

Organizational Change As An Example Of Socio-Technical Design

Ijeoma Ojukwu^a, Peter Bednar^{a,b}

^a School of Computing, University of Portsmouth, Buckingham Building, Lion Terrace, Portsmouth PO1 3HE, UK

^b Department of Informatics, Lund University, Ole Römers väg 6, 223 63 Lund, Sweden

Abstract

This study focuses on Organizational Change as an example of Socio-Technical Design (STD). STD is an approach that aims to give equal weight to social and technical issues when new work systems are being designed [8]. It is widely acknowledged that implementing a socio-technical design approach leads to systems that are more acceptable by stakeholders during organizational change. Despite this, STD is not often used or not correctly practiced in organizations. Baxter and Sommerville noted that even though many managers realize that socio-technical issues are important, socio-technical design methods are rarely used [1].

The study data was derived from the preliminary work done on the case study in a telecommunication company adopting an Action Research (AR) approach. It is based on the researcher and participants' experience together with reflection, a collaboration between the researcher and the employees'. Action research in an organizational setting draws the researcher and the employees involved into a joint process aimed at solving organizational problems and creating new ideas. According to Schurman et al action research is a co-learning process, employees' are involved in most aspects of the research and action, and the problems addressed are generated by the employees themselves and not theories by the researcher [2]. This study recommends that to realize the goals of organizational changes, the objective of socio-technical which has always been joint optimization of the social and technical systems should be observed. The technical system covering technology and the social system covering the individuals in the chosen boundary.

Keywords

Socio-technical design, organizational change, action research.

1. Introduction

This paper discusses organizational change as an example of socio-technical design (STD), a real-world case study. It is being recognized that organizations have to meet the social and technical needs of the employees [1]. Many past organizational failures can be attributed to employers not meeting the needs of the employees when change occurs. Mumford mentioned that the 1990s proved very frustrating to the exponents of socio-technical design because companies choose methods such as lean production and business process reengineering that took little account of employee needs and did not produce good human results [3].

6th International Workshop on Socio-Technical Perspective in IS development, June 08 – 09, 2020 (STPIS'20).

EMAIL: ijeoma.ojukwu@port.ac.uk; peter.bednar@port.ac.uk

ORCID iD: P. Bednar - <https://orcid.org/0000-0002-3631-2626?lang=en>



© 2020 Copyright for this paper by its authors.

Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

CEUR Workshop Proceedings (CEUR-WS.org)

Authors are drawing experiences from an industry-based AR project and STD framework. The authors combining AR and STD approach of investigation flexibly that some relative techniques, such as Soft Systems Methodology (SSM) can be applied when needed. This is the investigation of stakeholders values, experiences, reflections and expectations; a collaboration between the researcher and the stakeholders. Semi-structured interviews and face-to-face communication was used as a means of investigation as they are a good means for identifying problems and explaining the reasons for the problems. It allows the researcher and the employees' to participate and contribute knowledge. Employees' are involved in most aspects of the research and action, and the problems addressed are generated by the employees. Sessions with each employee was one to two hours consisting of systematic use of semi-structured interviews, reflection, conversations and description of roles and activities.

The interviews, conversations and feedbacks of some selected employees' were analyzed. Authors believe that it is not enough to simply analyze from a socio-technical viewpoint, thus, we suggest how STD approach can be used constructively during organizational change. Our approach is based on three characteristics.

1. It is participatory. The researcher and the employers' participate to co-learn and solve the organization's problem.
2. It recognizes the social aspect of employees' affected by the change.
3. It recognizes the social and technical systems of STD to achieve the goal of organizational change.

2. Linking Organizational Change and Socio-Technical Design

Checkland and Holwell argued that organizations are seen as open systems containing a set of functional sub-systems [4]. According to Mumford, there are major organizational changes within the industries that brings new and unfamiliar problems [5]. Employees' feel worried and uncertain at this time. Managing and addressing these problems sometimes become very difficult to handle. Many organizations lack an integrated approach to organizational and technical change [6]. Thus, during organizational change, organizations prepare and employ their own change management strategies.

STD theory, principles and approaches provide a framework for successful organizational change with respect to technology. STD describes a process and a humanistic set of principles that are associated with technology and change [3]. STD principles tell us that although there may be an organizational change, the rights and needs of the employee must be as high importance as those of the non-human parts of the system. Organizations are socio-technical systems, Mumford et al note that socio-technical is the name given to the interaction between people and technology [7].

Socio-technical design is an approach that aims to give equal weight to social and technical issues when new work systems are being designed [8]. An important objective of STD is to ensure democracy, that employees are allowed to participate in decision making. Participation and democracy can be of great assistance when change happens in an organization. Every aspect of socio-technical change needs a human-centred design perspective, whether work systems comprise people-to-people relations, machine-to-machine relations, or a combination of both [9]. Sometimes, when technology changes, organizations do not engage the employees' and this results to neglecting the employee needs. Bednar and Welch highlight the importance for actors to take ownership and control over their own change process [10]. Socio-technical design throughout history has had two important components. The first one was the need to humanize work through the redesign of jobs and the second was democracy at work [5].

Organizations must innovate to thrive in competitive markets, and they depend upon the resourcefulness and creativity of individuals and groups at work to do so. According to Bednar and Welch, innovation is needed in order to promote sustainability over the life of the organization [9]. Innovation is a major reason for organizational change, modern organizations may not survive unless they can innovate. Mumford points out that today, innovation is seen as one of the keys to successful survival [10, p.82]. Ciborra notes that to innovate means to create new knowledge about resources, goals, tasks, markets, products, and processes [12]. Thus, when organizations change, it becomes dominated by new information, new ways of work and communication technologies. Mumford argued

that organizational change is often stimulated and reinforced by businesses that take the lead and are ready to take risks [5]. With organisations innovating very quickly and changing, STD practices help organizations to achieve effectiveness as an object of the change. Bednar and Welch points out that effectiveness in any purposeful activity is a socio-technical phenomenon [9].

The constant innovation and new way(s) of doing things create some resistance from the people affected [10]. Due to this resistance, the people affected by the change need to be motivated, employees work best when they are motivated. Motivation is about stimulating people to do their work and discharging their energy into their work so that they perform and deliver above-average performance [14]. Organizations should make motivation a culture to increase productivity during and after an organizational change. When change happens, employees talk to each other and mentor each other in the context of change and a challenging situation. They want to know what motivations are there for them to share and represent knowledge of the change.

Designing systems for organizational change is a heavy responsibility and can have a dramatic effect on humans. Organizations should embrace the potential of STD, that at all times the joint optimization of the social and technical systems of socio-technical design should be obeyed to achieve the goal of organizational change. Bednar and Welch note that the development of socio-technical theory focuses on a reciprocal

relationship between human actors and the technologies that they use at the workplace [10]. For STD approach, this human and technology connection is very important. Morgan explained that work in most of the world has now shown that in designing or managing any type of social system/organization, the interdependence of the technical and human needs must be thought of [15]. Any system that tends to inconvenience or frustrates users cannot be an effective system. Mumford emphasized that despite the benefits of new technology in organizations and the pace of the change, the employees' and their talents are required more than ever without neglecting their needs [5].

3. Method of Analysis

Socio-technical design is closely allied with action research [3], therefore, an AR approach and STD techniques were adopted for this study. AR is a process of critical inquiry and a focus on social practice [4]. This is a collaboration between the researcher and the employees in the organization. AR and STD are participative and the argument for participation according to Mumford is that management may see participation as helping to produce an interested and committed workforce and therefore assisting in the avoidance of industrial related problems [7]. By participation, all those affected by the change will be able to exchange ideas and agree on strategies for implementation and evaluate its success. Involving and participation is an empowering process for the employees' and they also gain increased influence and control over their own lives. As the involvement and participation increases, the role of the researcher shifts from the researcher to co-learner. Learning and knowledge creation process are very important since what constitutes knowledge in human situation should not be taken as given [4].

