
<td>Routine Use of the innovation is stabilized. Few, if any, changes are being made in ongoing use. Little preparation or thought is being given to improving innovation use or its consequences.</td>
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<tr>
<td>Level IVB</td>
<td>Refinement State in which the user varies the use of the innovation to increase the impact on clients within the immediate sphere of influence. Variations are based on knowledge of both short and long-term consequences for clients.</td>
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<tr>
<td>Level V</td>
<td>Integration State in which the user is combining own efforts to use the innovation with related activities of colleagues to achieve a collective impact on clients within their common sphere of influence.</td>
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</table>
Level VI Renewal State in which the user reevaluates the quality of use of the innovation, seeks major modifications of or alternatives to present innovation to achieve increased impact on clients, examines new developments in the field and explores new goals for self and the system. (Hall et al., 1975)

Their research indicated that most people do not use an innovation effectively the first or second time. However, after three cycles of use, 30-40 per cent of an innovation's users are stable at Level IVA. Their long-term goal is to not only classify innovation adoption precisely, but "...to select appropriate intervention strategies and tactics to facilitate their growth in use of the innovation while minimizing the trauma of change" (Hall, et al., 1975).

Resistance

Most of innovation and diffusion studies are concerned with those individuals adopting innovations, and resistance or rejection is mentioned only indirectly. Eichholz (1961) conducted a study to test a theory of rejection. He developed a rejection classification system of newer educational media and tested it with 45 elementary school teachers. The results include: attitudes of rejecters were not related to the grade level at which a teacher taught, or to the number of years of teaching
experience; no teacher was a rejecter of all the newer media; each form of rejection was expressed by at least 50 percent of the sample. Eichholz concluded that there is some reason to believe that a person may be either a potential adopter or a potential rejecter, causing people to approach an innovation with adopter or rejecter "sets".

All change is met by some degree of resistance (Lancaster, 1982 p. 18). Watson (1969 pp. 22-3) offers the following principles as a summary of the sources of resistance within persons and within institutions.

A. Who brings the change:
1. Resistance will be less if adminis­trators, teachers, board members, and community leaders feel that the project is their own—not one devised and operated by outsiders.

2. Resistance will be less if the project clearly has wholehearted support from top officials of the system.

B. What kind of change?
3. Resistance will be less if partici­pants see the change as reducing rather than increasing their present burdens.

4. Resistance will be less if the project accords with values and ideals which have long been acknowledged by partici­pants.

5. Resistance will be less if the program offers the kind of new experience which interests participants.

6. Resistance will be less if partici­pants feel that their autonomy and their security is not threatened.
C. Procedures in instituting change.

7. Resistance will be less if participants have joined in diagnostic efforts leading them to agree on the basic problem and to feel its importance.

8. Resistance will be less if the project is adopted by consensual group decision.

9. Resistance will be reduced if proponents are able to empathize with opponents, to recognize valid objections, and to take steps to relieve unnecessary fears.

10. Resistance will be reduced if it is recognized that innovations are likely to be misunderstood and misinterpreted, and if provision is made for feedback of perceptions of the project and for further clarification as needed.

11. Resistance will be reduced if participants experience acceptance, support, trust, and confidence in their relations with one another.

12. Resistance will be reduced if the project is kept open to revision and reconsideration if experience indicates that changes would be desirable.

D. Climate for change

13. Readiness for change gradually becomes a characteristic of certain individuals, groups, organizations, and civilizations.

Methods of change which include authoritarian directives usually produce a high level of resistance. Odiorne (1981) analyzed resistance to change in various organizations. He advocates participation as an effective method for combating change resistance. "The best option for
change is one created by the people who must implement it, or one for which the implementers can claim ownership" (p. 250). He believes change can be facilitated and therefore resistance diminished simply by replacing perceived unfavorable consequences of change with favorable ones (p. 266). While there may be a variety of means to accomplish such a goal, encouraging participation in change decisions and instilling a sense of ownership are change strategies likely to reduce resistance.

LOCAL PRODUCTION AND UTILIZATION

While the benefit of audiovisual materials in the classroom has been established (Wilkinson, 1980; Moldstad, 1974; Schramm, 1973; Tickton, 1971), the appropriate utilization of those materials has not. Commercially available materials are in abundant supply (Komoski, 1974; NICEM, 1983). However, teachers indicate materials are not always available, are too expensive, or do not meet their needs. Teachers as a result often produce educational materials locally. Kemp (1956, p. 32) explored the area of local production in schools pursuing his belief that there must be some justification for spending public funds to produce costly as well as inexpensive teaching materials. Educators have proclaimed the values to the participant of producing materials locally. Further
Rationale for Local Production

Kemp (1956, pp. 24-32) traced the early development of media production services, and found educators began to realize the importance of locally produced materials as early as 1920. Larson (1949, p. 225) summarized significant ideas about local media production in schools:

School-produced materials supplement commercially produced materials. When there is a school or community need for audio-visual materials with subject matter and treatment appropriate to a specific situation, the school as a local institution can produce to meet the need. Adaptation to the locality is an advantage most readily achieved by local productions.

Cochran (1954, p. 83), as an early advocate of local production, indicated the rationale for locally produced materials included: they embody pupil participation, they develop naturally out of recognized educational needs, and they are specific to the immediate classroom situation. Schmidt (1970 p. 56) in his analysis of local production program components stated: "It is now widely recognized that the true potential of a good local production program is that it can readily fill gaps in the assortment of ready-made instructional materials available for use in teaching."
The current emphasis on individualized instruction increased the need for instructional materials that are designed to meet the individual needs of students. Belland (1976) suggested there are three major reasons to produce materials in a school setting:

1. Whenever there is a unique curricular experience required (either because of a particular learner or particular learners or a particular community).
2. To allow teachers to utilize their unique experiences in providing curriculum opportunities for learners.
3. To give the learners opportunities for expression in more than just written and spoken form.

A national study to determine the status of local production programs developed to serve in individual school buildings, school systems, and public school educational television stations was conducted in 1963 (Faris, Moldstad and Frye). Their rationale for programs of local production included:

1. Locally produced materials can be up-to-the minute. There is always a considerable time lag between the time an event happens or a new instructional method is introduced and related commercial instructional materials become available to teachers.
2. Locally produced materials provide functional flexibility for the teacher and the students.
3. Local production makes it possible to put the visual content in a form or medium which best suits existing physical and environmental conditions.

4. Locally produced materials meet specific local needs of both teachers and students.

Hunger (1972, p. 81) in his rationale for providing local production facilities included some additional advantages:

1. Sufficient software is not currently provided.

2. Software is not always available commercially.

3. Local production increases teachers' use of media.

4. Local production improves teacher understanding of subject matter.

As a result of their survey, Faris, Moldstad and Frye concluded: 1) Local production helped the classroom teacher gain a better understanding of the subject matter taught. 2) An understanding of production techniques increased the variety of materials teachers used in their teaching. While they did not conclude that teachers are more apt to utilize the materials they produce, it is conceivable that an increased understanding of the subject and an increased variety of media possibilities will lead the teacher to an increased utilization of those materials produced locally.

An analysis of the local production process by Smellie (1978, pp. 10-46), lends support to earlier recommendations. He presented a rationale for local
production which included improved teacher effectiveness, decreased in-class teaching time, meeting specific local needs, increased flexibility in using media, improved student motivation, and decreased cost.

Advantages of Local Production

Chisholm and Ely (1976, pp. 251-2) outlined the advantages of local production:

1. The product most closely matches the particular need of the teacher, students and setting.

2. Parts of the materials can usually be readily adapted to meet changing needs.

3. Production requires understanding of the subject content and often encourages creativity.

4. Students can participate in production activities, which often serves as motivation.

5. Production often encourages students and teachers to work cooperatively.

6. Local production is often less costly, so more students and teachers can be served.

7. Production can often be done even by less able students and so helps to develop self confidence.

8. Locally produced materials can be more up-to-date, be more specifically oriented geographically and regionally, and capture local flavor.

Grimes (1973), advocates the local production of instructional materials must be integrated with a purposeful development process. Mediated learning resources
can be obtained from commercial sources or can be produced locally. Generally, it is more expedient to use commercial products if they fit the learning objectives being addressed in terms of substance, technical quality, availability and cost. Many times however, commercial materials are too expensive, unavailable, or unsuited to particular instructional application. In these instances, local production of desired media may be the answer. A widely recognized yet often overlooked disadvantage of commercial materials is that they lack regional sensitivity. The content, organization, form and treatment of commercially produced materials have been determined to satisfy needs in all parts of the country, not just those of one school, one district or one region. (Beutler, 1978, p. 38)

One application of a purposeful development approach to local production is the procedure designed for the Detroit Public Schools Curriculum Laboratories (Grimes, 1973). There are two types of services available, information services and materials preparation services. The information services are available for reference use by individuals and groups developing new courses of study, curricular strategies and individualized materials. The materials preparation services includes a materials preparation center which is available for teachers to create learning resources according to their own style of
teaching, the local school curriculum, the nature of their students, and their individual goals. "Locally produced learning resources can be as effective, or more effective than, commercially developed materials if an appropriate mix of production technique and educational development process is applied" (Grimes, 1973). Lum (1975) also advocates local production of instructional materials using the same process used in instructional development.

The specificity and cost of commercial materials are problems considered by a few authors. (Brown, Norberg and Srygley, 1972 p. 251; Burrell, 1978 p. 10; Wynn and Craig, 1978 p. 16) The concern most of these authors share is that, commercially produced materials are often expensive, not specific enough for the instruction and not always available. Local production can alleviate some of the negative aspects of using only commercially prepared instructional materials.

Bretz (1971 pp. 146-48) listed advantages of media produced or adapted locally:

1. Local production can respond quickly to a local need.

2. Local production can be highly specific; production can be tailored directly to instructional needs.

3. Local production can be rapidly evaluated in practice and rapidly revised.

4. Local production is more democratic.
5. Locally produced materials tend to be better used.

6. Locally produced materials can incorporate familiar surroundings and people.

Local production work has been evaluated as a teacher and student activity, with the realization that, while quality may not approach that of commercial productions, the finished product would often be satisfactory for the designed purpose, and the accompanying learning experiences for those participating, might make the activity worth-while and highly valuable (Kemp, 1956, p. 282). Hooper's (1969 p. 245) analysis of why the newer technologies are failing to penetrate the American educational system includes an advocacy for local production. He noted, the mere existence of good programs does not guarantee they will be used. "There is probably no major university in the United States using videotaped lectures or lecture segments produced at another university" (p. 260). Local production can allow educational technology to be developed close to, and in response to, real problems. There is more opportunity for locally produced media to be integrated into the core of the instructional system (p. 259).
Disadvantages of Local Production

One of the pitfalls of local production is the difficulty of producing materials with proven and continuing instructional quality and value (Grimes, 1973, p. 6). An analysis of locally produced versus commercially produced materials revealed the following unfavorable characteristics of local production (Bretz, 1971).

1. The materials are frequently characterized by a low level of production quality.

2. Production is generally limited to local locations and subjects.

3. There is a limited use of long-range effectiveness and evaluation of the materials.

4. The high specificity to the local need often means a low level of commonality making them less useful over a range of situations.

The disadvantages of local production apparently are minor compared to the advantages. It is critical, however, to assess these factors in terms of the local environment. A relatively insignificant disadvantage may be significant enough in a local situation to make local production impractical.

Local Production in the Health Care Setting

While the advantages of local production have not been studied in the context of the hospital system, some
health professionals do encourage utilization of locally produced instructional materials.

Despite all the commercially produced patient education material available...it's often difficult to find information that suits your units needs. It may be too technical or detailed for your patients or may present policies and procedures different from those practiced at your hospital. Or perhaps it is just not geared to your patients social, economic, or educational background. ...you can write patient pamphlets that not only will be more effective since they're written specifically for your patients, but will save money on commercial publications (Boyd, 1981, p. 90).

The Rand Study

The Rand Corporation conducted a several year exploratory study of federally funded programs designed to introduce and spread innovative practices in public school. "Federal change agent policy rests on the idea that providing funds to a relatively small number of districts to try innovations will demonstrate the value of some of these innovations and thus intice other districts to adopt them selectively" (Berman & McLaughlin, 1976, p. 346). A nationwide survey in eighteen states of 293 change agent projects was conducted and included 1735 personal interviews. Field studies followed to provide a comparison of similar innovations operating in different local settings and supported by different federal programs. They classified the stages of innovation into
initiation, implementation and incorporation. The implementation state was determined to be crucial to the success of projects. "Many innovative projects fail or produce disappointing results because they are not implemented according to plan....We hypothesized that local school systems are so structured that in order to implement significant innovations there must be a process of mutual adaptation" (p. 349). Mutual adaptation implies that the initial design of an innovative project must be adapted to the particular organizational setting of the school, classroom, or other institutional hosts, and, at the same time, the organization and its members must adapt to the demands of the project.

