INFORMATION SYSTEMS AND COST CONTROL

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October 1984

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Working Paper Series

CRIS #83

GBA #84-75

This paper was prepared for The Ohio State University Conference on Information Systems and Accounting Education, November 8-9 1984.

Information Systems and Cost Control

The purpose of this paper is to consider how the key concepts of management information systems (MIS) might be integrated with accounting concepts relating to the managerial process of cost control to form a coherent module for a business school curriculum.

Perhaps the best place to start is with some definitions. Cost control, as seen by the writers of cost accounting texts, is the set of processes by which management secures and monitors adherence to cost standards. It is thus narrower than cost management, which encompasses both cost adherence and cost reduction and, according to some, includes actions which direct an organization away from activities which have low benefit-to-cost ratios.

There is much less agreement about the definition of management information systems. The information systems field draws from many disciplines -- e.g., computer science, management science, organizational behavior, and even accounting -- and information systems texts and courses usually include discussions of concepts and issues from these other disciplines. Many MIS definitions focus on the computer hardware and software which are

important components of most formal systems. Other definitions take a broader perspective and focus on the task which the MIS is to accomplish. Ein-Dor and Segev,[1] for example, suggest this definition:

> A management information system is a system for collecting, storing, retrieving, and processing information that is used, or desired, by one or more managers in the performance of their duties. (p. 16)

This definition sounds strangely like many common definitions of managerial accounting, which may be why we prefer it. It also has the advantage of allowing us to consider the broad range of issues which are important to understanding information systems, not just the physical elements from which they are built. In our discussion, however, we shall try to limit our attention to those issues which are truly MIS issues -- i.e., those which arise at the intersections of the various disciplines upon which the MIS field is based. For example, we shall not discuss the management science models which are embedded in many information systems, nor the fundamentals of computer operating system design -- our concern with these will be only with those aspects which impinge on a manager's understanding of MIS principles.

In trying to integrate the key concepts of MIS and cost control, our initial approach was to look for a natural mapping between these two sets of concepts, so that specific MIS concepts could be taught along with specific cost control concepts, with

few gaps and little redundancy. Unfortunately, we found no such natural mapping. There is no unique relationship between variance analysis and human information processing, for example, nor should discussion of flow charting be confined to, say, cost budgeting at the expense of other elements of the cost control apparatus. This means we had to look for connections -- less than a full mapping, but correspondences worth developing.

ALTERNATIVE APPROACHES

As we thought about how the concepts of these two fields could be integrated, we realized that another issue had to be addressed first. MIS concepts bear on most if not all aspects of accounting, not just cost control, and on all other managerial activities. It makes no sense to think about integrating MIS and cost control concepts without also considering the interconnections between MIS and other parts of the accounting and business curriculum.

We start with the assumption that there is (or can be) an agreed upon set of MIS concepts and material to be presented and that there is some sensible ordering of this material. Given that, we have identified several ways of partitioning and presenting MIS material within an accounting (or business) curriculum. Four possible ways to do this are:

1. Accounting modules as the driving force.

2. MIS modules as the driving force.

3. Accounting and MIS as a single discipline.

4. MIS as a prerequisite to managerial accounting.

Each of these approaches presents certain problems concerning (1) assuring that all relevant material is presented to all students, (2) minimizing redundancy, (3) maintaining a sensible ordering of material, and (4) accomplishing the objective of integration. In this section we shall consider the advantages and problems of each of these approaches to partitioning.

Accounting Modules as the Driving Force

If accounting modules are the driving force, the existing structure -- i.e., partitioning -- of accounting material would remain, and MIS material would be woven into several (or perhaps all) of the accounting modules. The MIS material included in each module should be that which can best be illustrated in that context.

This approach should result in substantial integration of MIS and accounting material and should be acceptable to the accounting establishment. It presents problems, however, in assuring that all material is presented in a sensible order while minimizing redundancy. MIS concepts would be spread among a

number of accounting modules (or courses). The problem is that students will not necessarily take all accounting modules nor will all students take a given set of modules in the same order.

MIS Modules as the Driving Force

This is probably the most radical approach to integration. An ordered set of MIS modules, perhaps similar to the set of MIS courses currently offered in several business schools, could be developed and illustrative material from accounting (managerial and financial) woven in. This approach would solve the problems of the previous approach concerning the presentation of MIS material, but would raise these same problems for the accounting material. In addition, or perhaps as a result, it would likely be unacceptable to both the academic and professional accounting establishments.

