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Socio-technical models

Describes impact of specific technology on organization

The socio-technical systems view came about to counter this technology-centric position, by stressing that work systems were composed of both human and machine elements and that it was the interrelationship between these that should be central.

Socio-technical models for interactive systems are therefore concerned with technical, social, organizational and human aspects of design. They recognize the fact that technology is not developed in isolation but as part of a wider organizational environment. It is important to consider social and technical issues side by side so that human issues are not overruled by technical considerations

1) CUSTOM methodology

CUSTOM is a socio-technical methodology designed to be practical to use in small organizations.

It is applied at the initial stage of design when a product opportunity has been identified, so the emphasis is on capturing requirements. It is a forms-based methodology, providing a set of questions to apply at each of its stages.

There are six key stages to carry out in a CUSTOM analysis:

1. Describe the organizational context, including its primary goals, physical characteristics, political and economic background.

2. Identify and describe stakeholders. All stakeholders are named, categorized (as primary, secondary, tertiary or facilitating) and described with regard to personal issues, their role in the organization and their job. For example, CUSTOM addresses

issues such as stakeholder motivation, disincentives, knowledge, skills, power and influence within the organization, daily tasks and so on.
3. Identify and describe work-groups. A work-group is any group of people who work together on a task, whether formally constituted or not. Again, work-groups are described in terms of their role within the organization and their characteristics.
4. Identify and describe task-object pairs. These are the tasks that must be performed, coupled with the objects that are used to perform them or to which they are applied.
5. Identify stakeholder needs. Stages 2-4 are described in terms of both the current system and the proposed system. Stakeholder needs are identified by considering the differences between the two. For example, if a stakeholder is identified as currently lacking a particular skill that is required in the proposed system then a need for training is identified.
6. Consolidate and check stakeholder requirements. Here the stakeholder needs list is checked against the criteria determined at earlier stages.

2) Open System Task Analysis (OSTA)
OSTA attempts to describe what happens when a technical system is introduced into an organizational work environment. Like CUSTOM, OSTA specifies both social and technical aspects of the system. However, whereas in CUSTOM these aspects are framed in terms of stakeholder perspectives, in OSTA they are captured through a focus on tasks.
OSTA has eight main stages:
1. The primary task which the technology must support is identified in terms of users goals.
2. Task inputs to the system are identified. These may have different sources and forms that may constrain the design.
3. The external environment into which the system will be introduced is described, including physical, economic and political aspects.
4. The transformation processes within the system are described in terms of actions performed on or with objects.
5. The social system is analyzed, considering existing work-groups and relationships within and external to the organization.
6. The technical system is described in terms of its configuration and integration with other systems.
7. Performance satisfaction criteria are established, indicating the social and technical requirements of the system.

8. The new technical system is specified.

Participatory design

Participatory design is a philosophy that encompasses the whole design cycle. It is design in the workplace, where the user is involved not only as an experimental subject or as someone to be consulted when necessary but as a member of the design team. Users are therefore active collaborators in the design process, rather than passive participants whose involvement is entirely governed by the designer. The argument is that users are experts in the work context and a design can only be effective within that context if these experts are allowed to contribute actively to the design process. In addition, introduction of a new system is liable to change the work context and organizational processes, and will only be accepted if these changes are acceptable to the user. Participatory design therefore aims to refine system requirements iteratively through a design process in which the user is actively involved.

The participatory design process utilizes a range of methods to help convey information between the user and designer. They include

Brainstorming: This involves all participants in the design pooling ideas. This is informal and relatively unstructured although the process tends to involve on the-structuring of the ideas as they materialize.

Storyboarding : Storyboards can be used as a means of describing the user s day-to-day activities as well as the potential designs and the impact they will have.

Workshops :These can be used to fill in the missing knowledge of both user and designer and provide a more focussed view of the design. They may involve mutual enquiry in which both parties attempt to understand the context of the design from each others point of view. The designer questions the user about the work environment in which the design is to be used, and the user can query the designer on the technology and capabilities that may be available. This establishes common ground between the user and designer and sets the foundation for the design that is to be produced. The use of role play can also allow both user and designer to step briefly into one anothers shoes.

Pencil and paper exercises : These allow designs to be talked through and evaluated with very little commitment in terms of resources. Users can walk through typical tasks using paper mock-ups of the system design. This is intended to show up discrepancies between the users requirements and the actual design as proposed.

Such exercises provide a simple and cheap technique for early assessment of models.

- Contextual inquiry studies the user in context, trying to capture the reality of his work culture and practice. Contextual inquiry focuses on a 2–3 hour interview with the user in the workplace.
- The idea is to capture and record as much detail as possible, including what the user says and does (step by step), how he communicates and coordinates with others, his feelings and responses to the situation, and a shared understanding of the meaning of actions and artifacts.
- Once the interview is complete, the data must be consolidated with those from other users and stakeholders. The team comes together to consider the interview data and to identify commonalities across stakeholders.

Effective Technical and Human Implementation of Computer-based Systems (ETHICS)

ETHICS methodology, stakeholders are included as participants in the decision making process.

1. Make the case for change. Change for its own sake is inappropriate. If a case cannot be made for changing the current situation then the process ends and the system remains as it is.
2. Identify system boundaries. This focuses on the context of the current system and its interactions with other systems, in terms of business, existing technology, and internal and external organizational elements. How will the change impact upon each of these?
3. Describe the existing system, including a full analysis of inputs and outputs and the various other activities supported, such as operations, control and coordination.
4. Define key objectives, identifying the purpose and function of each area of the organization.
5. Define key tasks: what tasks need to be performed to meet these objectives?
6. Define key information needs, including those identified by analysis of the existing system and those highlighted by definition of key tasks.
7. Diagnose efficiency needs, those elements in the system that cause it to underperform or perform incorrectly. If these are internal they can be redesigned

out of the new system; if they are external then the new system must be designed to cope with them.
8. Diagnose job satisfaction needs, with a view to increasing job satisfaction where it is low.
9. Analyze likely future changes, whether in technology, external constraints (such as legal requirements), and economic climate or stakeholder attitudes. This is necessary to ensure that the system is flexible enough to cope with change.
10. Specify and prioritize objectives based on efficiency, job satisfaction and future needs. All stakeholders should be able to contribute here as it is a critical stage and conflicting priorities need to be negotiated. Objectives are grouped as either primary (must be met) or secondary

Ethnographic methods

Ethnography is based on very detailed recording of the interactions between people and between people and their environment.

This is to understand the situation from within a particular workgroup or organization

Contextual inquiry

It studies the user in context, trying to capture the reality of his work culture and practice

Investigation takes place in workplace - detailed interviews, observation, analysis of communications, physical workplace, artifacts