

# **Recurrent Problems in Systems Implementation**

by Kefyalew Mandefrot  
E-mail:mandefro5@ca.inter.net

**Keywords:** End-user computing and training, management information systems, systems implementation, social aspects of computing, technical culture, and adult learning

Kefyalew Mandefrot is a graduate from the University of Toronto Graduate School of Education with Ed. D. and a former COBOL programmer. He is currently a private workplace education and training consultant. His research interest is understanding how people, technology and organizations interact in learning and using modern technology and adult learning.

Paper prepared for Organizational Systems Research Association 2002 Conference

St. Louis, MO, February 21-23

# **Recurrent Problems in Systems Implementation**

## **ABSTRACT**

This paper is the result of personal reflection on computing literature and on the implementation of ZMS. The study has been conducted by the writer using ethnographic methods (participant observation, interviews, group discussion and document analysis) in order to sensitize practitioners to common, recurrent problems in technology introduction. It attempts to shed light on the commonality of human and organizational problems in computer applications, both in business and education. The paper shows why human and organizational issues are minimized in systems implementation in terms of technical culture, the perceptions of programmers, and lack of management support. Despite the importance of human and organizational issues, research in Management Information Systems (MIS) is still technology-led. Yet, computing problems are in the main organizational problems. Attention given to the role of human and organizational issues in information systems is still minor. In business and education, computing infrastructure is taken for granted. The problem requires educators and managers to question current approach to computing so that MIS and educational technology resources can be used effectively.

It is paradoxical, but true that even as we are developing the most advanced... technologies, we must depend increasingly on informal modes of learning, design and communication” (Hirschhorn, 1984, 169, in Star, 1995, p.189).

## **Recurrent Problems in Systems Implementation**

### **Introduction**

The objective of the writer is to identify some problems and lessons learned from the implementation of new Management Information Systems (MIS) at BB insurance company in terms of available knowledge in MIS and education research literature. The first section presents review of literature, and is followed by a section that presents ZMS implementation. The last section discusses problems related to technical culture, suggests possible solutions, and presents personal reflections.

This writer previously examined the nature, availability, and context of end-user computer training (Mandefrot, 1997). He considers the focus on current problems important, because, as Rowan and Reason (1981, p. 122) noted, without understanding these problems and the human side of systems implementation, “we are condemned to repeat the existing social categories as if they were the limits of what could be true.” In order to help us understand and avoid common, recurrent problems in the use of MIS, the following section discusses problems noted in business and education literature.

### **Common, Recurrent Problems in Business and Education**

Despite the body of research in organizational culture and end-user computing there is no explicit definition of human and organizational issues (Doherty and King, 1998). In this paper human and organizational issues mean support, training, communication, policy, procedures and work practices. They include human, social, and subjective elements that are mostly intangible.

The crucial role that organizational issues play in Information Technology (IT) development and implementation are well recognized. For example, Roepke, Agarwal, and Ferratt (2000) show that the greatest impediments to success are often related to people rather than to information, technology, and systems. Report on Business (2001) also indicates that computing problems are all related to human problems.

In his paper on recurrent issues in MIS, Ginzberg (1981), presents how critical the organizational issues are in learning and using Information and Communication Technologies (ICTs). Lederer and Sethi (1999) indicate the commonality of pitfalls and unmet expectations in IT because of lack of attention to human and organizational issues. Hellman (1992) discusses the persistent failure of end-user computing to achieve its objectives because of lack of attention to human issues.

Furthermore, Eason (1988), Long (1989), Kling (1980), Kling and Scacchi (1980, 82), and Robey and Boudreau (1999) clearly show that non-technical aspects of computing are major problems in systems implementation. To bring foreword organizational and human problems in the computing environment, the September 1996 and the July 2001 issues of the ACM are devoted to technology transfer and to IT related human resource problems. Yet, aligning IT related human resources with business is still at an embryonic stage (Roepke et al, 1998).

According to Weiner and Brown (1989, p.10), some of the problems with IT implementation arise from the fact that managers do not anticipate and still do not really appreciate the human dimensions involved in the implementation and use of MIS resources. Organizational, human and social aspects of implementation issues are not the concern of systems professionals (Doherty, and King, 1998, Eason, 1988).

Lack of organizational commitment and support for human and organizational issues are still reported as major problems. The problem persists mainly because organizational issues and computing infrastructures are often taken for granted as being optimal and ready to serve. DeMarco and Lister (1987) urge computer experts to remedy this problem by including the human dimension and integrating the technical research with relevant behavioral research in Information Systems (IS). The non-technical aspects continued to be neglected,

however. While the above reports concern MIS use in business and industry, similar problems are also reported in educational computing. The next section presents computing problems observed in educational communities.