Intermix MIS and Accounting Modules

In this approach, neither the existing accounting nor MIS modules would remain. Rather, parts would be taken from each and reassembled to form truly integrated accounting/MIS modules. At least one business school has adopted this approach (and has been doing it for years), though many would argue that this school does not really teach accounting.

The advantages of this approach are substantial integration and a coherent path for presenting all material with a minimum of redundancy. The greatest disadvantage is the great effort

required to accomplish it. Since neither existing set of modules remains, this approach implies a nearly total redesign of both the MIS and accounting curricula. It also implies a faculty with a reasonable degree of expertise in each field. If these requirements cannot be met, some other solution should be adopted.

MIS as a Prerequisite to Accounting

This is the most conservative of the four approaches. It does not attempt major redesign of existing modules in either MIS or accounting. Rather, it assumes that the accounting context can be used to illustrate MIS concepts and principles which have been introduced in a previous module. The advantages of this approach are ease of development, likely acceptability by accountants, coverage of the desired material, and control over order of presentation. The key disadvantage is the high probability that integration will suffer, that MIS concepts, if discussed at all in the accounting modules, will be treated as adjuncts and not as integral aspects of the accounting solutions.

We do not mean by this to require that the first course in accounting be deferred to the second term or quarter of a student's business program. Preferably MIS and accounting would be taught in parallel during the first term, quarter, or year, with good communication between those responsible for the design of both courses. What is important is that basic MIS concepts be

introduced early, before they are needed in the various accounting modules. This requires more faculty interaction than most of us are used to.

BASIC CONCEPTS IN COST CONTROL

Since other papers are focusing on other interfaces between MIS and accounting, we shall limit ourselves in the remainder of this paper to those aspects of MIS which might most reasonably be integrated with the accounting aspects of cost control. After all, that is our basic assignment. We recognize that a final decision about the material to be included in this module cannot be made until a general approach to integration (as outlined above) has been selected.

We begin by identifying the following seven phases in the design and operation of a cost control system:

1. Establishing the nature of the information need.
2. Establishing information specifications.
3. Choosing the technical means of producing information.
4. Producing the information.
5. Insuring that management will use the information.
6. Responding to information.
7. Keeping the system up-to-date.

The typical managerial accounting approach to cost control ordinarily concentrates on the second and fourth of these, with a

passing swipe at the first. The second column of Exhibit 1 shows in abbreviated form the likely coverage of each phase in a managerial accounting course.

EXHIBIT 1. COVERAGE OF PHASES IN THE COST CONTROL PROCESS

Phase	Management Accounting
Establishing need for information	Steering control vs. scorecard control
Establishing information specifications	Responsibility structure Controllability criterion Chart of accounts Allocation criteria Specifications for performance standards Management by exception Predetermined charging rates Motivation/participation
Choosing means of producing information	No coverage
Producing information	Setting performance standards Measuring resource usage Choosing allocation methods Analyzing recorded results Communicating
Insuring managerial use of information	Occasional coverage (motivation/participation)
Responding to information	Minimal coverage (adaptive vs. corrective response)
Keeping the system current	No coverage

RELEVANT INFORMATION SYSTEMS TOPICS

Our ultimate objective will be to add (and fill in) a third column to Exhibit 1. This third column will identify material from the information systems curriculum which can contribute to the understanding and implementation of these seven phases in the cost control process. Before we can do that, however, we need to identify a set of topics which comprises our view of information systems. The following 12 topics capture the issues in information systems that are essential to understanding the cost control process:

1. Stages in system development.
2. Socio-technical nature of system design.
3. Approaches to system design.
4. Approaches to system development.
5. Implementation as planned change.
6. Matching system type to system purpose.
7. Hardware/software environments.
8. Human information processing (HIP) capacity.
9. File structures.
10. Data-base concept.
11. Interface design.
12. System life cycle.

In this section we shall explain what we mean by each of these topics and how each can contribute to our understanding of cost control.

Stages in System Development

System development normally starts when someone decides that a need for a system either does or may exist. The development process then proceeds through a sequence of steps to (1) define the need, (2) assess the feasibility of developing a system to address it, (3) define the system logically (i.e., as the users will see it), (4) define the physical realization of the system (i.e., the system as the computer will see it), (5) write programs, (6) test those programs, and (7) install the new system and convert to it. The process moves from the very broad and general to the very specific and detailed, and at each stage certain decisions are made which impact the final outcome of system development.

