

Innovation in Health Care Organizations: Review of Research and Plan of Projected Studies

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The growing concern in the past decade to maximize the effectiveness and efficiency of the health care system has resulted in increasing attention to innovation and to the factors underlying the implementation and acceptance of new programs and methods of delivering health care. (Innovation is here defined as bringing something into use, in contradistinction to invention, which implies bringing something into being [1].) Major research attention has been confined primarily to the individual as the unit of analysis, either as the consumer [2–8] or as the producer [9–12] of health services. More limited attention has been directed to factors underlying innovation within organizations. There has been no apparent interest in examining specific innovations that might facilitate the operational efficiency or the functional effectiveness of the system as a whole.

Studies of innovation in health care organizations have had two major conceptual focuses. The first is the organization itself and the factors that facilitate or impede the implementation of change within the organization. The second is the individual participants within an organization and their level of acceptance of implemented change.

In the first approach, the organization is the unit of analysis, and the decision-making processes within it are examined. The investigation is focused on the characteristics of the organization and its decision-making processes that affect the implementation of change. Study questions that exemplify this approach would be: (1) Do the characteristics of size, resources, morale, organizational structure, and the like have a bearing on implementation? (2)

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How do the attitudes, perceptions, behavior, and other characteristics of those most directly involved in the organization's decision-making process affect the implementation of program change?

In the second approach, the attention is directed to individuals within the organization and the factors associated with their acceptance of the implemented change. The following questions would be typical: (1) Why is the individual (e.g., the nurse or the physician) for or against a particular innovation? (2) Which particular attitudes and personality differences may affect acceptance of a particular innovation? (3) What organizational variables facilitate or impede the acceptance of implemented change by members of the organization?

STUDIES OF IMPLEMENTATION

One methodological perspective found in studies of implementation of innovative programs in health care organizations posits that different levels of implementation reflect the different characteristics of individuals functioning within the organization. The underlying rationale is that environmental factors, interorganizational relationships, and intraorganizational variables, although profoundly affecting the implementation of program change, do so by affecting the attitudes, perceptions, and behavior of organizational members. Thus, in this approach, data are collected on individuals rather than on the organization or its environment.

A second perspective posits that the collective properties of the organization and its environment cannot be reduced to characteristics of individuals. The level of implementation is considered to be a function of both the attitudes, perceptions, and behavior of individuals within the organization and the variables associated with the organization and its environment. The conceptualization and relevance of this approach have been discussed by a number of investigators [13-17].

Although many of the data associated with these two approaches are not directly comparable, either for methodological or for conceptual reasons, some general tendencies may be noted. The examination of the characteristics of key participants was the primary focus in a study by Kaplan [18]. This study of 42 health and welfare agencies found significant associations between personal characteristics of the executive directors and the number of implemented programs. Level of professional training, degree of psychological flexibility, acceptance of responsibility, and awareness of alternative programs were found to be significant variables.

Kaplan also showed that more programs are implemented when the members of the board of directors of an organization have values independent of community values and approve of the innovative activity of the executive director. Although there are no comparable studies utilizing this approach, data from other studies tend somewhat to contradict Kaplan's findings.

Investigators who have utilized the second methodological perspective have

considered both psychological variables and organizational variables and the effects of their interaction on program implementation, although there have been few attempts to relate environmental, organizational, and individual variables in any systematic way. Following this approach, Hage and Aiken [19] studied administrative and professional personnel in 16 health and welfare agencies. These investigators found that values and general attitudes toward change add little to the understanding of program implementation. Implementation was, however, positively related to the degree of organizational complexity and to the job satisfaction of workers and negatively related to the degree of centralization and formalization of the organization. These relationships remained when study data were controlled for organizational size, age, and resources.

Palumbo [20] and Mytinger [21] also used this general approach in examining innovation of specific health programs within health departments. Preliminary data from Palumbo's study support the general direction of the Hage and Aiken findings summarized above. Mytinger examined program implementation in 40 local health departments. He focused on the characteristics of the director, the nonstructural features of the organization, and community variables. Mytinger's findings correspond with Kaplan's in reflecting an association between the characteristics of the director and the level of program implementation within the organization. Level of professional training, degree of cosmopolitanism, and leadership status were associated with program implementation. No direct measurements of values and attitudes toward change were attempted. Organizational characteristics of size and extensiveness of resources were positively associated with the number of programs implemented. The community's size, socioeconomic status, and degree of urbanization were also positively associated with the level of program implementation.