For this investigation, the interview applied provided an opportunity for face-to-face interaction between the researcher and the participants. The semi-structured interview sessions were conducted lasting for about one hour and more for each participant. Participants were all interviewed individually, confidentiality was assured to the participants. Designing the interview questions, conducting the interviews, dialoguing, reflecting and sharing our experiences are learning processes for both (the researcher and the employees'). Authors use observation, brainstorming, feedback, evaluation and sense-making practices to examine each participant's responses and worldviews. Evaluation can be described as a result of both inquiring and reflecting thought processes [16]. All of these processes increases the understanding of the change and the people involved. Other means of communication consist of informal discussions, thinking, and study of the problem situation.

The STD approach provides a clear purpose which is to optimize both the use of technology and people. It also provides a design that enables work process to be analyzed systematically. The world of STD is democratic and humanistic and provides both freedom and knowledge to those who are part of it [16, p.29]. To achieve this, the researcher asks the employees' questions to find out the following;

1. If their jobs are demanding
2. If they are involved in the decision-making
3. If they are given the opportunity to learn
4. If they are supported socially
5. If they are allowed to relate work to social life

Finding answers to these questions are very important during and after any change. The researcher observes, document and analyze feedbacks from different employees'. Clegg mentions that a key feature of sociotechnical design involves bringing together people from different roles and disciplinary backgrounds who have different skills, experience and expertise to offer the design process [6].

4. Discussions

For this study, most STD techniques have been used to create participative and collaborative investigation. The researcher employed an action research approach and socio-technical techniques in investigating the case study. Direct and face-to-face conversation was used through semi-structured interviews, meetings and chats. These are good means of identifying problems, sharing knowledge and suggesting solutions. According to Mumford [9, p. 194], STD has always rested on two premises: 1) that in all organizations there are multiple combined social and technical systems in operation. 2) that every socio-technical design system is embedded in an environment greatly influenced by culture and values and provides both constraints and opportunities. The researcher based the investigation on this to find out if the organization obeys the principles of socio-technical during and after an organizational change.

For a better study, confidentiality was assured, the researcher asks questions and also observes the participants behaviour. The participants reflect and speak from their experiences. The semi-structured interview questions obtain information that will enable the organization design jobs in such a way that employees will enjoy their jobs during and after a change. These interview questions are intended to lead to a short conversation rather than a straight forward question and answer format. See table 1 below for interview protocol used, questions were introduced in the order shown. The questions were not designed for YES or NO answers.

Table 1
Case Interview Protocol

Interview Protocol
Tell me about yourself questions
Background questions
Skills, training and knowledge questions
Decision-making procedures
Job satisfaction questions
Motivation questions
Social Practice questions
Future Analysis

See table 2 below for some interview samples with responses from different participants in the case study.

Table 2
Case Study Interview Samples

Interview Samples
<p><u>Employee A: Interview question and response:</u> Interviewer: Could you please share with me the challenges you encounter in the area of change management (if any).</p> <p>Interviewee: I would say not getting us involved before the change, or training the employees before the change. I think that employees will do better if they are properly trained before any change as this will make us more efficient.</p> <p>Interviewer: Can you give me reasons why you might resist or refuse a change? Interviewee: Maybe if I am not sure about the reason for the change or I am not properly trained.</p>
<p><u>Employee B: Interview question and response:</u> Interviewer: Do you think that some of the team members need training?</p> <p>Interviewee: Due to new inventions, constant training for the employees is needed for skill update.</p> <p>Interviewer: Please could you mention a few ways the organization encourage KS? Interviewee: By project meetings, training, team bonding, job security, promotion, etcetera.</p>
<p><u>Employee C: Interview question and response:</u> Interviewer: Are the employees informed before any major changes?</p> <p>Interviewee: I would say yes, but again it depends on if it is an urgent change that needs to be taken immediately, so on and so forth.</p> <p>Interviewer: Do you think that the organization has chosen the best form of communication? Interviewee: I can't say, but I would suggest a more effective type of communication when introducing a change. A type that would allow the employees to know the why of the change.</p>
<p><u>Employee D interview and response:</u> Interviewer: Please tell me the approved means of communication in your project/organization?</p> <p>Interviewee: The first one should be the email, of course, meetings, notice board, etc.</p> <p>Interviewer: Would you tell me ways your organization encourage knowledge sharing? Interviewee: I would like to say by good communication, team bonding, meetings.</p>

For this investigation, employees' feedback was very important to the researcher for correcting errors and knowing the best ways to communicate with the employees'. This serves as a tool for constant learning and to improve performance. During the study, the researcher continuously recorded feedback from each participant after interviews and meetings. All feedbacks were face-to-face to enable clarification, questions and answers where and when possible. Feedbacks were quick and straight to point to avoid taking much of employees worktime. See samples of feedbacks from the same employees from table 3.