An understanding of the stages in system development and the decisions to be made at each stage is important to anyone who participates in the system development process. Decisions about the hardware to be used or the file architecture for a system should not be made until after a logical system design is completed. Similarly, the logical system design cannot be specified until needs have been assessed. Making decisions prematurely places unnecessary restrictions on the later stages

of the development process and may result in the development of a system which is not the best solution to the user's problem. On the other hand, failing to make a decision at the stage when it should be made leads to ambiguity and confusion at later stages, often resulting in implementation difficulties. If managerial accountants are to participate effectively in the design of cost control systems, they must have at least a general understanding of which decisions must be made at each stage.

Socio-Technical Nature of System Design

System design cannot focus on technical elements alone, but must consider the human and organizational environments in which the system will exist. The socio-technical systems approach to design forces consideration of more than just the measurement task at hand in the development of system specifications. This broader focus in system design is quite important; there is ample evidence that the probability of implementation failure or rejection of the system is much higher for systems designed without consideration of the organizational environment in which they will operate.

Many managerial accounting courses do consider the socio-technical aspects of system design to some extent, but most of this consideration comes under the heading of avoiding dysfunctional effects of accounting reports or "the effects of budgets on people." What the information systems literature can

contribute is a broader range of behavioral factors to consider as well as systematic procedures for assessing their impact on system design. Mumford's[2] ETHICS method, for example, identifies five critical areas of fit[3] between the person and the job which are necessary for job satisfaction. Since the systems a person uses can affect several or all of these fits, it is recommended that proposed (and existing) systems be evaluated in terms of their impacts on these fits. The ETHICS method provides a technique for making these assessments.

Approaches to System Design

No information system exists in a vacuum; a cost control system is surrounded by and interacts with a range of other systems in the organization. The degree and manner of interaction among systems reflects the organization's information architecture. There are a range of approaches to designing information systems -- e.g., top-down, bottom-up -- and each is appropriate to some architectures and not to others.

Top-down design starts with the broad view of the organization's information needs and specifies the set of systems that should be developed to meet these needs as well as the interconnections among those systems. Bottom-up design focuses on individual, operational level systems, and is much less concerned with the overall architecture or system interconnections. Top-down design has more front-end overhead,

and the total set of systems specified may never be built. Bottom-up design leads to quicker results on individual systems, but the systems may be unable to communicate with one another.

There are, of course, other design approaches which fall between these two, providing intermediate levels of architectural comprehensiveness and integration among systems. Familiarity with this range of design approaches and the strengths and weaknesses of each is of obvious importance to managerial accountants who will be involved in the design of an organization's information architecture.

Approaches to System Development

The traditional approach for an organization to use in developing an application system is to have in-house data processing professionals build the system following a sequential development model (e.g., the stages of system development described above). This is not, however, the only possible approach to system development; other options exist, and their use is becoming increasingly common. Among the options are:

- custom development vs. package acquisition,
- sequential development vs. evolutionary development or prototyping,
- data processing professional vs. end-user development.

Each combination of these alternatives is appropriate for some types of systems in some organizations, but no one approach is right for all systems or for every organization. For example,

application packages are usually less expensive to acquire and quicker to implement than custom-developed systems, but they are less tailored to an organization's unique way of doing business. Similarly, a sequential development process is quick and cheap, but it requires that management specify at the outset precisely what it is trying to accomplish. While this is easy enough for the development of standard transaction processing and operational level systems, it is not always possible when the system is to be a completely new planning tool for upper management.

Finally, end-user development often provides a way to develop small applications more quickly and with less bureaucratic hassle than would be possible by going through the data processing/information systems department. It is doubtful, however, that this is the appropriate strategy to follow for developing high volume transaction processing systems to be used by large numbers of people in the organization. Managerial accountants should understand these alternative development approaches and what each has to offer so that they can decide which approach is appropriate in each situation.

Implementation as Planned Change

Implementing an information system does not just happen; the technical, individual, and organizational aspects of change must be considered and planned for. Introducing this concept in the

discussion of cost control has two main benefits. First, it highlights the effects of participation in the system development process on system acceptance and on the likelihood that managers will use the system at all or will use it as it is intended to be used. Second, it brings out the range of changes (e.g., the need for training, the possibility that reporting relationships or organizational structure will have to be altered) which need to be made to implement any new information system successfully.