### **Experience from Educational Computing**

The study conducted by Zammit (1992, p.65) reports that “in the history of computers in schools, it has been easier to approve expenditure to purchase equipment than to pay for time to enable teachers to develop their knowledge and expertise.” Emihovich (1992, p. 505) also notes that “computers are purchased with little thought as to how they will be used, and budgets do not include monies for software and in-service training.” Budget allocation for incidental expenditures related to maintenance, support, and in-service training is insignificant. Legget and Persichitte (1998) further discuss 50 years of technology implementation obstacles as blood, sweat, and TEARS; TEARS is an acronym for lack of Time, Expertise, Access, Resource, and Support.

D’Amico (1990, p. 5) explains short planning in computer introduction as: “computer implementation came too quickly to the district, asked to make a decision to participate in May, installed in July, train staff in August, and begin to use in September.” Hammond (1990) discusses the consequences of rushing teachers and computer users, and notes that coping with the hardware and software questions left teachers drained and frustrated. According Hammond, for teachers, ITs are labor inducing tools rather than time saving devices. Here Hammond is indicating how much computers are still perplexing burdens.

The common approach to computer systems implementation in business and education minimizes the learning process during implementation and rushes workers to use the new systems. But, as Kluckhohn (1942) notes, “If the worker is rushed without warning into a new job where he can not use the skills upon which his self-confidence was based, ... free-floating anxiety ... may burst” (p. 149). Unfortunately, anxiety caused by such computing approaches is mostly interpreted as user resistance.

In addition to anxiety, rushing people to use computers meant wiring offices and classrooms, but not

supporting the computer users. Office computer users and teachers say that they are getting little support in learning how to use the computer (Mandefrot, 1997). In education, the struggle to get PCs is changing now to an effort to get qualified teachers. Who is responsible for computer training, pedagogic, and technical assistance is still unknown, however.

The literature in MIS and educational computing (Clegg, 1993, Doherty and King, 1998, Eason, 1988 and Levin and Rossmore, 1993), clearly shows that organizations face similar, if not identical, common and recurrent computing problems. For example, Shah, Dingley, and Golder (1994) report different culture, different communities, and different and ambiguous languages as the major problem in bridging the gap between users and experts. Orlikowski and Gash (1994), Feenberg (1991), and Star (1995) illustrate how cultural differences are at the heart of problems in MIS. According to the literature, what seem to be technical issues are actually differences in culture, focus, and orientation that are serving as an obstacles to implementation (See Clegg, 1993 for details). Therefore, approaching 'technical culture' from an anthropological perspective is needed to understand the technical culture i.e., commonly called the 'culture of computing' (Star, 1995).

Most computer and management experts consider information as digital, leak proof, and mostly non-human and non-problematic. This is what Kling and Scacchi (1982) identify as the 'discrete entity model of computing'. Discrete entity models of computing minimize the human side of technology and consider resource allocation as non-problematic. In "discrete entity models, all things are equal is the rule while the social setting of technical development and use is largely ignored" (Kling et al, 1982, p. 70). The popular computing approach according to Kling, is the discrete entity model of computing (Kling and Scacchi, 1980, 1982). Discrete-entity model of computing considers computing resources as a basic unit of analysis. It separates use from the actual work practices and other organizational factors. It assumes that computer based technologies have no inherent politics.

On the other hand, Web models of computing considers the social context of computer use as a

major unit of analysis and make explicit the silent connections between technology and its social contexts (see Kling, 1987, for basic assumptions of these two models). Web model of computing focus on the social aspects of computing. The social aspect of computing (Kling, et al, 1980, 1982) is computing where both PCs, and what Hallowell (1999) calls the “human moment”, are made visible in the computing environment. This approach urges us to give equal treatment to the emotion and frustration of the user and to the knowledge of the computer expert.

Web models of computing' use question such as: (1) How are resources allocated for learning infrastructure support, (2) What staff development resources and programs are available; (3) What educational linkages are available to support learning? (Kling and Scacchi, 1982) as a major approach to computing. Understanding these three questions add clarity and transparency to the world of computer application. This can help us differentiate data from knowledge, and access from awareness.

For IT oriented management information systems, the issue is to improve quality, security, backup and recovery. Yet the importance of this issue is mostly not well communicated to users. As a result, users consider these issues as non-essential technical activities. For example, users say:

Computer experts talk about what they call bandwidth, cards, instead of giving us useful knowledge. Their specialist language that emerges daily is not filtering down to most of us. In case of ZMS the talk was about systems and not people. The experts are the active players and we the users are the passive listeners (Mandefrot, 1997).

There is visible difference between discrete entity models (IT) oriented view of computing and a web model (user) oriented view. The first focuses on the problems computing causes, the technology it requires, the methods that should be used, and the means to control computing process. The second, on the other hand, focuses on the problem computing solves, the user's task, and the organizational environment.

For the proponents of the discrete entity model of computing, technology literally means the act of making or crafting. For managers, it means buying hardware, software, and having systems integrators for a month updating systems. This approach to technology removes the human actor from computing, masks the

process involved in crafting things, and disregards the knowledge that people use to accomplish their tasks using computers.

