

The Role of Participation in Systems

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ABSTRACT *The use of participational approaches to system design has been debated for a number of years. In some situations it seems that participational approaches are not a suitable or practical method by which to design an Information System or to analyse a problem. Within this paper we describe a framework in which participation plays an active and effective role and describe a method that was used to effectively design information systems and implement computer security countermeasures.*

Keywords: participational approach, SIM-ETHICS, Information System.

INTRODUCTION

There are now many different types of Information Systems in place in the world, from transaction processing systems to decision support systems. All of these have one thing in common the need for appropriate design and analysis of the “problem” before the production of such a system can take place. The development of a new information system can have an overwhelming result on the individuals contained within the organization as well as the organization itself (Zuboff, 1988). There is also of course the concern of system failure. Jiang & Klein (1999) discussed the risks associated with the success of Information Systems. They commented that even with CASE tools and new techniques such as prototyping, software development still has a high failure rate. This study also mentioned the monetary costs that are lost to failure of projects, in this case “millions of dollars” are lost due to “cancelled projects, late delivery, over budget delivery and limited functioning”. Therefore it is important to fully understand and model a system before attempting the implementation of such a system.

An information system contains many different parts, including people and procedures, information, software and hardware (Flynn, 1998). Different approaches to the analysis tend to focus specifically on one or more of these parts. For example, JSD (Jackson Structured Development) which is orientated toward software rather than organisational need (Avison & Fitzgerald, 1995).

However, it is almost impossible to remove the participation and involvement of users and stake holders from the design of a system, at some point, users will have some degree of input into the system, whether it just be deciding upon the budget or determining the key functionality of a system. There are a number of methodologies used within Information Systems that specifically encourage users to have a large say in how the impending system is designed and key areas of functionality are implemented. The main example of this approach is ETHICS (Mumford, 1983a). It is this participational (also referred to as a socio-technical Approach) approach that focuses upon people and procedures. This socio-technical approach is defined as "one which recognises the interaction of technology and people and produces work systems which are both technically efficient and have social characteristics which lead to high job satisfaction" (Mumford, 1983b).

For those supporters of “user participation” in the design of systems, it forms an essential part of the design, analysis and eventual implementation of a system. Previous research (McKeen et al, 1994), which looked at the relationship between user participation and user satisfaction, found that the correlation between these two variables could be affected by other factors, such as the complexity of the task. Mckeen

et al also noted that their study could not say that user participation was unproductive, unnecessary or dysfunctional when used in the design of a system.

But other studies have identified advantages in using a participational approach. Adams (1984) found that:

- staff have ideas which can be useful;
- effective upwards communications are essential to effective decision making at the top;
- staff may better accept decisions if they participate in them;
- staff may work harder if they share in decisions that affect them;
- workers participation develops a more co-operative attitude amongst workers and management;
- staff participation may act as a spur to managerial efficiency.

This paper introduces the SIM-ETHICS framework, which was used as part of a European Union IT security research project within a healthcare environment. This is one example where the incorporation of user participation was particularly effective for the development of information system and implementation of security mechanisms.

THE SIM-ETHICS APPROACH

The philosophy behind SIM-ETHICS is that computer technology is not only a technical problem but also an organisational issue and hence a socio-technical approach. This organisational issue is concerned with the effect that the process of change could have upon the organisation as a whole. The new features of SIM-ETHICS as compared with ETHICS is the development of an evaluation criteria a more detailed focus on technology and related impacts and a more effective manner of using user committees to develop user collective viewpoints. Other considerations relate to availability and reliability of the systems once they have been introduced. The introduction of new technology into an organisation can also be thought of as a human issue (Mumford, 1995).

THE SIM-ETHICS METHOD

The following are the steps used in the SIM-ETHICS method:

1) Initial Committee Consultation

The committee will be made up of a cross section of staff directly involved or affected by the implementation of the new security features. The SIM-ETHICS method uses the participational approach in order to allow user input into the process of change. There are various levels of participation (Mumford, 1983):

Consultative

This is when an existing body, e.g. security committee, is used to implement the change process. This committee would then consult users on the effect that change will have upon them.

Representative

This is when a cross selection of users affected by change, are brought together into a design group. This ensures that representatives affected by change have the same powers in the committee as those bringing about change.

Consensus

This is when all the staff affected by the change are involved in the design process. Representatives of the staff affected are elected to form the design committee.

Other areas of consideration within the SIM-ETHICS method at this stage are as follows (Mumford, 1993):

Job Satisfaction;
User Effectiveness;
Group Efficiency.