Berman and McLaughlin found that in all cases, mutual adaptation occurred only when the project was associated with problem-solving. (p. 353) They asserted that local material development promoted mutual adaptation (Berman & McLaughlin, 1975 p. 26). In addition to promoting mutual adaptation, local material development in most cases is an example of mutual adaptation. Rarely do school personnel adopt an innovation from outside their district without changing it (Berman & McLaughlin, 1978, p. 23).

Continuation of the projects by local systems was found to be more likely under the following conditions: an emphasis on training rather than the introduction of new technology; training focused on practical classroom issues
rather than on theoretical concepts; and local development of materials rather than reliance on outside consultants (Berman & McLaughlin, 1978, p. 12). The local production of materials ranged from adapting and repackaging materials to producing them from scratch.

The value of producing one's own project materials may not lie principally in the merits of the final product, but in the activity of development itself. The exercise of "Reinventing the Wheel" can provide an important opportunity for staff to work through and understand project precepts and to develop a sense of "ownership" in project methods and goals. Without this "learning by doing", it is doubtful that projects attempting to achieve significant teacher change would be effectively implemented (p. 20).

They reported no direct evidence as to whether the quality of locally developed materials improved the program. The project participants did, however, consistently report that locally developed materials suited their needs better than commercially prepared materials.

Berman and McLaughlin found the institutional setting to be of critical significance in the innovative process. While external motivators of information, money and technology often are intended to overcome local resistance to outside influence on internal decisions, in reality this goal rarely is accomplished. They conclude, "If educational technologies are not altered and adapted to local conditions, they are ineffective; information about practices elsewhere seldom goes beyond the level of simple
awareness; federal money is used for its intended purpose only if the federal purpose is congruent with local plans" (Berman & McLaughlin, 1976, p. 365).

Local implementation strategies influenced the project's short-run outcomes and long term continuance.

The elements of a strategy that fostered mutual adaptation and therefore more effective implementation, and that improved student performance, promoted teacher changes, and enhanced the continued use of the project at the classroom level were:

- Concrete, teacher-specific, and extended training,
- Classroom assistance from project or district staff,
- Teacher observation of similar projects in other classrooms, schools, or districts,
- Regular project meetings that focused on practical problems,
- Teacher participation in project decisions,
- Local materials development,
- Principal participation in training (Berman & McLaughlin, 1978, p. 34).

Participation

The impact of teacher input in producing instructional materials was tested in the PSSC study. The Physical Science Study Committee had proposed to devise the teaching materials required for a high school course in modern physical science and demonstrate that the
materials were scientifically, educationally and commercially feasible. Over 2000 teachers were involved in developing the materials and testing them on a variety of students. The committee was successful in using the production of instructional materials to effect a curriculum change in a relatively short period of time (Marsh, 1964).

Answers to questions of the nature, timing, scope and intensity of participation are largely left unanswered by researchers. Fullet and Pomfret (1977) cite a number of studies of teacher participation in material development as opposed to participation in planning and decision making. They conclude that active involvement in the development process appears to be the critical factor rather than participation in decision making.

One of the prominent hypotheses is that participation enhances effectiveness or achievement of organizational goals (Mohr, 1982, p. 124). Dachler and Wilpert (1978) reviewed a sizeable collection of literature on participation, and observed neither a systematic, incremental development in the understanding of participation as a social phenomenon, nor revolutionary changes and fundamental shifts in the conceptualization of participation. The studies tend to be fragmentary, contradictory and limited in the scope of participation outcomes. They
argue for a more holistic approach to the questions researchers ask about participation.

The notion that effective projects include the people in decision making who will be affected by the decision is not a new one. The Rand study found that teacher participation in decisions concerning project operations and modification was strongly correlated with effective implementation and continuation (Berman & McLaughlin, 1978 p. 29). Once the teachers developed a sense of ownership in the project they were willing to invest considerable time and energy to make the project work. One of the assumptions upon which the Bay Area Writing Project was based encourages teacher participation, "curriculum change cannot be accomplished with a packet of 'teacher proof' materials" (Gray & Myers, 1978). Successful implementation of the project mandates that local teachers participate in material development. Materials can be transported to other districts if the teachers there have an opportunity to talk with teachers who have already used the materials as well as an opportunity to revise and amend them to fit local circumstances (Gray & Myers).

The influence of teacher participation on the effectiveness of inservice programs is well documented. Lawrence's (1981) meta analysis of 59 studies concluded that inservice programs most successful in accomplishing
their objectives were ones that:

1. involved teachers actively in initiating, planning and conducting the program

2. were funded in ways that permitted the teachers and administrators of individual schools to sponsor them, to design activities, and to select inside and outside leadership as appropriate to the plans. (Programs led by school supervisors, teachers and college personnel met their objectives better than those led by state department of education personnel, school district staff, or other outside consultants).

Edelfelt's (1976, p. 13-5) criteria for making planning decisions regarding inservice programs are consistent with Lawrence's findings:

1. Decision-making processes are based on cooperation between all major interest groups, that is, school district, college/university, and teacher organization.

2. Decisions are made by the people who are affected, and the decisions are made as close as possible to the situation where they will be operative.

3. The cooperation of major interest groups is based on a concept of parity for each party.

4. Explicit procedures exist to assure fairness in decision-making.

5. There are policies related to inservice education.

6. Inservice education programs are institutionalized.
Utilization

The purpose in performing all the production functions is to encourage and provide for optimum utilization of the resources by the teachers and learners. In most cases the teacher takes the role of the resource provider. If the teacher does not make the resources available, the learner does not use them, and learning likely does not take place. Utilization is a unique function culminating in the actual interaction between the user and the medium (Chisholm & Ely, 1976, p. 346). "The competencies within the functions of logistics, research, design, and management all focus on one goal—the engagement of the student with ideas and materials for the purpose of learning" (p. 346). Utilization represents a synthesis of the total teaching learning process.

If successful projects involve teachers in decisions and material production, then one might be tempted to assume participation leads to utilization. However, this phenomenon has not been widely studied. Dayton (1978) maintains that producing materials locally can make a teacher more effective. He believes one reason this is true is that teachers who produce their own materials will probably use them to a fuller capacity than they would if the materials were commercially produced. This belief is consistent with the findings of Kamra (1977).
The rate at which teachers utilize media may be related to feelings of competency in producing media locally. Busse (1976) identified a significant relationship between the media competencies of teachers and the rate at which teachers utilize and value media in their instructional settings. However, Sevel (1981) found that producing modular films designed to allow for classroom flexibility did not affect teacher utilization. Larson (1949, p. 217) indicated utilization of instructional materials is dependent on the general philosophy of a particular school's personnel. The number of years experience a teacher has may also influence media utilization (Tibbs, 1974). Welch (1974) surveyed 380 teachers in U.S. Dependents Schools in Europe and found a significant relationship between the type of curriculum program (innovative or traditional) and the extent of utilization of instructional media. He concluded: 1) teacher attitude toward media is not a major factor in determining utilization of instructional media; 2) innovative curriculum programs stimulate teachers to use instructional media; 3) teacher characteristics of highest degree held and years of teaching experience are inconsequential to the understanding of utilization of instructional materials. The 1977 EPIE Report related that teachers revised materials without regard for the relevance to student needs.
Shannon (1982) questioned 539 classroom teachers, 26 reading teachers and 26 building administrators in a large midwestern school district. He reported most teachers use commercial reading materials because administrators expect them to do so. However, the supervisors, reading teachers and administrators did not agree. Berman and McLaughlin (1978, p. 13) indicated few school districts in their sample systematically searched for better educational treatments. Teachers tended to use information or treatments that were either already known to local personnel or were generally fashionable. Also reported in the Rand study was that dissemination efforts (a critical factor leading toward utilization) were more productive where they helped other districts build their own innovative capacities rather than attempting to replicate a specific model (Greenwood, Mann, & McLaughlin, 1975, p. 67).

**Not Invented Here Syndrome.** The NIH (Not Invented Here) syndrome is commonly recognized in business, particularly among people engaged in trying to find new technological approaches (Beckwith, 1971 p. 853). New products or processes invented in other organizations or locales are viewed as undesirable, unworkable or impractical. The attitude is that individuals in other situations can not understand the unique features of the local
situation. Therefore, if the product is not invented locally, implementation is impossible.

A major goal for the individual introducing change is to secure enough local initiative and participation so the enterprise will not be vulnerable as a foreign importation (Watson, 1969 p. 22). "Research, development, and engineering units are familiar with the way in which a new project is hampered if it is seen as NIH" (Watson, p. 22). There is some support for the notion that NIH operates in educational environments also, causing an automatic rejection of a new idea or at least violent tampering with technology developed and proved in some other institution or setting (Beckwith, 1971).

Evaluation of 61 educational units was conducted by the American Institutes for Research. The evaluation process involved initial revision, field testing and final revision of the units. During the initial revision, the needs of teachers, school administrators, and publishers resulted in the following categories: reduction in the length of units, inclusion of alternate learning activities, reduction in cost, replacement of copyrighted passages, and improvement in the appearance of materials. They stated that obtaining information without arousing resentment or reluctance was the most difficult aspect of the field test (Lipe & Haveman, 1977). This resistance to outside innovation may be related to a sense of economic
threat. Many innovations, especially educational innovations, have been introduced for the purpose of cutting costs or even decreasing personnel.

Comparison between school systems is a common phenomenon. Innovation in other systems, when noted at all, often are defined as no better—and perhaps somewhat worse than the local system (Miles, 1964, p. 644). Most impetus for change in organizations particularly schools comes from the outside (Griffiths, 1964, p. 431; Miles, 1964, p. 645). The psychological response of suspicion toward outsiders and strangers is universally known, but not widely studied. Argyris (1952) identified, from his own experience, individual and organizational defense mechanisms commonly used toward researchers who are seen as outsiders. Tucker (1979, p. 133) implied the power of the NIH syndrome can be reduced by involving in its development the people to whom a project is directed. One should not hesitate to look outwards to inter-institutional projects which involve various departments. This involvement reduces the "outsider" phenomenon. Tucker believes the result will assist in the broader process of dissemination and will raise the political profile of the project (p. 133).

Change in the health care system occurs at an alarming rate. More change in the health care system has
occurred in the last five years than the previous 50 (Lancaster, 1982). Uniformity gradually has been con-
verted to diversity. While it has not been reported,
observation of hospital systems may reveal that it is the
NIH syndrome which prohibits the wide-scale utilization of
innovations. Nurses who come to a new hospital fre-
quently will hear "we don't do it that way here." Proce-
dures and treatments which accomplish the same goal will
vary slightly from one hospital to another. Medical
treatment and protocol also vary in different locales.
Innovative procedures from outside hospitals tend to reach
implementation much slower than those developed and tested
locally. Health education programs often have been
criticized for "starting from scratch" when adequate
resources and materials already exist (Madnick, 1980).
Hospital policies are particularly susceptible to NIH.
The prevailing belief is that outside policies are not
appropriate because each situation is unique to the local
hospital.

Ownership

The psychological effects of investing oneself in a
project are known as ownership. The result of this sense
of owning the project result in efforts to insure the
success of the project. Berman and McLaughlin (1976
p. 361) indicate that the value of local production may
not be in the product, but in the sense of ownership which results. They argue that local material development promoted mutual adaptation, as an essential step in fostering commitment to the project (p. 366).

A sense of ownership in any project is most likely to develop when the individual is included in the project from the outset. It is difficult if not impossible to expect a high degree of commitment from a person whose first introduction to a project is during the implementation phase. The Rand Study began during the proposal stage to develop this commitment by "...mobilizing the district leadership and support necessary for implementation, by increasing the flow of communication and feedback among staff and administrators, and by involving project participants so they developed a sense of ownership toward the project" (1976 p. 367).

The U.S. Office of Education searched for a successful means by which to disseminate exemplary educational programs. Grants were awarded to local educational agencies to try out Project Information Packages (PIPs) during the 1974-1976 schools years. The success of PIPs was established if: people in tryout sites were found able, with little outside assistance, to reproduce the original program in their own schools; and they were able to demonstrate improvements in student test scores comparable to those reported by the original projects. The
majority of educators who tested PIPs felt that they were useful and that implementing a project by means of a PIP rather than through assistance and training from another site had given local staff a greater sense of pride, responsibility, and ownership in the project (Stearns, 1977, p. 58).

Emrick and Peterson (1978) reviewed five large-scale investigations of educational dissemination and change in American schools. They synthesized the results to derive a set of conclusions regarding the current state of knowledge for policy makers, program administrators, and researchers. Three of their findings relate directly to local production.

1. Local staff resist changing in any substantial way what they already are doing routinely.

2. Local commitment was invoked by all the studies as the single most powerful explanatory variable of outcomes. The components most instrumental in the development of this commitment were personal issues such as interpersonal style and constructs such as ownership, involvement, growth experience, and problem solving.