Within this second approach, a slightly different methodology, exemplified in only one study, has explicitly emphasized the interaction between the two sets of variables represented by the organization and the individual. This method has considerable potential for the understanding of program implementation. Mohr [22], in a study of program implementation in a regional sample of 93 local health departments, posits a three-dimensional model of implementation. This model hypothesizes that implementation is directly related to the director's psychological predisposition toward change, inversely related to the strength of organizational and environmental obstacles to innovation, and directly related to the availability of resources for overcoming such obstacles. Study data were supportive of this proposition.

STUDIES OF ACCEPTANCE BY PROFESSIONALS

The implementation of new programs is of little significance unless the individuals within the organization understand the objectives of these programs and incorporate them into their daily activities. There have been a number of descriptive accounts of program acceptance and rejection [23-26]. While these

studies have been interesting and suggestive of causal relationships, they have not employed standardized sets of observational dimensions and as a result have little explanatory value. Most of these studies have been descriptive and have been written by and for practitioners.

Recently, however, a number of investigators have become interested in studying the nature and range of social and psychological factors characteristic of health professionals who accept or reject implemented programs. These studies are useful in that ultimately it is necessary to predict the characteristics of health professionals who will accept or reject innovative programs and the conditions under which they will do so. This research, although not extensive, has tended to focus on two types of innovative programs: structural, defined as the addition of a new social position to a social structure, and technological, which is primarily concerned with a change in facilities or technology.

Structural Innovation

In 1963, Hage [27] studied physician acceptance of a medical education program introduced in a community hospital. He found different levels of acceptance associated with individual physician attitudes and with the characteristics of specific hospital departments. Acceptance was greatest among those physicians who had a preference for team work, depended largely on the reading of journals for their continuing education, and were members of a department with a history of frequently undertaking procedural changes. Within this study hospital, physicians in the department of medicine were most likely to accept the education program. Conversely, least acceptance was found among physicians whose responsibility involved considerable individual autonomy, who improved their professional competence by operational experience, and who functioned in a department with a history of little previous change. These characteristics corresponded with those of physicians in the department of surgery.

Wolfe and Teed [28] examined the acceptance of a social worker within a medical group practice setting and found that the physicians' acceptance varied for individual patients according to the patient's social characteristics and diagnosis. Moreover, the nature and extent of the physicians' previous training or orientation in psychiatry was also an extremely significant factor.

Technological Innovation

A number of investigators have examined the acceptance of various technological changes, including the introduction of new facilities within the community hospital. Coe and Barnhill [29] studied the acceptance of a new medication system. Three study variables were examined: variation in implementation methods, the characteristics of the innovation as perceived by the participating nurses, and the impact of the innovation on the social organization of the system into which it was introduced. Unfortunately, the authors' data are ambiguous and do not permit firm conclusions.

Taking a less holistic approach, O'Hare [30] studied the acceptance of a

time clock installed in a community hospital, positing that change would be accepted less readily by the semiprofessionals in the organization because it would represent a threat to their status, in contrast to full professional or nonprofessional workers, who would express more favorable attitudes. Data generally tended to support this hypothesis. However, study data also identified the individual's own adjustment mechanism and his perception of external forces supporting the implementation of the program as key factors in the ultimate acceptance of the change.

DISCUSSION: DIRECTIONS FOR FURTHER RESEARCH

Each of the studies cited has contributed substantive knowledge to the understanding of the processes of and barriers to program change within health care organizations. The limitations of these data, however, make it impossible to construct a definitive account of either program implementation or acceptance from any one study or a combination of studies.

Three reasons may be cited for this difficulty: lack of an analytical focus, absence of methodological development and comparability, and inappropriateness of analytical techniques.

First, with the exception of Mohr [22], these studies have been largely descriptive and exploratory. Emphasis has been given to significant personal, organizational, and environmental variables associated with program implementation and acceptance. No consideration has been given to the conditions under which these variables are associated with program change. Each group of study variables has presented evidence of association. However, the important question is not, for example, whether attitudes of key organizational participants affect implementation or acceptance but *under what conditions* they will do so.

