User Involvement in Office Automation:
Overcoming the Barriers

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April 1993

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Abstract

Although the value of user involvement in facilitating change is generally accepted, its application has proved to be quite difficult. Key obstacles to the effective implementation of user involvement emanate from a number of sources, prominent among them being those associated with the lack of competence of users both technically and psychologically to contribute positively to the systems development process, a misconception of the prevailing organisational climate, and the lack of an effective medium and methodology for participation.

A new approach to user involvement in office automation is presented in this paper. The distinctive features of this approach include a focus on evolutionary learning and participation prior to the introduction of new computer-based office systems; a coherent strategy that addresses contextual variables at the individual, group and working environment level; a computer-aided mechanism that facilitates and guides the process of knowledge assimilation, user analysis of requirements and group interaction; a capability of adapting to different organisational contexts; and finally, an interface to selected system development methodologies.

This approach has been successfully implemented at several user sites in Egypt.
1. Introduction

When the concept of office automation was first introduced, it was hailed as a universal panacea for solving many office problems. Exaggerated claims about opportunities for enhancing productivity and gaining a competitive edge were made by numerous vendors. Many organisations, large and small, rushed to embrace the new technology, particularly after the significant drop in the size and cost of hardware. This incorporation of computer-based technologies into the office - generally referred to as office automation - brought many people into more direct contact with the technology, and provided a potential for faster and easier access to information and computing power in general.

The new technology, however, did not in many cases live up to the high expectations associated with its use (Pava 1983, Hirschheim 1985, Long 1987). Focusing on the technology to the exclusion of other human, social, and organisational aspects associated with technological change, has often resulted in problems and system implementation failures. Excellence in technical design alone did not guarantee system success (Baronas and Louis 1988).

The following are among the keys obstacles that impeded the effective implementation of office automation:

*Problems associated with human adjustment to new technology and to change (Tapscott 1982, Kling 1983, Matherly and Matherly 1985) lead to resistance and an unwillingness to relinquish existing systems for new ones (Markus 1983).

*The difficulty of determining system requirements for, and by, non-technical users (Tapscott 1982).

*Issues related to the pluralism in organisations, the political aspects of information systems and the link between information and power (Keen 1981).
*An incomplete view and, possibly 'faulty', understanding of the office environment, by both designers and implementers (Wynne and Otway 1983, Grusec 1985). and an inadequate understanding of the nature of office functions (Damodaran 1986).

*The neglect of important organisational and social issues such as organisational restructuring, organisational learning, and cultural change (Pava 1983).

*The absence of mechanisms for diffusing office technology and integrating it to the organisation (Keen 1983).

Given the above human, social and organisational problems, user involvement and participation was called upon to supplement the quality of technical design in several approaches to systems development (for example, Mumford and Weir 1979, Hedberg 1980, Mumford 1981, Land 1982, Pava 1983, and Hirschheim 1985). There has been growing belief that vendors and technical specialists are not in a position to handle such problems effectively. Eason (1983) notes that "it is far better that the pressures for change and growth come from within from informed users than that changes are imposed in a revolutionary way from outside".

The effective implementation of user involvement has, however, proved to be quite difficult. Several reasons associated with the user and the organisational climate have been advanced to account for this difficulty (see, for example, Damodaran 1977 and 1986, Eason 1982, Mumford 1983, Hirchheim 1985). One of the obstacles to participation is the fact that many of the users are non-technical (Chesney and Dickson 1982, Hirschheim 1985, Damodaran 1986) and even if they are not resistant, their inadequate knowledge about the potential and impact of the technology renders their participation ineffective. Kemp (1987) indicates that the level of a awareness of the opportunities available with information technologies are poorly understood by policy makers who further underestimate the associated social and psychological implications. Moreover, there is no adequate information about when and how much user involvement is appropriate (Ives and Olson 1984) and about the specific mechanisms through which involvement is liable to take effect (Robbey and
Farrow 1982). Bronsema and Keen (1982) further note that although the implementation literature emphasises the need for user involvement, it fails to provide techniques for making it effective.

2. Problems and key issues addressed

A realistic approach to user involvement within the context of the office has to take a global perspective and address concurrently the major human, social, and organisational obstacles associated with this seemingly familiar domain.

This paper responds to such a need and proposes a coherent user involvement strategy that addresses within its framework:

* Users' attitudes and resistance to technological change.

* Users' lack of orientation with respect to the potential of the new technology and its possible implementation.

* Group behaviour, manifested in conflicts of interests and intra-organisational power and politics.

* The need for a conceptual framework through which to perceive the office environment and office work.

* The need for a mechanism and a methodology for effective participation.

The proposed approach focuses on the non-technical potential users of computer-based office systems. It conceives of 'early' learning, progressive participation, and guided group interaction as vehicles for activating the involvement of such users.
The approach presented in this paper evolved as a result of cumulative observations and surveys grounded in active experience, as well as exposure to empirical findings obtained by other practitioners in the field. The application context is the Egyptian office environment.

3. **Rationale**

3.1 *Contextual and implementation challenges*

Among the many problems facing Egyptian offices, particularly in the public and governmental sectors, is a growth in the number of office workers that has not been accompanied by an appropriate growth in productivity. A high level of bureaucracy, and a low level of awareness about, and use of, new office technology tools, characterise the majority of these offices.

In Arab countries in general, two major problems face offices in various organisations (El Hady 1982): first, the inadequate attention given to office work with respect to keeping pace with technological development and new methods and tools; and second, the lack of emphasis placed on the subject of office automation in existing educational institutions, leading in turn to a shortage of expertise in this area.

3.1.1 *General observations*

Contact with management and support staff in both private and public sectors in Egypt revealed many difficulties encountered in association with new office technology. Inadequate information about the potential and impact of information technology, shortage of expertise, low quality of training, conflicts of interest and power, and the absence of a guiding mechanism have made the introduction of new technology a rather haphazard, piecemeal process with limited or hardly any productivity benefits. There are many cases, particularly in the public sector, when equipment was purchased and simply gathered dust from lack of use! In some cases the decision to introduce new technology was not based on real needs, but was possibly taken to adhere to an overall policy, or for very superficial reasons, such as, wanting to keep up-to-date. Non-technical managers have found
great difficulty in choosing the 'right' technology considering the wide array of tools and the pace of change. Lacking experience, they also found difficulty in analysing their working environment, and in specifying problems and needs. People in a number of offices have expressed their need for guidance and support in understanding, coping with, and managing the new technology. Resorting to external 'experts' or consultants for assistance has often proved unfruitful and costly.

It is such problems and needs, combined with a scarcity of skilled people, and escalating office costs, that provided the initial impetus for the development of this approach.

3.1.2 Specific case study

An investigation of the reaction of managerial staff to changes in management techniques, procedures and tools in one of the main intercity bus companies in Egypt brought forward a number of interesting findings (Hozayen 1986). The changes incorporated the establishment of information units in each company equipped with computers, and qualified personnel. Links were to be established between the information unit and all other departments in the company. Other changes, related to policy formulation and service planning, were also introduced. Resistance of top and middle management to the introduced changes was analysed using a random sample of 7 top management officials out of a total of 15, and 18 middle management staff out of a total of 42. The results of the analysis indicated that lack of knowledge was the main reason for opposing changes, particularly for top management, followed in rank by other reasons such as 'not convinced', 'insufficiently trained', and 'individual job importance threatened by change'. Top management and middle management were asked later to provide suggestions for achieving staff adaptation to changes. 'Increasing knowledge' and 'convincing company employees' were the most important suggestions given for achieving staff adaptation to change. 'Gradual introduction of the changes' and 'training' followed next in rank.
3.1.3 *Local environment scan*

To consolidate the above findings, a limited scan of the local office environment was next conducted. The target was twofold, firstly, to elicit users’ attitudes towards information technology, and secondly, to determine actual needs, problems and existing technologies in Egyptian offices.

Questionnaires and informal interviews were used as the primary methods of data collection. (See Kaddah 1990 for more details). The major findings obtained after processing the data can be summarised as follows:

1. Of the sample of users interviewed who had no information technology background, 60% tended to reveal mixed and contradictory attitudes towards the technology.

2. Providing users with information technology orientation prior to participation had a positive influence on their attitudes towards technology, and their ‘readiness’ for involvement.

3. Users with no information technology background, displayed minimal interest in participation and considered as obstacles to participation: difficulties in expressing computer-based technology needs, difficulties in describing the office environment, inadequate technological background, and conflicts with colleagues.

4. The analysis of user’ needs with respect to a selected number of information technology educational facilities revealed that self-education packages ranked highest, followed by video-films. There was no significant demand for reading or regular courses.

3.2 *Call for research*

A review of the literature has been conducted to search for approaches and/or mechanisms that address the contextual challenges presented in the previous sections.
It was found that neither with the traditional technology-led approach nor even under the more recent socio-technical approaches do end-users become involved until the analysis process has been initiated. The end-users have had no prior preparation and, in consequence, have been ill-equipped to contribute effectively during the system development cycle.

The issue of user 'readiness' or 'predisposition to become involved' (Ives and Olson 1984), prior to the initiation of any system development effort, has not received adequate attention from researchers.

Eason (1992) reports that although with user involvement the influence of users has moved to an earlier phase of the design process, they needed time before they were capable of making an effective contribution, and by then the design was "frozen" and there was only a limited "window" through which users may influence design decisions.

The behaviour of individuals in organisations may in fact be viewed as operating at three levels, the individual, the group and the organisation (Gibson, Ivancevich and Donnelly 1985). Given this multi-level perspective there is a need for a coherent user involvement strategy that addresses the issue of user 'readiness', in conjunction with other critical and related issues, among which are group behaviour, conflicts of interest and power, and environmental forces.

In general, a review of a number of approaches to systems development (Kaddah 1990) selected on the basis of their high user involvement potential and their applicability to the office environment has revealed the following:

* Despite the emphasis placed by participative approaches on user involvement, particularly during the analysis and design stages, the 'professionals' are still relied upon heavily due to their expertise and experience. This may result in a low level of user involvement and influence.

* The education of users is advocated by almost all approaches, but mechanisms that specify what users should learn, when, and how, are not adequately specified.
Although conflicts of interests and power are acknowledged by the different approaches, mechanisms that enable negotiation, confrontation, and bargaining to be carried-out as part of the systems development effort have not been clearly specified.

Research on the subject has further revealed that in actual practice, user involvement has in fact received little attention during the design and implementation process (Willcocks and Mason 1987). Rarely do users report that they had been meaningfully involved (Long 1987). The fact that participation is carried out under the guidance of computer professionals causes doubts about its effectiveness (Nurminen 1988). Thus, even an approach such as ETHICS, which has been highly rated in the research community has been little used in practice (Willcocks and Mason 1987).

4. Proposed solution

What is really needed is an approach that combines different concepts, dimensions and techniques from other approaches, but with, possibly, a different strategy, and additional tools, to overcome the obstacles previously outlined. A different perspective on user involvement and participation is also needed, whereby users are perceived to be leading the development process, and computer professionals participating, possibly as facilitators and technical consultants. For this to happen, an early start is necessary, whereby the involvement of both individuals and groups in the analysis of their working environment and the need for change, is 'meshed-in' with a learning and guiding process that has a number of dimensions (see figure 1).

![Figure 1 A new perspective on user involvement and participation](image)
A strategy and mechanism designed for this purpose are the focus of this paper.

5. **A strategy for activating user involvement and participation**

5.1 *Features and outcome of the strategy*

To overcome the obstacles previously outlined, this paper proposes a strategy and appropriate tools designed to activate user involvement in office automation. The strategy has a number of distinct aspects; *first*, it focuses on the problem of user acceptance of new technology prior to its introduction; *second*, it proposes a comprehensive approach which tackles issues at both micro and macro levels manifested in individuals, groups and their organisational context; *third*, it views learning and participation at the early stages as enabling vehicles for enhancing users' predisposition to involvement; *fourth*, contingencies are incorporated to allow for differences in organisational and political climates, and to enhance the flexibility of the strategy; *fifth*, it views the office as an open system and provides a global, conceptual model of its environment; and *sixth*, it proposes a user learning and participation methodology, and illustrates how it interfaces with other systems development methodologies.

Designed to orientate and mobilise users, the strategy is also geared towards the generation of other tangible outputs in the form of assessment documents. The generated documents reflect users':

- analysis of their working environment.
- assessment of needs and required resources with respect to information technology.
- vision of a future office automation plan.

By reflecting user' real needs and perceptions, such documents contribute valuable input to the systems development process. They make user participation real, effective and influential.
To achieve the objectives of the strategy, a learning and participation process is implemented whereby learning is perceived to be a vehicle for activating user involvement, and is 'meshed-in' with other processes involving group interaction and early progressive participation in the analysis of problems and needs. Based on evidence that attitudes change with direct experience of the technology (Kemp 1987), the process utilises a computer-aided mechanism to provide users with the necessary interaction and skill-acquisition capabilities. Figure 2 illustrates the learning and participation process.

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**LEARNING**

- Knowledge, Skills, Attitudes
- Phased Individual and Mechanism Interaction

**PARTICIPATION**

- Organisational, Social, Human, and Technical Issues and Needs
- Guided Group Interaction

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*Figure 2* The learning and participation process

To activate user involvement, learning and participation supplement one another through a feedback process, based on a phased and evolutionary approach. Simply stated, users interact individually with a computer-aided orientation mechanism designed to generate knowledge and skills, and to shape attitudes. The mechanism operates in four phases and provides guidelines for group interaction following each phase. The knowledge and guidelines provided to users in turn generate a new set of perceived issues and needs that require group investigation and consensus.
interaction therefore takes place after each phase to relate what individual users have acquired to their own specific environment, given the guidelines generated by the mechanism. During such group interactions (possibly with the help of a facilitator), individual differences of competence and of interest are recognised and, hopefully, resolved or minimised, and efforts are coordinated. The outcome of group interaction is a document that reflects users’ responses to the various issues and an assessment of their needs. The content of this document is fed back into the mechanism for subsequent retrieval, and, if necessary, updating by users whose experience and awareness evolve from one phase to the next. This process is repeated for each of the four phases of the mechanism.

5.3 Phases of orientation and involvement

The knowledge base, a critical component of the mechanism, is divided into four ‘phases’. Each phase is divided into ‘modules’ which in turn are divided into ‘topics’. The first module of each phase presents the learning objectives for that phase. Each phase also includes a self evaluation module for the reinforcement of the knowledge acquisition process. Group interaction occurs at the end of each phase and a module is dedicated to group interaction guidelines and feedback. A brief overview of the phases follows.

Phase 1 ‘The office environment’

Realising the importance of developing a clear conceptual model of the office (Christie and Gardiner 1987) and of understanding the nature of office work, the first phase is not about technology at all but about the ‘office environment’. A conceptual model of the office designed to guide users in their analysis of their work environment is presented in this phase. A description of the model is provided in section 5.4.1. During subsequent phases, the significance and impact of technology is visualised through this conceptual framework. With the assistance of guidelines, users are encouraged to investigate their own working environment and to identify problems and needs.
Phase 2  'Information technology and the office'

This is an exciting phase for users because it draws them closer to the technology. Having gained a broad perspective of the office and nature of office work in phase 1, users become aware of the ways technology can be used to increase the productivity and effectiveness of an organisation. Through hands-on training, users become familiar with popular office automation tools such as word processing packages and spreadsheets.

Phase 3  'Planning and developing office systems'

This phase familiarises users with the process of planning, developing, and implementing office systems. It enables them to develop a preliminary vision of the process and of their roles as participants in the introduction of new technology into their workplace.

Phase 4  'Getting ready for participation'

This phase enables users to store, modify and retrieve the initial documents that they have developed during the previous three phases and subsequent group discussions. They finish the orientation package with a valuable analysis document on how office automation might best be applied in their own organisation.

5.4  Key concepts and techniques

5.4.1 A conceptual model of the office

As Doswell (1983) commented, the knowledge most people have of the office, is "a poor unthought-through kind of knowledge from which comes no real comprehension of the surrounding environment". One of the key concerns of the proposed user involvement strategy has been to overcome this obstacle. A conceptual model of the office has been constructed, to describe the office in its totality and to provide users with a means of understanding the relationship between
components of the office and between the office and its environment. Figure 3 outlines the conceptual model of the office.

As illustrated, individuals form the core of the office and are influenced, driven, and constrained by various internal and external forces, perceptions, and structural variables. Individuals are responsible for a certain level of performance and goal-achievement through the fulfilment of functions, processes and activities. These are carried out to satisfy the needs and requirements of other individuals in the office and the needs and requirements of the external environment. This in turn exerts forces in the form of new input, demands and constraints which impact the behaviour of individuals and groups in the office. By understanding this dynamic aspect of their working environment and by identifying the different variables that impact their behaviour, individuals can adapt more easily and prepare for change in advance.
The design philosophy of the model has been based on a number of factors derived from different conceptions of the office (Hirschheim 1985):

**Office view**: the model postulates the existence of both rational and irrational elements in relation to the behaviour of people in offices and the work they perform. The model therefore embraces both interpretivist and analytical perspectives.

**Focus**: people in offices at the level of individuals and groups are considered the key ingredients in the model. They are the driving forces and accordingly the targets for transformation. The successful introduction of technology into the office is based on their understanding of their work environment and the capabilities of the technology, as well as on their effective involvement.

**Target Office**: the model is not targeted towards a specific office, it is a general framework designed to convey a global picture of the different components that constitute any office.

**Purpose**: the model is intended to help individuals view their office environment from a wide and comprehensive perspective, and to guide them in the collection and analysis of relevant data at the individual, group, and organisational level.

**Approach**: the design of the model is based on systems theory and the concept of an open system. The office is viewed as a complex system formed of a set of interrelated components. It is also part of a wider system, the external environment with which it interacts, manifested in other units within the same organisation or outside of it, such as customers, suppliers, and government agencies.

5.4.2 **Skill acquisition**

A key aspect of the mechanism is to provide users with what Eason (1984) refers to as a "risk-free, non-threatening environment", in the context of which they become familiar with some of the most pervasive office tools, for example, word processing and spreadsheets. Phase 2 of the computer-
aided mechanism introduces users to information technology and office automation and provides them with some office tools. Based on their profile, users can select one of the tools, and use it to different levels of depth depending on their needs.

Before any tool is invoked, users are provided with simplified information about the functions supported by the tool as well as some operational information. As the office tools provided have not been developed specifically for the mechanism but have been selected from what has been available locally, screen dialogue and formatting varies from one tool to another. To avoid confusing users during the operation of the tools, background help as well as 'hot' help is provided through a window that accompanies each screen to clarify its purpose. This feature is designed to simulate to a certain extent the support provided by a facilitator or technical expert and to enable users to proceed somewhat independently along the learning process.

5.4.3 Group interaction

In recognition of the political and social aspects of organisations and information systems (Keen 1981), and the importance of team problem solving, open communications and confrontation of differences (Lawrence and Lorsch 1967 Maier 1967 and Boland 1978), as effective approaches to conflict resolution, the group interaction component of the strategy is a technique designed to elicit individual and organisational needs, and to address conflicts of interest and power, individual differences, and group behaviour in general. It enables users to share the knowledge they have acquired and to relate it their working environment. To keep users on 'track', guidelines are provided as 'openers' for discussion. The group response to the guideline represents a valuable user assessment document.

Group interaction sessions do not take place once but at the various stages of orientation, to minimise the complexity and overlap of issues connected with the office and information technology. They begin by introducing users during phase 1 to an environment with which they are familiar. This provides them with an opportunity to relate their knowledge and experience to what is then newly presented. As an illustration, users discuss in their first sessions, objectives and goals,
functions, activities, procedures, resources, and structure, and identify each according to its attributes, interrelationships and problems areas. In the second phase, knowledge about the potential and impact of the technology is provided and users are required to discuss areas where office systems may improve the effectiveness of the organisation, for example, job satisfaction, communications, administrative support, and decision making, and to relate all this to the reference base established during phase 1.

