2000

Examining an ERP Implementation through Myths: A Case Study of a Large Public Organization

Rosio Alvarez
University of Massachusetts - Boston, rosio@mgmt.umass.edu

Examining an ERP Implementation through Myths: A Case Study of a Large Public Organization

Rosío Alvarez, Department of Management Science and Information Systems,
University of Massachusetts Boston, rosio@mgmt.umass.edu

Abstract

As organizations confront new information technologies, they are often forced to implement very expensive systems on the basis of little information about the product's benefits and potential 'fit' within the organization. This research examines the implementation process of an Enterprise Resource Planning (ERP) system and shows that implementation cannot be viewed solely in instrumental terms—that is, organizations do not simply make structural adjustments to the organization so that proper fit can be achieved. Instead, this research suggests that the activities of selecting and implementing new technologies at the same time serve to elaborate existing organizational values. Theorists have described such activities as a 'mythmaking' process. In that context, the 'new' ERP system and its implementation become the medium for (re-)constructing or (re-)constituting the organization's values. A case study of an implementation at a large public organization is presented to demonstrate how myth-making served to construct an ERP system as an 'ideal system' and the legacy system as a 'dying system.' The myth functioned as a vehicle of consensual organizational reality, serving to align the acquisition of an ERP system with the organizational value of 'integration,' thereby garnering widespread support for a complex and unknown technology.

Keywords: Myths, systems implementation, ERP, social process models

Introduction

The purchase and strategic use of information systems and technologies by organizations has been offered as the solution to surviving in the emerging 'e-based' economy by both practitioners and researchers alike. Yet, as the media has recently reported, the promise of new technology has not been realized by many companies, especially those implementing large scale Enterprise Resource Planning (ERP) systems. For these systems, implementation failures are becoming the norm rather than the exception (Deutsch 1998, Knorr, 1999;). Many organizations purchasing new ERP software are confronted with complex, untried technologies, which they are forced to evaluate and make very expensive decisions about potential 'fit' and acceptance within the organization. The research presented in this paper investigates the implementation of an ERP system as a process of myth-making. These myth-making practices contribute to 'aligning' the ERP software with espoused organizational values and objectives. The paper adopts an interpretive case-study as a means of studying how implementing a new ERP at the same time served as a vehicle for elaborating the organization's values thereby contributing to its acceptance by organizational members.

Information Systems and Organizations

Many studies of information technology implementation have been influenced by contingency theory. In this view, findings identify structural alignments which respond in some way to technological demands. Researchers adopting this approach concern themselves with identifying structural arrangements such that greater efficiency may be achieved. Structure delimits responsibilities, control over resources, authority to make decisions, communication relationships, and other matters thereby providing organizations with boundaries within which efficiency may be a reasonable expectation (Thomson, 1967). Traditionally, this perspective has influenced studies examining information technology and organizations (Huber, 1984; Pfeffer and Leblebici, 1977; Robey, 1977, Robey, 1981). While studies of technological innovations have yielded interesting results, judging from the number of continued failures (Jenkins, 1984; Sauer, 1993) technology implementation continues to be an issue of considerable concern for practitioners and researchers alike.

Generally speaking, this theoretical orientation carries an implicit managerial bias toward rationality and efficiency thereby, imposing limits on the explanatory ability of studies conducted from this vantage point. Rationality means that goals are selected, effectiveness criteria are established, and managers adopt strategies to achieve identified outcomes to benefit the organization. Moreover, technology and people are factors to be optimized. Excluded are the influences of a range of cultural, political --in a word social[1]-- considerations which are seen as distraction or complication in what would otherwise have been straightforward technical

[1] Social is defined as the general ways in which groups are organized (such as gender, network, or occupation) as well as the practices and interactions among people and/or groups as they negotiate their way through settings (their actions, strategies, roles, interests and language). Through and by these social interactions, people produce common frameworks of meaning and understanding.

problems. Instead, social issues are relegated to the status of explanatory fixes, as secondary 'patches' only after technical explanations have somehow failed. Additionally, the idea that people are social agents actively involved in constructing their work environments (Myers, 1995) is not considered. In other words, very little is said about the social process in which people, technology, environment and other elements interact over time.

This paper contributes to a growing movement of social process research on information technology (Newman and Noble, 1990; Newman and Robey, 1992; Sabherwal and Robey, 1995) often referred to as *social informatics* (Kling, 1999). Researchers in this tradition examine how contextual elements influence and interact with information technology in its cultural and institutional environment. Following in this tradition, this paper examines the extent to which actors actions and language use is influenced and constituted by the wider institutional and cultural environment (Barley, 1986;Orlikowski, 1992) when involved in an ERP implementation. This paper shifts the conventional rational focus of organization-technology research to a deeper social context by examining the role of myths.

Myths

The idea of myth, or story, as a symbolic representation, has begun to take hold in organizational research. One theoretical tradition underpinning myth-making organizational research is derived from the work of Meyer and Rowan (1977). Along similar lines, other theorists have examined the role of stories, or what some have termed 'narratives.' Like myths, stories are recounted to formulate a collective memory. Stories people tell contain all kinds information (Pentland, 1999). Myths and stories are created and sustained through language, rituals, ceremonies, and other social practices. They also function as a mechanism that allows participants to bring order to what would otherwise be very 'messy' situations (Bruner 1990). In particular, when myths are used to order reality, they also 'explain' the way in which activities, whose origins may be symbolic or social, are linked to appropriate technical objectives (Tolbert, 1988:103). In other words, myths function by making the subjective seem objective and the non-rational appear rational in disordered contexts. Research has been conducted on organizations and myths (Boje, Fedor and Roland, 1982; Filby and Willmott, 1988; Quaid, 1993), stories (Boje 1991,1995; Boyce 1995; Czamiawska 1997) and information technology in particular (Brown, 1994; 1998a, 1998b;Hirschheim and Newman, 1991).

Myth-making and storytelling are particularly well suited for examining an information technology implementation. New systems developments projects present users with equivocal situations or what some have termed 'ill-structured' environments (Zmud et al. 1993). In this view, users are required to imagine very unfamiliar or radically altered organizational environments and in some form, make sense of this. In other words, end-users are presented with 'messy' situations which they must somehow organize in order to make sense of their past actions and future environment. For this reason, myths are particularly valuable as an organizing tool.

This paper argues that 'myth-making' activities will function to produce an information system as an objective tool whose acquisition will enhance specific organizational objectives. These activities serve to organize the organizational environment and, very importantly, distance what might otherwise be perceived as a symbolic action from the social practices that produced it. In a sense, myth-making activities link the acquisition of new, untried and expensive tool with seemingly 'objective' organizational values. They bring a sense of order and stability to what would otherwise be a fairly unknown environment. Thus, myth-making activities function as 'alignment' mechanisms that allow the technology to fit to the organizational context.

Research Method

This research was conducted within the interpretive perspective. Recent research on information systems implementation has indicated an interpretivist approach is most appropriate for the study of this organizational phenomenon (Meyers, 1995). In an interpretivist approach, the world is seen as being made up of words, labels and concepts which humans use to construct social reality. Therefore, interpretive research requires that the researcher be immersed in a stream of organizational events (Evered and Louis, 1981) in an inductive attempt to create categories, or in this case myths, that are revised through the integration of data from observed experiences and the language use of organizational participants (Putnam, 1983). This generation of 'thick description' (Geertz 1973) resulted in empirical account which was firmly grounded in theory (Glaser and Strauss, 1967; Turner, 1981).

The data collection for this case study began in January 1996 and lasted through December 1998. The data were collected by the researcher through unstructured and semi-structured interviews with 18 managers, participant observations at 32 implementation meetings lasting between 1-3 hours each, dozens of informal conversations, and a survey administered to 213 participants. Most of the meetings were taped. The sampling method employed for the interviews is described by Marshall and Rossman (1995) as elite interviewing, "a specialized case of interviewing that focuses on a particular type of interviewee" (:94) "considered to be the influential, the prominent, and the well-informed people in an organization" (:83). The survey administered included demographic information

and open-ended questions asking participants from all levels of the organization to describe the new information system and the existing legacy system which was being replaced.

The interviews and observation provided the researcher with information to interpret the implementation process and identify myths that emerged. After transcribing tapes from the interviews, qualitative analysis proceeded iteratively. The researcher was involved in every iteration allowing her to become 'intimately familiar' (Eisenhardt, 1989) with the data. First, each interview was 'open-coded' to identify overarching myths. In open coding the researcher operates without predetermined codes and allows the data to suggest categories (Strauss and Corbin, 1990). From this analysis, several myths emerged for each interview. Then cross-case analysis was conducted across meetings and interviews, to identify overlapping myths. The open-coding and cross checking produced two overarching myths. Within each myth, however, there also emerged themes that contributed to sustaining that myth.

The survey provided a window into the language use of participants as well as verification of themes that emerged in the open-coding of interview data. And finally, document analyses provided insight into the formal representation of the organization. That is, the formal documents provided added information on the organization's formal vision and values.

The Case Study

The organization chosen for the study is a large public research university located in the northeastern United States. It's annual budget exceeds $.5 billion. The university is part of a five-campus system where each campus has Chancellor as Chief Administrative Officer, but all report directly to the University President. At the time of the fieldwork, the University had recently acquired a large pool of funds targeted for the purchase of a new information system, which would be owned and maintained by the campus. Previous to this, the campus received information systems services from an IS department located in and reporting to the Presidents office. The implementation project, which will be called the CIS (Campus Information System) project, was directly under the control of the Vice Chancellor (and CIO) of the University. The phases of the implementation covered by this study include initiation, information requirements analysis, request for proposal issuance, proposal evaluation, and the purchase of new ERP system.

The Myth Of A Dying System

The old must be discredited before the new can be ushered in. Such was the case at the University. The legacy administrative system that had been in use for approximately eighteen years was delegitimated through the creation of the myth of a dying system. There we several factors that contributed to discrediting of the legacy system. Some factors stemmed for events passed that participants recounted during interviews and information obtained from organizational documents. In this section those event are traced out beginning in the early 1990s through 1996.

In the late 80s and early 90s microcomputer based networks proliferated throughout the organization and with it came a new cadre of technology specialists with criticisms of the existing mainframe legacy system. With the growth in access and use of these networks technologies departments began to hire technical support. A host of new positions were created and filled that did not belong to the central IS organization that serviced the legacy system. The new technologists organized committees to address their dissatisfaction with the mainframe legacy system, on which all the major departments relied. These committees issued reports that directly criticized the legacy system and made strong pleas for a new information system and support organization that would be owned and controlled by the campus. In the Spring of 1996, immediately before the CIS project was publicly announced, a committee issued an IT strategic plan. The committee was composed of thirty IS specialists representing a broad cross-section of the campus. However, no member of the central IS staff was asked to participate. The report stated:

> Administrative systems … are characterized today by out-of-date, *unintegrated*, labor intensive applications. Systems have been created in a haphazard manner and are either *inaccessible* or difficult to use. (emphasis added)

The discontent with the legacy system was clear. This report made evident that the new technologists perceived the legacy system as unintegrated and inaccessible. Later, the request for proposals for the new ERP system also strongly criticized the existing system using similar language:

> A variety of applications… however, tend to be vertically oriented — meeting the needs of an individual department or part of a department but not facilitating an *integrated* view of student services. (emphasis added).

The story being created here was one of a dysfunctional legacy system that was no longer viable because it was neither integrated nor accessible to users. Later, the desirable technical objectives of the new ERP would be those of integration and accessibility, created in

direct contrast to the perceived failures of the legacy system.

In addition to discrediting the legacy software, the IS support structure was also the target of criticism. As one report describes this structural arrangement:

> While this administrative structure may have certain advantages in allowing for the sharing of certain computer systems, it also leads to both cumbersome and lengthy procedures before any decision or action may be taken, since any given actions may have different impact on different campuses.

These reports contributed to creating a story of a dying legacy computer system as well as an inefficient structural arrangement for support of that system. Existing research suggests that the process of institutionalizing myths involves both *creating* and *discarding* existing rules and practices (Oliver, 1992) Certain pressures contribute to creating a context in which existing practice may erode, destabilize or altogether disappear. In the case of the University, particular organizational actors launched attacks directly on the competing or contradicting institutional practices. Both the legacy system and its support staff were being discredited through the conversations that took place at meetings and the reports that were issued by committees over the course of six years. These actions rendered the legacy system as an illegitimate practice in need of a solution and created the myth of a dying system. The rejection of old institutional practice -- of using the existing legacy system—could itself be seen as a necessary ritual before the creation of a new rationalized myth could take place.

Attacks continued on other levels. Increasingly, 'mainframe' was considered a source of ridicule while PC, and later client-server, a source of admiration. As one manager recounted about an earlier RFP meeting:

> these meetings were more about proving that mainframe technology was outdated and PC was in, than it was about evaluating new financial software.

There were other stories about these confrontations. Managers described meetings between the 'mainframe people' and 'PC staff' or later called 'client-server staff.' The mainframe people were ridiculed as though they were anachronisms awaiting death. On the other hand, client-server was talked about as the future of technology. Yet, when asked, these same managers could not in any substantive way articulate what if any differences existed between one form of technology or the other. However, the story was still believed and reproduced by managers during conversations and interviews. Clearly, the death of one practice was contrasted with the possible birth of a new practice.

The Myth of an Ideal System

In this section the paper examines how particular activities created and reinforced the story of a new and ideal, or 'better' system, through attributing to it the characteristic of integrated. Myth-making activities throughout the entire decision and implementation process centered on this theme. This myth functioned to shape acceptance of the decision and garner overwhelming support . Moreover, the implementation process would also serve to align the new ERP with formal organizational values.

The theme of integration was a very dominant one throughout the implementation process. This theme was constantly reinforced by the project team, the consultants hired by the University, the CIO and Chancellor. In preparation for the kickoff meeting for the CIS project, one member of the project team described the objectives of the new system as, among other things, "integration..flexible tunable system…allow for department control"

For public meetings presentations were carefully crafted. For example, the project team and consultants developed an overarching script for the performances of all of those who would be speaking at the kickoff meetings. At the first kickoff meeting the project sponsor began by attacking the existing IS legacy system and the support structure. "We outsource computing services [to the IS central office] but have no control over how they do it. Money is simply taken off the top for services." The CIO then described the ideal system, "in the past people had to work in silos…we were forced to think vertically, now we are asking people to think and work horizontally…in interactive and interdependent ways." According to the CIO, the new system would allow them to work in an integrated environment. She promised resources to transition into this new way of working. The story of an ideal system was sustained through the continued reinforcement of integration. The myth of the dying system was sustained by the idea that the old system was unintegrated, whereas, the ideal system was placed in contrast to this by attributing to it the characteristic of integrated.

More importantly, the theme of integration was also a formal organizational value that was at the same time strongly promoted by the upper level executives of the organization. Integration was not a theme that had been created by the project team for the CIS project, it was a theme that the Chancellor used in many of his public appearances and formal documents prior to the initiation of the CIS project. For instance, in his strategic

plan published before the initiation of the CIS project, he states that the campus

> will strive to achieve the greatest human potential among its students, faculty, staff and alumni, and through them and its integrative programs…The University will continue its historic commitment to removing barriers…The University will be integrative in all that it strives to do.

The document suggests integration for a variety of academic programs and projects, on the campus. Integration, as expressed by the Chancellor in his plan, evoked images of unification, cohesion, and collaboration. Throughout his public performances, such as faculty senate or board of trustees meetings, the Chancellor continually reinforced the value of integration.

What we can see here is that in fact, integration was perhaps as much a symbol of the ideal state for the campus community as it was a description of the ideal system. Creating the myth of an integrated system and integrated campus worked to produce a close alignment between the technology and the organization. This close coupling is evidenced in the request for bids issued for the purchase of the ERP. According to this document, an integrated system was one that "must be integrated with its environment as well; it can not be an isolated system, but one which much exist in the broader administrative, academic, and cultural setting of both the campus and the university system." The 'fit' of the technology to the organization seems to be an appropriate one.

However, the myth-making also allowed members to elaborate and re-constitute the organizational value of integration. The rhetoric of organizational change was one of transforming the organization from fragmented to integrated, whereas the CIS project was to transform the information environment from a fragmented to an integrated one. Through the constant reinforcement of the attribute of integration the myth of an ideal (and integrated) system took shape. This myth functioned as a vehicle of consensual organizational thought, serving to align the implementation team's various activities with the organization's values, but at the seam time re-constitute them. Moreover, the implementation process, as myth-making activity, served to align the technology purchase with formal organizational goals.

In order for myth to be believed, the myth must be shared and sustained by individuals. In this view, language is key in the creation and maintenance of a myth. This study examined the language use of participants involved in the CIS project. A survey was administered to 213 participants at all levels of the organization. At the time the survey was administered, the ERP was not yet in production. The response rate was 42.4 percent, providing a sample of 86 surveys. In responding to the question of level of support for the decision to purchase and install an ERP (7 point Likert scale), findings show that there was overwhelming support. 97.7 percent either somewhat agreed, agreed or strongly agreed. An open-ended question asked respondents to describe the legacy system and the new ERP system. After reading and coding all questions the following categories and frequencies listed in Table 1 were obtained:

Table 1. Survey Responses to Open-Ended Question

The new CIS is/allows for:	*Percent answering*
Integration/interconnection	46.5%
Distributed/shared access to information	24.4%
Web based/new technology	18.6%
Flexibility	9.3%
User friendly	8.1%
Efficient/Better service to students	7.0%
Real-time access and/or updates	5.8%
Better reporting	3.5%
User configurable and updateable	3.5%
Campus-owned and operated	2.3%

The responses are revealing of just how successful the project team, consultants, and CIO had been in creating the myth of ideal system that would be integrated and also accessible. In open-ended questions respondents used language that indicated that 46.5 percent believed the new system was either an integrated system or would allow for integration and 24.4 percent believed it to be accessible. Yet, only 13.4 percent of those responding had actually used the new system. That is, only a select group of individual were now in the testing phase and had actually any information by which to judge whether the new ERP system was either integrated or not. However, the performances by CIS supporters rendered the ERP as an objective tool with integration ability thereby, distancing it from the social practices that produced it as such. Additionally, 54.7 percent of the respondents stated that they had received most of their information about the ERP system from co-workers. These respondents had not attended public performances

by project team member or the CIO, yet they seemed to be equally influenced. This suggests that the myth was now being reproduced and sustained by others beyond the more visible supporters of the myth. The myth of an ideal system seemed to have taken hold as it was sustained and recreated by organizational members at all levels of the organization.

Conclusion

This paper has argued that much of the organizational literature on technology takes a very rationalistic and static approach to examining the changes that must take place for technology to become 'aligned' with the organization. The research presented here provided a framework that punctuated the importance of social context as a key influence in the technological implementation process. Specifically, this paper argued that technology cannot be considered in isolation from the social practices which produce it. Put another way, information technology must be understood as dependent on a variety of complex social processes and cultural conventions, all of which render it a 'knowable' entity. Through the study of an implementation, this paper highlighted the crucial importance of myth-making as the vehicle by which technological attributes are rendered 'real' and come to positively influence an implementation. Moreover, this story-making process served to align the technology with ideal organization values.

References

Barley, S R., "Technology as an Occasion for Structuring: Evidence from Observations of CT Scanners and the Social Order of Radiology Departments," *Administrative Science Quarter,* (21), 1986, pp. 78-108.

Boje, D. M. "Stories of the Storytelling Organization: A Postmodem Analysis of Disney as Tamara-Land,"*Academy of Management Journal*, (38:4), 1995, pp. 997-1035.

Boje, D. M., "The Storytelling Organization: A Study of Story Performance in an Office-Supply Firm," *Administrative Science Quarterly*, (36:1), 1991, pp. 106-128.

Boje, D. M., Fedor, D. B. and Rowland, K.M., "Myth Making: A Qualitative Step in OD Interventions," *Journal of Applied Behavioral Science*, (18:1), 1982, pp. 17-28.

Boyce, M., Collective centering and collective sensemaking in the stories and storytelling of one organzation. *Organization Studies*, 16(l), 1995, pp.107-137.

Brown, A. "Narrative, Politics and Legitimacy in an IT Implementation," *Journal of Management Studies*, (35:1), 1998a, pp. 35-59.

Brown, A. D. "Politics, Symbolic Actions and Myth Making in Pursuit of Legitimacy. *Organization Studies*, (15:6), 1994, pp.861-878.

Bruner, J. *Acts of Meaning*, Harvard University Press, Cambridge, MA, 1990.

Czarniawska, B., *Narrating the organization: Dramas of institutional identity*. University of Chicago Press, Chicago, 1997.

Deutsch, C. H., "Software That Can Make A Grown Company Cry," *New York Times,* Nov 8, 1998

Eisenhardt, K., "Building Theories from Case Study Research," *Academy of Management Review*, (14:4), 1989, pp. 532-550.

Evered, R. and Louis, M., "Alternative Perspectives in the Organizational Sciences: Inquiry From the Inside and Inquiry From the Outside," *Academy of Management Review*, (6), 1981, pp. 385-396.