This problem area can be resolved by analytical rather than descriptive investigation. Several levels of comparison are possible when dealing with implementation and acceptance studies. The personal characteristics of participants in the organization must be investigated as they operate within different organizations and community settings; and these personal, organizational, and environmental variables must also be examined relative to specific innovative programs that manifest a range of program characteristics. A threefold sampling of participants, organizations, and innovative programs is thus required. Identification of significant variables and the conditions under which they operate provides an analytical base for understanding the implementation and acceptance of change. This is particularly relevant for health service planners and administrators concerned with inducing change, since it would provide the basis for a strategy that would maximize implementation and acceptance of new health programs.

The second problem associated with existing data is a lack of methodological development and standardization. Specific data indexes have not been established and in fact cannot be established without additional background

information. However, the studies cited have not shown sufficient concern for the basic issues of instrument construction. Sensitivity of measurement and the use of weighting procedures in score construction have been given only minimal attention in the work thus far reported.

Moreover, data have not been collected or analyzed within the framework of behavioral science theory. This defect has hampered conceptual and methodological comparability. The use of this framework would facilitate the integration of study data and conclusions into the mainstream of existing theory and the testing of specific hypotheses in an actual field situation.

The third problem area is associated with the types of analytical techniques currently employed. Simple correlations (Palumbo [20]) represent an oversimplified form of analysis in view of the large number of nonindependent variables involved. Regression analysis (Hage and Aiken [19], Mytinger [21]) is an improvement over simple correlation analysis but raises serious questions as to whether the data meet the assumptions required by the analysis. More important, regression analysis, while suited to a predictive model, permits individual estimates of regression parameters to take any direction. Thus the sign of the regression coefficient may be either contrary or illogical in terms of the component with which it is associated. Factor analysis (Kaplan [18], Mytinger [21]) is attractive in that it provides a method for representing a natural grouping of independent variables. This method is not well adapted, however, to the development of a definitive understanding of innovation in health care organizations. The analysis does not produce unique groupings that can be replicated by other studies.

Multivariate chi-square analysis circumvents some of the limitations of these methods. This form of analysis requires minimal assumptions about the data. More important, it permits single or multiple degrees of freedom contrasts to be tested among groups or subsets of the data. This flexibility facilitates the exploration of more complex relationships.

Within the general context of the research findings described, several new directions in the study of innovative programs in health care organizations require consideration. These may be described in terms of diffusion of innovative programs, decision-making processes, and communication patterns, although these areas are not mutually exclusive.

Diffusion of Innovative Programs

Little is known about diffusion of new programs or of information concerning them or their implementation among health departments, hospitals, and other service agencies. With the exception of the national survey of family planning programs by Eliot [31], the diffusion of information and the actual implementation of innovative programs have not been studied. Program innovation has been viewed largely either in aggregate terms or on a case study basis. No consideration has been given to selective program innovations and their relation to functional areas of the larger health care system within which the organization functions.

Planners and administrators need information on the process and rate of implementation and acceptance of health programs that are associated with maximizing the effectiveness of health services, such as social work service and family planning. Areas for further study include the socioeconomic and cultural conditions that are operative in various geographic areas of the country and their influence on the rate of diffusion of specific programs. Another area for investigation involves the factors that increase or decrease the time intervals between the introduction of information about a program, its implementation, and its final acceptance by members of the organization.

Decision-making Processes

Decisions regarding program implementation and acceptance reflect the relationships among environmental, organizational, and personal variables and specific program attributes, but no studies have attempted systematically to relate these four sets of variables. Although Mohr [22] and Hage and Aiken [19] have begun to explore the interaction of environmental, organizational, and personal variables relative to program implementation and acceptance, the possible interaction of these variables with the characteristics or attributes of the innovation itself and the joint effect of all four sets of variables on program implementation and acceptance have yet to be investigated. This type of study must be approached in the context of a decision-making process, which follows a time sequence and involves a series of stages in both the implementation and the acceptance of innovative programs. Much evidence warrants consideration of this investigative approach [32-36], but it has had only limited use (Hage [27]) in the study of implementation and acceptance in health care organizations.

The stage process concept is primarily a heuristic device for partitioning a continuum of activities into discrete categories. It does, however, provide a framework for comparing organizations in the process of implementing programs and individuals in the process of accepting implemented programs; it thus facilitates an understanding of the conditions under which specific variables are operative. Special characteristics of organizations and individuals located at given points in the process are analyzed for the detection of influences that maximize change at these particular points in the process. This use of time sequences for the examination of program implementation and acceptance is extremely useful in the attempt to relate study findings to the development of operational change strategies.