3. Projects in which staff members were involved in all aspects of operations were highly successful.
Effectiveness

The influence of teacher participation on student achievement has not been well researched. The EPIE Report (1977), Nature and Quality of Instructional Materials Most Used by Teachers and Learners, attempted to link participation to student achievement. The question, "Do students learn more from materials when their teacher has had a major role in selecting them than when the teacher has had little or no role in selecting them?" was asked of over 5,000 teachers. Because of the poor response rate and lack of objective achievement data no conclusion could be drawn on this question.

Priesler (1982), studied 120 military officers to determine whether a subject's attitude toward other institutions interfered with his ability to learn from media perceived as other than locally produced. Four television treatments that varied only in the appearance of their production location were used. He found products produced by the using agency are no more effective than products produced elsewhere and commercially produced products are as effective for a military population as are military produced products. Boyd (1981) displays possibly the more prevalent attitude in her advice to health professionals to produce their own patient education materials because they are more effective.
SUMMARY

Advocacy for the systematic design of instruction is prevalent in most instructional settings today. The purpose of this design is to produce quality, cost effective instructional materials by revising the materials during the development phase until the learner can perform according to predetermined criteria. A variety of models appear in the literature. Most incorporate the following components: specify objectives and content, identify learner characteristics, design materials, and evaluate learner performance. Instructional systems design is a process which has not been widely researched and has been criticized for a lack of attention to humanistic features, and an incongruence between what teachers actually do and what the models propose. There is evidence, however, to suggest that with the use of systematic design, effective instructional materials can be produced. The most useful ISD model is one that is specific enough to be easily utilized yet is flexible enough to provide for designer creativity.

Innovation research is abundant in many of the behavioral sciences. However, the application to instructional situations in health care settings is non-existent. Five characteristics of innovations that are important in
explaining the rate of adoption include: relative advantage, compatibility, complexity, trialability and observability. The study of innovations has been criticized for excluding the concept of reinvention; a more qualitative approach to the study of innovations in organizations has been advocated. Among the factors influencing reinvention are: pride of ownership, lack of information, complex innovation, scope of change, organizational disorder, mismatch between organization and innovator perceived need, and linkage systems. The concept of reinvention led to a need to be able to categorize the level of use of an innovation.

While much of the research related to innovation theory resulted in non-significant or conflicting findings, the existing data can be used as guidelines for planning innovations. Innovations in health care settings are relatively unstudied. The frequency and variety of change establishes a need to explore the innovative process within the health care context.

The disadvantages of locally produced instructional materials can be justified relative to the values to the producer and the objectives which may be served by the materials. The objective of all producers of instructional materials (local and commercial) is to have the materials utilized by the intended learner. Teachers serve as gatekeepers between instructional materials and
students. Before reaching the students, the materials must be accepted by the teachers and administrators. Acceptance of materials is more likely if the person who will utilize them has participated in their development and a sense of ownership has been established. Instructional materials viewed by the gatekeepers as ineffective or inappropriate because they were "not invented here" will not reach the intended audience regardless of their quality.

Research efforts within the identified areas of instructional systems design, innovation and local production have often ignored theories' points of overlap and divergence and excluded many important details which are not directly or only tangentially related. The use of ISD models to produce effective instructional materials which will reach the intended audience must incorporate what is known about innovation and local production, as well as consider the interrelationships of these areas.
Diffusion of innovations and change are used as synonymous terms in much of the literature. There is, however, a slight difference in meaning between the two words. Innovation implies newness. Change does not always involve anything new. All innovation diffusion by definition produces change. This differentiation is not stated clearly in the literature. Therefore, both terms will be referred to as they are used in the literature cited.
The focus of this study was the exploration and description of the use of word processing to adapt cardiac rehabilitation materials for use in nine local hospitals.

DESIGN

The study was designed to be conducted in three phases.

Phase I. The health professionals responsible for cardiac rehabilitation in the nine local hospitals were identified. Each of these individuals plus selected other health professionals were interviewed. Relevant theory and research was reviewed.

Phase II. The cardiac rehabilitation instructional booklet was produced based on the data collected during
Phase I, relevant theory and research, and the experience of the investigator. The process of design followed Belland's ISD model.

Phase III. The completed booklet and accompanying questionnaire were sent to the participants for review. The resultant data were analyzed.

The timeline for completion of the study was:
Phase I—Summer/Fall 1982
Phase II—Fall 1982/Winter 1983
Phase III—Spring/Summer 1983.

POPULATION AND SAMPLE SELECTION

The population consists of all hospitals in Franklin County where cardiac patients are admitted. The participants in this study were those health professionals responsible for the cardiac rehabilitation program in each hospital.

The study sample was drawn from the population of Franklin County hospitals. The sample included the entire population of nine hospitals. The hospitals varied in size: 3 hospitals had from 175-350 beds; 3 had 400 to 700 beds; and 2 had more than 700 beds. There is a total of approximately 109 coronary care unit beds in the population.

All health care professionals participating in the study were acting as representatives of the individual
hospital's cardiac rehabilitation program. One person represented two hospitals. All participants were registered nurses: 2 diploma prepared, 4 baccalaureate prepared, and 2 masters prepared. Their total professional experience ranged from 4 to 23 years. Experience in the rehabilitation of cardiac patients ranged from 0 to 6 years.

Cardiac rehabilitation programs in many Franklin County hospitals utilize an interdisciplinary team approach. Therefore, disciplines in addition to nursing including: medicine, dietary, physical therapy, occupational therapy, social service, and psychology, may comprise the cardiac rehabilitation team. The nurse coordinators were asked to involve the team members in the review process wherever they deemed it appropriate. Some of the data reflects a composite of health care professional's opinions.

INSTRUMENTATION

The exploratory nature of the study encouraged collection of a variety of data. Several instruments were developed for use in the study.
Interview Schedule

A semi-structured interview schedule was developed (Appendix A). The purposes of the interview were to determine the content health professionals perceive as necessary in cardiac rehabilitation instructional materials; to review those cardiac rehabilitation materials currently in use by the hospitals; to acquaint the health professional with the proposed project and the investigator; and to begin to develop, on the part of the health care professionals, a sense of participation in the booklet design.

Instructional Booklet

A draft of cardiac rehabilitation instructional materials in print form was developed utilizing word processing technologies. Belland's ISD model was followed to produce the draft. Detailed description of this process follows.

Describe Learner Characteristics. It is the intent of this stage to identify the range of learner characteristics. Learners differ intellectually, emotionally, culturally, psychologically, experientially, and physically. These learner differences are more important to the designer than their similarities. The range of learners on each of these dimensions must be delineated so
that an appropriate range of instructional materials can be designed (Allen, 1975). It is not intended to try to aim for just the middle group of learners but rather to target specific instructional experiences to different learners. This is a critical step in systematic design and one that is frequently omitted by instructional designers.

The characteristics of cardiac patients vary widely. While the presence of certain cardiac risk factors is common among individuals experiencing a myocardial infarction, the absence of these factors does not guarantee an absence of cardiac disease. People in need of cardiac rehabilitation represent every social, cultural, educational, vocational and economic status. Often it is possible to identify similarities of cardiac patients based on locale, because health professionals, hospitals and communities tend to accept and follow certain treatment conventions.

Learner characteristics were identified through the following: health professional interviews, patient interviews, cardiac rehabilitation theory and research, and the experience of the investigator. The similarities in learner characteristics were those associated with the myocardial infarction itself. The most notable difference was the educational level of the patients.
Describe Content. Choosing relevant and motivating content is based on learner characteristics. Selecting content involves assessing a variety of potential content and judging what will best achieve the desired outcomes on the target audience. Because of the knowledge explosion, there is a wide variety of content which can enable the learner to achieve any one objective. Experience with this stage has indicated the designer must include the gatekeepers (people who will purchase and utilize the product) in the content selection process. In order to accomplish this interaction between designer and gatekeeper, a fair amount of diplomacy must be evidenced. Perhaps a reasonable prediction of utilization occurs when the gatekeepers believe they were instrumental in specifying the content.

The hospitals in Franklin County were surveyed for their interest in and need for a cardiac rehabilitation patient education program. There was evidence of some similarity in general topics the health professionals believed should be included in the booklet. However, the manner in which these topics should be managed varied drastically.

Design Objectives and Outcomes. The specific question that must be answered at this stage is--what does one want the learner to be able to do as a result of this
instruction? (Briggs, 1977) The objectives must be specified in terms of the learner and the desired outcome. The cardiac rehabilitation instructional booklet was to be a part of the existing cardiac rehabilitation program in the various hospitals. Therefore, it needed to be consistent with the existing program's objectives. In most cases these objectives are not written. However, whether program objectives are written or understood, most cardiac rehabilitation programs have three general goals:

1. To assist the cardiac rehabilitation patient to return to work and previous activities.
2. To assist the patient and family members to learn about their heart problems, treatment and recovery.
3. To maintain the patient's psychological and social well-being.

The learner who is able to meet the objectives of the booklet was able to:

1. Describe at a basic level the cardiac rehabilitation concepts of: healing, risk factors, energy expenditure, activity progression, effort symptoms, diet restriction, rest periods and exercise.
2. Utilize the material presented in the booklet to make decisions which reflect current concepts of health.
Identify Instructional Media and Instructional Strategy. Various media can be used appropriately with different learners in different settings to affect different learning. Learners can learn from all media (Gagne, 1977; Schramm, 1977; Solomon, 1979), and no one medium is universally superior to all others for all outcomes and learners (Gagne & Briggs, 1979). The designer is expected to review all possibilities of achieving the objectives through varied media or a combination of media. Within any given medium there are various instructional strategies which are possible.

Select Prototype, Form, Content, and Instructional Strategy. The designer at this stage evaluates the alternatives for a particular form, content and strategy.

An effort was made to design the booklet to include the topics deemed important by the health professionals as well as those topics current literature and research indicate are necessary. The printed booklet was chosen as the medium because it was portable; was manageable by the patients with little energy expenditure; could be taken home with the patient and family; allowed alternate sequencing of information to accommodate individual interest; could be referred to as often as the individuals
desired, could accommodate inserts where needed by hospitals; could be used to achieve the objectives at a relatively low cost.

A variety of instructional strategies were incorporated into the booklet design: questioning, sequencing, humor, programmed instruction and reinforcement. Attitude learning, defined as conditions that influence or modify the individual's choices of personal action (Gagne, 1977), are of prime interest in cardiac rehabilitation instructional materials. One means of effecting attitude learning is through human modeling. The design of the illustrations was intended to carry significant messages as well as to simulate a human model. The general strategy considered throughout the booklet was that it was written to emphasize the positive outlook for recovery and progressive return to previous activities. The intent was to maintain a future orientation.

**Produce Prototype.** A cardiac rehabilitation patient education booklet was produced which presented a general overview of cardiac rehabilitation concepts as well as specific guidelines for individual home care. The booklet prototype was designed so that it is useful to a variety of cardiac patients in the various hospitals and community settings.
**Test Prototype—Formative Evaluation.** Formative evaluation is the iterative tryout of the prototype with a representative group of learners. The purpose is to determine to what extent the objectives have been met. The designer tests the prototype on an individual learner, makes immediate alterations in it and proceeds to test on the next individual until learners can move through the material easily and accomplish the objectives. The designer assesses: What difficulties does the learner encounter? What was the attitude of the learner? What was the degree of interest in the material? Were the intended procedures carried out? Were the objectives accomplished?

This stage of design process is important in order to eliminate the additional time and high cost of changing the program based on summative evaluation. The cardiac rehabilitation booklet formative evaluation was completed with a representative group of learners. The prototype was modified with each iteration until three learners were able to proceed through the material without difficulty. A draft of the revised booklet was also reviewed by educators and a recognized expert in the field of cardiac rehabilitation. Following these evaluations and revisions, the booklet was submitted to the various hospitals for review. One section was typeset to give the health professionals an idea of the booklet's appearance in final form.
Questionnaire

A questionnaire comprised of open-ended questions and likert scale questions was developed (Appendix B). It was tested on a group of health professionals and approved by a panel of educators. The purposes of administering the questionnaire included: to determine health professional's overall opinion of the booklet; to determine the educational and experiential background of the participants; to determine individual decision making process required in order to utilize the proposed materials in the hospital; to determine participants perception of scope of change required by the proposed study materials; and to determine participants perception of the relative advantage of the proposed materials. The review of related literature indicated these factors might be of importance in an individual's decision to adopt instructional materials.

DATA COLLECTION

Data were collected utilizing the three instruments developed for this purpose: interview, instructional booklet, and questionnaire. The investigator interviewed each of the participants in the study according to the semi-structured interview schedule. In many cases the participants took the opportunity to question the investigator about general rehabilitation concepts and concerns,
program problems, and comparison of one hospital's program with another. The project was explained during the interview and each health care professional was asked to participate in review of the booklet. All agreed and the review process was explained. Other health professionals were also interviewed upon recommendation from the participants.