Managerial accounting courses often include some coverage of the role of participation, but this coverage is usually limited to an examination of the effects of budget tightness or attainability on managerial expectations and efforts. The information systems literature is much broader than the accounting literature in this area and identifies several important reasons for user participation in system development -- e.g., incorporating the user's knowledge and understanding into the computerized system, starting the training process early, and assuring realistic expectations. In addition, the information systems literature suggests a range of mechanisms for facilitating user participation -- e.g., feedback and sign-off, user liaisons, steering committees, etc. An understanding of <u>all</u> the reasons for gaining user participation as well as the mechanisms available for doing so should be quite valuable to managerial accountants involved in cost system development.

Matching System Type to System Purpose

Systems can serve a variety of purposes -- e.g., operations recording, operational control, management control, or strategic planning -- and the type of system that is needed will differ depending on purpose. For example, operations recording implies a transaction processing system, management control may be adequately served by a structured reporting system, while strategic planning likely requires a decision support system.

System type has numerous implications for system design (e.g., type and organization of data, means of access, type of reports). It is important for those involved in system design to understand what purpose(s) the system they are building is to serve, so that the appropriate type of system will be developed.

The traditional cost control course in accounting differentiates between steering control and scorecard control as essentially different processes which require different types of information, formats of presentation, etc. In information systems terminology, scorecard control implies a structured reporting system, while effective steering control requires a decision support system.

These two types of systems are likely to have differing requirements for:

- Data accuracy, currency, and level of detail (aggregation).
- Reporting frequency or periodicity.

- Degree of interaction with the data base.

Introducing the idea of matching system type to system purpose in the discussion of cost control provides a broader and more general context in which to discuss the differences between steering control and scorecard control systems.

Hardware/Software Environments

Undoubtedly the aspect of information systems which most people think of first is the set of hardware and software which make up the data processing capabilities of each system. In fact, our paper may come as a surprise to many because we choose to include a substantial variety of other topics. Nevertheless, the popular view is based on a good deal of substance. Hardware/software selection is an essential part of any system design activity. The system developer must choose from a range of hardware/software environments -- e.g., batch, on-line, network, stand-alone micro -- not all of which are appropriate to every system or organization. Furthermore, the specific equipment and software to be used will both influence the choice among these environments and be determined by the decision among them.

For example, a generation ago most application systems were constrained to operate in a batch processing mode because the equipment available at that time could not support multiple on-line users efficiently. Given that batch processing was to be

used, system designers then had to select the specific equipment configuration to be used. Advances in technology have opened up a wide range of hardware and software environments to choose from; the question is no longer just which "boxes" will be strung together.

Most accounting courses in what we like to think of as the "better" programs have little to say about hardware/software environments. In fact, the older co-author of this paper has made it his career-long principle that his courses deal in "concepts," not in "procedures." Discussion of hardware and software is more properly left to manufacturers' training courses. We stick to that general principle, and do not recommend that detailed examination of particular pieces of hardware or operating systems be included in the curriculum. Nonetheless, without an understanding of the range of system architectures available, the capabilities that each provides, and the circumstances in which each is appropriate, the designer of a cost control system cannot take advantage of the ever-growing capabilities of computer and communications technology. Managerial accountants must acquire this understanding if they wish to participate effectively in system design.

Human Information Processing Capacity

Few managerial accounting texts devote space to a discussion of the capacity of individuals to process information. It is

clear, however, that people have limited information processing capabilities; information system design should attempt to compensate for and adapt to these limitations.

The literature on human information processing is extensive, and full coverage would require more class time than most managerial accounting courses can spare. Some coverage is important, however, primarily in connection with the evaluation of the format in which cost control information is to be presented to management. Understanding HIP limitations should help the cost control system designer specify report formats that will most effectively communicate results to the system's users. The discussion of HIP limitations in this context should provide the student with a broader, more general framework in which to consider the presentation and communication of the results of cost control activities.

File Structures

The way data are organized and stored in a computer (the file structure) determines what types of data presentations and analyses can be done easily and what types will be difficult or even impossible. For example, while sequential files are most efficient for large batch updates, they are very slow for retrieving individual records. Direct access files, which allow fast retrieval of individual records, are prohibitively slow for finding the (logically) next record in a file. A knowledge of

possible file structures therefore is important to cost control system designers to assure that the computer-based system will be able to produce the types of analyses and reports that are desired.