5.4.4 Self-evaluation

In each of the first three phases, a self-evaluation module is incorporated to reinforce the knowledge acquisition process and to enable users to gain confidence and acquire a sense of achievement and satisfaction. The module offers users three question sessions to allow them to pace themselves. User are allowed to navigate back and forth from the self-evaluation module to the other modules to enhance their understanding of topics.

When the self-evaluation module is invoked, two operations take place, parsing and evaluation. Based on the user's choice of a particular session, the selected set of questions are then parsed based on their type (multiple-choice, fill-in blanks or true and false) and communicated to the evaluation module. For each question the user is allowed two attempts, after which the correct reply is displayed.

5.5 Learning and participation methodology

5.5.1 Description of the methodology

To implement the proposed user involvement strategy, a learning and participation methodology is outlined in this section. It illustrates all the steps involved from the moment it is activated until it terminates or interfaces with other systems development methodologies. Figure 4 illustrates the logical flow of the methodology. As shown it can be divided into three broad stages:
Stage 1: Establish initial contact, assess climate and identify participants.

Stage 2: Initiate the learning and participation process.

Stage 3: Formulate philosophy for orientation diffusion/proceed along development path/terminate.

The first step in stage 1, establishing initial contact, will take place either through:

1. An internal trigger from within the user organisation, by a member of management or staff, who is aware of the methodology and mechanism, or is seeking facilities for orientation and involvement;

2. An external trigger, through vendors, agents or facilitators assigned the task of providing orientation and/or introducing new technology.

In recognition of the differences between one organisation and another, the next step in stage 1 is to assess, in general, the working environment and to identify major participants, all or some of whom can become change agents during subsequent stages. The outcome of this step is dependent on a number of situation variables, such as the size of the organisation, its culture, structure, and power distribution. The quality of the assessment is also dependent on the insight of the external facilitator and the cooperation of the user(s). Based on this preliminary assessment of the organisation, participants - potential change agents - are identified.
Figure 4  A learning and participation methodology
By the conclusion of stage 1, the learning and participation process is now ready to start. This is the main concern of stage 2, and the core of the methodology. A phased approach is used whereby individuals interact with the technology and the group in four phases which proceed methodically to enable users to:

* Learn about and explore their office environment and the new technology;
* Generate, with the help of guidelines and group negotiations, assessment documents regarding the office and the new technology.

During the third stage, users may proceed in different directions depending on various situational variables. If more users need to undergo the same iteration, a decision has to be taken by management or someone with authority - preferably from those who have already participated - about the approach to be used in diffusing this process and involving more users, to determine, for example, what are the priorities, the number of individuals or groups, the need for the facilitator in further iterations. The vision formed in the first iteration is often helpful in guiding this decision. Once these issues are decided, new participants are selected, and the process is initiated again. If there are no more users, then a decision to proceed along the path of introducing new technology, or to terminate has to be taken. If the organisation decides to proceed, then the outputs from the learning and participation process in the form of assessment documents, and, more importantly, oriented and involved users, are input to the next stages of the systems development cycle. It is at this point that the learning and participation methodology needs to be interfaced with other systems development methodologies. Finally, if the organisation decides to terminate or postpone a decision, then the process stops.
The choice of an appropriate systems development methodology is not always a rational process. It depends on many variables, such as the state of awareness of the users about existing methodologies, the prejudices of available analysts and consultants, the methodology already in use (if any), the type of application and the degree of urgency.

In practice, it is anticipated that linking the learning and participation methodology to systems development methodologies will not pose any real problems. The link will most probably take place at the analysis stage, prior to the design stage. The contribution of oriented and involved users is expected, however, to extend beyond the initial stages. Having experienced the learning and participation process, users become familiar with basic terminology, concepts and issues related to the technology and the analysis of their environment. Some users may become more technically sophisticated, and, in turn, be even more capable of contributing to the systems development process.

To illustrate the interface two example methodologies are briefly considered.

