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Information Technologists

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**Edited by
Vevek Ram**

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FOREWORD

This book is a collection of papers presented at the National Research and Development Conference of the Institute of Computer Scientists and Information Technologists, held on 26 & 27 September, at the Interaction Conference Centre, University of Natal, Durban. The Conference was organised by the Department of Computer Science and Information Systems of The University of Natal, Pietermaritzburg.

The papers contained herein range from serious technical research to work-in-progress reports of current research to industry and commercial practice and experience. It has been a difficult task maintaining an adequate and representative spread of interests and a high standard of scholarship at the same time. Nevertheless, the conference boasts a wide range of high quality papers. The program committee decided not only to accept papers that are publishable in their present form, but also papers which reflect this potential in order to encourage young researchers and to involve practitioners from commerce and industry.

The organisers would like to thank IBM South Africa for their generous sponsorship and all the members of the organising and program committees, and the referees for making the conference a success. The organisers are indebted to the Computer Society of South Africa (Natal Chapter) for promoting the conference among its members and also to the staff and management of the Interaction Conference Centre for their contribution to the success of the conference.

On behalf of the Organising Committee

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**A Cultural Perspective
On IT/End user Relationships
(A description of Research in Progress)**

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Abstract

An IT/end user relationship is described as intriguing and complex and is based on a *physical* and *abstract* dimension. These two dimensions enable one to fully describe the holistic nature of such a relationship and encapsulate the important elements of a support-oriented organization, namely mutuality, belonging, and connection. (Pheysey (1993)). In this paper a perspective on the importance of a supportive culture for sound relationships is described.

The importance of a *knowledge base* for both the end user and the IT professional before entering a relationship is also emphasized. Research in this regard shows that end user involvement should be seen as part of a relationship which exist between IT and its end users and which emerges during the life cycle of a software product.

Introduction

In order for the IT department to provide a proper service and support to its end users (customers), it is important that IT managers must first understand the meaning of "proper service" and how it should be managed. According to Luevano (1991), even if the IT department's reporting mechanisms may indicate that IT is meeting its objectives and doing an adequate job, these reports have no value if, in users' eyes, the IT department is not providing the expected service. He further states that the typical factors that contribute to negative perceptions on the end user side are, amongst others, a lack of communication between the IT department and the end users, and an IT department that is not "user driven".

The understanding and managing of these factors are very important. Global competition and challenges demand that the quality of services and support offered by IT should more than satisfy end users. In his article De Jarnett (1993) emphasizes the fact that everything IT does should be focused on fulfilling the needs of the customer and that the new goal should be to have delighted customers.

Di Carlo (1989) states that there is wide recognition for the maintenance of better service levels and that this should be a major strategic business objective.

According to Carey (1988) this involvement increased the likelihood that the resulting system will be satisfactory, as well as the amount of time necessary to complete the development task. Furthermore, it normally ensures that the amount of time and money spent on after service activities (maintenance) is greatly reduced. It is therefore of the utmost importance not only to ensure that the IT department knows how to manage end user involvement, but also that end users know why they should get involved and what role they need to play. In this regard, Ives et al (1984) also mention that the most commonly used indicator of success in user involvement studies has been user information satisfaction.

If one looks at what De Jarnett (1993) has to say in his article about this whole issue, it is easy to realise that not much has happened in this critical area. The question is why not? One could also ask whether all the complexities of the whole picture are presented?

In this paper some important issues regarding relationships¹ between IT and its end users are addressed. The complexities of such relationships will be explained as well as how it should be managed. Furthermore, I will explain why a supportive culture is important for sound relationships and which elements are important in order to ensure that such a culture will prevail.

In section 2 the diversity of end user involvement situations are briefly explained whereas in the third section the concept of an IT/end user relationship is defined and described as the umbrella for all the "contact" which takes place between IT and its end users. Thereafter the factors are described which will contribute to the creation and enhancement of a supportive culture. The importance of a 'paradigmatic break' from the prevailing orthodoxy in the management of IT/end user relationships is emphasized in the conclusion.

End user involvement

A few years ago, user contact was mainly focused on user involvement during systems development in a mainframe environment. Nowadays, with all the recent developments in technology, this contact varies in nature. For example, the growth in end user computing (EUC), which started in the 1980s, implies a new way of "contact" the IT environment has to deal with. According to Cotterman *et al* (1989) this significant phenomenon is ranked among the 10 most important MIS management issues for the 1980s.