Communication Patterns

A neglected area of investigation is associated with information flow and the functional role of a change agent in the process of implementation and acceptance. Interpersonal communication patterns that identify leadership roles in specific innovative programs can be studied by sociometric techniques, which can be used also to test, within an organizational context, such theories as the two-step flow of communications. The utility of such investigations for

planning activities and for the development of educational programs for health professionals is obvious.

PROJECTED RESEARCH

In view of the limitations of existing research, the authors have embarked on a plan of empirical study of innovation and diffusion in health care organizations. These investigations are being carried out in conjunction with the University of North Carolina Health Services Research Center.

The projected research includes the following areas of study: (1) diffusion patterns of selected health care programs in hospitals and health departments, (2) factors that facilitate or impede their implementation, and (3) factors associated with physician acceptance of implemented programs.

The innovative health programs to be studied were selected because of their association with the operational efficiency or the functional effectiveness of the health care system as a whole (e.g., family planning, mental health, medical social work, rehabilitation, and home health services).

Diffusion Patterns

The specific aim of this phase of the investigation is to gather data concerning the extensiveness of implementation of selected health care programs from a national sample of hospitals and health departments.

A sampling frame for selecting study hospitals and health departments is currently under development. Two samples will be selected. The first will be a sample of local health department jurisdictions; within each jurisdiction a subsample of hospitals will be selected. A sample of general voluntary hospitals will also be used to examine program diffusion.

Data regarding program implementation will be collected in three areas. First, the presence or absence of the study programs in the selected sample of hospitals and health departments will be determined, and where a program exists, information will be obtained regarding the date of its implementation. Where a specific program does not exist, information will be obtained as to whether the organization has ever had the program, and if so, the reason for its discontinuance and any plans for its reimplementation. The second set of data will involve the degree of organizational involvement in specific program areas. Data will be gathered on the extent of the program, the manner in which the services are being performed in the organization, and the sources of funding. The third area will involve the attitudes and perceptions of organizational directors regarding programs and associated service activities. These data will be collected in the form of paired comparisons, to permit the use of scaling procedures for both scale construction and substantive analyses.

Implementation of Programs

The aim of this phase of the study is to analyze factors that facilitate or impede program implementation in health care organizations. Study sites

will be selected, either within one state or in contiguous states, that provide maximal variability of selected programs, as determined from the prior diffusion analyses. The research design requires the selection of primary, secondary, and tertiary sampling units, which will reflect, respectively, the political boundaries of specific geographic areas to be included in the study, the formal organizations selected for study purposes within the areas, and key participants within the study organizations.

The study programs will be grouped by their stage in the innovation process (recognition, initiation, implementation, stabilization) and then classified by such attributes as initial cost, continuing cost, complexity, and compatibility with existing programs. A further category of data will include relevant environmental, organizational, and personal variables, which will be analyzed with respect to their interactions with the program attribute variables in the process of program implementation. Analyses will be directed at both aggregate and individual program implementation.

Acceptance of Programs by Professionals

This phase of the investigation will analyze the factors associated with physician acceptance of implemented health care programs within hospitals. The study design requires an initial selection of hospitals defined *a priori* as innovative and a probability selection, within the study hospitals, of general practitioners, internists, and pediatricians in active practice.

The first area of data collection will involve physician acceptance of innovation within the organization and will include both attitudes and behavior toward the innovative programs. Attitudinally, acceptance is defined as the physician's perception of the relevance and value of the specific innovation to his own role performance. The behavioral aspect is defined in terms of the degree to which the physician utilizes the innovation. This distinction is of significance because in many instances the physician's attitude and his behavior relative to an innovation may be at variance with each other.

A second set of data will include sociodemographic variables, attitudes concerning medical practice, and similar personal variables exhibited by the study physicians. A third set of data will pertain to situational variables associated with the environment within which the physician functions, with focus on the nature and scope of his interaction patterns within the hospital and with other professional personnel. The specific attributes that influence program acceptance will make up a fourth category of data.

Analyses will be directed to the interaction of these variables as they affect the process of program acceptance by the physician.

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Kaluzny et al.

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