Discrete entity model of computing is the manifestation of computer culture and technological frames (Orlikowski and Gash, 1994) that omit the dimensions of time, people, and resources. Negotiation for time and resources for example, is neither recognized nor widely accepted. The availability of resources and their allocation are treated as ready and even. Emerging problems are treated as noise or human faults. The model ignores social conflicts, and appeals to administrative means to resolve conflicts. This is why most anthropologists and sociologists claim that computing practice is framed by the way computing professionals see the world, and this view determines how a computer is used and implemented.

Observing a computer user at the workplace, of a learner at different learning sites, and of the help desk 'call tracking systems' in private or public offices shows some of the above common, recurrent, and unresolved problems in computing environments. However, consultants continue to encourage discrete entity model of computing in business and education. Yet the following examples show that computer applications in businesses are still having problems.

### **The Case with ZMS at BB**

BB (a pseudonym) is a large insurance company with a strong real estate and property management branch. In 1995 the company CEO with an external consultant prepared request for proposal to buy a better database management system. Request for proposal was advertised and BB bought a system from Smart Management Computing (SMC). It was anticipated that the new system, called ZMS, would effectively handle the insurance, property management, purchasing, payroll, and strategic change management of BB.

Anticipating such a result the vice president (VP) released the following information to all BB members.

We have advertised for, received proposals on, evaluated and recommended to the CEO the selection of a new, off-the-shelf and highly user friendly information system called ZMS to replace our current computer systems. Equipment will be ordered as soon as possible and the new software will be installed within 3 months... The implications of these steps will be far reaching and should make all of our jobs considerably faster, easier, and rewarding. You will soon be able to press a button and get the information right away...

The vendor promised a separate report writer, with a small extra payment, for each department of BB and an easy transition from the old system. With this promise, BB and the software company signed an agreement to implement the new system and integrate ZMS with the rest of BB's database software. Before ZMS was installed, there were seven different database systems used by different departments of BB.

For smooth implementation of ZMS, BB organized a steering committee and notified its staff about the date for take off of the new system. To make sure that time was not wasted and that no undue charges were made, the CEO (1) gave the vendor representative special authority to coordinate the steering committee and to report directly to the VP, (2) assigned the VP as the principal contact person for ZMS and, (3) directed the IT manager to cooperate with the vendor and prepare internal standards for IT.

The software company system integrator and the steering committee started to work together. After three months, the vendor representative asked the VP to reconsider the composition, knowledge, and experience of participants in the steering committee. Participants in the steering committee were all managers with specific interest in the new software. Each manager wanted to make ZMS focus on his/ her section without due consideration of the need to have common and linked database systems. In one meeting with the vendor, all managers spent the day arguing about the similarity of ZMS and Excel spreadsheets.

To speed up the process, the vendor representative wrote a second letter to the vice president that stated the emerging problems and the difficulty of working with the steering committee. A new steering committee was formed, this time with people of lesser status in the organization. At this time the principal contact person (the vice president) who was working smoothly with the vendor representative, resigned from his position, and a new group took the responsibility for ZMS implementation. As a result, the management of ZMS project was transferred from the IT department to the department of Strategic Change Management (SCM).

This time the SCM group recommended HRIS for the HR department, and call center software agent for the department of operations, to be installed and integrated with ZMS. The department of operations was also instructed to go ahead with implementing customer relations management software. To do this, three different consultants were hired. In all cases, users were promised that the new system could be easily integrated with ZMS. Users were all promised the capacity to find information in one place with a single click, rather than going through different paper files or systems.

After working two months, the new steering committee found that it could not complete or implement all the software on the due date and recommended that it would be prudent to extend the date for phase one. The manager supported the idea and passed the issue to the CEO. In response to this recommendation from the new committee, a memo from the CEO was released that states: Despite the incredible efforts of the entire implementation team to shape the software to BB's business needs, the implementation plan and preparation have been reworked. This delay should not alter the implementation date for performance evaluation developed by our consultant.

The main objective of the second committee then became mainly meeting the deadline given by the CEO and not paying serious attention to the problems at hand. This situation encouraged them to implement the new system before enough testing, data conversion, validation, and training for users were complete even though the agreement with Smart Management Computing require them to do so.

As directed by the CEO, the new system was installed and went on live on the due date. By this time, BB has already lost important people from its various departments and most notably six from its IT department. After the installation of phase I was said to be completed the SCM manager posted the following memo to all members of BB about the major achievement of the year.

We have come a long way. Departments had been augmented with new computers and... The Projects Management Department is established with a new management approach. A business process management has been initiated and performance indicators developed for all branches. This work is currently being augmented with the results of highly successful and professionally developed surveys conducted by our consultant. All in all, a difficult year, yes, but from another perspective, ZMS will soon let us be proactive, and

enable us to monitor capacity, performance, and constraints. Now you can press buttons and can get the information right away. A total system failure is very rare. While the issue is effective implantation of ZMS and configuring different software to work smoothly with ZMS, the above statement focuses on augmenting departments, monitoring, and restructuring.