¹ The term IT/End user relationship is defined in a separate paragraph in this paper.

As far as the mainframe environment is concerned, three different stages of IT/end user contact can be identified, namely:

- * The request stage, during which the user communicates his/her needs in order to activate the IT department to develop a new product or to give the necessary support. (The pre-development phase).
- * During development, which entails user involvement at different levels depending on the development strategy that is followed and
- * During the production phase or post implementation phase - in other words, after the product has been placed in operation.

During all these different stages the end user and IT professionals are involved in different formal and informal social communication structures. The most common of these structures are project meetings, end user groups, training and JAD sessions¹.

According to Carey, end user involvement is an often overlooked aspect in developing easy-to-use systems which consist of the methods used to get users directly involved in the design, development, testing, implementation and maintenance of the system. He states that end users are involved in different ways after an information system has been implemented, of which the following are the most important:

- * End user training;
- * User resistance to change;
- * User feedback for system evaluation; and
- * User acceptance of the system.

Of course, the abovementioned "ways of involvement" are different social communication structures in which the end user participates. In general, the importance of these social communication structures cannot be over emphasized, because it has a direct influence and impact on the quality of the end product, but more specifically on the efficiency of use by the end users. As Carey puts it: "All of these issues impact on the success of the information system."

Furthermore, as we all know, nothing is more pleasant than an end user who is positive about a software project and who gives all the necessary cooperation during the life cycle of the product. According to Hawk (1992) an important and widely recognised goal of getting end users involved, is to obtain a positive change in user attitudes and perceptions.

In their articles Ingersheim (1976) Baroudi (1986) and Olson *et al* (1986) again point out that in order to improve user attitudes towards the resulting system, they should get involved.

In the article of Roode *et al* (1989), reference is also made to user involvement during systems development and the concept of "user

¹ The existence of social structures is a characteristic of a relationship and is discussed in more detail in the following section.

involvement transactions" is introduced. According to them, user involvement during systems development has two overall objectives, namely to achieve improved systems quality and to increase user acceptance. This of course also contributes to the eventual success of an information system. As far as involvement is concerned, it is defined to "... cover generically all activities which a person who is involved may perform relative to the systems development project being undertaken..". The generic term 'user involvement' includes a number of 'user involvement transactions' which are observable units of involvement.

Characteristics and definition of an IT/End user Relationship

First of all a definition of such relationships are given in order to eventually show the important role and influence that organization culture may have on these relationships. Furthermore, it is important to take cognisance of the fact that the success of information systems depends to a great extent on the soundness of these relationships.

The abovementioned different "ways" in which end users are involved before, during and after the implementation of an information system are embodied in so-called "relationships". When an end user initially states his need(s) for a given business environment, a *new relationship* grows or develops therefrom. This means that whenever the IT department starts with a new project, a new relationship is created with the end user. In this regard Dahlbom *et al* (1993) states that a systems development process is actually an intervention into current business processes. As he puts it:

"Intervention is an approach to systems development with and by the users. Responsibilities are negotiated and shared between systems developers and users".

The nature of a relationship is therefore not only dependent on the business environment that will be involved during the whole systems development life cycle but also on the systems development approach that is going to be followed¹.

According to Carey (*supra*) there are basically three partners during the life cycle of a software product, namely the IT professional(s), the end user and the product itself. "The three participants in this relationship ...form an intriguing and complex relationship." (Carey (*Op. cit.*))

A definition of a relationship between IT and the end user during the life cycle of a software product will have to consist of two dimensions, namely a *physical dimension* and an *abstract dimension*. The physical dimension should describe those elements which are necessary in order to enable contact between IT and its end users, whereas the abstract dimension should describe the soft issues of a relationship. These two

¹The hard, soft and dialectic approaches as described by Dahlbom *et al* refer.

dimensions enable one to fully describe the holistic¹ nature of such a relationship and encapsulate the important elements of a support-oriented organization, namely mutuality, belonging, and connection as mentioned by Pheysey (1993) in his book *Organizational Cultures*².

As far as the *physical dimension* is concerned, the following elements could be seen as the most important:

* People³

As far as people are concerned, a relationship consist of all the responsible people who are involved in the systems development life cycle at a given time. "Responsibilities are negotiated and shared between systems developers and users" (Dahlbom (*op. cit*))

* Technology

Technology may be seen as one of the most important elements in such a relationship, which enables the people who participate in the relationship to communicate with one another. Apart from the normal communication technology⁴, facilities like *help desks* and *internet* are of the most important role players in this regard.

