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A framework for information management: Evolution of the new manager

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ABSTRACT

This article provides a framework for the information management field and of the evolution of the new manager of the future. It reviews the key changes in our modern society and how the computer has become a new tool. It presents a new definition of information management and then gives a short explanation of the framework areas.

OVERVIEW

Since the introduction of the first commercial computer in 1951 the world has forever changed the way it conducts business. The computer has become that technology which can improve performance, permit cost reductions and better productivity in the organization's information functions of management and administration. Where the technology of machines has replaced the worker's muscle in the Industrial Revolution, today's computer technology enhances the information worker's brain power. The computer has become the dominant tool to aid executives and workers process the increasing plethora of paperwork, analyze complex problems, identify and evaluate viable alternatives and effectively communicate with others.

Each new generation of hardware and software encourages greater application to business tasks and problem-solving. The development of the microcomputer has had a substantial impact on increased computer activity in organizations. The microcomputer with its relative low cost and increasing ease of use is readily accessible to managers, secretaries, accountants, and others in the workplace. These information workers can enhance their performance by creating their own computer applications.

The popularity of computers and the emphasis on end-user applications has created new challenges, new concerns and new problems in the modern organization. Managers are spending large sums of money to purchase computers, their peripheral devices and software. Are the computer systems actually enhancing performance? Are information workers using these systems in innovative ways that increase the quality of their decisions and improve communications. Or are their computer workstations expensive paper weights?

Academic and organizational training areas are finally being forced to evolve with the changes in organizational computer applications. Management training now includes courses and workshops in popular microcomputer software applications. Managers are not considered prepared for business and public administration unless they can develop spreadsheets, work word processors and create business graphics. They are taught the importance of information as an organization resource and a competitive tool. The MIS professional is now trained in not only supporting the end-user, but he or she has also been integrated into strategic management activities.

A framework is needed to guide research and to develop concepts and theory in the area of information systems (IS) in organizations. Older tradition-bound paradigms no longer address the nature of computer applications in modern organizational environments. Older curriculum models address only a narrow segment of the IS function in today's organization. A new curriculum model should be developed for standardizing training topics and skills. This article will attempt to construct and justify such a framework, a framework for the new manager.

KEY CHANGES IN OUR MODERN SOCIETY

We have become an "information society." Our economy has evolved through major dispensations to arrive at this current point. Through the nineteenth century the American society was agricultural based. The majority of the population lived on the land and made their living by growing and providing foodstuffs. It is estimated that 90% of the American society was agriculture based with only 10% working in cottage industries. By the start of the Twentieth Century, society had shifted from agricultural to industrial. Approximately 60% of the people made their living by producing manufactured goods. By 1957, the economy had shifted dramatically again. The majority of the people were producing information. Jobs in which the worker gathers, stores, manipulates and/or disseminates information have since become the mainstay of our economy. By 1990, it was estimated that the agricultural jobs accounted for only 1% of the jobs in our society, the industrial jobs 29%, while information jobs made up 70% of the economy.

The modern information worker generally lacks the background and skills necessary to design and build mainframe computer applications. With the introduction of the first commercial computer to the industrial society in 1951, a new group of specialists began to evolve. They were trained in the technical design and operation of complicated computer equipment. Organizations hired programmers, analysts, operators and hardware engineers into data processing departments. Information workers come to these computer centers to have the specialists computerize different department functions and activities.

Computer specialists continue to produce more complicated computer systems. Over the years, the systems have evolved from relatively simple systems to microscopic circuits that literally perform billions of operations per second. Software applications have become very complicated and quite sophisticated in the functions they perform. Hardware, software and data security have become a coordinated effort managed by the modern computer professional, trained to protect these valuable assets. The computer center today is a beehive of high tech devices, beyond the understanding of the average information worker. The information worker who turns to the computer center for assistance must depend on the programmers, operators and analysts for help.

Sales in larger automated computer systems (e.g., mainframe systems) remain constant for 1992. Despite recent downturns in the economy, the growth trend will be flat. Large organizational applications are important to many businesses and government agencies. Mainframe applications become more complex and demand more powerful hardware. However, the information worker desires procedures and a framework that can be used to define problems and forecast solutions.

The sale of microcomputer workstations continues to grow, though at a slower rate. Despite a general drop in sales revenues, microcomputer sales will increase 4% during 1992. Slower than the explosive growth in earlier years, microcomputers are still popular purchases in recessionary times.

The microcomputer has changed the manner in which information is managed in the organization. Though the microcomputer is technologically a complex machine, it's simple, easy to use interface makes it popular among information workers. When first introduced to mass society, it appeared to most individuals as a hobbyist's "play" toy. Little software was available, most applications were programmed by the user.

Most computer center employees viewed the microcomputer as a "fad," not useful except for games and checkbook balancing programs. Thus, in their judgment it didn't have a place in the organization. This "step-child" wasn't considered a responsibility of the computer center. Little support was offered to end-users in organizations. Most applications were self-taught.