The instructional booklet was mailed to the participants. A letter describing the review process (Appendix C) and directions for completing the review (Appendix D) were enclosed. The participants were asked to differentiate those comments and alterations which were absolutely necessary in order to utilize the booklet in their program, from those that were editorial. When the individual health professionals could not give the final approval to use the materials, they were asked to have such hospital officials, consultants, or patients as necessary review the draft and make any changes required to grant that approval. Telephone contact was made with participants in order that they would expect the booklet and to answer any preliminary questions. Follow-up telephone calls and interviews were completed as necessary for clarification and to encourage response. All participants responded.

Following their review of the booklet, the participants were asked to complete the questionnaire. In order
that completion of the questionnaire would be viewed as part of the booklet review, the questionnaire was bound as a part of the booklet. Therefore, the questionnaires were returned with the booklets; all participants completed the questionnaire.

DATA ANALYSIS

The analysis of data resulting from this study reflected the exploratory nature of the inquiry. Rogers and Adhikarya (1979) recommended that one approach to measuring re-invention was to tabulate the number of elements that were similar to or different from a main version of the innovation. They expected that the degree of re-invention was likely to be greater when there was a wider degree of heterogeneity in the organizational problems with which the innovation was matched.

The purposes of the study were to explore the feasibility of producing cardiac rehabilitation instructional materials which were adapted for specific hospitals and to identify personal and institutional variables potentially significant to that process. The data were analyzed so that a basis, from which additional inquiry could emerge, was established. The questions asked by the study provided the framework for the reporting and analysis of data.
The interview and questionnaire data were subjected to content analysis according to the interview and questionnaire schedules. These data are reported in terms of measurements for central tendency (mean) and dispersion (frequency and percentage).

The data from the booklet reviews were also content analyzed for patterns in the type and quantity of entries. The unit of analysis for innovation research should no longer be the innovation or the organization. The most effective analysis treats the innovation in respect to a given organization (Downs & Mohr, 1976).

SUMMARY

This three phased exploratory study provided data on: the cardiac rehabilitation programs in Franklin County, Ohio, the content needed for a patient education booklet, and the issue of adoption of instructional materials which have been adapted to address local concerns. The data obtained through use of three instruments were subjected to content analysis according to the framework provided by the questions asked in the study. These data provide a basis to support further exploration of designing locally produced patient education materials.
CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

This chapter presents the results of the investigation. It contains a description of the characteristics of the nine hospitals comprising the sample. The data are presented according to the research questions which guided the investigation.

The study design included data collection via three different instruments: a semi-structured interview of participants; the instructional booklet review by participants; and a 15 item primarily open ended questionnaire. The health professionals responsible for cardiac rehabilitation in the nine local hospitals were identified, and the interview conducted. A draft of the instructional booklet was produced based on Belland's ISD model. These drafts were then sent to the participants for review accompanied by specific instructions for making adapting revisions. Personal contact was made with participants by telephone to insure clarity of instructions. Following
completion of the adapting revisions, the health professionals were asked to complete the questionnaire. A follow-up interview was scheduled as necessary.

CHARACTERISTICS OF THE SAMPLE

The population consisted of all hospitals in Franklin County where cardiac patients are admitted. The participants in this study were those health professionals responsible for the cardiac rehabilitation program in each hospital. The study sample was drawn from the population of Franklin County hospitals. This sample included the entire population of nine hospitals. Two of the hospitals share one cardiac rehabilitation coordinator, cardiac rehabilitation program, and instructional materials. These two hospitals, therefore, were considered as one which reduced the actual sample to eight. The entire population participated in data collection.

The investigator was aware that all data generated by this study were influenced by the personalities, experience, education, and expertise of the participants as well as that of the investigator. Since it was important to consider these data in light of the hospital and health professional characteristics, there was no attempt to maintain anonymity in data collection. The participants knew that it was necessary for the investigator to know
their identity. However, the data are reported by code letter only, and the participants/hospitals have not been identified by name. A general description of the sample characteristics follows.

1. This is a private, non-teaching hospital of less than 400 beds. There are 12 coronary care unit beds to which myocardial infarction patients may be admitted. Approximately 10 myocardial infarction patients are admitted per month, 97 percent of whom receive cardiac rehabilitation instruction. The in-patient team consists of the physician, registered nurse, dietician, physical therapist, occupational therapist; a social worker is available on a consultation basis. However, instruction is provided by one registered nurse on an individual basis. There is no out-patient program. One registered nurse produced an instructional booklet for use in rehabilitating these cardiac patients. They intended to continue use of this locally produced booklet, but were interested in participating in the study. Other cardiac rehabilitation instructional materials used in this hospital include: American Heart Association pamphlets, drug company flyers, and filmloops.
2. This hospital is a private, teaching institution of over 900 beds. There are 12 coronary care unit beds and approximately 55-60 myocardial infarction patients are admitted per month. Nearly all of these patients receive cardiac rehabilitation instruction. Two registered nurses provide all the instruction in individual as well as group sessions. The cardiac rehabilitation team meets every week to discuss patients' progress. This team includes: a registered nurse, physician, dietician, occupational therapist, physical therapist, pharmacist; a psychologist and social worker are available on a consultation basis. Some patients are recommended to enter the out-patient program which consists of stationary bicycle exercising and informal instruction during exercise. The in-patients receive a series of photocopied instructional materials which when compiled in a folder serves as their individual booklet. Other materials used include: slide/tape programs from the American Heart Association and Trainex. The nurse coordinator was interested in the study but warned of this hospital's extensive approval process and the unique educational level of these patients.

3. This hospital is a public, teaching medical center of over 900 beds. There are 27 coronary care unit beds where approximately 20-25 myocardial infarction patients are admitted per month. All of these patients receive cardiac
rehabilitation instruction. The instruction is shared by a team of health professionals consisting of a registered nurse, physician, occupational therapist, physical therapist, dietician, and social worker. An out-patient conditioning program is available which includes bicycling, walking, running and group instruction. They indicated interest in a revision of the booklet produced by health professionals for patients in this institution. Definite interest in the study was indicated. Additional instructional materials used include: American Heart Association and other pamphlets, a book on type A behavior, a slide/tape program, heart models and charts, and closed circuit television.

4. This is a small, community hospital of less than 250 beds. Approximately 25 myocardial infarction patients are admitted each month to the nine coronary care unit beds. An average of 50-60 percent of these patients receive cardiac rehabilitation instruction. Their in-patient only program utilizes registered nurses for all instruction, however, the dietician and physical therapist may see these patients on a consultation basis. There is no activity, exercise or walking section in this program because it was difficult for all physicians to agree on appropriate information for these patients. They had just produced their own instructional materials, however they
indicated an extensive administrative approval process would be required in order to show these materials to the investigator. A commercial booklet about angina and a commercial flipchart are the only other materials available, and these are utilized only with selected patients. All patients have access to closed circuit television where two cardiac programs can be viewed. An interest in this study was indicated. Since they had recently produced instructional cardiac rehabilitation materials, it was doubtful they would utilize the study booklet at this time.

5. There are approximately 500 beds in this teaching medical center. Twelve beds are allocated to the coronary care unit where an average of 30 myocardial infarction patients are admitted each month. Approximately 75 percent of these patients receive cardiac rehabilitation instruction. There are some cardiologists who insist their patients not receive instruction. The nurse coordinator and other health professionals provide all the instruction on an individual or group basis as is required. The team consists of the coordinator, registered nurses, and dietician. The program is an in-patient educational program only; there is no activity or exercise component. They have developed seven modules which include brief written materials patients can take
home. They have other booklets and pamphlets available, but no other booklets, pamphlets or materials are used regularly. However, they do use Trainex filmstrips for more advanced patients. All patients have access to closed circuit television where two heart related programs are scheduled during the day. They indicated an interest in the study but were unsure of the potential for implementing additional materials and programs because of their unique situation.

6. As a small, private, non-teaching hospital of less than 200 beds, there are approximately 10 myocardial infarction patients admitted per month to this hospital's 4-6 coronary care unit beds. During the initial interview the Director of Education indicated no cardiac rehabilitation program existed, they had no instructional materials, and the myocardial infarction patients received little or no instruction. There were no active plans to initiate a cardiac rehabilitation program at that time, however, an interest in this study was expressed. At the time of the booklet review, the Director of Education stated an interdisciplinary team had been organized and a booklet for use with cardiac rehabilitation patients was written. However, this booklet was not being utilized for patient instruction at that time.
7. This institution is a medium sized teaching hospital. There are over 400 beds, 15 of which are coronary care unit beds. Approximately 25-30 patients with confirmed myocardial infarction are admitted every month, and about 90 percent of them receive instruction. This is an in-patient only program and although activity levels are used while the patient is hospitalized, there is no formal activity program. The team consists of the registered nurse, dietician and pharmacist; a chaplain participates on a consultation basis. They are using photocopied pages of a cardiac rehabilitation booklet which are selected individually for the patients and placed in a folder. A group class is presented once a day. Individual instruction is provided as a follow-up to the classes. They also use heart figures, a commercial booklet on stress, and a commercial slide/tape series. An interest in this study was expressed.

8. These two teaching hospitals have a total of 525 beds. Approximately 20 myocardial infarction patients are admitted to the 12 coronary care unit beds per month. An average of 35-40 percent of these patients receive cardiac rehabilitation instruction. The program is for in-patients; there is no out-patient program. One registered nurse provides all the instruction on a one to one basis in the patients' rooms. The team consists of
the registered nurse, physical therapist, pharmacist and dietician. A commercially produced booklet presently is utilized, but the educational level of this booklet is not always appropriate for this patient population. American Heart Association pamphlets also are used in this program. The cardiac rehabilitation coordinator expressed definite interest in this study.

This sample consisted of eight urban hospitals that vary widely in terms of size, function and facilities. If the total number of hospital beds were divided equally among the eight hospitals, the average number of beds per hospital would be 524. However, the existing range is from 178 to greater than 1000 beds. From within this total number of hospital beds, 104 are coronary care unit beds. This represents an average of 13 coronary care unit beds per hospital. While four of the institutions do have 12 coronary care unit beds, the range is from five to 27. The approximate total of myocardial infarction patients in Franklin County is 210 per month, an average of 26 per hospital. These patients are not evenly distributed over the hospitals however. The range of myocardial infarction patients is from 10 to 60 per month per hospital.

The percentage of patients who receive cardiac rehabilitation instruction varies from zero to 100 percent. An average of 71 percent receive instruction across
the eight hospitals. Most of the institutions indicated only an in-patient cardiac rehabilitation program was available (Table 1). Within those in-patient programs, seven hospitals (88%) had an instructional component, and four hospitals (50%) also had an exercise component to the cardiac rehabilitation program. Only two hospitals (25%) indicated an out-patient program was available. Out-patient programs often focus on patient and group exercise. It is consistent with that trend that only one program claimed scheduled instructional classes as part of the out-patient program.

Hospitals in Franklin County have a variety of instructional materials available for cardiac rehabilitation. Some of the hospitals utilize this variety of materials while others do not. Table 2 summarizes the types of materials utilized. Five hospitals (62%) produced or duplicated materials locally and placed them in folders for individual patients. There was no category of instructional materials utilized by every hospital.

There was little consistency seen in the composition of the hospital cardiac rehabilitation teams (Table 3). One hospital had no active program. Each of the remaining seven hospitals involved a registered nurse in the rehabilitation of myocardial infarction patients. Six of the hospitals (75%) also included a dietician. The other disciplines, physical therapy, medicine, occupational
### TABLE 1

**IN-PATIENT AND OUT-PATIENT CARDIAC REHABILITATION PROGRAMS IN FRANKLIN COUNTY (N=8)**

<table>
<thead>
<tr>
<th></th>
<th>INSTRUCTION</th>
<th>EXERCISE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>IN-PATIENT</td>
<td>7</td>
<td>88</td>
</tr>
<tr>
<td>OUT-PATIENT</td>
<td>1</td>
<td>12</td>
</tr>
</tbody>
</table>

### TABLE 2

**INSTRUCTIONAL MATERIALS UTILIZED FOR CARDIAC REHABILITATION**

<table>
<thead>
<tr>
<th>MATERIALS</th>
<th>HOSPITALS</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locally produced materials placed in folders</td>
<td>5</td>
<td>62</td>
</tr>
<tr>
<td>General pamphlets</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>Closed circuit television</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Heart Association pamphlets</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Slide/tape programs</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Commercially produced booklet</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Anatomic Models and Figures</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Filmstrips/filmloops</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Locally produced booklet</td>
<td>2</td>
<td>25</td>
</tr>
</tbody>
</table>
TABLE 3

HEALTH PROFESSIONALS PARTICIPATING IN CARDIAC REHABILITATION PROGRAMS

<table>
<thead>
<tr>
<th>HEALTH PROFESSIONAL</th>
<th>N</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered Nurse</td>
<td>7</td>
<td>88</td>
</tr>
<tr>
<td>Dietician</td>
<td>6</td>
<td>75</td>
</tr>
<tr>
<td>Physical Therapist</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>Occupational Therapist</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Physician</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Social Worker</td>
<td>1</td>
<td>12</td>
</tr>
</tbody>
</table>

therapy, pharmacy and social service, were members of the cardiac rehabilitation team in less than half of the hospitals.