* Procedures

In this regard one can refer to two types of procedures, namely organizational procedures (like standards and policies) which already *exist* and which can be seen as a given and *new* procedures that are being created by people because of their interaction with the given procedures and technology. In this regard DeSanctis (1994, p. 125) states:

"Prior to development...structures are found in institutions such as reporting hierarchies, organizational knowledge, and standard operating procedures...the structures may be reproduced so as to mimic their nontechnology counterparts, or they may be modified, enhanced, or combined with manual procedures, thus creating new structures within the technology."

¹Under the description of the abstract elements the term 'holistic' is described in broader terms.

²The nature of a support culture is discussed in more detail in the following section.

³As human beings, people are viewed in this regard as the *physical enablers* who initiate, create, participate and maintain relationships because of their interaction with one another in the IT/End user environment. This is inline with the adaptive structuration theory of DeSanctis (1994) which is used for theory building in my research; see also Orlikovski (1992) who's structural model of IT consists of three components, viz, human agents, IT, and institutional properties of organizations.

⁴ Telephones, fax machines and cellular networks.

* Structures

Depending upon the "type" of end user and therefore the service and support that will be offered, relationships will differ in content as far as *formal and informal* social communication structures are concerned. The most common of these structures are project meetings, JAD sessions and end user group meetings.

For example, end users in the pure EUC environment would have much less contact with the IT department than users who are totally dependent on IT for their software products. In the first example, relationships will probably consist of some informal social structures in order to give the support this type of end user will need from time to time. In the second example, relationships will probably consist of formal social structures like scheduled end user group meetings, in order to give the end user the necessary support and service.

These structures are mainly used by the end user to inform IT about the business needs, but also to ensure that the emerging product stays on track. On the other hand, it is used by IT to get hold of business needs but also to get clarity on already stated needs. Furthermore, these communication structures serve as inquiry forums for both the IT professional as well as the end user during which they learn and understand the new environment of the emerging system or that part of the organization they are actually redesigning. According to Dahlbom (1993, p 122) designing a computer system is really a means of redesigning the organization. According to him the challenge is to understand and change established traditions in the user organisation as well as in the project group.

As far as the *abstract dimension* is concerned, the following characteristics are the most important:

* They are dynamic

The nature of the relationships between the IT department and its end users will, *inter alia*, depend upon the "type" of end user, as well as upon regarding the end user as a human being. According to Umbaugh (1991, p. 140), when talking to end users the IT professional should always keep in mind the users' concerns, problems, environment, and responsibilities in terms of opportunities for IT services and support. Furthermore, he says, continuous contact with end users gives IT the opportunity to gain more insight into their problems. This, of course, demands that relationships should be adaptive to changing circumstances.

- * They are sensitive to change¹

One of the most difficult problems during systems development is to cope with users' resistance to change. Because of the social nature of relationships, any form of change which is initiated on the IT side will disturb such relationships.

- * They have a knowledge base

According to Carey (*supra*) at least part of the design problem seems to be that the analyst/designer is working from his or her own perceptions of the user's needs which often include unrealistic expectations of user *knowledge* and an often mistaken idea of user desires and requirements. Furthermore, he says, the analyst views the computer from an expert's point of view and an often technical perspective. The user views the computer as a potentially useful tool, but from a more general orientation. These two views are quite different and are often incompatible and in conflict.

The resolution of these different perspectives is possible only when the analyst begins to understand the needs, requirements, and desires of the user in order to design and produce the system properly². Users must also aid in this resolution by understanding the limitations of the computer systems they desire as well as by developing a thorough and specific understanding of their own needs.

The abovementioned explanation of the complex world of perceptions, attitudes and approaches towards developing software products by IT professionals for the end user, forces us to a point where one can say that in order to overcome the most serious problems during this communication process in a relationship, a knowledge base³ of some kind is necessary before entering a relationship.

- * They have a supportive culture⁴

In order for a relationship to be sound continuous support and mutual understanding, *inter alia*, need to be elements of such a relationship. According to Pheysey (*op.cit.*), a support-oriented organization have the elements of mutuality, belonging, and connection. Furthermore, an appreciative form of control should be applied, which means: "management is seen to be a process focused

¹Research in this regard still in progress.

²This problem also relates to Brunwik's law of the lens which is discussed in the next section.

³Research in this regard is described in the next section.