The micro has continued to evolve. It has moved from 8-bit processing to 64-bit processing capacities in the last 15 years. Clock speeds continue to double. The software operating systems improve in performance and functionality. The application packages progressively perform more sophisticated tasks and are relatively easier for the end-user to navigate and implement. Currently, word processing, electronic spreadsheet, database and graphics programs are common. More sophisticated microcomputer applications, such as Geographical Information System (GIS), expert systems and distributed databases, are cropping up in many departments and offices.

Advances in hardware and software technologies have almost eliminated the need for managers to program computers. Instead the use of off-the-shelf program packages have become very popular and have changed the basic skills needed to operate the computer.

Networking of computers permits the end-user to share information with other end-users, a feature which many organizations are finding very useful. The manager is also able to tap into and manipulate the data bases, software programs and sophisticated processing power of large mainframe computers.

Decentralization and expansion of computer processing has made hardware, software and data security more complex and subject to trespass. The end-user must be aware of information security issues and methods.

The organization must be prepared to manage the information as an organizational resource. The appropriate deployment of systems should support the organization in achieving its planned mission and objectives.

The microcomputer has become the "tool of the modern manager." It has been introduced to the information worker despite the reservations and lack of support from the traditional data processing areas.

Changes in organizations are broader than the introduction of microcomputer workstations. Businesses are recognizing that computer technology, if applied properly, can not only decrease operating expenses, but also improve the strategic position of the organization. Simply stated, good management includes effective management of the information resource.

Earl (1989, p. 21) of the Oxford Institute for Information Management describes a change from the traditional *data processing (DP)* strategy to a new *information technologies (IT)* approach to technology development and utilization. He describes these two strategies or philosophies in terms of eras.

TWO ERAS OF INFORMATION MANAGEMENT

| DISTINCTOR | DP ERA | IT ERA |
|------------------------|-------------------|----------------|
| Financial Attitude | A Cost | An Investment |
| Business Role | Mostly Support | Often Critical |
| Applications Oriented | Tactical | Strategic |
| Economic Context | Neutral | Welcoming |
| Social Impact | Limited | Pervasive |
| MIS Thinking | Traditional | New |
| Stakeholders' Concerns | Few | Many |
| Technologies Involved | Computing | Multiple |
| Management Posture | Delegate/Abrogate | Leadership |

More and more managers are incorporating the concepts and tools of information technology into the very fabric of the organization's functions. To be successful, managers must have the vision and tools of information technology. They must understand what current technology can and cannot do. They must be able to apply that technology to the organization's functions and to their own personal tasks. The modern manager must have the vision of information management, else he or she cannot incorporate this technology into the organization's operational and strategic plans.

This movement to the Information Technology Era is shifting and reconstituting many tasks and duties and the responsibilities to the information worker or end-user.

WHAT IS INFORMATION MANAGEMENT?

Information management is defined as the *opportunity to increase individual and organizational productivity through improved decision making and better communication by utilizing the power of the computer*. The computer can increase the "brain functions" of the information worker. The computer is faster, more reliable, more accurate and can store much greater quantities of data than the human mind. When harnessed, these characteristics can be applied to the tasks of the information worker. Data processing can be significantly improved if applied properly.

Reacting to the shift in management and organizational strategies, many business schools have changed their curriculum, offering courses which teach computer skills and concepts for the manager. The business student can take classes that teach spreadsheet and word processing skills, strategic information planning, and information policy. Organizations are offering internal and external computer training opportunities. Research in the information management area has increased substantially.

Unfortunately, the models that were used for curriculum design and research efforts are outmoded and archaic. The shift to end-user orientation is difficult to accommodate within the technical DPMA and ACM models. A new model of information management is important for this new emphasis.

Existing research and curriculum models focused on the technical aspects of information management. They speak to the topics and competencies of the information specialist, such as programmers, operators and systems analysts. A new model needs to address important issues affecting the information worker. For example, training topics need to be identified that affect the typical computer illiterate manager and secretary. The appropriate model can help researchers focus on important information management issues.

A new framework for computer competency has been developed that incorporates important changes in computer technology and shifts in computer applications in organizational environments.

THE FRAMEWORK FOR INFORMATION MANAGEMENT

The Information Management Model was devised by Rohm and Stewart in 1986 to help managers utilize the power of the computer. It is a systematic approach to the skills and knowledge levels necessary for computer applications in organizations. The focus of the model is a series of competencies for capitalizing on opportunities to increase individual and organizational productivity through increased decision making and improved communications by utilizing the power of the computer.

The Information Management Model consists of 15 different information management competencies. These competencies are grouped into four general areas: Information Fundamentals, Information Tools, Information Specialists and Information Knowledge Builders.

INFORMATION FUNDAMENTALS

Competencies in Information Fundamentals are the building blocks for information systems in organizations. They provide the terminology, concepts and organizational focus for the other competencies.

Information Theories and Concepts: The information worker should be familiar with information and organizational theories which are the building blocks for computer applications in organizations. They should understand and implement basic systems theory, management functions and computer terminology and concepts.

Information Management (IM) Planning: IM planning focuses all IS activities on the mission and objectives of the organization. Information workers should understand that IS plans, project priorities and IS budgets and expenditures are aimed to satisfy "business" objectives. Systems should not be designed and/or purchased solely because of ease of implementation or organizational politics. IM planning is the macro planning activity of the organization and includes IS strategic planning actions.