Data-Base Concept

Data can be isolated to specific applications or shared among multiple applications. Prior to the mid-1970's, almost all application systems were designed to work with data files that were custom-tailored to that application and were not shared with other applications. More recently the trend has been towards the data-base approach, the sharing of a common set of files among many application systems.

The data-base approach has both costs and benefits, and the designer of a cost control system must understand these tradeoffs in order to make a decision about the appropriate data architecture (e.g., data-base vs. stand-alone data files). An application-specific data base is more accessible to system users and can be designed to meet the needs of the specific application. A broader data base will have to be structured in ways that are not optimal for the users of any single system. If the data-base is to support both government contract costing and internal cost control, for example, great care must be taken in defining data items; government contract costing requires ex-post average full costing, whereas cost control requires the

application of the controllability and responsibility concepts, with predetermination of many of the determinants of the costs of individual responsibility centers.

The benefits of a shared data-base, however, include (1) reduced cost of data storage, (2) fewer discrepancies and inconsistencies in the organization's data, (3) better availability of data to departments other than that which collected the data, and (4) quicker and easier development of application systems. A discussion of the data-base concept in the context of cost control can make students (who are, after all, future systems users and systems designers) aware of the benefits and problems which accompany the data-base approach.

Interface Design

Another behavioral determinant of the success or failure of cost control systems is the design of the interfaces between the system and its users. It is quite clear that the "face" a system presents to its users affects their ability to use the system. Too often, however, designers treat the interface as something that is determined by the technology. This is seldom the case, and the characteristics of the interface should be a conscious choice of the system designer.

Among the interface characteristics which the designer should consider are:

Control language	command language vs. menu selection, novice and frequent user modes, reversibility of actions;
System messages	messages understandable to user vs. computer technician;
Help facilities	tutorials, well-written user manuals, on-line help facilities;
Input devices	mouse, keyboard, touch screen, light pen, etc.; and
Output devices	graphics vs. tabular, CRT vs. hard copy.

Each of these interface characteristics can be designed to fit the needs of the particular system and its users. Making future cost control system designers aware of these interface options should help them make their systems more usable.

System Life Cycle

All cost control systems exist in a dynamic environment. Changes take place in the processes being controlled, in knowledge about these processes, and in the people responsible for controlling them. Changes may also occur in the computer system on which the cost control system is run. Any of these changes may require that the cost control system be modified to reflect its new environment.

Less dramatic than the changes which inevitably occur, but equally important, is the fact that no information system runs

itself; a variety of supporting roles are needed to feed the system with input data, assure that files are properly maintained, etc.

Managers responsible for cost control should recognize that systems go through a sequence of stages -- development, operation, evaluation, maintenance, and retirement or replacement. In information systems parlance, this is known as the system life cycle. From a discussion of the system life cycle, cost control system designers should learn that their role extends beyond the initial design of the system, and must include the design of supporting structures which will allow the continued functioning of the system in a changing environment. Further, as users of these systems they must be alert for evidence that movement to a new stage is appropriate. Coverage of the system life cycle should also show how these adaptations can be made.

CONCLUSION: MAPPING THE CONCEPTS

The preceding section gives us the basis on which to map our list of information systems concepts to the cost control phases presented in Exhibit 1. Exhibit 2 shows one such mapping.

EXHIBIT 2. MAPPING INFORMATION SYSTEMS TOPICS TO COST CONTROL PHASES

Cost Control Phase	Information Systems Topic
Establishing need for information	Matching system type to system purpose
Establishing information specifications	Stages in system development Socio-technical nature of system design HIP capacity
Choosing means of producing information	Hardware/software environments Approaches to system design Approaches to system development Data-base concept
Producing information	File structures HIP capacity
Insuring managerial use of information	Implementation as planned change Interface design
Responding to information	
Keeping the system current	System life cycle

This is not the only mapping that could be made, but it seems likely to fit the accounting coverage of cost control better than others we have thought of. Given that, our remaining task is to discuss briefly how these information systems issues might be discussed in conjunction with the cost control material, and what they would add to a more traditional presentation of cost control.

It takes little imagination to conclude that matching system type with system purpose is the information systems topic which corresponds most closely to the need-for-information phase in the control process. As we pointed out earlier, introduction of this material in managerial accounting courses can provide depth to the discussion of steering controls versus scorecard controls.