## **Post Implementation**

The new system was implemented and different departments started to use it. Within a short period of time, users found that the new system was unable: (1) to generate reports, (2) to communicate with existing database systems, (3) to handle negative transactions, and (4) to import historical data such as insurance policy, property location, and basic client history. They also found that ZMS inadvertently altered date and amount, let invoices surpass original cost, and did not allow users to develop their own reports. In addition to this, problems such as :

(1) Because of all the shifting and some last minute changes in ZMS...created a challenge for our payroll software. (2) We are encountering a problem running certain reports. We have been unable to determine exactly which reports are affected, but it seems that some reports relating to the financial management module are having this problem. So, it is possible that some reports in other modules are affected. started to emerge and were reported daily by the systems administrator to all BB members.

Lack of personnel to deal with important changes and updates in ZMS affecting different departments became common. By this time, two top level SCM managers asked one employee with good knowledge of IT, (who was not originally invited to participate in ZMS) to develop a system solution that would enable tracking and forecasting modules for ZMS. In response to the request , the employee said:

I was asked to do it because neither the IT branch nor the consulting firm, CC, with which BB was negotiating, was prepared or able to do it. The price that CC was asking was huge. Given this our own organization should have encouraged us to participate from the initial selection of the system and taken an action related to recognition of our work. In addition to this last year only, I have alerted my manager and ZMS personnel to .. . overstatement in forecasts in ZMS and outlined the many deficiencies in the ZMS. It appears, however, that there is a systematic effort to ensure that many of those associated with ZMS project be rewarded and promoted. Our concern is that many continue to hire or promote unqualified people who have no real understanding how to develop or facilitate systems implementation. My experience with ZMS has shown it to be more a minefield system rather than a management system. It is loaded with hidden surprises, and I can never accept any data at face value. The frequency and the magnitude of errors in ZMS are not once or twice, but daily.

This employee put forward what was a chronic problem with ZMS from the time of its inception to its final implementation.

Armed with the above information, managers authorized their staff to use their own old spreadsheets as major reporting and input resources. Users in different departments resorted back to their old resources. This encouraged having seven different departmental manual data input to recover what was lost during ZMS implementation. Each department started to guard its spreadsheet as unique, private and without error. This scattered data storage was one major reason why BB bought ZMS. Even manual input of data became difficult without a quick fixes of ZMS are completed. Finally BB went to the vendor and retained one programmer to customize different ZMS modules. This writer observed the first communication session between the new programmer and ZMS users.

USER: We did not change the software. EXPERT: The customer had the customization for the code field set to display only. This prevented things from being calculated and to a drop in line. USER: It is not dropping a line. It is now not calculating correctly. EXPERT: X said that he fixed this. USER: I am still having a problem with it. EXPERT: This problem is similar to the previous case. USER: No this time it is accounts payable that is posted and then not found in GL in production. EXPERT: The customer using CSF causes this problem. USER: What is CSF?

This kind of communication is more about changing human problems which are 'lived through' to 'thought through.' Through this kind of communication, managers and technical experts nullify users' immediate concerns and problems.

After three years, a new IT manager was employed and released the following statements

Since we first went live with ZMS, staff of BB has continued to work diligently with the software vendor to smooth out the wrinkles that have been causing frustration for staff. We are pleased that we are finally able to take advantage of these fixes due to a new software patch process implemented by the vendor... There have been literally hundreds of changes, the majority of which are fixes to bugs that are essentially "behind the scenes", but will make the system work faster and more efficiently.

To smooth out wrinkles and hundreds of changes or fixes minimize the extent of problems with ZMS. Finally version three of the ZMS was installed and key operators were given basic training for one day with the ZMS user manual, which was to be distributed to others in their departments.

## **Discussions**

It took BB three years to make ZMS work. Enhancements of ZMS are ongoing. Version three of ZMS can be said to be radically different from original ZMS. These situations frustrated the user community. What was needed according, to the CEO, was simply placing a computer in front of a user loaded with ZMS, and standing back, and watching the miracle to take place. To this effect they tried to mandate or force change from above. It is such program installations that are commonly masked and presented as barriers and resistance to use computers. One employee explained the situation as:

ZMS was originally presented to us as providing us high flexibility, ease of installation, seamless integration of people and systems, and all without a problem. The fastest and easiest way to increase our productivity turned out to be the easiest way of frustrating us and losing critical data.

This statement clearly indicates the paradox. No department other than Human Resources reported a positive outcome with the new software. The predefined model for dealing with new system was not taking BB members to the place where they wanted to go. Implementation processes that loosely follow the dictates of the normative model of change (Ginzberg, 1981) minimized recurrent issues such as involvement and training. The normative model in case of ZMS made it clear that promises and great ideas in the board room may not be realistic outside. User friendly in the board room resulted in being user hostile in use environment.

Integrating and consolidating the disparate systems of BB into one ZMS are daunting tasks for experts. Securing the users' buy-in was not considered an issue. The emphasis was placed almost exclusively on getting the hardware and software. The first steering committee did not feel supportive or integrated, and this reduced the incentive to work cooperatively. The second committee were staying out of the CEO's way or keeping out of sight as much as possible.