While five (62%) of the respondents indicated an interest in the potential for using the proposed cardiac rehabilitation booklet, eight respondents (100%) indicated an interest in participating in the study. Three hospitals recently had produced cardiac rehabilitation instructional materials for use with their patients and were not interested in additional materials at that time.
FINDINGS BY QUESTION

Question 1: What is the educational and experiential background of the health professionals who coordinate the cardiac rehabilitation effort in the nine local hospitals?

The educational and experiential backgrounds of the respondents are summarized in Table 4. Most of the respondents (62%) hold the title, Cardiac Rehabilitation Coordinator. The field of cardiac rehabilitation is less than 15 years old, and it is only during the past five years that the title of cardiac rehabilitation coordinator has become common. Whereas the title is common in the urban medical centers, it remains unknown to the smaller, community hospitals.

The education of those people who coordinate the cardiac rehabilitation effort in Franklin County varies from a three year diploma to a Master of Science in Nursing. The majority (75%) have a Bachelor of Science degree. Only 2 (25%) have a Master of Science. The trend in nursing is toward increasing levels of education; this trend is apparent in the specialty positions such as cardiac rehabilitation.

The cardiac rehabilitation experience of the respondents ranged from none to six years. The mean ($X$) is 3.5 years. Total professional experience of these respondents ranged from 2 to 23 years, with a mean equal to 11.7 years.
TABLE 4

DESCRIPTION OF RESPONDENTS ACCORDING TO SELECTED DEMOGRAPHIC VARIABLES (N=8)

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>FREQUENCY</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>POSITION TITLE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac Rehabilitation Coordinator</td>
<td>5</td>
<td>62</td>
</tr>
<tr>
<td>Patient Education Coordinator</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Director of Education</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Unit Coordinator</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>CARDIAC REHABILITATION EXPERIENCE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>less than 1 year</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>1-2 years</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>3-4 years</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>5-6 years</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>TOTAL PROFESSIONAL EXPERIENCE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4 years</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>5-10 years</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>11-15 years</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>more than 15 years</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>EDUCATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Bachelor of Science</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>Master of Science</td>
<td>2</td>
<td>25</td>
</tr>
</tbody>
</table>
Question 2: Do health professionals who coordinate the cardiac rehabilitation effort in nine local hospitals have similar priorities in determining content for instructional materials?

Data in response to this question were collected via interview and through examination of the instructional materials currently utilized in the hospitals. It was necessary to use only interview data for the one respondent who did not release locally produced materials.

The health professionals who coordinate the cardiac rehabilitation effort in Franklin County exhibited some agreement regarding those topics which are important to include in instructional materials (Table 5). The areas of: anatomy and physiology, description of a heart attack, coronary risk factors, diet modifications, and stress were considered to be important sections by 100 percent of the sample. The activity, walking and exercise sections evoke more controversy among respondents. These sections presently are not included in instructional materials from several hospitals, and two hospitals indicated the section should not be included at all. While 75 percent of the sample indicated walking and exercise should be included, the exact content to include is a more polemic issue.

Knowledge about the medication one takes is considered to be imperative in order to maintain health. Most
<table>
<thead>
<tr>
<th>TOPICS</th>
<th>WISH TO INCLUDE</th>
<th>INCLUDED IN PRESENT MATERIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>YES N %</td>
<td>NO N %</td>
</tr>
<tr>
<td>Anatomy &amp; Physiology</td>
<td>8 100</td>
<td>0 0</td>
</tr>
<tr>
<td>Coping &amp; Stress</td>
<td>8 100</td>
<td>0 0</td>
</tr>
<tr>
<td>Coronary Risk Factors</td>
<td>8 100</td>
<td>0 0</td>
</tr>
<tr>
<td>Description of a Heart Attack</td>
<td>8 100</td>
<td>0 0</td>
</tr>
<tr>
<td>Diet Modifications</td>
<td>8 100</td>
<td>0 0</td>
</tr>
<tr>
<td>Daily Activities</td>
<td>7 88</td>
<td>1 12</td>
</tr>
<tr>
<td>Exercise</td>
<td>6 75</td>
<td>2 25</td>
</tr>
<tr>
<td>Walking Program</td>
<td>6 75</td>
<td>2 25</td>
</tr>
<tr>
<td>Complications</td>
<td>4 50</td>
<td>3 38</td>
</tr>
<tr>
<td>Medications</td>
<td>1 12</td>
<td>2 25</td>
</tr>
</tbody>
</table>
hospitals have some mechanism for medication instruction prior to patient discharge. Often patients are given medication sheets to take home with them which describe drug purpose, dose, side-effects and warnings. Most of the hospitals (75%) do not include these materials with the cardiac rehabilitation instructional materials for three reasons: 1) all patients do not need to know about all possible medications, 2) most medications are used for a variety of patients, not just those with myocardial infarction, 3) there is an unnecessary cost of duplicating pages that are not appropriate for all patients. One respondent would like to continue presenting a variety of medications in the cardiac rehabilitation booklet. Only two hospitals specifically indicated medications should not be included in a booklet. It has become accepted practice to supplement cardiac rehabilitation instructional materials with medication sheets appropriate to the individual.

There are a few areas in cardiac rehabilitation in which health professionals can all agree. Because this field is relatively young, many theories have yet to be tested on a longitudinal basis. The controversy escalates even further when one attempts to delineate those things that should be included in patient instruction. Table 5 describes a high level of agreement regarding desirable instructional content. However, only broad concepts were
considered. Therefore, these data indicate health professionals who coordinate the cardiac rehabilitation effort in Franklin County have similar priorities in determining general content for instructional materials.

Question 3: What are the processes through which the decision to print the adapted materials is made?

The respondents were asked to identify by questionnaire those individuals in addition to themselves who were involved in the approval process for cardiac rehabilitation instructional materials. Some of these people eluded to their individual approval process also during the initial interview. Those health professionals who actively participate in the decision making process are likely to develop an increased sense of ownership in the instructional materials approved. Identification of the individuals who make the final decision about adopting instructional materials suggests the autonomy the respondents feel in their positions. Four of the respondents indicated they were responsible for final approval. Two of these also included others in the final decision.

Table 6 summarizes the various hospital personnel who were identified as participants in the approval process. In order to describe the approval process in every hospital, the eight hospitals are listed A through H. This listing, however, does not correspond in any way to the
<table>
<thead>
<tr>
<th>HOSPITAL</th>
<th>PERSONNEL INVOLVED IN APPROVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Team members (PT, Dietary, Pharmacy)</td>
</tr>
<tr>
<td>B</td>
<td>Nursing Director&lt;br&gt;Patient Education Committee&lt;br&gt;Physicians</td>
</tr>
<tr>
<td>C</td>
<td>Medical Executive Committee</td>
</tr>
<tr>
<td>D</td>
<td>Patient Education Coordinator&lt;br&gt;Nursing Service Department</td>
</tr>
<tr>
<td>E</td>
<td>Physicians&lt;br&gt;Nurses&lt;br&gt;Administration</td>
</tr>
<tr>
<td>F</td>
<td>Patient Education Coordinator&lt;br&gt;Physician Coordinator for Rehabilitation</td>
</tr>
<tr>
<td>G</td>
<td>Team Members&lt;br&gt;Medical Director for Cardiac Rehabilitation</td>
</tr>
<tr>
<td>H</td>
<td>Physicians&lt;br&gt;Nurses&lt;br&gt;Staff Members</td>
</tr>
</tbody>
</table>
previous hospital listing. No two hospitals follow the same process. There is some similarity among the hospitals, however. Table 7 lists the composite of health professionals involved in approval of cardiac rehabilitation instructional materials at the eight local hospitals. Six hospitals indicated physicians or a medical committee were involved in the approval process, while three hospitals stated physicians made the final decision. Team members, a nursing director, and patient education personnel, were each part of the approval process in three hospitals. One individual alone gives the final approval for instructional materials in four hospitals. The other four share the final approval responsibility with two or three health professionals. No respondent indicated total autonomy in approving instructional materials for cardiac rehabilitation, however, four of the eight stated responsibility for final approval of cardiac rehabilitation materials.

Question 4: What is the health professionals' perception of the scope of change proposed between the instructional materials produced in this study and those currently in use?

The scope of change perceived by individuals affects implementation outcomes (Berman & McLaughlin, 1976). The respondents in the participating hospitals were asked four questions to determine their perception of the scope of
TABLE 7

COMPOSITE OF INDIVIDUALS OR GROUPS WHO APPROVE CARDIAC REHABILITATION INSTRUCTIONAL MATERIALS, N=8

<table>
<thead>
<tr>
<th>HEALTH PROFESSIONAL</th>
<th>N</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians/Medical Committee</td>
<td>6</td>
<td>75</td>
</tr>
<tr>
<td>Nursing Director</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Patient Education Coordinator/Committee</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Team Members</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>Nurses</td>
<td>2</td>
<td>25</td>
</tr>
</tbody>
</table>

change proposed by the study booklet. They were asked to describe the similarities and differences between the study booklet and the instructional materials they use currently. This comparison is delineated in Table 8. The only similarity identified was content, however it was identified by all the respondents. The differences identified fall into two major sections: 1) the study booklet was more comprehensive including an increase in specific explanations of most topics; 2) the booklet format and sequence was different from currently utilized instructional materials.
## TABLE 8

**COMPARISON OF THE STUDY BOOKLET TO THE INSTRUCTIONAL MATERIALS CURRENTLY IN USE**

<table>
<thead>
<tr>
<th>HOSPITAL</th>
<th>SIMILARITIES</th>
<th>DIFFERENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Major issues discussed.</td>
<td>More comprehensive in all areas. How the heart works section separate from rehabilitation section.</td>
</tr>
<tr>
<td>C</td>
<td>Content</td>
<td>Present materials are sequenced differently and include forms placed on patient chart.</td>
</tr>
<tr>
<td>D</td>
<td>Content</td>
<td>Greater length.</td>
</tr>
<tr>
<td>E</td>
<td>Content</td>
<td>More specific content about activities and menus.</td>
</tr>
<tr>
<td>F</td>
<td>Content</td>
<td>Organization. Better print and illustrations.</td>
</tr>
<tr>
<td>G</td>
<td>Content</td>
<td>Format and sequence.</td>
</tr>
<tr>
<td>H</td>
<td>Content</td>
<td>Longer. No medication section. Current materials allow for more individualized exercise program.</td>
</tr>
</tbody>
</table>
The other two questions involved rating the study booklet on a five point scale (Table 9). When asked to rate the booklet from very similar (1) to completely different (5) all but one respondent chose (1) or (2). The mean was equal to 1.88, indicating most individuals (88%) perceived the study booklet was similar to the cardiac rehabilitation instructional materials they used. Most of the respondents indicated the study booklet could be incorporated easily into their existing programs, \( \bar{X} = 2.25 \). Those who stated the study booklet would be difficult to implement, also indicated they preferred to use their own materials.

In general, the responses indicate most health professionals perceive the scope of change between the study booklet and their currently utilized materials to be relatively minor. Although differences were identified, the similarities were judged to be stronger; most respondents could incorporate the study booklet into their programs with ease.

Question 5: What is the health professional's perception of the relative advantage of the proposed instructional materials?

Relative advantage, the degree to which an individual perceives an innovation to be better than previous ideas, is one characteristic of innovations that contributes to the rate of adoption (Rogers & Shoemaker, 1971). Data in
### TABLE 9

**DESCRIPTION OF THE SCOPE OF CHANGE PERCEIVED BY CARDIAC REHABILITATION HEALTH PROFESSIONALS (N=8)**

Compared to patient education materials for cardiac rehabilitation currently in use, the Road to Recovery booklet can be incorporated into your rehabilitation program:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
<td>1</td>
<td>12</td>
<td>1</td>
</tr>
</tbody>
</table>

$x=2.25$

Compared to patient education materials for cardiac rehabilitation currently in use, the Road to Recovery booklet is:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>3</td>
<td>38</td>
<td>4</td>
<td>50</td>
<td>0</td>
</tr>
</tbody>
</table>

$x=1.88$

response to this question were collected via questionnaire. Respondents were asked to list the strengths and weaknesses of the study booklet. These comments are summarized in Table 10.

The features of the booklet identified by the respondents as strengths and weaknesses can be classified in three sections: content, organization, and clarity. The
<table>
<thead>
<tr>
<th>HOSPITAL</th>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Depth of information—simply stated. Organization (what to do separate from what happened)</td>
<td>Only 1 medication described.</td>
</tr>
<tr>
<td>C</td>
<td>Programming can be individualized</td>
<td>No visual teaching aids.</td>
</tr>
<tr>
<td>E</td>
<td>Easily incorporated in present program. Clearly written. Good booklet overall.</td>
<td>None</td>
</tr>
<tr>
<td>F</td>
<td>Explanations brief, simple. Covers material in a way patients would prioritize it.</td>
<td>Diet. Some activities strenuous. Some pictures could discourage activities.</td>
</tr>
<tr>
<td>H</td>
<td>Coping section. Clearly written. Good illustrations.</td>
<td>Have to jump from page to page at times. CCU section at back. Doesn't allow for individualized exercise program.</td>
</tr>
</tbody>
</table>
range of responses varied from one to five per individual. Twenty-three strengths were listed in regard to the booklet in general. Ten comments related to content as a strength; four comments indicated the booklet organization was a strength; clarity was identified in nine statements (Table 11). There was agreement that the overall content, organization and clarity were strengths. Features identified as strengths by some respondents were listed as weaknesses by others. The weaknesses refer to specific

| TABLE 11 |
|---|---|
| **SUMMARY OF STRENGTHS AND WEAKNESSES OF THE STUDY BOOKLET** |  |
|  | **N** | **PERCENT** |
| **STRENGTHS (N=23)** |  |  |
| CONTENT | 10 | 44 |
| ORGANIZATION | 4 | 17 |
| CLARITY | 9 | 39 |
| **WEAKNESSES (N=17)** |  |  |
| CONTENT | 10 | 59 |
| ORGANIZATION | 5 | 29 |
| CLARITY | 2 | 12 |
concerns within categories of content, organization and clarity, rather than the booklet in general. No weakness was identified by more than one respondent. A total of 17 weaknesses were listed. Ten comments (59%) referred to specific content; five (29%) indicated organization was a weakness; clarity was identified in two comments (12%).

Also, the respondents were asked to list the advantages and disadvantages to using the study booklet over that which they currently used (Table 12). The advantages listed generally refer to the strengths of the booklet. The disadvantages include: cost; activity and exercise programs; and staff investment in present materials. Follow-up interviews clarified misconceptions the respondents held about the cost of producing the study booklet.

A series of four questions asked respondents to rate relative advantage aspects of the study booklet on a five point scale. These questions are summarized in Table 13. Most respondents indicated the booklet was clearly written ($\bar{X}=2$). When asked to rate the booklet between being an improvement (1) and being less effective (5) than that which they currently were using, the mean equalled 2.62, indicating respondents generally believed the study booklet would be only some improvement over present materials. Three respondents indicated a predetermined decision to continue to use present materials regardless
TABLE 12

COMPARISON OF THE STUDY BOOKLET TO MATERIALS CURRENTLY IN USE

<table>
<thead>
<tr>
<th>HOSPITAL</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent guidelines. Detailed but not difficult. Booklet includes things that normally must be added to our materials. Well illustrated.</td>
<td>Walking program</td>
</tr>
<tr>
<td>B</td>
<td>More comprehensive information.</td>
<td>Less visually appealing</td>
</tr>
<tr>
<td>C</td>
<td>None</td>
<td>Team members have a feeling of ownership and participation in the program they just developed.</td>
</tr>
<tr>
<td>D</td>
<td>Activities section.</td>
<td>Expensive. Too sophisticated.</td>
</tr>
<tr>
<td>E</td>
<td>None</td>
<td>Have spent alot of time revising own booklet and prefer to use it.</td>
</tr>
<tr>
<td>G</td>
<td>Eliminate time spent duplicating and collating present materials.</td>
<td>Cost.</td>
</tr>
<tr>
<td>H</td>
<td>Section on diet and feelings more complete.</td>
<td>Staff is familiar with present booklet.</td>
</tr>
</tbody>
</table>
### TABLE 13

**DESCRIPTION OF THE RELATIVE ADVANTAGE OF UTILIZING THE STUDY BOOKLET**

Compared to patient education materials for cardiac rehabilitation currently in use, the Road to Recovery booklet is:

<table>
<thead>
<tr>
<th></th>
<th>Clearly written</th>
<th>Confusing</th>
</tr>
</thead>
<tbody>
<tr>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>4</td>
</tr>
<tr>
<td>50</td>
<td>25</td>
<td>0</td>
</tr>
</tbody>
</table>

$\bar{X}=2.0$

An effort was made to provide you the opportunity to participate in the planning of a cardiac rehabilitation booklet for patient education. In view of the time you invested, the Road to Recovery booklet:

<table>
<thead>
<tr>
<th></th>
<th>An improvement</th>
<th>Less effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>3</td>
<td>38</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>12</td>
</tr>
</tbody>
</table>

$\bar{X}=2.62$

To what degree does the Road to Recovery booklet accommodate the rehabilitation ideas you expressed during the initial interview?

<table>
<thead>
<tr>
<th></th>
<th>Completely</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>3</td>
<td>38</td>
<td>5</td>
</tr>
<tr>
<td>62</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

$\bar{X}=1.62$
of the evaluation of the study booklet. When these three responses were removed from the sample, the mean equalled 2.0.

One potential advantage to the health professionals involved in cardiac rehabilitation is the time and effort expended in relation to the product. When asked to consider, in terms of respondent time investment, whether the booklet exceeded expectations (1) or was a disappointment (5), most respondents chose (2), ($\bar{X}=2.25$), indicating the booklet was somewhat more than respondents expected. A related question was intended to identify health professionals' perceptions of whether the ideas they expressed in the initial interview were taken into consideration completely (1) or not at all (5). The respondents indicated their expressed ideas were accommodated almost completely ($\bar{X}=1.62$).

In general, both relative advantages and relative disadvantages to utilizing the study booklet were identified. Most respondents indicated a greater degree of relative advantage. However, those individuals who had decided previously to continue utilizing present materials described little advantage in using the study booklet.
Question 6: What features of cardiac rehabilitation instructional materials would be altered by local health professionals as they attempt to make those materials responsive to the needs of the patients in their care?

A draft in field testing format was given to the health professionals for critique. They were asked to make alterations necessary in order to use the materials for their patients (Appendix D). If these individual health professionals could not give the final approval to print the materials, they were asked to have such hospital officials, consultants, or patients as necessary review the draft and make any changes required to grant that approval.

The booklet review was analyzed according to the predetermined categories of degree, type and importance of the entries. The criteria by which each entry was evaluated are summarized below.

DEGREE

MINOR— one word to one sentence altered
MODERATE— more than one sentence, but less than one paragraph altered
MAJOR— more than one paragraph altered
TYPE

STYLE—editorial suggestions
   elaborating present content
   changing words
   adding or deleting words that do not change
   the meaning
   typographical errors
   sentence structure changes
   illustration changes
   adding page references

CONTENT—adding new information
   change in information other than style
   illustration changes when message is
   incorrect

FORMAT—alter structure of sections
   change instructional strategy used
   move content to different section

GENERAL COMMENTS—comments related to style, content,
   format, or quality that do not require any alteration
IMPORTANCE

REQUIRED— those entries listed in RED ink (required for use in hospitals)

OPTIONAL— those entries listed in pencil. (Suggested, but not required in order for the booklet to be utilized)

Table 14 summarizes the occurrence of required and optional entries according to the seven major sections of the booklet. The frequencies are indicated by respondents who made any entry in that section. Most respondents (75%) listed no required changes in every section. One section, Available Resources, had no required changes by any respondent. There was little consistency in the occurrence of respondents' optional comments. The section in which most respondents (75%) indicated optional comments was How the Heart Works. Only one respondent indicated optional comments related to the Available Resources section.

Entries according to hospitals are briefly summarized in Table 15. Three respondents preferred to utilize the instructional materials produced in their hospital regardless of the evaluation of the study booklet; two of these individuals provided no entries throughout the booklet. Therefore, the following analysis is based on N=6.
TABLE 14

OCCURRENCE OF RESPONDENTS' REQUIRED AND OPTIONAL ENTRIES ACCORDING TO BOOKLET SECTIONS

<table>
<thead>
<tr>
<th>SECTION</th>
<th>REQUIRED</th>
<th></th>
<th></th>
<th>OPTIONAL</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>YES %</td>
<td>NO %</td>
<td>YES %</td>
<td>NO %</td>
<td>YES %</td>
<td>NO %</td>
</tr>
<tr>
<td>RECOVERY</td>
<td>2</td>
<td>25</td>
<td>6</td>
<td>75</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>GENERAL GUIDELINES</td>
<td>2</td>
<td>25</td>
<td>6</td>
<td>75</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>DIET</td>
<td>2</td>
<td>25</td>
<td>6</td>
<td>75</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>ACTIVITIES</td>
<td>2</td>
<td>25</td>
<td>6</td>
<td>75</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>HOW THE HEART WORKS</td>
<td>2</td>
<td>25</td>
<td>6</td>
<td>75</td>
<td>6</td>
<td>75</td>
</tr>
<tr>
<td>RISK OF CORONARY ARTERY DISEASE</td>
<td>2</td>
<td>25</td>
<td>6</td>
<td>75</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>AVAILABLE RESOURCES</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>100</td>
<td>1</td>
<td>12</td>
</tr>
</tbody>
</table>
### TABLE 15
GENERAL SUMMARY OF BOOKLET ENTRIES ACCORDING TO HOSPITAL RESPONDENTS N=8

<table>
<thead>
<tr>
<th>HOSPITAL</th>
<th>SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>This respondent accepted the booklet in its present form. There were very few changes indicated. The changes were of the style and content type and all were optional. These suggestions fell in only two sections of the booklet.</td>
</tr>
<tr>
<td>B</td>
<td>A few comments were made by this respondent who intends to utilize the booklet in this hospital. The comments were dispersed throughout the sections. They were mostly style and format in nature. Two comments related to elaborating on present content.</td>
</tr>
<tr>
<td>C</td>
<td>No entries were made by this respondent. The hospital intends to use materials recently produced there.</td>
</tr>
<tr>
<td>D</td>
<td>Only two minor changes were indicated, one in style and one in content. This respondent believed the cost would prohibit the hospital from utilizing the booklet. When this misconception was clarified, that decision was altered. However, further evaluation will be required before final approval is given.</td>
</tr>
<tr>
<td>E</td>
<td>No entries were made by this respondent. The hospital intends to use materials recently produced there.</td>
</tr>
<tr>
<td>F</td>
<td>This respondent listed a variety of changes in every section. Most of the changes were optional and minor. Those that were required in order to utilize the booklet in this hospital fell mostly in the Activity section. This respondent accepted the booklet with revisions.</td>
</tr>
</tbody>
</table>
TABLE 15 (continued)

G This respondent made a variety of style changes which were in the optional category. The content changes that were required fell primarily in the Activity section. Further evaluation of changes was necessary before approval could be given.

H A few comments throughout the booklet were made by this respondent. They were primarily of the general comment type. This respondent will continue to use the booklet produced at that hospital.

Respondents' style, content, format and general comments entries were summarized within each booklet section according to whether the overall suggestions represented minor, moderate or major changes. Four respondents indicated no changes were required. As a result, all the required entries were offered by two respondents. These two respondents represented the largest hospitals and the most established cardiac rehabilitation programs. Both hospitals are teaching institutions.

Content analysis is best accomplished by attention to occurrence of respondents' comments (Holsti, 1968). It allows the investigator to consider the number of respondents who indicate a response rather than simply the frequency with which a single response is given. The composite of frequency and substance of the entries was evaluated as to the requirements of minor, moderate or
major alterations. Actual frequencies alone were not tallied. Such an attempt at quantification with a small sample and infrequently occurring entries would result in unreliable data (Kerlinger, 1973).

There was little, if any, overlap in the nature of the entries. While one topic received a comment of excellent by one respondent, another listed required entries. Table 16 outlines the respondents' required entries according to type and section.

The Recovery section included no entries in the style or format category. There were content suggestions classified as minor, and the overall number of entries was minimal. In order to give respondents a clear image of the booklet in final form, the first section including Recovery was finalized. The page layout, illustration and typesetting appeared as they would in final form. The entries in the General Guidelines, How the Heart Works, and Risk of Coronary Artery Disease sections were more frequent. However, these entries were primarily minor style suggestions. Two sections, Diet and Activities, involved moderate or major entries of the style and content type.

Diet is a poorly understood, controversial aspect of myocardial infarction treatment and prevention. Research upon which prescriptive diets can be based is sorely needed yet difficult to design. However, the dietician's


TABLE 16

<table>
<thead>
<tr>
<th>SECTION</th>
<th>STYLE</th>
<th>CONTENT</th>
<th>FORMAT</th>
<th>GENERAL COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A B C</td>
<td>A B C</td>
<td>A B C</td>
<td></td>
</tr>
<tr>
<td>Recovery</td>
<td>0 0 0</td>
<td>2 0 0</td>
<td>0 0 0</td>
<td>1</td>
</tr>
<tr>
<td>General Guidelines</td>
<td>2 0 0</td>
<td>1 0 0</td>
<td>0 0 0</td>
<td>1</td>
</tr>
<tr>
<td>Diet</td>
<td>0 0 1</td>
<td>0 2 0</td>
<td>0 0 0</td>
<td>0</td>
</tr>
<tr>
<td>Activities</td>
<td>2 0 0</td>
<td>0 1 1</td>
<td>1 0 0</td>
<td>0</td>
</tr>
<tr>
<td>How the Heart Works</td>
<td>2 0 0</td>
<td>1 0 0</td>
<td>0 0 0</td>
<td>0</td>
</tr>
<tr>
<td>Risk of Coronary Artery Disease</td>
<td>2 0 0</td>
<td>1 0 0</td>
<td>1 0 0</td>
<td>0</td>
</tr>
<tr>
<td>Available Resources</td>
<td>0 0 0</td>
<td>0 0 0</td>
<td>0 0 0</td>
<td>0</td>
</tr>
</tbody>
</table>

A = minor
B = moderate
C = major

contribution to the health care team has been increased by a public interest in healthy diets.

The essence of the diet content was not altered. One respondent offered suggested alterations that involved primarily the descriptive sections. Although references to the fact that the dietician would assist the patient
with individual diet modifications were included in the diet section, similar statements were added by this respondent. The other respondent concentrated on additions and deletions to the food lists. Meal plans which incorporated the major aspects of cardiac diet modification were included in the booklet to give patients an example of integrated menus. While some dieticians questioned the utility of this strategy, there were no required or optional entries listed in this section.

The other section which precipitated moderate or major entries was Activities. Progression of activities, and the amount and type of exercise allowed or encouraged following an acute myocardial infarction finds little consensus among health professionals in this field. As recently as ten years ago, common practice was to insist on complete and prolonged bed rest following myocardial infarction. The trend has changed drastically since that time. However, there is only a modicum of research upon which to base activity and exercise protocols, leaving this area subject to major controversy. The style entries were minor and infrequent. All the entries classified as moderate to major were in the content category. Most entries were in the form of additions or deletions which would bring the study booklet into exact conformity with the respondents' existing programs.
The entries labelled Optional in every section were mostly minor and occurred in the style category. A few content, format and general comments optional entries also were listed. Optional entries tended to be distributed throughout the seven sections of the booklet.

**DISCUSSION OF THE FINDINGS**

The findings of this exploratory study suggest that it is possible to produce cardiac rehabilitation instructional materials that are adapted to the concerns of local hospitals. The participants demonstrated considerable agreement as to the general content that these materials should address. The advantage of using instructional design models is acknowledged in school settings. However, little information is available regarding their use in hospital systems. This study indicates a flexible ISD model (Belland, 1981) can be used in a hospital system to produce cardiac rehabilitation instructional materials, a conclusion consistent with the studies involving school systems.

Innovation studies (Rogers & Shoemaker, 1971; Berman & McLaughlin, 1975, 1978, 1980) conclude that there are characteristics of innovations that can be identified. Relative advantage and scope of change between present conditions and the innovation are two characteristics that help explain the rate of adoption of innovations. When
asked to rate the relative advantage and scope of change, all the responses were similar, yet not all respondents accepted the innovation. It is not possible to conclude from this study the effect of scope of change and relative advantage on hospital related innovations. The factors of education, experience, autonomy, integration into the social system, and complexity of the organization have been identified as important to innovation adoption (Becker, 1970; Corwin, 1975; Counte, 1973; Havelock, 1969; Rogers & Shoemaker, 1971; Watson, 1969). The findings of this study present initial evidence to support those ideas.

The literature suggests that people who participate in the process of innovation respond more favorably to the innovation (Berman & McLaughlin, 1978; Fullet & Pomfret, 1977; Gray & Myers, 1978; Lawrence, 1981; Mohr, 1982). All participants were included in the planning and implementing of this innovation to some degree, and some became more involved than others. The study suggests a method to test the idea that those people who are most involved in an innovation will exhibit a greater sense of ownership in the products. The study also provides a basis upon which to test whether those people who participate in an innovation will utilize the products to a greater extent than those who are not involved. The literature suggests this potentially is a reason to produce materials locally.
Local production of instructional materials is beneficial to both the teacher and the learner (Belland, 1976; Bretz, 1971; Faris, Moldstad & Frye, 1963; Hunger, 1972; Larson, 1949; Schmidt, 1970; Smellie, 1978). Many hospitals in this study were using cardiac rehabilitation instructional materials that if not produced locally were at least adapted to meet local concerns. The findings imply that a flexible ISD model together with word processing technologies can be used to produce locally adapted instructional materials. Concomitantly, these findings also lend support to the idea that the Not Invented Here syndrome operates in hospital systems. Participation in the design of instructional systems and local production or adaptation of materials may provide a means to reduce the NIH syndrome, ensuring learner access to quality instructional materials. These findings provide a foundation from which the issue of utilization of these materials can be studied.

The two respondents who offered the only required adaptations represented the largest hospitals with the most established cardiac rehabilitation programs. In addition, these two coordinators were the most experienced in the rehabilitation of cardiac patients. The adaptations did not incorporate the full capability of present word processing technology. However, all adaptations indicated by the respondents could be accommodated easily
by word processing technology, lending support to the idea that word processing technology can be used to produce cardiac rehabilitation instructional materials that are adapted to consider local needs.

SUMMARY

Three instruments were used to collect data to address the questions posed by this study. These instruments include: a semi-structured interview of participating hospitals' personnel responsible for cardiac rehabilitation; a cardiac rehabilitation instructional booklet reviewed by cardiac rehabilitation health professionals; a questionnaire completed by health professionals following their review of the instructional booklet. The study sample included the entire population of nine hospitals in Franklin County. The average size of the hospitals was 524 beds with 13 coronary care unit beds. There are approximately 210 patients admitted to Franklin County hospitals with acute myocardial infarctions each month.

The typical individual responsible for cardiac rehabilitation in these hospitals is a registered nurse with the title of Cardiac Rehabilitation Coordinator, who has a Bachelor of Science degree, 3.5 years experience in the rehabilitation of cardiac patients, and a total of 11.7 years professional experience. There is a fairly
high degree of agreement among health professionals in regard to the general topics which should be included in a cardiac rehabilitation instructional booklet. A variety of health professionals are involved in the approval process required in order to utilize cardiac rehabilitation instructional materials in these Franklin County hospitals. A standard approval process does not exist, although there is some similarity among hospitals as to those health professionals involved.

The responses indicated most health professionals perceived the scope of change between the study booklet and their currently utilized materials was relatively minor. Respondents answered positively questions designed to address the issue of perceived relative advantage.

Content analysis of the alterations respondents required in order to utilize the booklet in their institutions yielded widely variable results. Most listed few if any entries. Respondents in two hospitals offered suggestions in most sections. Most entries were classified as minor style suggestions throughout the booklet. The content entries designated moderate to major were in the Activities and Diet sections of the booklet.
CHAPTER V

SUMMARY AND IMPLICATIONS

Information upon which to base instructional decisions for the rehabilitation of myocardial infarction patients is scarce. Individualization that accommodates each person's or group's need to know is a complex issue beyond the expertise of most health professionals. In addition, the time and cost required, make one to one tutorial instruction not feasible in the current health care setting. Health professionals must rely on effective instructional systems to provide quality cardiac rehabilitation. While there is little evidence to indicate curriculum excellence is related to locally produced materials, there is evidence to suggest locally produced instructional materials are more specific to local conditions and are better utilized than commercial materials. Effective educational technologies are those which are adapted to local conditions.
SUMMARY

The purposes of this study were to explore the feasibility of using word processing technology to produce cardiac rehabilitation instructional materials which are adapted for specific hospitals, and to identify some personal and institutional variables influencing that process. These results can be used to assist in instructional design decisions necessary to produce efficient, cost effective, patient education materials. The study provides a basis for additional inquiry related to the institutional benefits of adapted instructional materials, rate of adoption of adapted materials, and ultimately the efficacy of adapted instructional materials in predicting healthy behavior.

The study was designed to be conducted in three phases. Phase I involved identifying the health professionals responsible for cardiac rehabilitation in the nine Franklin County hospitals and conducting semi-structured individual interviews. During Phase II, the cardiac rehabilitation instructional booklet was produced based on data collected in Phase I, relevant theory and research and the experience of the investigator. The completed study booklet and questionnaire were sent to the participants for review during Phase III. Analysis and report of the data completed Phase III.
The sample consisted of eight urban hospitals that vary widely in terms of size, function and facilities. The total number of hospital beds was not divided equally among the eight hospitals; the average number of coronary care unit beds is 13. There are approximately 210 individuals experiencing an acute myocardial infarction in Franklin County per month. An average of 71 percent of these patients receive some type of cardiac rehabilitation instruction. Most of the cardiac rehabilitation in this locale takes place in in-patient hospital programs. While the type and extent of instructional materials varied from one hospital to another, 62 percent of them produced or duplicated at least some material locally.

Several research questions guided this study. The data were collected, analyzed and reported according to these questions.

QUESTION 1: WHAT IS THE EDUCATIONAL AND EXPERIENTIAL BACKGROUND OF THE HEALTH PROFESSIONALS WHO COORDINATE THE CARDIAC REHABILITATION EFFORT IN THE NINE LOCAL HOSPITALS?

Most (75%) of the individuals who coordinate the cardiac rehabilitation programs in Franklin County have a Bachelor of Science degree. Most of the respondents (62%) hold the title of Cardiac Rehabilitation Coordinator. The average experience in cardiac rehabilitation is 3.5 years, and the average total professional experience of the respondents is nearly 12 years.
QUESTION 2: DO HEALTH PROFESSIONALS WHO COORDINATE THE CARDIAC REHABILITATION EFFORT IN NINE LOCAL HOSPITALS HAVE SIMILAR PRIORITIES IN DETERMINING CONTENT FOR INSTRUCTIONAL MATERIALS?

The health professionals who coordinate the cardiac rehabilitation effort in Franklin County exhibited some agreement regarding those topics which are important to include in instructional materials. The areas of: anatomy and physiology, description of a heart attack, coronary risk factors, diet modifications, and stress were considered to be important sections by 100 percent of the sample.

QUESTION 3: WHAT ARE THE PROCESSES THROUGH WHICH THE DECISION TO PRINT THE ADAPTED MATERIALS IS MADE?

There is diversity among the hospitals in Franklin County as to the process followed to approve cardiac rehabilitation instructional materials for patient use. The professionals and/or groups involved in this approval include: cardiac rehabilitation coordinator, team members, nursing director/administration, patient education coordinator/committee, physician/medical committees. In some cases final approval is given by one individual and in others it requires a group decision.
QUESTION 4: WHAT IS THE HEALTH PROFESSIONALS' PERCEPTION OF THE SCOPE OF CHANGE PROPOSED BETWEEN THE INSTRUCTIONAL MATERIALS PRODUCED IN THIS STUDY AND THOSE CURRENTLY IN USE?

The respondents were asked to describe similarities and differences, and to rate selected features related to perceptions of scope of change. Content was the only similarity identified, and it was mentioned by all the respondents. The differences identified fell in two categories: 1) the study booklet was more comprehensive including an increase in specific explanations of most topics; 2) the booklet format and sequence was different from currently utilized instructional materials. Most respondents perceived the booklet was similar to the cardiac rehabilitation instructional materials currently in use and believed the study booklet could be incorporated easily into their existing programs.

QUESTION 5: WHAT IS THE HEALTH PROFESSIONAL'S PERCEPTION OF THE RELATIVE ADVANTAGE OF THE PROPOSED INSTRUCTIONAL MATERIALS?

The strengths and weaknesses were classified into three sections: content, organization and clarity. The strengths addressed these issues in terms of the booklet as a whole. Weaknesses refer to specific concerns within categories of content, organization and clarity rather than the booklet in general. When asked to list advantages and disadvantages to the study booklet, the
advantages listed referred generally to strengths of the booklet and the disadvantages included cost, activity exercise programs, and staff investment in present materials.

Respondents were asked to rate on a five point scale factors believed to represent their perception of relative advantage. They indicated the booklet was clearly written and somewhat more effective than currently used materials. Respondents also indicated their ideas were accommodated by the booklet and it exceeded their expectations. These responses indicated most health professionals who coordinate cardiac rehabilitation programs in Franklin County perceived at least some advantage to using the study booklet over that which currently was used.

**QUESTION 6: WHAT FEATURES OF CARDIAC REHABILITATION INSTRUCTIONAL MATERIALS WOULD BE ALTERED BY LOCAL HEALTH PROFESSIONALS AS THEY ATTEMPT TO MAKE THOSE MATERIALS RESPONSIVE TO THE NEEDS OF THE PATIENTS IN THEIR CARE?**

The booklet review was content analyzed according to predetermined categories of degree, type and importance of entries. Most respondents (75%) listed no changes that were required in order for the booklet to be utilized. Those entries that were listed as required were concentrated in the Activities and Diet sections. The most frequent entries were optional and of the minor style type.
IMPLICATIONS

Patient education and cardiac rehabilitation are relatively recent occurrences in health care systems, and little research exists upon which to base the design of instructional materials for health education. There is a need for research and theory which provides a broad foundation for decisions related to cardiac rehabilitation instruction. This study proposed to explore the feasibility of using word processing technologies in adapting instructional materials for the rehabilitation of cardiac patients in nine local hospitals as well as personal and institutional variables which potentially influence that process.