Filby, I. and Willmott, H., "Ideologies and Contradictions in a Public Relations Department: The Seduction and Impotence of Living Myth," *Organization Studies*, (9:3), 1988, pp.335-349.

Geertz, C., *The interpretation of cultures*. Basic Books, New York, 1973.

Glaser, B. G. and Strauss, A. *The Discovery of Grounded Theory: Strategies for Qualitative Research*, Aldine, New York, 1967.

Hirschheim, R. and Newman, M., "Symbolism and Information Systems Development: Myth, Metaphor and Magic," *Information Systems Research*, (2:1), 1991, pp.29-62.

Huber, G. P., "The Nature and Design of the Post-Industrial Organization," *Management Science*, (30:8), 1984, pp.928-951.

Jenkins, A,M., Naumann, J.D. and Wetherbe, J., "Empirical Investigation of Systems Development Practices and Results," *Information and Management*, (1), 1984, pp. 73-82.

Kling, R., "What is Social Informatics and Why Does it Matter?" *D-Lib Magazine* 5(1). www.dlib.organization:80/dlib/january99/kling/01kling.html (1999).

Knorr, E., "ERP's Rough Waters" *Upside Today*, November 18, 1999

Marshall C. and Rossman, G. B., *Designing qualitative research* (2nd ed.), Sage, Thousand Oaks, CA, 1995.

Meyer, J. W. and Rowan, B. "Institutionalized Organizations: Formal Structure, Myth and Ceremony," *American Journal of Sociology,* (83), 1977, pp.340-363.

Meyers, M. D. "Dialectical hermeneutics: A theoretical framework for the implementation of information systems." *Information Systems Journal*, (5), 1995, pp. 51-70.

Newman, M. and Noble, F. User involvement as an interaction process: a case study. *Information Systems Research*, (1:1),1990, pp.89-113.

Newman, M. and Robey, D. "A Social Process Model of User-Analyst Relationships," *MIS Quarterly*, (16:2), 1992, pp. 249-266.

Oliver, C., "The Antecedents of Deinstitutionalization," *Organization Studies,* (13:4), 1992, pp.563-588.

Orlikowski, W. J. "The Duality of Technology: Rethinking the Concept of Technology in Organizations," *Organization Science,* (3:3), 1992, pp.398-428.

Pentland, B. T., "Building Process Theory with Narrative: From Description to Explanation," *Academy of Management Review*, (24:4), 1999, pp. 711-724.

Pfeffer, J. and Leblebici, H. "Information Technology and Organizational Structure," *Pacific Sociological Review*, (20:2), 1977, pp. 241-261.

Putnam, L.L. "The Interpretive Perspective, an Alternative to Functionalism" in *Communication In Organizations, An Interpretive Approach*, L.L. Putnam and M. E. Pacanowsky (eds.), 31-54. Beverly Hills, CA, Sage. 1983.

Quaid, M., "Job Evaluation as Myth," *Journal of Management Studies*, (30:2), 1993, pp.239-260.

Robey, D., "Computer and Management Structure: Some Empirical Finding Re-examined," *Human Relation*, (30), 1977, pp. 963-976.

Robey, D. "Computer Information Systems and Organizational Structure," *Communications of the ACM*, (24:10) 1981, pp.679-687.

Sabherwal, R, and Robey, D., "Reconciling Variance and Process Strategies for Studying Information System Development," *Information Systems Research*, (6:4), 1995, pp. 303-327.

Sauer, C. *Why Information Systems Fail: A Case Study Approach*. Alfred Waller, Henley-on-Thames, England, 1993.

Strauss, A., and Corbin, J., *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, Sage, Newbury Park, CA, 1990.

Thompson, J. D., *Organizations in action*. McGraw-Hill ,New York, 1967.

Tolbert, P.S., "Institutional Effect on Organizational Structure," in L.G. Zucker (ed.), *Institutional Patterns and Organizations: Culture and Environment*. Cambridge, MA: Ballinger Publishing Co. 1988

Turner, B. "Some Practical Aspects of Qualitative Data Analysis: One Way of Organizing the Cognitive Processes with the Generation of Grounded Theory," *Quality and Quantity*, (15), 1981, pp. 225-247.

Zmud, R. W., Anthony, W. P. and Stair, R. M., "The Use of Mental Imagery to Facilitate Information Identification in Requirements Analysis," *Journal of Management Information Systems*, (9:4), 1993, pp. 175.