The Shift to Knowledge Work

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This paper, with a very different introduction and some slight differences in wording throughout the remainder of the document, was published in the October 1983 issue of *Performance & Instruction*. Despite its age, it still applies. It was selected as a "classic" in the field of knowledge management (KM) and appears in the Butterworth-Heinemann *Knowledge Management Yearbook* (2000).

Introduction

What you think is, isn't. This is at least true of the world of work and working. It has been turned topsy-turvy by a shift from manual work to knowledge work. As a result, managers, consultants, academics, and other professionals in the fields of management, performance, and instruction have two reasons to reexamine their relationship to that world: (1) as knowledge workers, it is their world; and, (2) as professionals, it is their market.

The Shift from Manual Work to Knowledge Work

"What is" in the world of work is that its center of gravity has sharply shifted from manual work to knowledge work (Drucker, 1980). In 1920, the ratio of manual workers to knowledge workers was 2:1. By 1980, things were the other way around. The mid-point in this shift seems to be 1956, the year white-collar workers first outnumbered blue-collar workers (Naisbitt, 1982).

In recent testimony before a senate subcommittee, the percentage of knowledge workers in the computer industry was estimated at 72% (13% managerial, 15% clerical, and 44% technical and professional); and, on the other side of the coin, the percentage of the employed work force engaged in actual manufacturing operations was estimated at 13%.

More important, the pace of the shift from manual work to knowledge work seems to be slowing considerably. Bureau of Labor and Bureau of Census projections for 1990 show roughly the same ratio of knowledge workers to manual workers as was revealed by the 1980 Census. Because "growth is never exponential in a linear way, but follows an S-shaped or logistic curve" (Bell, 1979), we are probably witnessing, among other things, the "leveling off" of the shift from manual work to knowledge work.

Most important, then, it is time to stop holding our breath and start examining how the new world of knowledge work differs from the old one of manual work. To do so requires first making a distinction between work and working.

Work and Working

"The most important thing we know is that work and working are fundamentally different phenomena" (Drucker, 1973). Work is a process and it has a result. Both the process and the result exist apart from the worker. The work of an insurance claims examiner, for instance, consists of a set of information-processing operations that can be specified quite apart from the examiner (e.g., in the form of algorithms). The results of this adjudication process are adjudicated claims, which also exist apart from the examiner. In the case of an automated process, these adjudicated claims exist without the examiner.

Working is the activity of the worker in carrying out the work process and thereby producing its results. In the case of the claims examiner, working consists of carrying out the adjudication process (i.e., adjudicating claims). The worker, of course, is the claims examiner. Work, then, is roughly the equivalent of performance and working is definitely the equivalent of behavior. Work and working, in the world of knowledge work, are very different from what they are in the world of manual work.

Knowledge Work and Manual Work

A major difference between knowledge work and manual work is that knowledge work is information-based and manual work is materials-based. A manual work process, no matter how much skill and knowledge is required of the worker, consists of converting materials from one form to another (with or without the use of tools and equipment).

Because manual work consists of converting materials from one form to another, the results of a manual process are tangible. Because knowledge work consists of converting information from one form to another, the results of a knowledge work process are frequently intangible. Although it is true that both the manual worker and the knowledge worker work with knowledge and information, only the knowledge worker works on them. Consequently, the nature of working is very different for a knowledge worker than it is for a manual worker.

"The essence of the knowledge organization is that work is done in the head" (Zand, 1981). This means that working (and work, while it is in process) can't be seen. In other words, the working behaviors of the manual worker are public and those of the knowledge worker are private. From the perspective of a supervisor or an industrial engineer, this means the visibility of working is high for a manual worker and low for a knowledge worker.

Owing to the materials-based nature of manual work and to the public nature of its working activities, it is a comparatively simple matter to observe the interactions between the manual worker, any tools or equipment being used, and the materials being processed to determine which behaviors contribute to the desired results and which do not. Moreover, results (and therefore feedback) are almost always immediate. Conversely, owing to the information-based nature of knowledge work and to the private nature of its working activities, the linkages between behavior and results are not so apparent, and they are rarely immediate.

The decreased visibility of the working activities of knowledge workers and the murky links between activities and results give rise to concerns regarding managerial control. As Shoshanna Zuboff, a researcher at the Harvard Business School, says,

> "It is much easier to envision how to exert managerial control over a set of people turning bolts and screws than it is to envision such control over people who must mentally attend to and process information" (Zuboff, 1983).

The issue of mentalism aside, this statement touches on the central problem brought about by the shift from manual work to knowledge work; namely, that the locus of control over work and working (at the individual task level) has shifted from the manager to the worker. How this happened is of more than passing interest.

A Shift in the Locus of Control

For thousands of years, the basic power equation (i.e., means of control) in organizations was simple and effective: "Knowledge held by a few, plus iron discipline over the many" (Bekkedahl, 1977). Nowhere is this better illustrated than in the days of "wooden ships and iron men." As Bekkedahl observed, mutiny at sea was probably restrained more by the unlettered seaman's inability to navigate than it was by his fear of punishment in the event of failure. After all, what is the point of taking over a ship if one cannot take it anywhere?

In modern organizations, knowledge is widely distributed instead of narrowly concentrated, thus altering one of the two variables opposite control in the ancient power equation.

The other variable, "iron discipline," was enforced by an equally metallic device known as "the chain of command." It, too, has been altered by the shift from manual work to knowledge work. Because the behaviors of a knowledge worker are primarily private ones, supervisors cannot supervise. Gone are the days when, as John Kenneth Galbraith wrote, "the laggard worker could easily be identified" and "then be encouraged to greater productivity by the voice of the overseer" and the sound of his whip (Galbraith, 1977).

In effect, the shift from manual work to knowledge work shears the most critical link in the chain-of-command paradigm: supervision.

The preceding discussion is only half the argument. It shows that the locus of control over working might have moved away from the manager, but not that it has moved to the worker. Evidence in this regard is presented next.

"Perhaps what most annoys and frustrates tradition-oriented managers is that knowledge work is non-linear" (Zand, 1981). The key point to be made here is that knowledge workers must configure their responses to work situations instead of act out prefigured ones (Drucker, 1973). As a result, "the knowledge worker has almost total authority in matching individual work methods to the varying job tasks her or she faces" (Gregerman, 1981). In short, the nature of knowledge work is such that it demands a significant amount of control by the worker over work and working. It is in the nature of control that we find the fundamental reason for the shift in the locus of control over work and working from managers to workers.

Control, whether by self or others, is always against some standard. Standards, coupled with information about actual conditions, determine if one should take action or leave matters alone. As regards work and working, there are conditions that call for a response on the part of the worker and those that do not. These latter conditions are known as "reference conditions" (Powers, 1973). If conditions, as perceived by the worker, differ from the reference conditions (i.e., if results are not what they should be), the worker acts so as to make the perceived conditions consistent with the reference conditions. This formulation holds true whether the worker is performing manual work or knowledge work. The key question in this formulation is this: From whence come the standards or reference conditions that govern work and working?

When work was materials-based and working consisted primarily of public behaviors, the linkages between behavior and results were ascertainable through study and observation by people other than the worker (e.g., industrial engineers, work designers, methods and performance analysts, and job-task analysts). The ability to study the work is what made possible Frederick Winslow Taylor's "scientific management." