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Technological Frames and End-User Computing

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Research Question and Research Framework

This present study is targeted at examining why end-user computing does not live up to its expected promises. Why is there this notion that end-users, MIS personnel and management are generally dissatisfied with end-user computing? We propose to investigate these questions based on the work that has been done on technological frames.

The combination of inexpensive personal computers and easy-to-use software packages has resulted in the emergence of a phenomenon now known as end-user computing (EUC). The early 80's saw the rapid proliferation of personal computers in corporate computing. In the years since, the roles of both the producers and the consumers of MIS have changed dramatically; blending and intertwining until it is almost impossible to tell the two groups apart. Before the advent of PC's, the MIS department had full responsibility for the entire system: they were the producers. The end-users had little if any responsibility for the creation or design of the systems they ultimately used; they were the consumers. Today, the end-users can be responsible for all aspects of the systems they use; everything from choosing the software and the hardware, installing the package, and creating the system. The MIS department typically is now only involved in main frame applications, having little responsibility or involvement on systems running on PCs. This drastic change in roles has occurred in the relatively short time frame of 10 to 15 years. While the actual roles played by the two groups might have physically changed, the changes in the frames of reference they hold regarding their roles may not have changed at exactly the same pace.

In addition to the changes in the roles played by the users and the IS department, another change has occurred in the skill sets and perspectives that are brought to the relationship by the two groups. In the old environment, the users possessed the business knowledge, and the IS department possessed the technical expertise. The partnership was based on the complementary nature of the two skill sets, and the results were systems that were built to the specifications of the users using the expertise of the IS professionals. In the new environment, many end-users come to the relationship with a significant amount of knowledge regarding the use and management of information resources. On the other hand, IS professionals are now being required more and more to gain knowledge of the business functions in the corporate world. It is no longer sufficient to possess only technical knowledge or business knowledge exclusively. IS professionals and end-users are becoming more aware of each other, and are becoming more and more alike. The end-users, however, still retain the responsibility of advancing the business needs of their domain, while the IS professionals remain responsible for providing the technical expertise required to manage the integration of the information resources with the business needs of the end-users [McLean, *et al*, 1993].

Looking at the potential synergistic effect of IS-oriented end-users combined with business-oriented IS professionals, one would assume that this would be an automatic prescription for success. However, both academic and practitioner journals continue to provide anecdotal as well as empirical evidence to the contrary. Hellman discusses "the persistent failure of end-user computing (EUC) to achieve its objectives" [Hellman, 1992].

Research Model

The cognitive sciences suggest the world as it is experienced does not consist of events that are meaningful in themselves. Cognitions, interpretations, or ways of understanding events are all guided by what has happened in the past [Schutz, 1970]. Each individual will have expectations and assumptions about a particular artifact that is dependent on their prior experience with that artifact. These expectations and assumptions become their frame of reference or structure towards that artifact. If an individual has had no experience

with that artifact, he will attempt to create a frame of reference or structure that is based on similar artifacts that already exist in his past experience. In this manner, ambiguous situations can be clarified and understanding can be facilitated. When faced with an unknown artifact, we automatically create our own interpretation of what that artifact is. Which particular past experiences are called up, and how those experiences are imposed onto a structure is what determines our individual cognitive structures [Gioia, 1986].

The concept of frame of reference or cognitive structures is not new in social cognitive research. However, Orlikowski and Gash (1994) were the first to apply this concept to an individual technology. Of particular significance is the discussion of the contextual dimension of frames. Members of a social group as a whole will come to have an understanding of individual technological artifacts, including not only knowledge about that particular technology, but also local understanding of specific uses in a given setting. When two or more groups possess different technological frames of the same artifact, they are considered to be incongruent. Congruence in technological frames would imply similar expectations governing the role of technology in business processes, the nature of technological use, or the type and frequency of support and maintenance. Conversely, where incongruent technological frames exist, organizations are likely to experience difficulties and conflicts when developing, implementing, and using technologies. While Orlikowski and Gash applied the concept of technological frames to a specific piece of technology (groupware) used in a specific organization, we intend to apply the concept to a more generic technology known as end-user computing. Specifically, we wish to determine if incongruence among the technological frames of reference held by different groups in an office setting contributes to the level of dissatisfaction expressed regarding the level of support provided for end-user computing.

It is our contention that the following elements taken together portray the technological frame of reference of an individual or a group.