(i) Modified systems development life cycle approach

In recognition of the major deficiencies associated with the life cycle approach, mainly its rigid and technical orientation, and its tendency to disregard human and organisational issues, Long (1987) proposed a modified version designed to overcome such deficiencies. A checklist of major human resource and organisational issues is incorporated into the various phases of the systems development life-cycle. Realistic responses to the questions included in the checklist necessitate the active participation of users. However, users need to be motivated, oriented and willing to be involved, to be able to participate during the different phases. Producing such users is the main concern of the learning and participation methodology.
Prior to the initiation of the life cycle approach, the learning and participation methodology can be activated. Its outcomes in the form of user assessment documents cover many of the issues raised during phase 1 of the modified life cycle approach, which is concerned with conducting a feasibility study and identifying needs. Oriented and involved users are also able to contribute to both the initial and the more advanced phases of the life cycle approach to different degrees.

(ii) **Multiview**

Despite the hybrid orientation of Multiview and its concern with 'human activity systems' and socio-technical aspects, it has been criticised for its reliance to a great extent on 'professionals' rather than users. By interfacing the learning and participation methodology with Multiview, this problem can be alleviated. For example, the first stage of Multiview, 'Analysis of Human Activity Systems' is concerned with analysing and identifying the purpose, problems and information needs of the organisation where unprepared non-technical workers would certainly find difficulty conducting such activities and contributing meaningful input.

Moreover, another aspect of Multiview is its exploratory and contingent orientation. Unless users are adequately oriented and involved, they would not be in a position to decide or participate in determining whether a particular aspect or technique of Multiview is appropriate to their environment. The professionals will prescribe specific aspects and users will remain inactive. By implementing the learning and participation methodology prior to Multiview such obstacles can be to a great extent alleviated.
6. An implementation case: activating top management involvement

The strategy presented in this paper has been successfully implemented at several users sites in Egypt. This section presents one of the implementation cases to illustrate the potential of the approach, as well as the problems encountered during implementation.

6.1 User organisation

The context of this application is an Egyptian governmental institution responsible for planning and follow-up, on the macro level, of: production, national income, consumption, exports and imports. The institution consists of two key divisions and several sectorial divisions. A number of departments is affiliated to each division. The sectorial divisions are responsible for gathering data from external sources, processing it, and feeding it to the two key divisions, one responsible for follow-up, and the other for preparation of the plan. The managers of these two divisions are the key decision makers. They are a little over middle age and perform work that is largely unstructured using their intuition and judgement that had evolved out of long experience. They have had no previous computer orientation and were inclined to believe that new technology could not contribute much in their line of work (planning and decision-making). They also displayed resentment at any external interference in what they considered confidential processes.

6.2 Background

Prior to the introduction of the mechanism, two trials had taken places to introduce information systems into the institution:

* In 1985, an external group was assigned, by the chief of the institution, the task of developing an integrated computer-based systems to support the operational and decision-making activities of all divisions. Systems analysis was conducted in the traditional way and a proposal was prepared. No action has been taken, as a result of users' lack of enthusiasm. No attempts has been made to activate users' motivation regarding the new system.
In 1987, another external group from an institution whose mission is to support the establishment of information and decision support systems in existing governmental organisations had attempted to introduce another system to support the managers responsible for the two key divisions. The design of the system was based mainly on the expertise of the external group and their previous experience in similar areas. The users were scarcely involved. This attempt failed for obvious reasons.