Problems related to computer systems implementation are not unique in BB. What makes the case with ZMS problematic is the extent to which users were removed from the issue and how the focus on meeting the deadline given by the CEO created more problems than had been imagined. A change of the contact person for ZMS did not reduce the problem of implementation, but instead changed the whole focus to SCM, which some people consider just another term for doing different things. The “issue after the coming of ZMS for the SCM,” said one employee, “is project management. Everything is project management, project management, and project management. Yet no one is handling ZMS properly.”

The problems and limitations identified are not insurmountable. What has happened in BB with ZMS implementation process is that computer users were put into a process of change and left without clear direction and support during transition stages. In not recognizing the difficulty that was ahead with implementation, and in not recognizing that “every investment in IT is a voyage into frustration” (Geisler, 1992, p. 76) the leaders of BB invited more conflicts and misunderstanding instead of minimizing them.

The preferred approach to computing used by BB managers is the discrete entity models of computing. This approach considers computing as non-problematic, and as such is useful. The problem with the preferred methodology is that what is significant for a manager is insignificant for computer users. The methodology sets goals independent of users, organizational abilities and also separates ends from the means to achieve them. The preferred approach is short in organizational problems, tacit knowledge, user problems, and the social aspects of computing. Technical interests ignore factors that are human. They also defy the fact that understanding is situated and requires interactions, dialogue, constant negotiations, and the application of concepts. The following statement indicates the extent to which experts consider processes easy and simple.

I went to a session for the new systems implementation and learned a lot about technical promises rather than real understanding of the new systems. The IT guy and the vendor representative had no willingness to take a complicated area of ZMS and make it accessible for me without minimizing the problem and issues.

Yet, ZMS was seen as easy, non-problematic, and ready to operate without a problem. However, Feenberg

(1991) indicates that what is user-friendly to an engineer, and obvious to him, is obscure to people who have not been socialized in an engineering or technical culture.

According to Goodman (1969), a technician should be able to criticize the programs given to him to implement. This is particularly possible in computing environment where IT is revered, and considered critical. However, technologists are often asked to refine the means that they use to implement a product, but not to question the ends they serve. Those who do question are branded as unstable people, as uncooperative, and as not team players. Very few people question or challenge taken for granted assumptions within systems implementation. Most purport to be value free and make no reference to normative matters, they consider some problems, solutions, and knowledge more significant than others. Implementation problems are always considered minor.

MIS experts, instead of encouraging criticism of the application environment seem to act as defenders for the existing environment. For example, instead of looking to anthropology, sociology, and education to understand and narrow existing disparities, computer experts focus on interface that serves as a bridge between a machine and a user. This can be seen in human computer interaction research, where experts consider interface a bridge between the world of the computer system and the world of the users. There is a strong belief in interface to make computers interact effectively with users and become more transparent. However, from office automation to end-user computing support, even with Visual Basic language that made it easier to enhance computer interface, the computer is not fully transparent and free from headache (Agre, 1995).

The following comment made by one BB employee on ZMS interface validates Agre's observation about the current nature of computer interface.

So what kind of a software package offers multiple ways of exiting to the user but only "one way to exit properly"? Why are people being forced to conform to the very peculiar requirements of a computer program instead of a computer program being designed to serve people's needs?

People still have a problem with computer interface and how to save their documents using the available interface. In addition to this, letting users use a confusing interface is making life difficult.

To concentrate on new systems and neglect the user of the system and the condition of use environment can be seen in the action that management took during ZMS implementation process. Working with the consultant, the CEO wanted to create creative accounting solutions without involving accountants and internal staff. In the process of ZMS implementation process, organizational issues were not properly addressed, and there was no visible evidence that managers or IT experts were encouraged to address organizational issues.

The transition from the old system to the new was problematic for managers and users. Members of the BB were not involved in analysis, design, or implementation planning. ZMS was built on the specification determined by proxy users. User involvement or participation in ZMS implementation, instead of involving representatives of the target user group (Ives and Olson, 1984), started with non-users. Proxy users did not realize the difficulty in ZMS, and this resulted in forcing the vendor representative to customize ZMS to their own specific departmental needs. The expectations and assumptions of the proxy users were taken as the major frame of reference and guiding principles. This was enforced using administrative means such as letters from the CEO. This approach caused human and organizational issues to accumulate and did not facilitate implementation. After the installation problems occurred almost daily. In reaction to problems related to ZMS, users resorted to their old way of doing things.

The implementation of the ZMS process is full of paradox. While the SCM is set on automating old policies, procedures, and practices, which may serve as a means of control with new tools, users of ZMS struggle to make the system work and improve efficiency. The gap between what internal experts are saying and what the change agents are doing and saying is probably at its widest point. Insiders say outsiders get the most interesting assignments and compensation, while insiders are urged to cooperate with various consultants. The tremendous pressure that managers and CEOs exert on their staff in the process of buying, customizing, and rushing implementation processes might be damaging in the long run.