Table 3
Case Study Feedback Samples

Feedback Samples
<p>Employee A:</p> <p>Interviewer: Would you like one more interview before the end of the project? Interviewee: I don't mind.</p> <p>Interviewer: Do you have any suggestions for improvement for the next interview? Interviewee: Yes, for the next interview, I would like two or more employees to participate to enable conversations.</p> <p>Interviewer: Do you prefer a face-to-face interview or skype? Interviewee: Face-to-face</p> <p>Interviewer: Do you have any questions or comments you would like to mention? Interviewee: No.</p> <p>Interviewer: Would you like to be contacted regarding your experiences as a participant? Interviewee: I don't mind.</p> <p>Interviewer: Do you like the topics covered during the interview? Interviewee: Yes.</p>
<p>Employee B:</p> <p>Interviewer: Would you like one more interview before the end of the project? Interviewee: If we have the time, yes.</p> <p>Interviewer: Do you have any suggestions for improvement for the next interview? Interviewee: No.</p> <p>Interviewer: Do you prefer a face-to-face interview or skype? Interviewee: Face-to-face</p> <p>Interviewer: Do you have any questions or comments you would like to mention? Interviewee: No</p> <p>Interviewer: Would you like to be contacted regarding your experiences as a participant? Interviewee: Yes.</p> <p>Interviewer: Do you like the topics covered during the interview? Interviewee: Yes.</p>

<p>Employee C:</p> <p>Interviewer: Would you like one more interview before the end of the project? Interviewee: Yes, that's okay.</p> <p>Interviewer: Do you have any suggestions for improvement for (any) next interview or meeting? Interviewee: No.</p> <p>Interviewer: Do you have any questions or comments you would like to mention? Interviewee: I would like more time for this interview since the result would be used for organizational improvement but unfortunately we are only allowed for an hour.</p> <p>Interviewer: Do you prefer a face-to-face interview or skype? Interviewee: Face-to-face</p> <p>Interviewer: Would you like to be contacted regarding your experiences as a participant? Interviewee: I don't mind.</p> <p>Interviewer: Do you like the topics covered during the interview? Interviewee: Yes.</p>
<p>Employee D:</p> <p>Interviewer: Would you like one more interview before the end of the project? Interviewee: I don't mind</p> <p>Interviewer: Do you have any suggestions for improvement for (any) next interview or meeting? Interviewee: I should be informed at least a week before the interview, I think I need time to prepare.</p> <p>Interviewer: Do you prefer a face-to-face interview or skype? Interviewee: Face-to-face</p> <p>Interviewer: Do you have any questions or comments you would like to mention? Interviewee: No.</p> <p>Interviewer: Would you like to be contacted regarding your experiences as a participant? Interviewee: Yes.</p> <p>Interviewer: Do you like the topics covered during the interview? Interviewee: Yes.</p>
<p>Employee E:</p> <p>Interviewer: Would you like one more interview before the end of the project? Interviewee: If time permits, yes.</p> <p>Interviewer: Do you have any suggestions for improvement for (any) next interview or meeting? Interviewee: No</p> <p>Interviewer: Do you prefer a face-to-face interview or skype? Interviewee: Face-to-face would be better but skype is ok.</p> <p>Interviewer: Do you have any questions or comments you would like to mention? Interviewee: No</p> <p>Interviewer: Would you like to be contacted regarding your experiences as a participant Interviewee: Yes</p> <p>Interviewer: Do you like the topics covered during the interview? Interviewee: Yes, because it affects us (employees) directly.</p>

5. Conclusion

This paper is giving a brief overview of organizational change as an example of STD, a real-world case study. STD involves the allocation of task amongst and between human and machine. This is the most important thing STD contributes to an organization. It creates democratic work structures, this allows and encourage employees to participate in, and influence decisions that concern them in the workplace. Mumford mentions that an important socio-technical value is that of democracy. Employees should be allowed and encouraged to participate in, and influence, decisions that concern them. In. The socio-technical approach recommends the involvement of lower-level groups in decision-making [5]. Our experience is that the ideal of genuine and full participation is difficult to achieve. However, technology and organizational structures may change, the rights and needs of the employee must be given as high a priority as those of the non-human parts of the system[3].

It has been our experience that STD approaches are wanted and common within organizations in practice, but the managers need to have more understanding and training with simple socio-technical tools to apply it in the organization. The employees and managers need to know the importance of STD and ways of getting involved to achieve the best results. The employees need to be trained before, during and after an organizational change to be familiar with STD processes. Authors of this paper recommend that employees should be motivated to avoid resistance to change and to achieve high productivity/good human result. According to Mumford [3], the world of socio-technical design is democratic, humanistic and provides both freedom and knowledge to those who are part of it. Also, our conclusion here as noted by Mumford [8] is that STD requires decisions to be taken, or influenced by, the groups most likely to be affected and to ensure that both technical and human factors should, whenever possible, be given equal weight in the design process [3]. Our view is that individuals need to be allowed to interact and cooperate to create a productive learning environment.

6. References

- [1] G. Baxter and I. Sommerville, "Socio-technical systems: From design methods to systems engineering," *Interact. Comput.*, vol. 23, no. 1, pp. 4–17, 2011, doi: 10.1016/j.intcom.2010.07.003.
- [2] B. A. Israel, S. J. Schurman, and M. K. Hugentobler, "Conducting action research: relationships between organization members and researchers," *J. Appl. Behav. Sci.*, vol. 28, no. 1, pp. 74–101, 1992.
- [3] E. Mumford, "The story of socio-technical design: Reflections on its successes, failures and potential," *Inf. Syst. J.*, vol. 16, no. 4, pp. 317–342, 2006, doi: 10.1111/j.1365-2575.2006.00221.x.
- [4] P. Checkland and S. Holwell, *Information, systems and information systems: making sense of the field*, vol. 1. Wiley Chichester, 1998.
- [5] E. Mumford, *Redesigning human systems*. IGI Global, 2003.
- [6] C. W. Clegg, "Sociotechnical principles for system design," *Appl. Ergon.*, vol. 31, no. 5, pp. 463–477, 2000.
- [7] E. Mumford, S. Hickey, and H. Matthies, *Designing human systems: an agile update to ETHICS*. Lulu. com, 2006.
- [8] E. Mumford, "A Socio-Technical Approach to Systems Design," *Requir. Eng.*, vol. 5, no. 2, pp. 125–133, Sep. 2000, doi: 10.1007/PL00010345.
- [9] P. M. Bednar and C. Welch, "Socio-Technical Perspectives on Smart Working: Creating Meaningful and Sustainable Systems," *Inf. Syst. Front.*, pp. 1–18, 2019.
- [10] P. Bednar and C. E. Welch, "Contextual inquiry and socio-technical practice," *Kybernetes*, vol. 43, no. February 2015, pp. 1310–1318, 2014, doi: 10.1108/K-07-2014-0156.
- [11] E. Mumford, *Systems design: ethical tools for ethical change*. Macmillan International Higher Education, 1996.
- [12] C. Ciborra, *The labyrinths of information: Challenging the wisdom of systems: Challenging the wisdom of systems*. OUP Oxford, 2002.
- [13] J. W. Moran and B. K. Brightman, "Leading organizational change," *J. Work. Learn.*, vol. 12, no. 2, pp. 66–74, 2000.
- [14] J. Cadle and D. Yeates, *Project management for information systems*. Pearson education, 2004.
- [15] G. Morgan, "Images of organization 2nd Edition," in *SAGE Publications, Thousand Oaks*, 1997.
- [16] P. M. Bednar and C. Welch, "IS, Process, Organisational Change and their Relationship with Contextual Dependencies," *ECIS 2005 Proc.*, no. 2005, pp. 1466–1476, 2005.