⁴The importance of a supportive culture for maintaining sound relationships is discussed more fully in the next section.

om maintaining balance in a field of relationships" Gadalla and Cooper (1978) quoted by Pheysey (*op.cit.*).

- * A co-operative behaviour pattern is followed by the participants

Co-operation is not a fixed pattern of behaviour, but is a changing, adaptive process directed to future results. The representation and understanding of intent by every party is therefore essential to co-operation, and so the role of communication in co-operation is important. Clarke *et al* (1993).

Furthermore, they say, co-operation can also create new motives, attitudes, values and capabilities in the co-operating parties and therefore such behaviour will help to create and maintain a supportive culture.

- * They have an holistic nature

The important elements which make up a relationship between the IT department and its end user at a given time are organized together as a whole. If any of these elements are disturbed in a negative sense, the whole relationship between the IT department and its end users is undermined.

In order to ensure proper end user involvement, it is of the utmost importance that the end user should understand its role and function as end user.

One of the typical characteristics of end-user behaviour is the lack of certainty of what they want which normally starts to disappear the moment they get exposed to different possibilities shown by an IT professional.

It is the responsibility of the IT department to create a culture with the necessary characteristics to ensure that the end user can fulfil its role. In such an environment the end user should feel comfortable, secure, knowledgeable, and useful. Furthermore, such an environment should incorporate the abovementioned factors that will not only ensure end user participation but will maintain a sound relationship during end user involvement. The question now is how can an IT department create and maintain such an organizational culture?

A supportive culture for sound relationships

First of all it is important to start with a definition of what is meant with the term culture. According to Towers (1992), an authoritative definition of a corporate culture is as follows:

"Culture is the commonly held and relatively stable beliefs, attitudes and values that exist within the organization"

Williams *et al* (1989).

Service and support are but two of the important issues that IT should concentrate on in order to survive. In a recent study of end users done by Daryl *et al* (1994), it was found that only 2% of the interviewees do not use a computer at all. Furthermore, the study revealed that the majority of the companies in the study did have an information center (IC), but a significant percentage of the end users were less than pleased with support provided by the IC. This indicates that the problem is serious and that a supportive culture does not exist in the majority of cases.

In a study done by Orlikowski (1992), she points out the importance of culture and the understanding of various viewpoints held by managers, users and system designers in implementing new technology. According to her, the viewpoints are significantly different, therefore they define success very differently. Unless these various viewpoints are surfaced and explored, use of technology can fail miserably, with everyone blaming the product rather than the true culprits - the corporate culture or the various groups' conflicting perceptions.

In order to bridge the "gap" between the world of the end user and the IT professional, especially as far as new and/or unexperienced participants in a relationship are concerned, it is of the utmost importance that all participants in such a relationship should be on the same "level" of communication. The understanding and managing of all communication factors are very important.

Research conducted so far has shown with reasonable certainty that the following factors are very important in order to change the mind frames of all participants in a relationship in order to ensure sound communications and proper involvement within the relationship - this in itself will cause the creation of a new culture between IT and its end users. According to Pheysey, in a supportive culture "people will contribute out of a sense of commitment to a group or organization of which they feel themselves truly to be members, and in which they believe they have a personal stake." (Pheysey (op. cit.) It is therefore of the utmost importance that every participant should have a proper understanding and realisation of and commitment to these factors:

- * Knowledge of the *physical* and *abstract* nature of the IT/End user relationships as previously discussed
- * An understanding of the functions and responsibilities of the end user as well as the IT environment

As previously discussed¹, Sprague et al (1993), states that the old categories of end users are no longer appropriate, because of the new level of pervasiveness taken on by information technology. It is therefore important for an end user to know the category or *end user type* he belongs to in order to know what his responsibilities are and what kind of service and support he can expect from the IT side.

¹Research in this regard still in progress.

* Knowledge of the ethical¹ grounds a sound relationships should be based on

* An understanding of the effects of organizational change on a relationship²

* Brunwik's Law of the Lens.

The value of Brunswik's lens (Pitt & Bromfield, 1994, p.5) lies in its emphasis of the fact that the accuracy of a person's judgement depends upon the extent to which his mind represents the environment it attempts to predict.

* Cognisance of the "holistic-dilemma"

As discussed previously, if any of the elements that make up a relationship is disturbed in a negative sense, the whole relationship between the IT department and its end users is undermined. It is therefore very important for all role players to be sensitive and aware of this dilemma, in order to ensure sound relationships.

* Empowerment of the end user³

* Levels of end user involvement depending on the end user type⁴

* Approach to systems development

When developing information systems, development teams should discuss and decide what course of systems thinking (paradigm) they are going to follow. This is important because everyone on the development team should at least work within the same broad framework of thinking in order to ensure a collaborative atmosphere. This is especially important from the end user's point of view. According to Dahlbom (1993) it should be realised that only by working closely with the users the development team will be able to develop useful information systems.

* The delegation trap as explained by Tony Gunton (1990).

Tony Gunton's 'delegation trap' refers to the bad habits of end users who easily hand over systems to sub-ordinate staff to operate as soon as the 'novelty wears off'. In practice we have seen numerous cases where end users participate in the

¹.Research in this regard still in progress.

²Research in this regard still in progress.

³Research in this regard still in progress.

⁴.Research in this regard still in progress.

development process and as soon as they get bored, they delegate this important task to a sub-ordinate which may not be the 'right' end user.

Conclusion

The question is, what is to be done by an IT department or for that matter the organization which the IT department belongs to, that will help to create and maintain such an environment where a supportive culture between IT and its end users will prevail?

So far research in this area shows the importance of a 'paradigmatic break' from the prevailing orthodoxy in the management of the participants in the abovementioned intriguing and complex relationships.

I believe that there are several approaches or actions that IT can follow in order to create such an environment. However, it is very important that all employees on the IT side should be part of such a program of action and everyone should work towards this new paradigm of thinking.

One of the biggest dangers regarding the maintenance of a supportive culture in an IT department is that this culture can change because of different forms of internal/ external change without even knowing it. According to Pheysey *et al (supra)* one should take note of Greiner's model which shows contingencies over time. Greiner called his model 'evolution and revolution as organizations grow'. The model is used by Pheysey to show a cyclic movement of control, starting in the supportive culture area, moving through power, achievement and role cultures and back to support culture. During this movement the organization must resolve, as they grow, the four crises down the centre. At this point, the question is: "Will the old crises recur, or will there be new crises to face?" (Pheysey *op. cit.*)

Possible solutions which may help IT departments in creating such a supportive culture, might be to rethink the way their support is structured and managed. In his article, Scannell (1994) states that research among IT departments indicates that most need to adopt a new method of end user support. According to him many things need to be done of which restructuring the support function in order to implement all efforts effectively is necessary. This is sanctioned by Fischer (1994) who says "a well-designed IT support organization provides direct end user support and training, innovations to the working environment, consulting, and the necessary support management."

As a conclusion a few practical suggestions are made in this regard.

- According to Fryer (1994), as companies become less hierarchical and employees are expected to shoulder more responsibility, operations staffers can be placed first in line for critical customer and end user support positions. This implies a much more direct IT/end user relationship.

- With new technology it is very important to make sure that the gap between what is offered and how it is supported by IT is not too wide. In this regard Nicastro (1994) points out that: "the gap between the client/server potential and the reality is especially wide in the area of end user support." She suggests that in order to meet the needs of both IT and the end users, an effective service desk must provide a number of functions, such as: (a) fully automated service, (b) single management function, (c) access, (d) consistent interfaces, (e) umbrella technology, (f) integration, (g) cost-effective delivery, and (h) organization wide consistency.
- Training of IT professionals and end users in the abovementioned factors are very important in order to change the mind frames of all participants before entering into a relationship. As was mentioned, this will ensure sound communications and proper involvement within the relationship. The question that immediately arises, is whether culture can be changed purely by training people. Things to note about the abovementioned definition of culture include: firstly, to change culture you need to change the beliefs, attitudes and values underlying behaviour; secondly, since it is concerned with commonly held beliefs, the target for change needs to be the organization as a whole or a fairly autonomous part of it; thirdly, the beliefs, attitudes and values associated with a culture will have achieved stability over a long period of time, and therefore are likely to be deep-rooted. If one is prepared to accept these assumptions, it follows that "planned culture change is an uphill battle requiring leadership, time and plenty resources!" (Towers, op cit.)
- Although training is one important method of establishing a supportive culture, sound relationships have in themselves the *power* to establish and enhance a supportive culture. This follows from the very nature of the abstract dimension of a relationship as discussed in section 3. Viewing the 'relationship' as the structure in Giddens' structuration theory, it is also clear that the continuous enactment and constitution of structures (i.e., relationships) by the human agents (i.e., IT and end users) imply a continuous growth - the relationships which would certainly benefit by 'proper' education of users and even of IT personnel.

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