Information Technologies: These technologies include: hardware, software, maintenance and training. The information worker should understand enough about hardware and software to more fully use their system's functions and to discuss end-user needs with the organization's information specialists and outside vendors. Software knowledge includes operating systems, such as DOS, Netware, etc., and application programs. Microcomputer systems require regular maintenance and occasional repair, as do larger mini- and mainframe systems. The information worker should practice simple maintenance practices, such as using surge protectors and applying floppy disk handling procedures. He or she should also understand potential maintenance/repair strategies. The information worker needs to be familiar with computer skills training options available and understand the importance of budgeting for IS training.

Information Systems Networking: As discussed earlier, organizations are networking more and more of their individual workstations. Information workers who have learned basic networking concepts and how to negotiate the organization's networks can use the added functionality which networks provide. Networks can be confusing and frustrating to end-users who are not minimally competent in information systems networking.

INFORMATION TOOLS

Information tool competencies are specific computer skills and their application to organizational activities. Though concepts are important for each tool area, computer applications are each competency's main focus. An information worker learns these competencies in a computer lab or at an end-user's workstation.

Information Processing: The information worker who is competent in Information Processing can use the computer to prepare information for dissemination to others in and outside the organization. Specific skills include word processing, graphics design, desktop publishing, electronic mail, facsimile technology and so on. A sales manager, for example, might use an electronic spreadsheet to prepare a series of graphs for use in a sales meeting.

Information Based Management: Organizations gather data to better enhance their decision-making capability. Good decisions are derived from good information. The information worker who can access the right data in a timely manner will have the advantage over those who cannot. Specific skills include using database management systems (DBMS) to access and manipulate databases, employing integrity and security procedures to maintain the data's integrity, and, for some end-users, designing and building database applications and the appropriate data structures.

Information Forecasting: Planning and controlling functions require the ability to anticipate future events. Competent in information forecasting, the end-user will better understand relevant factors and their relationships, identify trends, and can demonstrate the impact different courses of action will have in future situations. Specific skills include creating accurate forecasting models and simulations using electronic spreadsheets, statistical programs, econometric modeling systems and so on.

Information Problem Solving: Everyone solves problems and makes decisions. In organizations, the ability to solve important problems and make the "big" decision results directly into increased personal and organizational productivity. All managerial functions depend on the ability to identify problem causes and related optimal solutions. Specific skills include qualitative and quantitative methods, human factors and computer supported problem solving and decision making.

INFORMATION SPECIALISTS

These next four competencies examine who the end-user might turn to for assistance, their strategies and methods for providing help and, finally, how the end-user might acquire the right information system.

Information Professionals: There are individuals inside and outside the organization who can help the end-user acquire, create and manage information systems. The information worker should be familiar with the organization of information services within an organization and the roles of the analyst, programmer, network and database administrators, operators, consultants, vendors and systems houses.

Information Analysis: The systems analyst studies existing systems and designs improved systems. Because they rely on information from the end-user, the information worker might participate in a systems analysis study. Topics include the traditional analysis and design approach, prototyping and different tools the analyst/programmer might employ.

Information Strategies: As computer systems have evolved they have been applied to different functions and different levels of management. Systems at the operational levels of the organization assume a data processing strategy. End-users can expect to use systems designed according to different strategies including management information systems, decision support systems, expert systems, and so on.

Information Acquisition: The selection and acquisition of computer information systems have become major concerns for many managers. This competency includes concepts and methods for formally and less-formally identifying and evaluating alternatives, and contract negotiation.

INFORMATION KNOWLEDGE BUILDERS

The final set of competencies focuses on knowledge the information worker should possess to protect information systems, understand computer and information law, and to anticipate today the changes in information systems that will benefit the organization tomorrow.

Information Security: Information system's hardware, software, data and end-users and specialists are valuable information assets that need to be protected. The information worker should know and practice policies and procedures for securing these information assets.

Information Law: Information workers can become entangled in the information and computer laws that state and federal legislatures have enacted. Violation of copyright, privacy and computer fraud laws could bring about costly civil and criminal legal actions against the individual and the organization.

Information Innovations: This competency examines anticipated changes, both reality and fantasy, that will affect information systems and the work place. Topics include hardware and software trends, artificial intelligence, office of the future, and the impact of automation on information workers, organizations, and society.

CONCLUSIONS

The workplace is evolving. More organizations are becoming service and information oriented. Most Americans are considered information workers. The number of information workers continues to increase.

Improvements in the information systems hardware and software have made designing and implementing computer applications relatively simple. Information workers can improve their productivity using automated information systems. These gains are enjoyed when these systems are properly implemented.

These changes suggest a new framework for training the information worker is necessary. Old models for education and research no longer reflect the knowledge and skills information workers need to be successful in organizations today. This article presents such a framework.

The Information Management Model has been developed to help future managers, scholars and instructors accommodate changes in the workplace. Proficiency in the 15 competencies will prepare information workers to capitalize on the computer technology to improve communication and decision making. The information worker should improve his or her productivity in the organization.