

A constructive commentary to Clegg and Symon (1989)

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A CONSTRUCTIVE COMMENTARY TO CLEGG AND SYMON (1989)

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Summary

This paper is a constructive commentary to Clegg and Symon (1989), in which three major points of criticism are put forward: the conceptualization of technology, human-centred technology as a synthesis, and the ingredients of the approach as presented in memo 1036. It is argued that technology should not be defined as a subsystem, nor as an aspectsystem. In order to develop a parsimonious design theory, technology should be defined as the attribute structure of the elements. Next it is dissuaded to use the term "human-centredness" as an indication of an integral approach to system design. Each reference to any partial model whatsoever should be avoided. Last the ingredients of the approach are reviewed as important steps towards a framework for integral design, which eventually could evolve to be a modern socio-technical paradigm. Clegg and Symon are praised for their excellent scientific projects.

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Introduction

This paper is a constructive commentary to the presentation of Chris Clegg and Gillian Symon 'An approach to designing more human-centred technologies', which was the main entry to the symposium 'The Psychology of Work and Organization: Design-oriented Research' at the First European Congress of Psychology in Amsterdam, The Netherlands.

To be able to prepare this paper in advance, we have based our constructive commentary on a written document of SAPU, namely Memo No 1036 by Clegg and Symon, March 1989, which is titled: 'A review of human-centred manufacturing technology and a framework for its design and evaluation'. We are responding to the interesting ideas of Clegg and Symon from the angle of incidence of integral design theory and practice.

Points of praise

To start with, we would like to praise our colleagues at SAPU for their high-standard research projects over the years. Especially their published evaluation studies of semi-autonomous work group functioning are good examples of excellent scientific work. More recently, the undertaken ESPRIT Projects 534 and 1217 are show-pupils of European Scientific cooperation.

Another compliment concerns Clegg and Symon's annotated review of design schools. The dominant technology-led approach to system design is compared with its principal counter-vailing approaches, such as Sociotechnical System Design, Convivial Technology, Appropriate Technology, Participative Design, User-centred Design and Human-centred Technology.

Points of discussion and disputation

Clegg and Symon are presenting an approach to designing more human-centred technologies. We would like to respond to this proposal on three major issues:

1. The conceptualization of technology;
2. Human-centred technology as a synthesis;
3. Ingredients of the approach.

Although those issues are very much related to one another, we will treat them separately.

The conceptualization of technology

The first point of criticism concerns Clegg and Symon's use of the concept of technology. Our criticism echoes dated disagreements about the meaning of technology as a theoretical construct for professional use in modelling scientific design approaches. Being a rather abstract issue, in the literature it hasn't got much further conceptual deepening since the review of technology definitions by Lynch (1974), covering the prominent positions of Woodward (1965), Perrow (1967) and Hickson et al. (1969).

From the article of Clegg and Symon there is no direct evidence of a stated theoretical or operational definition of technology. Reading between the lines makes us concluding they must have some sort of Aston-definition in mind. Technology is typically seen as hardware, as the techniques the organization uses in its workflow. Clegg and Symon explicitly are arguing that some countervailing approaches take technology as given, or don't succeed in influencing or changing technology. We criticize this with respect to Sociotechnical System Design.

In the past few years we have learned that defining technology as a 'thing', interferes with building up a parsimonious design theory. Therefore we explicitly state that technology is just a phase in the human decision process, namely the syntactical one. Let's elaborate this rather formal argument although it's counter-common sense and it seems of minor importance to practitioners.

The main question is: 'How do we see technology as a scientific construct?' What do socio-technical practitioners mean when they say they changed the system but not the technology?

Let's start our plea by simply stating technology is everything that is not of flesh and blood. So my papers and pencil, your chair, this furniture, that all we call technology.

Back at the office we have all sorts of machines to produce our texts, print the booklets and answer calls. That's for a start our first working definition of technology: technology as system elements. But what about coherence, about the relationships between the elements? We pick up all our chairs, furniture, documentation, personal computers, printers and communication facilities and put them outside this building in the beautiful North Holland country side. We are piling our technology at one side of a large green field. We ourselves take place at the other side of the meadow, calling ourselves the social system. The other side of the field we call the technical or technological system. It is a nominal system because the only relation between its elements is the characteristic of 'being invented by man'. Everybody will understand that all relevant connections have been lost. What's there on the grass is an unordered mess of things without any functional coherence at all. We come to our first conclusion: Formally speaking, technology itself, without the presence of man, cannot be a subsystem. Technology should *not* be defined as 'things', as system elements, because this results in a nominal system without any functional relation between its elements.

Let's continue this argument by stating technology is the existence of technical relationships between the human elements of a system. This is our second working definition of technology.

So, we have a system, for instance a car factory, with all sorts of outcomes. One output arrow is what we call a technical function. So in our example the product is a car and the technical aspect is its construction. We are afraid that's not what we are looking for in defining technology. Defining technology as an aspectsystem undoubtedly is a theoretical possibility, but such a definition is not a very useful one for building up design models. We better can start all over again.

