Preface

Information systems pervade complex organizations. In healthcare organizations such as hospitals, the U.S. Congressional Office of Technology Assessment has estimated that computerized systems, when fully implemented, account for 4% to 8% of an institution's total operating budget. As healthcare costs continue to spiral upward, healthcare institutions are under increasing pressure from purchasers and payers of services to create a cost effective system by controlling operating costs while maintaining quality of care and service. The Institute of Medicine also estimates that as many as 98,000 deaths occur each year because of medical errors. Information systems are being marketed to healthcare organizations to provide management information, control costs, facilitate total quality management and continuous quality improvement programs, and improve patient safety. Cost control and improvements in safety and quality are the two major premises on which decisions to purchase information systems are based.

There is mounting evidence, however, that the implementation of many information systems has resulted in unforeseen costs, unfulfilled promises, and disillusionment. There is also the growing realization that information systems affect the structure and functioning of organizations, the quality of work life of employees within them, and ultimately the cost and quality of the goods and services they provide. Professionals who develop, implement, and evaluate clinical computer systems, however, frequently address only the technical aspects of these systems, while the success of implementation and utilization depends upon integration of the computer system into a complex organizational setting. Without an evaluation strategy that goes beyond the technical aspects of the system, an institution has no means of knowing how well it is actually functioning within the organization and no firm basis for developing specific interventions to enhance system success. Including these issues in systems evaluations will increase the likelihood of implementing a system that is cost effective for the organization as a whole.

The purpose of this book is to provide computer system developers, administrators, healthcare policy analysts, chief information officers, inves-

tigators, and others with a guide for evaluating the impacts of computerized information systems on (1) the structure and functioning of healthcare organizations, (2) the quality of work life of individual healthcare professionals and others working within the organization, and (3) the cost-effective delivery of health care. Evaluating information system impacts requires not only an understanding of computer technology, but also an understanding of the social and behavioral processes that affect and are affected by the introduction of this technology into organizational settings. Investigators in the social sciences have developed theoretical foundations and analytical approaches to help understand the impact and use of information systems, but few guidelines exist to help developers, administrators, and evaluators design evaluation strategies and select appropriate methods to study system outcomes.

This book is designed as a practical guide for determining appropriate questions to ask and the most effective methods available to answer those questions. The book begins with the premise that any evaluation must be preceded by a clear statement of study objectives. Next, investigators should recognize their own perspective and assumptions concerning how information systems affect and are affected by the organizational setting in which they are implemented. Only at this point are investigators ready to review and select appropriate methodologies to answer their research questions.

The selection of appropriate methodologies is critical to the successful outcome of any investigation. Given the complex interrelationships between computer systems and their organizational environments, there is no one best method for evaluation. Rather, the selection of methods will be determined by the evaluation objectives. This book advocates a pluralistic approach, providing the reader with detailed information on a number of methods that can be used to evaluate healthcare information systems. More than one evaluation strategy may be brought to bear on the same problem domain, with each method providing a different, complementary view of the issues under study. The book is designed to assist an investigator in selecting among different methods to build the specific approach that will be most fruitful for investigating a given situation or problem. The chapters also provide a practical overview of established research guidelines for sampling, data collection procedures and instruments, and analytic techniques.

The material presented in this book draws on more than two decades of empirical studies in healthcare computing conducted by the contributors and others. Individual chapters review specific methods for organizational evaluation such as direct observations, use of archival data, interviewing strategies, survey research, cognitive approaches, work sampling, simulation, and social network analysis. Part I begins with an overview of theoretical perspectives and evaluation questions, followed by eight chapters covering different methods for evaluating the impacts of information

systems using examples specific to healthcare organizations. Each of the eight chapters provides the reader with a detailed overview of a specific method, followed by annotated references at the end of the chapter for further reading. The example studies in Part II illustrate different evaluation methods and provide the reader with an understanding of the nature and scope of evaluation research and its importance in studying the impact of information systems, including providing information for practical decision-making and interventions.

The book also draws from a variety of social science disciplines to integrate the study of information systems with social science theory and methods. We argue that investigators in the social sciences have developed theoretical frameworks and analytical approaches that can help understand how the introduction of computer systems in healthcare settings affect the quality of the work environment, tasks and skills of health professionals, social interactions among professionals in the organization, and the effective delivery of medical care. We hope to make the developers and users of medical information systems more aware of (1) the extent to which the success of these systems depends upon complex social processes, and (2) the contributions the social sciences can make in helping to understand these processes.

The study of information systems, however, also requires social scientists themselves to develop new theories, data collection techniques, and analytic methods. This book should provide investigators and students with a starting point for new theoretical and policy oriented research into the impact of information systems on healthcare organizations. We also hope to initiate a dialogue between adherents of different research approaches, helping to clarify the range of methods and their appropriateness, strengths and weaknesses, and the understanding that can be acquired by combining different methods in a single research endeavor.

Finally, there is growing awareness at colleges and universities of the importance of studying and evaluating the use and impact of information systems as evidenced by the growth of curricula and faculty positions in the information sciences; medical, dental, and nursing informatics; and healthcare administration. Moreover, some schools are developing joint teaching and research programs that draw from diverse disciplines such as medicine, computer science, information systems, library sciences, organizational behavior, operations, management, and social sciences. This book is meant to provide a useful guide to the research and evaluation of systems for this wide variety of disciplines as well as to system developers, administrators, and practitioners.

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