Key players in ZMS are more concerned with project management, call centers, and performance measurement than with solving problems with ZMS. This created a work environment that is uncertain and unclear. The use of ZMS were often, associated with ambiguity and chaos. As a result, members of BB went back to their old system to meet the daily requirements. Neither the managers nor the ordinary users were clear about ZMS, and problems identified with ZMS were not given proper attention. The staff had no forum to voice their concerns.

Management clearly underestimated the problems involved in ZMS and the deeply ingrained culture. Emphasis on computing, the assumption that there is a consensus about the need for new computer systems, provision of synoptic accounts of problems, a focus on the world of computers and efficiency, consideration of computing systems as highly reliable, seamless, and leak proof, recognition of new opportunities but not new difficulties are some identifying characteristic of discrete entity model of computing (technical culture) observed in ZMS. These need to be challenged. Challenging discrete entity model of computing involves the kind of thinking that goes beyond simple technology,

### **Suggestions**

Sound implementation practice involves creating an environment conducive to learning and moving participants smoothly through the different stages of the implementation process. It is about building users' self-efficacy through what Bronsema and Keen (1983) call 'educational intervention.' Educational intervention is effectively helping people move through transition and the change process. It is meant to facilitate learning, to identify common needs, to develop trust, and to bridge the gap between experts and computer users.

In the literature, it is possible to see that the absence of such educational intervention, support, and trust building during the implementation process generates misunderstanding and user resistance. Mary Douglas (Douglas, 1966) highlights the fact that ambiguity and risk are real and necessary if change is to occur. Transition from one system to another entails zones of uncertainty, which are full of ambiguity, risk, and danger (Douglas, 1966). Creating environments where people can talk about the change process and support

each other help to clarify ambiguities.

To understand the delicate nature of technology implementation and to make implementation a learning process, the place to look first need be the organization and the users' ordinary activity. In this case, this involves office computer user, the use environment, the computer training room, a computer expert, and the situation at the help desk, not only in the boardroom. Problems with computer use lie in the daily life of clerks and administrative assistants and in the concrete things that they do. This is in line with symbolic interactionism, that considers the empirical world as the world of everyday experience that can be recognized in the lives of others (Charon, 1998).

To look in this sense is to observe, and to observe is to be aware. Awareness means being accountable and being aware of some problems with the user, with the computer, and with the environment and to be accountable. In symbolic interactionism, accountability is to make things or ideas clear and understandable. Accountability can involve informing users, reorienting programs, or justifying what is promising. In both cases, things, process, and concepts are clear and understandable not only through counting or directing from the top, but also through words and actions. Therefore, instead of calling different experts for different problems, organizations are better off if they make effective use of what Klepper (1989, p. 38) has concluded as, "the most important function of a" [*Strategic Change Management, Organizational Effectiveness in case of ZMS*] "quality assistance group can perform is the education of end-users and user-managers in quality assurance issues" in their organizations. Quality in this sense is quality through people, not just through software.

### **Reflections on Current Computing and Educational Research Findings**

Although the computer is practically ubiquitous, the computer still poses substantial technical challenges to the user. Even technical workers with advanced computer skills and certification encounter usability problems when they try to learn new systems and programs (Kiestler, et al , 2000). This situation created the condition of assuming that an explosion of data is equivalent to an explosion of information.

Lack of clarity in data and information is currently extended to “trivialize knowledge to the content of databases” (Denning, 2001, p 19). This situation can be seen in some MIS and educational research.

Traditionally people learn through apprenticeship, where social interaction and collaboration with seniors are available. By nature learning occurs by doing and is situated. Learning occurs through engagement, support, and guidance from a more experienced partner. Learning is not only the activity of an individual, which can be understood by collecting data about the individual user or learner. However, recent MIS and educational research about learning how to compute seem to focus on collecting data without due attention to what is available. The result is that they report the importance of human and organizational issues as new findings.

Most of the recent findings in MIS and educational research on learning, human, and organizational issues can be found in earlier work of Clyde Kluckhohn, Alfred North Whitehead, and John Dewey. They came to the same conclusion with different words, but the same ideas. In fact, as Stuart Chase commented in the Mirror for Man, today one can confidently say that, if computer experts and office managers had the knowledge contained in the works of one of the above authorities on education, anthropology, and social psychology, computer users everywhere could use computers with less problems and minimal anomalies.

Furthermore, Martimer Graves long ago noted that “the essential fact is that man’s major problems are not at all in the natural sciences but in such areas as ... the control of organized power...what is needed is ... better social organization...” (in Kluckhohn, 1942, p.216-17). Kluckhohn (1942, p. 141) also notes that “there is an essential human element in the successful carrying out of all technological operations.”

From these statements it can be said that our current major technological problems and shortage of computing skills are the result of our unwillingness to consider the human and organizational elements in our encounters with information technologies. In this context, we need to understand how far we have reversed the learning process IT (access to activity without guidance) by letting people use computers without first giving them guidance.