Let's consider technology in a more process-oriented way. Our third working definition of technology is 'an act of organizing in an one-sided way'. We started this discussion by stating technology is just a phase in the human decision process, namely the syntactical one. Now we will make our point in more detail. Technology, not being a subsystem, nor an aspectsystem, we see as a characteristic of the human control process. In each control loop four basic steps can be distinguished: signaling, comparing with norms, selecting the right action, and intervening.

Applied to the human act of organizing as a decision process, those four steps can be operationalized as: perception, judgement, design and implementation.

- The first step, perception we would call the semantical phase in organizing as a human decision process. Inputs have to be signalized. We need a window, a filter and a coding system.
- The second step, judgement we would call the pragmatistical phase in organizing as a human decision process. A value function is attached to the perceptions. For a long time this field has been the prerogative of the social sciences.
- For the next two steps, selection of actions and intervention, we need solid insights in reality. We call these two steps the syntactical phase in organizing as a human decision process. At this point technology comes into the picture as the knowledge base of not falsified statements about reality. But you never can say that a human act is purely a technical one. In advance there is always a perception, and the adding of a value function to it. In the decision process semantical, pragmatistical and syntactical phases have been integrated. There is no 'technical action' possible which is not penetrated by social concepts.

Let's look again at your chair. It's not a product of technology as we defined it, it's a coagulated idea, a materialization of our own thoughts. A chair is just a human.

We come to our final conclusion. What do we mean with 'technological design'? From this discussion we would say: technological design is a form of organization which is not directed to all relevant functions in the environment. For instance, an organization design which is out of tune with the labour market, the quality of work, health, milieu and so on. Technology is not an isolated entity in the organization, it's part of the attribute structure of the elements, it's the syntactical phase in the design decision process. Technology is applied science. Applying our knowledge is technology!

Technological design is a system that chose a partial organisational solution which is only useful to its direct inventers. In such a situation, we use our knowledge in a one-sided way. In order to solve organizational problems, we need an integral design.

Human-centred technology as a synthesis

Clegg and Symon present human-centred technology as the synthesis of reviewed countervailing approaches such as sociotechnical systems design, convivial technology, appropriate technology, participative design and user-centred design.

According to Clegg and Symon, this preventive approach, developed by Rosenbrock and Cooley, is 'true sociotechnical design' and works 'towards the formulation of a practical design methodology informed by both technical and social considerations' (p. 25). Certainly, the authors made clear the human-centred approach combines different angles of incidence. But as its title suggests, we feel there is a real danger of a new bias. From our previous discussion of technology as an one-sided way of organizing, our criticism at this point is straight forward. Human-centred technology as a design approach is as one-sided as the Human Relations School has been to the Scientific Management Movement. As a countervailing approach it temporarily could be very helpful within the context of a party model, but as an instigator towards an integrated approach it will be not appropriate in the end. A real integrated design approach should incorporate as many aspects as possible, not only on a micro level, but also on a meso and macro level. Not a party model, but a system model should be the main point of departure.

Of course, our point of criticism again is of a more formal theoretical nature. We understand the history of one-sided system design and the resulting power and party struggles in organizations. But at the same time we want to stress the importance of well-developed parsimonious design theories for the nineties, which can be used for integral organizational design.

To call your approach 'human centred' is, we are afraid, not very functional. By doing so, you wrongly range yourself on the side of partial approaches. Integration of all aspects, not only human-centredness, should be the main design objective. But that's exactly what Clegg and Symon are doing in their projects, as we did understand it!

Ingredients of the approach

Clegg and Symon present a framework for human-centred design and evaluation which is

summarized in five statements:

1. A philosophy which states that people are as important as the 'technologies'.
2. Appropriation and ownership of the production problems and their solutions by regular production personnel.
3. A set of goals: matched design process containing user appropriation, strategic analysis, meaningful allocation of system functions, dynamic job and organization design and design of information and control systems.
4. Method or process: parallel approach to technical and social design choices, creation of inter-disciplinary design teams, multiple users (system users, supervisors, managers, maintenance people), a pluralist approach and development and use of specific methods and tools.
5. Education: concern about appropriateness of schooling at the level of the firm and of society as a whole.

Although not yet a framework in the methodological sense of the word, the listing of issues looks impressive. We think this is a very interesting agenda which should be further developed. Just to stimulate ideas, we want to add some useful remarks. To serve as a framework any approach to design should contain a global description of the paradigm, its methodological basis, a definition of all relevant terms and concepts and a description of relations, a definition of primary goals and the object of design, and a presentation of design methods and instruments.

Modern sociotechnical paradigm

From our own experience we have the impression more joint efforts should be undertaken in developing integral design paradigms. To us, sociotechnical system design has proven to be a good carrier for such an approach. As we have argued elsewhere, in the eighties STS design evoked towards that end. Recently we succeeded in proposing a coherent whole of an innovative regulative design methodology, an integral design theory and an iterative design method.

Also we developed an analytical design-interface model specifying necessary ingredients of an integral approach. Any sociotechnical (read integral) approach to design should incorporate the production structure, the control structure and the information structure as the main aspects.

Parts of this paradigm we have presented at the Cambridge Conference last april and at the Venice Conference last october.

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ORGANIZING AS A HUMAN DECISION PROCESS