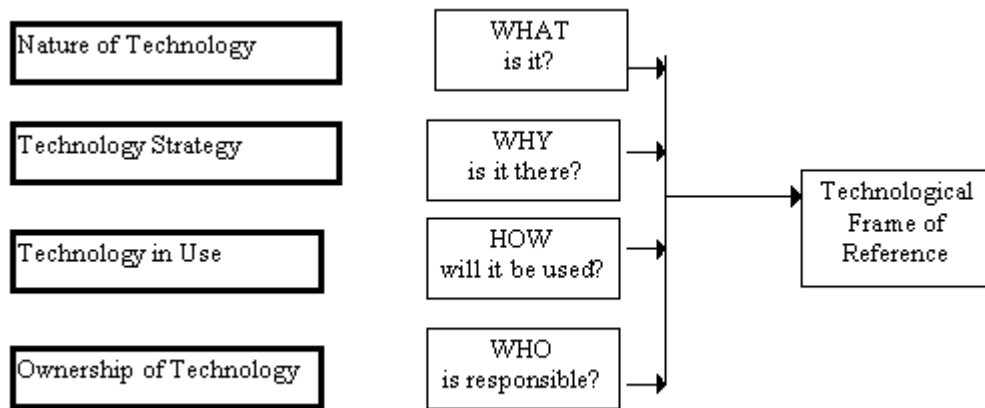


Figure 1. Technological Frame of Reference for EUC

When faced with a new technology, users try to make sense of that technology within existing frames of reference. However, prior to the introduction of that technology, individuals as well as communities already hold beliefs or mental models concerning technology and how it fits into their work. If the technology is not introduced properly into the organization, the ultimate adaptation of that technology may not conform to the original intentions.

It is our contention that congruence among the technological frames of reference held by various groups in an organization will result in an appropriate level of end-user support provided to the end-user. If an appropriate level of support exists, then end-user satisfaction should also naturally follow, as shown below.

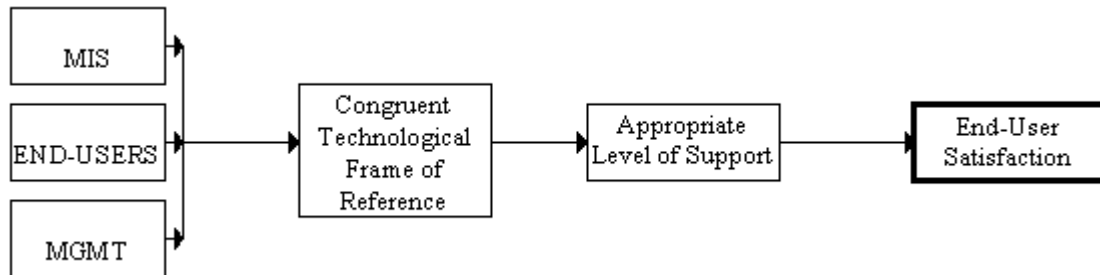


Figure 2. Research Framework

Proposed Methodology and Plan

The proposed research will be carried out in two phases. The first phase would use a combination of two survey instruments, while the second phase would be an in-depth case study using grounded theory.

Phase One: The objective of the first phase of the study is to measure the level of support in the firms studied, while at the same time measuring the level of end-user satisfaction in the firm. The two survey instruments to be used are the end-user support satisfaction instrument developed by Remenyi and Money and the Doll and Torkzadeh measurement of end-user computing satisfaction [Remenyi and Money, 1994; Doll, *et al*, 1994]. We expect a positive correlation between level of support and end-user satisfaction. This correlation has been posited in earlier studies [Lederer and Spencer, 1988; Ranier and Carr, 1992].

Phase Two: Once the level of support and degree of satisfaction has been categorized for each firm in the study, we can examine the technological frames using the four domains outlined above for the three different groups. We intend to perform a case analysis with in-depth interviews in order to assess the technological frames of the respective groups within the domains using grounded theory techniques. The software package NUD*IST will be used to perform the content analysis. For the firms with a high satisfaction measurement, we would expect to find a high level of congruence. For the firms with a low satisfaction measurement, we would expect to find a low level of congruence.

Progress to date

The User Support Instrument and the UIS instrument have been adapted to the local context in Singapore. A multi-national firm with regional headquarters located in Singapore took part in a pilot survey to assist in assessing the relevance and accuracy of the modified survey instruments. Two multi-national firms with regional locations in Singapore have agreed to participate in the study. The survey instruments are being administered in May, 1996. The follow-up interviews are expected to be conducted in June and July of 1996.

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