2) Managerial consultation

The intended security countermeasures are evaluated against the SIM-ETHICS criteria to determine the level of impact its implementation will have. The criteria relates to (Warren, 1999):

Ease of Implementation;
Training Issues;
User Impact;
Organisational Impact;
Human Issues.

A representative of the committee would meet the following key stakeholders such as management within the organisation. At these meetings, issues relating to the introduction of the security systems would be discussed (as determined in Stage 1) as well as any other possible problems that managers could foresee.

3) Committee Stage

The views of the managers are discussed within the committee. It is now that initial problems are discussed, e.g. problems of introducing new security swipe cards.

4) Users consultation

A representative of the committee then meets the users to explain the proposed security countermeasures and then ask them a series of pre-set questions.

The security countermeasures are then re-evaluated against the SIM-ETHICS criteria to take into account the newly raised user issues.

5) Committee Stage

The views of the users are discussed. If problems are found concerning the system, ways would be discussed on how to overcome the problem, e.g. increase the level of training.

6) Post implementation review

This meeting takes place after the implementation to determine if any unforeseen problems have occurred and if so discuss ways in which to rectify them.

THE USE OF SIM-ETHICS

SIM-ETHICS was used to determine the impact of two new security countermeasures, a new computer information system and also a multimedia information system (Warren, et al, 1995) within a major UK hospital. This major hospital was located in the South of England and was used as part of the European Union SEISMED (Secure Environment for Information Systems in Medicine) project. The hospital was used as a reference centre for the implementation of new security systems. The lessons learned from the implementation would be shared with other partners within the project consortium.

The areas looked at were:

Passwords

To determine users perception on the need and use of passwords as a form of access control for computer systems.

Physical Access Control Cards

The use of 'Swipe Cards' to control access of staff and visitors within the hospital. These cards were used to control access after working hours and in sensitive areas, i.e. maternity wards.

Information Message System

A universal organisational information message display system. Some of the information contained on the Information Message System was considered as being sensitive in nature.

Feasibility of Medical Multimedia Information Systems

The proposed information systems related to the development of multimedia electronic health care records for all patients that are treated within the hospital described above for the treatment of certain cancers (Warren, et al, 1995).

CONCLUSIONS

The use of SIM-ETHICS has enabled management to collect the consensus view of users relating to new security systems and has given management the chance to implement solutions to future problems, before they occurred. This method also allows users to raise issues and concerns about implementing new security features. The use of SIM-ETHICS was a success because it allowed users to determine how information systems and security systems could be implemented within their organisations. It also allowed management to cater for problems before they occurred, e.g. developing training strategies for several hundred staff.

The method gives management information about problems that may occur, but it is the role of management to decide how to use this information when making decisions.

The method was originally piloted in the United Kingdom. The next step is to use the method in other countries to ascertain whether culture differences have any effect upon the methodology.

REFERENCES

- Adams, R. (1984) *Participation Today*, The Industrial Participation Association, UK, 1984, ISBN 0-9503090-36.
- Avison, D.E. & Fitzgerald, G. (1995) *Information Systems Development: Methodologies, Techniques and Tools*. McGraw-Hill, UK.
- Cavaye, A. (1995) User Participation in systems development revisited. *Information and Management*, Vol 28, pp311-323, UK.
- Flynn, D. (1998) *Information Systems Requirements: Determination and Analysis*. McGraw-Hill, UK.
- Jiang, J., J. & Klein, G. (1999) Risks to different aspects of system success. *Information and Management*, v36, pp263-272.
- McKeen et al (1994) The Relationship Between User Participation and User Satisfaction: An Investigation of Four Contingency Factors. *MIS Quarterly*, December, USA.
- Mumford, E (1983a) *Designing Participatively*, Manchester Business School, UK, ISBN 0-903808-29-3.
- Mumford, E (1983b) *Designing Human Systems*, Manchester Business School, Manchester, UK.
- Mumford, E (1995) *Effective Requirement Analysis and Systems Design: The Ethics Method*, Macmillan, UK.

- Mumford, E. (1993) *Designing Human Systems For Health Care, The ETHICS Method*, 4C Corporation, Netherlands, ISBN 90-74687-01-6.
- Warren, M.J. (1999) A Practical Soft System Management Approach to Implementing Security. *Deakin University Technical Report CC99/05*, Deakin University, Australia.
- Warren, M.J. Sanders, P.W & Gaunt, P.N. (1995) Participational Management and the Implementation of Multimedia Systems. *MEDIACOMM 95 - International Conference on Multimedia Communications*, Southampton, UK.
- Zuboff, S. (1988) *In the Age of the Smart Machine*, Basic Books, New York, USA.