Information technology research and practice are dominated by a single set of philosophical assumptions regarding the nature of computing and what constitutes valid knowledge about computing and computers (see Hirschheim and Klein, 1989, Orlikowski and Baroudi, 1991, and Galliers and Land, 1987, for details). This single assumption made what Checkland (1991) calls '*vehicles of learning*' invisible and inactive in the computing environment, and reduced conflict between and among individuals in computer classroom and use environment to a mere footnote.

Quite a few MIS literature recognize conflicts, misunderstanding, and the role of technological frames in systems implementation. The September 2001 issue of *Report on Business* attests that computing problems are not always or even technological. The difficulties may be social, and products of miscommunication. In computing, a web of relationship occurs between and among people, organizations, and technologies. These relationships as observed in ZMS, are complex, first they are not easily subjected to measurements. Second, people making decisions about PC investment for schools or business have little knowledge about the technology. Those who recommend the technology often do not fully understand the general needs of teachers, employees, and organizations. In this context, what is important is learning to work more with computer users and teachers rather than focussing only on software, networks and individual user.

The implementation process at BB has enabled this writer to observe and understand how a different culture is impacting technology adaptations. The problems, the differences, and the contradictions in ZMS are not only in the language but also in the differences among the features that the director, the vendor representative, managers, and users see as essential. The cultures of "administrators and administered" (Kluckhohn, 1942, p. 150) observed in ZMS implementation were not only conflicting but made the issue more incomprehensible.

Focusing on configuration, interface, or X or Y certification without considering the human user means considering that IT has some magical power to make clear what is blurred, and purify what is polluted (Boland and Schultze, 1996). Mary Douglas notes that purity without pollution is dangerous. Focus on individual user, and computing without the human touch and skills may be more about what Pfaffenberger

(1992, p.505-506) calls “technological drama”, i.e., contradictions, ambiguities, and inconsistencies in action - than about solving current end-user computing problems. However, the social informatics work now available in some U.S. universities includes a promising approach to current computing problems. Still, literature about social informatics and the social aspects of computing is not commonly cited in MIS and educational technology literature. Even Peter J. Denning (2001, p. 20-1) in his recent article on building an IT core curriculum model neglects the inclusion of a course on the social dimensions of computing. However, computing problems are mainly organizational problems.

The quotation at the beginning of this paper from Hirschhorn noted a reality that was paradoxical, but true. Today it is equally contradictory to have huge investments in Information and Communication Technologies (ICT) and still face organizational problems in systems implementation after systems implementation. There are plenty of programs, strategies, concepts, and approaches, developed with a lot of effort, that try to make implementation smoother and easier. What is missing is a firm commitment from senior levels of management and IT educators to deal with implementation problems.

#### References

- Agre, P. (1995). *The Network observer*, 2(6).
- Boland, R.J. and Schultz, U. (1996). From work to activity: Technology and the Narrative of Progress. In W.J. Orlikowski, G.Walsham, M.R. Jones, and J. J. DeGross (Eds) *Information Technology and Changes in Organizational Work*. London: Chapman & Hill.
- Bronsema, G. S., and Keen, P.G.W. (1983), *Educational Intervention and Implementation in MIS*. Sloan Management Review, Summer, 35-43.
- Charon, J. M. (1998). *Symbolic Interactionism an introduction, an interpretation, an Integration*. 6<sup>th</sup> Ed. Upper Saddle River, NJ: Prentice Hall.
- Checkland, P. (1981). *Systems Thinking, Systems Practice*. Chichester: John Wiley & Sons.

- Clegg, C.W. (1993). Social Systems that Marginalize the Psychological and Organizational Aspects of Information Technology. *Behaviour and Info. Technology*, 12(5), 261-266.
- D'Amico, J.J. (1990). Three Lessons I Learned from a Year of Computer-Based Instruction. *J. Computer-Based Instruction*, 17(3), 103-109.
- DeMarco, T. and Lister, T. (1987). *Peopleware: Productive Projects and Teams*. Dorset Housing Publishing.
- Denning, P. J. (2001). The IT Schools Movement. *Communications of the ACM*, 44(8), 19-22.
- Doherty, N.F. and King, M (1998). The Importance of Organizational Issues in Systems Development. *Information Technology & People*, 11(2), 104-123.
- Douglas, M. (1966). *Purity and Danger*. London: Routledge.
- Eason, K. (1988). *Information Technology and Organizational change*. London: Taylor & Francis.
- Emihovich, C. (1992). Computer Discourse. *Education and Urban Society*, 24(4), 498-507.
- Feenberg, A. (1991). *Critical Theory of Technology*. Oxford: Oxford University Press.
- Galliers, R. and Land F. (1987). Choosing Appropriate Information Systems Research Methodologies. *Communications of the ACM*, 30 (11), 900-
- Geisler, E. (1992). Managing Information Technologies in Small Business: Some Practical Lessons and Guidelines. *General Management*, 18(1), 74-81.
- Ginzberg, M.J. (1981). Key Recurrent Issues in MIS Implementation Process. *MISQ*, June, 47-60.
- Goodman, P. (1969). *The New Reformation*. New York: Random House.
- Gunton, T. (1988). *End-User Focus*. New York: Prentice Hall.
- Hallowell, E.M. (1999). The Human Moment at Work. *Harvard Business Rev.*, Jan-Feb., 59-66.
- Hammond, D. (1990). Designing and Facilitating Learning-to-Learn Activities. In R. M. Smith & Asso., *Learning to Learn Across the Life Span* (pp. 137-168). San Francisco: Jossey-Bass.
- Hellman, R., (1992) . Comprehensive User Education for Successful End-User Computing. *Information Technology and People*, 6 (1) , 65-84.

