

# Computers Dividing Man and Work

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# Conditions for Change in Working Life

The Paas Project Group

## Background

The research program »Conditions for Change in Working Life» is a synthesis of completed and planned studies based on empirical and theoretical experiences from the PAAS-project (Perspectives on administrative development).<sup>1</sup>

The PAAS-project has pursued research and pedagogical studies, since 1974, in close cooperation with union organizations. The main area of concentration in this work has dealt with studies on the development of computer-based systems and their effects on work organization.

The project group consists of members representing several scientific disciplines. There has been a close connection between the theoretical work (theory and methods development) and the practical fieldwork experiences in completed studies.

The completed studies have aroused interest in a number of separate problem themes, such as; perspectives on data-systems development, development of union competence, realization of the law on co-determination, theory and methods development.

## Theory and Methods Development

The research approach used in the project is to some extent action research which has gained ground in the last ten to fifteen years. But in contrast to action research, it is not a question of carrying through a definite action, which is to lead to a definite goal. It is a matter of helping *to put in order the conditions* for a selfchanging process in the long run. The research can not be con-

cluded with »actions,» but rather, it should be a lead in the evaluation of the results. The researcher can then investigate the results of actions, draw knowledge from them and present a basis for further actions. In this way one gets a more long-term building up of competence where both the researcher and the acting participant are involved. This gives also a long-term perspective for planning the research project.<sup>2</sup>

In a study on the theme of language and action, Tore Nordenstam states, »to learn a language is, at the same time, to learn to understand reality in certain ways and to learn to deal with that reality in certain ways.»<sup>3</sup> Through language we structure reality. If it is through language that we understand reality, then it is reasonable to expect that different languages lead to different understandings of reality. The point can be generalized: different concepts demand different kinds of competencies on the part of the users of these concepts and lead to the fact that they do not comprehend the same reality. Concepts are created and given definite meaning in activities where they are given a place and have a purpose to be carried out.

In this connection it has been fruitful to take in a model for action and practice, which has developed in cooperation between philosophers and historians at the University of Bergen.<sup>4</sup> The point of departure is from Ludwig Wittgenstein's late works in philosophy. The model presents themes for some *conditions for change* and thereby directs attention in certain directions. The placement of all action in *social space* with *social institutions* obliges the investigator to closer reflect upon this defined social space, which is the prerequisite for his intervention activities, and the limits immanent in it.

## Degradation and Qualifying of the Work Process

A central concept in the analysis of systems development is degradation of the work process. In studies of production systems with effects on lower levels in the organization the content of this concept is clearly illustrated by, e.g., the replaceability of man-machine or direct effects on work content for employees on lower levels. But what does the concept degradation mean in relation to professional groups in an organization?<sup>5</sup> And, what does a degradation of the work process mean for professional groups in relation to collectives on lower levels in an organization?<sup>6</sup> A type of system development which can imply a degradation of the work process for professional groups must be analysed from a different starting point than what would apply to employees on lower levels.

Our studies have shown that professional groups demand an intermediary function as a service function on the job. What are the conditions under which the intermediary function shall mean qualifying of the work content? This will be looked at and described in more detail in a few case studies.

## Two Case Studies

Two case studies have been central in the development of the PAAS-project. They concern:

- ◆ a computer system for forest valuation at the National Board of Agriculture to assist in the foresters' calculation tasks;
- ◆ a computer system for heat measurement at a building company to assist in the VVS-constructors' calculation tasks.

In the planning of the computer systems in these two case studies, it was intended that middle-level salaried employees – foresters and VVS-constructors – themselves would use the system. The results developed otherwise.

The computer system developed at the National Board of Agriculture in the beginning was built in such a way that the foresters themselves in direct contact with a data terminal would work out a calculation with possibilities for making variations in sensitive values which influence the final results. Instead there later developed demands for *middleman functions* in the form of operators who could carry out this work. These operators were recruited from within the organization, e.g. from cartographers, secretaries, telephone operators etc. They lacked an understanding of the fundamental principles in calculating methods, in other words competence in the subject, but afterwards have developed a computer-technical proficiency. This development brings up questions having to do with work organization and computer systems development. It has to do with the rise of a new occupational group.

The computer system at the building enterprise has still not been put into operation. The data technical development was ready in the Spring of 1976.

At the VVS-department a so-called »ready-reckoner» for the constructors, i e., tables and diagrams from which the constructors can select their computation values from a fixed program design, often without knowing how these »ready-reckoners» are mathematically set-up. Because a computer system demands complete logic in order to function, the analyst must understand the construction of these »ready-reckoners» much more thoroughly than the VVS-engineers

ever have had reason to do. The VVS-technicians' work methods have through years of experience been developed and adjusted to a strongly individualized work process. The implementation of a computer system sought at the same time to convince experienced constructors to do some rethinking in order to coordinate and adjust their methods to the new facilities which were to be put at their disposal, a computer-based model. The analysts have observed that there is a tendency among the constructors to experience the computer system as a real threat to their own professional know-how.