Word Processing Technology

Use of word processing technology to develop instructional materials is untested particularly in the area of cardiac rehabilitation patient education. Word processing technology makes it possible to alter certain aspects of instructional materials in order to accommodate individual differences. Health professionals tend to believe there are factors unique to their staff, hospital, locale, or patient population which make commercially prepared materials ineffective. The basis of this belief may be in fact or may be in a perception of participation
or ownership related to the setting. Can word processing technology be utilized to accommodate this belief?

Instructional materials which are typewritten and duplicated are adapted most easily using word processing technologies. This method allows words to be altered; sections added, deleted or reordered; and identifying features included such as the name of the hospital. These alterations can be made at a relatively low cost. Instructional materials which are intended to be typeset can also utilize word processing technology for individualization, but the additional typesetting and page layout required significantly increases cost.

Most of the changes suggested by respondents in this study can be accommodated easily by utilization of word processing technology. The only change that can not be so accommodated is that which involves alterations in illustrations. The majority of the hospitals had ready access to duplicating facilities and therefore can reproduce their adapted versions at a relatively low cost. The result of such an innovation is that hospitals, staff and patients have access to instructional materials which are designed specifically for their needs. Related research would predict a subsequent increase in utilization.

An alternate possibility for instructional designers of patient education materials is to capitalize on the power a sense of participation and ownership can have in
increasing utilization. The initial interview where health professionals were asked about their unique program features plus the opportunity to review and alter the booklet likely had at least some impact on the participants' sense of ownership in the project. While no respondent indicated total autonomy in the approval process, each one was involved at least to a degree. This involvement in decision making also contributes to the respondents' sense of ownership. It may be possible to attend to an individual's sense of ownership in such detail as to make the need for adapting through use of word processing technology unnecessary.

Utilization

Two factors related to innovation adoption and consequently utilization are scope of change and relative advantage. Respondents indicated the scope of change was minimal and the advantage to using the booklet was relatively high. Based on these two factors, one could expect the study booklet to be fairly well utilized in these hospitals.

The investigator observed overall poor utilization of instructional materials for cardiac rehabilitation in the nine Franklin County hospitals. This underutilization of available resources is costly to the designer and producer as well as the health professionals and patients. A
design process which produces quality, cost effective, instructional materials, should attract the interest of producers as well as consumers. This study serves as a basis for further investigation in the area of producing individual instructional materials which are indeed utilized for patient education programs.

Local Production

Local production in a variety of forms was observed in the nine Franklin County hospitals. Two respondents had some part in the production of a booklet specific to their cardiac rehabilitation programs. The others produced some materials locally which varied from single written pages inserted in commercial booklets to duplication of selected pages of booklets produced by others. All respondents engaged in local production of patient educational materials to some degree. The rationale for this effort in every case was that currently available materials did not meet their specific needs. The reasons individuals do not locally produce instructional materials include: lack of thorough understanding of the content to be presented, unavailable resources, inability to design and produce effective instructional materials, and perception of little need or advantage to local production. In some cases patient instructional materials such as the booklet produced for this study will be instructional for
the staff as well as the patients. This is a feature of certain interest to producers as well as consumers.

The need for local production in these hospitals was apparent. However, the quality of the materials produced varied, and in most cases was less than desirable. Since health professionals generally can agree on the overall content to include in cardiac rehabilitation instructional materials, an instructional booklet covering these topics should be useful in a variety of health care settings. Local production of instructional materials as described in this study can combine the advantages of local production with the quality which often results from a more commercial approach.

RECOMMENDATIONS

The following recommendations may be productive for future research in this area:

1. Further exploration utilizing a larger sample will be useful in future research. A variety of innovation factors which possibly contribute to utilization of locally produced materials for patient education need to be considered. The sample should be drawn so that institutions of like size, type and sophistication in patient education can be compared. The primary population, rural or urban, served by an institution also should be identified as an institutional variable important to consider.
2. The two hospitals in this study with the most established cardiac rehabilitation programs offered the greatest number of booklet entries. Future research should include further examination of institutional variables which may impact on the adaptation of cardiac rehabilitation instructional materials. In addition, the impact of adapting on the utilization of the booklet should be considered. Those individuals who took the time to make entries may perceive a greater investment in the materials than those who made few if any entries. The effect of the degree of adapting entries on long term utilization of the booklet should be studied.

3. The effect of locally producing materials by adaptation on patient education needs to be studied. If one is to justify the cost of giving health professionals the opportunity to adapt instructional materials to their institutional needs, the impact on patient behavior must be studied. Does adapting instructional materials at the hospital level versus using materials developed for those hospitals in a given locale influence the degree of patient learning or resulting patient behavior. Future research should address the issue of whether locally produced materials influence patient response to materials, patient learning, or patient decision making regarding healthy behavior.
4. The utilization issue should be studied. Further exploration is needed which addresses the questions: Do health professionals and patients utilize locally produced materials more effectively than those available commercially? Does the opportunity to adapt instructional materials lead to an accelerated rate of adoption? When locally produced materials are utilized, does more effective instruction result? How does locally producing materials influence hospitals' overall patient education or cardiac rehabilitation programs? Can this process of producing instructional materials locally be successful in increasing utilization through advancing participants' sense of ownership in the materials?

5. None of the health professional respondents utilized the full capability of word processing technology in their entries. While respondents did suggest entries which adapted the booklet to local concerns, they did not approach the current capacity of this technology. A variety of causes are plausible: ignorance of word processing capability in adapting instructional materials; resistance to computer technology; resistance to change resulting in making those entries which bring materials into conformity with present materials rather than adapting to current instructional needs; reluctance to suggest adaptations due to an insecurity about cardiac
rehabilitation content or the instructional design process. Further exploration of this issue is desirable in order to establish the feasibility of designing instructional materials in this manner. A central question to this issue is: How can cardiac rehabilitation health professionals become aware of the potential of word processing technology in order to utilize this technology to adapt instructional materials to local concerns?

6. Cost effectiveness studies will be useful to those health professionals involved in patient education. However, many of the other questions must be addressed before it is appropriate to study cost effectiveness.

CONCLUSION

Design of effective instructional materials for patient education is a complex problem. Although it is encountered frequently by health professionals, design of these materials is beyond the expertise of most. In general, health professionals can suggest content they believe patients require about health, but the design of the resultant instructional materials usually is not systematic. Instructional materials which are accurate in content yet inappropriate for the audience or overall goal often result.
Health professionals tend to believe there are unique features of their health care institutions or settings which often preclude utilization of instructional materials designed for general use. In addition, those materials which are produced elsewhere are subject to careful scrutiny and typically are rejected as not attending to the unique features of that setting. This phenomenon, referred to as the Not Invented Here Syndrome, is commonly described in business and industry but unknown to health care settings. It is believed that participation in planning and decision making, developing a sense of ownership, and producing materials locally can diminish the power of the Not Invented Here Syndrome.

The problem addressed by this exploratory study was the design of instructional materials for patient education which are accurate, effective in predicting learning, relevant to individual health care settings, and will be utilized by individual health professionals and patients. As many as 1,500,000 Americans may have a heart attack this year, and approximately 550,000 of them will die. Fifty one percent of all U.S. deaths are attributed to cardiovascular disease, and nearly one-fourth of these deaths are persons under age 65. The economic cost of cardiovascular disease will amount to an estimated $56.9 billion in 1983 (American Heart Association, 1983). People in the U.S. today constantly make decisions that
influence their cardiovascular health. If these decisions are to reflect current research on cardiovascular disease treatment and prevention, quality instructional materials must be accessible.

The purposes of this study were to explore the feasibility of producing cardiac rehabilitation instructional materials which are adapted for specific hospitals and to identify personal and institutional variables significant to that process. The data suggested that it is possible to use word processing technologies to produce accurate instructional materials which are adapted for specific hospitals. It also is possible to involve local health professionals in this process. This participation diminishes the Not Invented Here Syndrome to the degree that utilization may be predicted. This study serves as a basis for future investigation in the area of designing instructional materials adapted for patient education programs which will be utilized by health professionals.
APPENDIX A

INTERVIEW SCHEDULE
INTERVIEW SCHEDULE

1. Give me an overall description of the cardiac rehabilitation program at this hospital.

2. Do you have an inpatient and an outpatient program?

3. Who are the health professionals who participate in the rehabilitation program?

4. What do you believe is unique about your program? Are there aspects of your program you would like to change?

5. Would a cardiac rehabilitation booklet for patients and families be useful in your hospital?

6. What are the topics you believe are important to include in such a booklet? Which ones are most important to include?

7. What are the topics you would not want to include in a cardiac rehabilitation booklet for your patients?

8. What written books and pamphlets are provided currently for your myocardial infarction patients?

9. If you could change the printed materials you now use for myocardial infarction patients, what would you change? What would you want to be certain was not changed?

10. What other audiovisual materials are used in your hospital for these patients?
APPENDIX B

QUESTIONNAIRE
ROAD TO RECOVERY QUESTIONNAIRE

1. When you seek approval to utilize patient education materials in your hospital, who are the people you must contact?

2. Who makes the final decision about what materials will be utilized for patient teaching?

3. How is the Road to Recovery booklet you have reviewed different from the rehabilitation materials you currently are using?

4. How is the Road to Recovery booklet similar to the materials you currently are using?
5. An effort was made to provide you the opportunity to participate in the planning of a cardiac rehabilitation booklet for patient education. In view of the time you invested, the Road to Recovery booklet: (circle one)

1  2  3  4  5
exceeds the expectations is a disappointment

6. To what degree does the Road to Recovery booklet accommodate the rehabilitation ideas you expressed during the initial interview? (circle one)

1  2  3  4  5
completely not at all

7. Compared to patient education materials for cardiac rehabilitation currently in use, the Road to Recovery booklet can be incorporated into your rehabilitation program: (circle one)

1  2  3  4  5
easily with great difficulty
QUESTIONS 8-10.

Compared to patient education materials for cardiac rehabilitation currently in use, the Road to Recovery booklet is: (circle one)

8.  
   1  2  3  4  5  
   very similar completely different

9.  
   1  2  3  4  5  
   clearly written confusing

10.  
   1  2  3  4  5  
   an improvement less effective
11. What are the strengths of the Road to Recovery booklet?

12. What are the weaknesses of the Road to Recovery booklet?

13. What are the advantages to using the Road to Recovery booklet over that which you now use?

14. What are the disadvantages to using the Road to Recovery booklet over that which you now use?
15. Please make any other comments you may have concerning the Road to Recovery booklet below or on the back of this sheet.

************************************************************
Title:
Position in relation to cardiac rehabilitation:

Professional experience:
  Years in this hospital:
  Years in cardiac rehabilitation:
  Total years professional experience:

Education:
  Highest degree held:                    Major:

Number of beds in hospital:
Number of CCU beds:
Average number of myocardial infarction patients per month:

Approximate percentage of these patients that receive cardiac rehabilitation instruction:
APPENDIX C

COVER LETTER
May 10, 1983

Dear

Last fall you were interviewed about the <hospital> Cardiac Rehabilitation Program. The project to develop instructional materials for cardiac rehabilitation patients sponsored by the Central Ohio Heart Chapter was described to you at that time and you indicated an interest in participating. The information from all the hospitals in Franklin County was assimilated over the past few months to form the enclosed booklet which will be printed by the Heart Association.

We appreciate your continuing assistance in reviewing the booklet. Your comments on the booklet as well as your response to the enclosed questionnaire are part of an exploratory study to determine the feasibility of producing patient instructional materials in this manner.

The instructions to help you complete this review are attached to the booklet. When your review is complete, please return the booklet, approval form, and questionnaire in the enclosed envelope. We need your response by June 1, 1983. If you have questions or concerns please don't hesitate to call.

Sincerely,

John C. Belland, Ph.D.
Associate Professor

Joan E. Watson, R.N., M.S.
Doctoral Candidate
APPENDIX D

DIRECTIONS FOR BOOKLET REVIEW
REVIEW INSTRUCTIONS

The finished booklet will be typeset on a 7" by 10" page. The first section, page 1-14, is an example of this format. A red color will be used to highlight the illustrations and headings. If you desire, the booklet cover can be unique to your hospital. One form of the booklet will be printed by the Heart Association. However, alterations specific to your patient population can be accommodated by this project, but your hospital will need to print your version of the booklet.

1. If you need to make additions, deletions or changes to make the booklet useful to your patients, make those changes on the booklet itself IN RED INK.

2. If you want to make editorial suggestions, make those suggestions on the booklet IN PENCIL.

3. If there are other people who must review the booklet in order for it to be approved and distributed to your patients, ask them to review the booklet following the procedure in #1 and #2. Additional copies can be supplied for this purpose.

4. Complete the Approval Form.

5. Complete the Questionnaire.
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