6.3 A strategy for user involvement and participation

Two years later another group from the same institution was assigned the task of developing an information and decision support system for the two key divisions. Having been informed about the previous attempts, this group decided to pay more attention to human factors from the very start. The first step taken had been to establish good relations with the top managers in the two key divisions. Issues that previously caused worries and concerns, such as, confidentiality and ownership of data, and the flexibility of systems in allowing for judgement in decision making, were brought out in the open and discussed. This approach mobilised the top managers’ interest and they expressed their willingness to participate in the development of a new system. However, considerable difficulty was encountered in eliciting the required information from them. This may have been due to their lack of orientation about information technology or to a combination of other factors. For example, the processes and procedures connected with many functions were not clear and were not documented; and the relation of the offices in the two key divisions to other offices in the same institution, and to offices in external organisations was not clearly specified. The two top managers were reluctant to show that they lacked adequate knowledge. It was clear that the effective participation of the two managers necessitated that they become better oriented in the area of information technology and systems development. They also needed to perceive their working environment from a more global perspective, and to prepare an appropriate infrastructure in the institution for the introduction of new technology and new systems. This required, for example, organisational restructuring, manpower development, and equipment acquisition.
The two managers were told about the mechanism by the external systems analyst and they agreed that an intervention to the planned flow of systems development activities take place. Two microcomputers were installed in the offices of the top managers and the mechanism was demonstrated. With the help of the external systems analyst, who was the major facilitator, the two managers were led through the different phases of the mechanism. Key members from different divisions were then asked to go through the same experience. One of the two top managers became himself a facilitator for the other members. The user assessment document prepared jointly by all members in response to the guidelines generated by the mechanism was considered an excellent analysis document by the external systems analyst. It was used during a subsequent stage in the development of the required information and decision support systems.

6.4 Achievement

* One of the two managers asked for more intensive training in some areas, for example, more sophisticated use of spreadsheets in analysis for planning and decision-making. Training in the 'DOS' operating system, database management, and spreadsheets was requested for the other staff members from the sectorial divisions.

* A team consisting of representatives from each sectorial division, and supervised by one of the top managers, was set up with the purpose of participating in the development of the information and decision support system already initiated.

* A better and closer relation was established between the external systems analyst and the internal participants (managers and representatives).

* An analysis of the working environment was carried out during group interaction, resulting in a clearer outline of the functions performed by the sectorial divisions in relation to one another and to the two key divisions.
Participants subjected to more intensive training, joined in the development of the new system. Some participants made excellent suggestions for the design of data collection forms.

Most participants agreed to work after regular hours to complete the system in a short period of time.

6.5 Difficulties and remedial action

The English language was a barrier to some of the participants, particularly the non-managerial staff members - the Arabic version of the mechanism is still being developed. The external facilitator had to exert extra effort to overcome this obstacle. He made a presentation in Arabic and a demonstration of the mechanism explaining its purpose and philosophy, before the learning process started. The guidelines generated by the mechanism were also translated into Arabic.

The concept of computer processing was not clear to some participants. They could not get a 'feel' for the processing capability of computers in terms of its significance to their own work. To overcome this obstacle, the facilitator demonstrated to the participants two previously developed systems related to their line of work. They discussed at length the relation of the input to the output and the processing operations performed by computers. This was definitely helpful.

7. Conclusions and further research

The user involvement strategy presented in this paper has two major ingredients: a management ingredient, in the form of a methodology, procedures and intervention techniques to control the learning and participation process and outcome; and a technology ingredient, in the form of a computer mechanism to provide the tools to be manipulated by the process and to provide the necessary interaction with, and exposure to, the technology.

Designed to keep pace with, and to contribute to, the systems development process, the strategy is geared towards the generation of specific outcomes. In additions to oriented, mobilised and involved
users, other tangible outputs in the form of assessment documents are generated, reflecting the users' analysis of their working environment, an assessment of needs and required resources with respect to information technology, and a vision of a future office automation plan. The strategy has already been successfully implemented at several sites in Egypt.

Despite its success further research is needed as follows:

*To determine appropriate approaches for the introduction of the mechanism in different organisational contexts to reduce dependency on the skill and insight of the individual facilitator.

*To explore the possibility of making the mechanism more adaptive to the needs of office workers with various profiles and skills levels, the knowledge base and office tools need to be further customised to satisfy the needs of the various categories of office workers. Additional enhancement of the user interface is recommended to make it more adaptive to changes in user skill levels.

*To assess the effectiveness of the mechanism in influencing user involvement and participation, and the need for appropriate modifications and enhancements, measures of user involvement and participation for the purpose of evaluating the effectiveness of the mechanism need to be developed.

*To conduct a more intensive study of the interface with other systems development methodologies, further work is needed to develop, for example, better guidelines for producing more effective user assessment documents and relating this output to the input requirements of the target systems development methodology.

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