The circumstances under which the systems were developed in the two case studies differed. (Compare pp. 133). One common experience is the feeling of degradation of one's work, which is felt more or less strongly by professional groups when it comes to data processing. How can this feeling of degradation be understood? It is not equivalent to replaceability between the computer system and the professional group. It might be fruitful to place two types of competencies against each other: *professional expertise* and *data-technical expertise*. In this perspective the relationship between professional groups and a middleman function can be seen as a serious problem to be solved.

## Necessary Requirements of Work Organization in Respect to Computer Systems Development for Professional Groups: Preliminary hypotheses

Three preliminary hypotheses have become central in the studies of work organization and computer systems development:

- ◆ Implementation of advanced data-technical systems can result in consequences of an unexpected nature in the job category content of the work organization. The rise of new occupational groups with a middleman function and degradation aspects for professional groups become important to observe.
- ◆ Implementation of advanced data-technical systems in branches characterized by structural changes can reinforce a threat to the existence of some qualified occupational groups. Employment aspects are important to observe.
- ◆ A systems development with permanent changes of an unexpected nature in the form of new service occupations must, when taking in consideration a new division of responsibility, give this occupational group training in the basic principles of valuation methods in order to guarantee the quality of the com-

pleted computations and to improve the job content for this new group. A work valuation of the new job assignments must be carried out and serve as a basis for negotiations regarding job position and wage level.

## STU-project (The National Board for Technical Development)

The Work Research Center project at STU is based on conclusions and hypotheses in the two previous sections. They aim at giving the trade unions support in the construction of an information system at STU. The information system is intended to transfer the major part of the manual administrative routines to a data-technical milieu. All employees will be directly affected in their daily work by this development.

The project offers possibilities for receiving insight into and for influencing the decision-making process in assessment of bids from computer system suppliers. Of particular interest is the fact that certain signs seem to be saying that the multinational companies within the near future will have to compete with smaller domestic companies using a mini-data processing system. The weakness of these smaller companies lies more on the economic level: confidence in solidity and liquidity, in other words the survival of these smaller companies in a long-term perspective.

When the computer system supplier is chosen the Work Research Center is going to give support to the union organizations for building up of the work organization in the form of planning and carrying through of a study circle. Here, the development of work forms between the managing and service functions in the organization will be of special interest. It will also be important to emphasize the need for more qualified work assignments for lower personnel positions. It is a relatively new knowledge that professional groups experience data-technical aspects of their work as degrading. If one is conscious of these effects, then the situation can be taken advantage of constructively by creating more meaningful work forms for lower personnel in the organization. Should one instead regard a middleman function as being unnecessary, then permanent changes of a destructive nature within a few years will most likely become apparent in the organization. This will strike the lower levels of the organization first, since they will be confronted with trying work tasks. The Work Research Center project at STU aims at applying this new knowledge to the computer system development in professional organizations. This work is closely related to the development



towards democratization of work life, which extends over the relation between professional work groups and collectives on lower levels in the organization.

The aim of the study circle is to come up with basic knowledge and material for a plan of action when it comes to the principles for designing work organization.

The whole study program aims at coming up with some basic materials for the design of an educational training program for the State Employee Union's members. In our judgement the problems at hand in these two case studies cover a broader spectrum of work life and are of a basic interest for further building up of competence when it comes to computer-based systems development. An important pedagogical feature of the educational training materials will be the visual documentation from STU and other data-technical environments.<sup>7</sup>

## Notes

- 1 PAAS. Rapport no. 7, *Villkoren för förändring i arbetslivet*. (Conditions for Change in Work Life). Continuing research program for the PAAS-project, Swedish Work Research Center, Stockholm, 1978.
- 2 von Wright, G. H., *Explanation and understanding*. Routledge & Kegan Paul, London, 1971. – *Causality and determinism*. Columbia University Press, 1974.
- 3 Nordenstam, Tore. »Språk och handling» (Language and action) in Bo Göransson (ed.), *Ideologi och systemutveckling*, (Ideology and Systems Development), second expanded edition. Student literature, 1978.
- 4 Johannesen, S., Nordenstam, Tore & Danbolt, Gunnar: *Historie, vitenskap og samfunn: Den vitenskapsfilosofiske tradisjonen fra Wittgenstein och dens oppfatning av vitenskapshistorien ingår volymen Wittenskapshistori*, Aalborg, 1977. (History, Science and Society)
- 5 One usually speaks of *profession* when a group of workers have a set of knowledge and occupational monopoly. See for example Torgeersen, Ulf, *Profesjonssociologi*, (Sociology of Professions) Universitetsforlaget, Oslo, 1962.
- 6 Important problem discussions which deal with an analysis of the relationship between professional groups and employees on lower levels are taken up by Edmund Dahlström in »Arbetsdelning, klasskiktning och kunskapsutveckling» (»Division of labor, class stratification and knowledge») Department of Sociology, University of Gothenburg, 1978 (work report)
- 7 The obtained study material will complement and further develop the content of Bo Göransson's (and others) book, *Perspektiv på datasystemutveckling* (Perspectives on computer-based system development), Student literature, 1978, concentrating especially on building up of competence as a contribution and design for work organization.

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