



“Summary of article by Maryellen R. Kelley: Alternative Forms of Work Organization under Programmable Automation” in Frontier Issues in Economic Thought, Volume 4: The Changing Nature of Work. Island Press: Washington DC, 1998. pp. 238-240

Social Science Library: Frontier Thinking in Sustainable Development and Human Well-being

“Summary of article by Maryellen R. Kelley: Alternative Forms of Work Organization under Programmable Automation”

Programmable automation (PA), the use of computers to coordinate the operation of machines, is a new technology for batch manufacturing processes. There is much debate over how this technology will affect the social organization of work. Some hope that the microprocessor applications of PA will play a seminal role in restoring U.S. competitiveness in the world economy.

Post-Taylorist theorists such as Poire and Sabel portray PA as a flexible form of automation that will flatten bureaucratic hierarchies within firms and require collaborative, skill enhancing forms of work organization. In contrast, labor process theorists, building on the work of Braverman's deskilling thesis and often taking the old, strict Taylorist approach as their starting point, see PA as the latest attempt by management to increase its control over the production process by reducing its dependence on worker's skills.

This paper draws on a study of U.S. manufacturing plants of various sizes that are using microprocessing PA systems. It concludes that neither a post-Taylorist nor a labor process (strict Taylorist) description adequately characterizes the trends in work organization that are associated with PA. As an alternative framework for analysis, post-Taylorist theories identify possibilities for worker-centered control over programmable automation. This paper extends the post-Taylorist approach, discovering a reality of PA control that is shared between white and blue-collar workers.

ALTERNATIVE FORMS OF ORGANIZATION FOR PROGRAMMING TASKS

Machines in batch manufacturing were conventionally operated by blue collar workers. With PA, machines are directed by a computer program, leaving open the important question: who controls the programming? The predictions of labor process theory, assuming a strict Taylorist approach, would expect programming to be performed by engineers and managers, centralizing work organization by shifting the locus of control from blue collar workers to management.

By contrast, post-Taylorist (or post-industrial) theorists would suggest that firms could distribute programming responsibilities widely among blue collar workers to gain flexibility and flatten the occupational hierarchy within the firm -- an outcome that may be called "worker-centered control." Another possibility, "shared control", emerges when control over programming is shared between white and blue collar workers. In both of these more contingent approaches to

the distribution of control, the firm gains flexibility by decentralizing programming while maintaining a hierarchical chain of command.

Out of the nearly 477 establishments surveyed in 1987, 44.8 percent use shared control and 31.2 percent use worker-centered control. Only 24 per cent could be described as strict Taylorist (i.e., blue-collar workers have no responsibility for programming.) However, the strict Taylorist establishments tend to have more employees, so that the number of workers in manufacturing occupations operating under the Taylorist approach rises to 38.8% of the sample. In establishments with the shared control form of work organization, 40 percent of machine operators wrote programs on a regular basis. In contrast, 62 percent of the worker-centered groups of PA machine operators were found to write programs regularly. These findings are contrary to the "labor process" hypothesis that the main function of PA is to enhance managerial control.

FACTORS INFLUENCING THE ORGANIZATION OF WORK

Work organization in facilities using microprocessing PA develops as a function of three interconnected variables: organizational size, industrial relations, and the technical requirements relating to product variety and to volume of output. This research supports the expectation that unionization (the leading industrial relations variable) correlates with a tendency to rely on the strict Taylorist model, while large firms tend to separate programming from operating work roles. The interaction of these two factors may be exemplified by two statistics: in unionized plants with 1,000 or more workers, there is less than a 4% chance that control over programming will be exclusively worker-centered; while in an average size firm with no union there is a 50:50 chance that programming will be shared between blue-collar and white-collar workers.

Contrary to these findings, labor process theory might imply that unionized work places have an advantage in attaining PA operating responsibilities for their members. However, the conventional collective bargaining approach appears too weak to counter management's power to reorganize work roles when new technology is introduced. In the U.S. industrial relations system, management can avoid bargaining over wages and work rules by creating entirely new specialized technical occupations outside the bargaining unit composed of blue-collar occupations. Thus the chances of worker-centered control are, in fact, smallest in unionized plants, and even shared control is significantly lower in plants that are unionized than in those that are not.

Organizational structure and technological capability appear to be independent dimensions; the likelihood of finding a Taylorist approach to the way programming is controlled depends upon organizational, not technical factors. Regarding the technology variable, the major advantage of PA is "a gain in efficiency when many different small-batch runs are to be carried out with the same equipment." [245] Flexible specialization theorists argue that this advantage can only be fully exploited when the workers who perform other machining functions also write the programmes. This is only partially true. Data from this study show that plants that differ widely in both batch size and product variety. A more applicable version of the flexible specialization hypothesis would be restricted to a "combination of specialization in very small batch production (a median batch size of less than ten units) and a large array of product types (more than fifty

different parts of products)." [245] Plants with such a high degree of technical flexibility have about the same chances of having either a worker-centered approach or a shared-control over programming.

CONCLUSION

Across a broad spectrum of U.S. industries, the modal approach to work organization under microprocessing PA appears to be shared control. With shared control, neither the strict Taylorist form, as described by labor process theorists, nor the worker-centered approach, depicted by post-Taylorist theorists, hold true. Instead, a certain degree of programming by workers is permitted while the organizational hierarchy is maintained.

The debate has been miscast as a controversy over a "technological imperative allegedly driving management's approach to the organization of work." [246] This paper reveals, however, that no technological imperative exists. Rather the degree of centralization of control over programming responsibilities is a joint function of organization size, industrial relations, and technical factors.