The topics typically covered in managerial accounting courses which relate to the process of developing information specifications, deal almost exclusively with the content of the information to be provided by the system. Discussion of the information systems views of the stages in the system development process, the socio-technical nature of control systems, and the limitations of human information processing broaden this coverage by (1) providing an understanding of the context in which the system will be used, and (2) delineating the process by which specifications are determined and converted to operational systems.

As we pointed out earlier, most managerial accounting courses have little to say about the third phase of the cost control process, the choice of means of producing information. The four topics listed in Exhibit 2 opposite this phase present the range of options available for the realization of cost control systems (i.e., system architectures) as well as the alternative means of developing or acquiring those systems.

Insofar as these choices affect the ability of cost control systems to realize their objectives, the general characteristics of these choices ought to be recognized.

The focus of the traditional cost control course in the fourth phase of the cost control process -- producing information -- is on the task-specific (i.e., controlling costs) aspects of producing and communicating information. Thus, it deals with how costs should be classified, how standards should be set, the procedure for analyzing costs and cost variances, and the appropriate formats for communicating results. We suggest that file structure concepts and a review of human information processing limitations be introduced in this context. The first of these determines what types of data presentations and analyses can be done easily; the second ought to help the system designer specify report formats that will communicate results effectively to system users.

The process of insuring that management uses the information generated by the cost control system has two aspects, a motivational aspect and a facilitational aspect. Accounting coverage of this phase of cost control is typically limited to the motivational aspect. It centers on the impact that measuring certain variables has on managerial attention, and on the effects of budget tightness or attainability on managerial expectations and effort.

Information systems concepts can make a significant addition to this coverage. The first contribution comes from the introduction of the notion that implementation is a process of planned change. This highlights the effects of participation on system acceptance and use. It also points out that other changes -- in organizational relationships, training programs, and so forth -- may have to be made to insure the effective adoption of a system. In other words, the information system contribution at this phase is to focus on getting the system used at all; topics covered here could complement the usual managerial accounting approach, which focuses on the likely impacts of that use.

Exhibit 2 shows one other information systems topic under the insuring-use-of-information phase. Discussion of the problems of interface design -- how users interact with the system, the facilities available for data input, output, and user manipulation of data -- should help cost control system designers make their systems more usable.

The sixth phase in the cost control process, responding to information, is covered only lightly in the usual managerial accounting course. The usual course distinguishes between corrective responses and adaptive responses to information, and discusses the conditions under which each is likely to be appropriate. Some courses introduce information economics concepts, usually with emphasis on variance investigation decisions. The information systems curriculum also incorporates

information economics concepts. In general, however, this is the one phase of the cost control process for which information systems concepts appear likely to make no net addition to concepts from other sources. As a result, the right-hand column in the sixth row of Exhibit 2 remains blank.

The final phase in the cost control process, keeping the system current, is a topic not covered in most courses on cost control, but it is of critical importance for real systems. The relevant topic here is the system life cycle concept.

Our conclusion from this attempt to integrate material from these two areas in the business curriculum is that coverage of information systems topics adds to the discussion of cost control in several ways. In some cases, it fills in where the typical cost control course has little to say -- e.g., at the choosing the means of producing information phase. In other cases, the information systems issues provide a general framework and the cost control issues provide a specific context for discussion -- e.g., establishing the need for information. Finally, in still other cases, the information systems coverage provides a different perspective on the question at hand -- e.g., insuring the use of information. In each of these cases, we believe that incorporating the information systems material could enrich the typical cost control course and would make the presentation of cost control systems more realistic.

FOOTNOTES

1. Phillip Ein-Dor & Eli Segev, Managing Management Information Systems, Lexington, Massachusetts: D.C. Heath, 1978.
2. Enid Mumford and Mary Weir, Computer Systems in Work Design -- The ETHICS Method, New York: Wiley, 1979.
3. The five fits are: (1) knowledge fit, concerning the use and development of skils and knowledge; (2) psychological fit, concerning aspirations for achievement, recognition, status and responsibility; (3) efficiency fit, concerning the balance of effort and rewards; (4) task-structure fit, concerning the variety, interest, feedback, autonomy and identity of tasks performed; and (5) ethical fit, concerning the compatibility of values between the individual and the organization.