- Hirschheim, R. and Klein, H. K. (1989). Four Paradigms of Information systems development. *Communications of the ACM*, 32(10), 1199-1216.
- Ives, B, and Olson, M. (1984). User Involvement and MIS Success: A Review of Research. *Management Sci.*, 30(5), 586-603.
- Jones, T.H. & Paolucci, R. (1998). The Learning Effectiveness of Educational Technology: A Call for further Research. *Educational Technology Review*, 10, 10-12.
- Klepper (1989). Support for Quality Assurance in End-user Systems. *Info. Manage. Rev.*, 5(1), 33-38.
- Kling, R. (1987). Defining the boundaries of computing across complex organizations. In R.J. Boland and R.S Hirschheim (Eds.), (pp. 307-3), *Critical Issues in information Systems Research*. New York: John .
- Kling, R. (1980). Social Analysis of Computing. *Computing Survey*, 12(1), 61-110.
- Kling, R, Rosenbaum, H, and Hert, C. (1998). Social Informatics in Information Science: An Introduction. *J. of the American Society for Information Science*, 49(12), 1047-1052.
- Kling, R., & Scacchi, W. (1980). Computing as Social Action: The Social Dynamics of Computing in Complex Organizations. *Advance in Computers*, 19, 247-327.
- Kling, R., & Scacchi, W. (1982). The Web of Computing: Computer Technology as Social Organization. *Advance in Computers*, 21, 1-90.
- Kluckhohn, C. (1942). *Mirror for Man*. Greenwich, Conn.: Fawlett World.
- Lederer, A. L. and Sethi, V. (1999). Root Causes of Strategic Information Systems Planning Implementation Problems. *J of Management Information Systems*, 9(1), 25-45.
- Legget, W. & Persichitte, K. (1998). Blood, Sweat, and Tears: 50 years of Technology implementation Obstacles. *TecnoTrends*, 43(3), 33-36.
- Leonard-Brton, D. and Deschamps, I. (1988). Managerial Influence in the Implementation of New Technology. *Management Sci.*, 34(10), 1252-165.
- Long, R. (1989). Human Issues in New Office Technology. In F. Forester, *Computers in the Human Context:*

- Information technology, productivity, and People (pp. 327- 334). Cambridge: MIT.
- Levin, H. G. & Rossmore, D. (1993). Diagonising the Human Threats to Information Technology Implementation: A missing Factor in Systems Analysis. *J. of MIS.*, 10(2),55-73.
- Mandefrot, K. (1997). End-User Computer Training and Adult Learning: Implications for Human Resource Development. Unpublished Dissertation, OISE, University of Toronto.
- Orlikowski, W., & Gash, D.(1994). Technological Frames: Making Sense of Information Technology in Organizations. *ACM Transactions on Information Systems*, 12(2), 174-207.
- Orlikowski, W.J., & Baroudi, J.J. (1991). Studying Information Technology in Organizations: Research Approaches and Assumptions. *Information Systems Research*, 2(1), 1-28.
- Pfaffenberger, B. (1992). Social Anthropology of Technology. *Annu. Review Anthropology*, 21, 491-516.
- Report on Business Magazine (2001). September 1, The Globe and Mail.
- Roepke, R., Agarwal, R. & Ferratt, T. W. (1998). Aligning the IT Human Resource with Business Vision: the Leadership Initiative at 3M. *MISQ*, 24(2), 327-353.
- Robey, D., and Boudreau, M-C (1999). Accounting for the Contradictory Organizational Consequences of Information Technology: Theoretical Directions and Methodological Implications. *Information Systems Research*, 10 (2), June 1999, 167-185.
- Rowan, J., and Reason, P. (1981). On Making Sense. In P. Reason and J. Rowan (Eds.), *Human Inquiry*, (pp.113-139). New York: John Wiley & Sons.
- Shah, H., Dingley, S., & Golder, P. (1994). Bridging the Culture Gap between Users and Developers. *The J. Systems Management*, July, 18-21.
- Star, S. L. (Eds) .(1995). *The Cultures of Computing*. Oxford, UK: Blackwell.
- Weiner, E. and Brown, S. (1994). Human Factors. *The Futurist*, 23(3), 9-11.
- Zammit, S. A. (1992). Factors Facilitating or Hindering the Use of Computers in Schools. *Educational Research*, 34(1), 57-66.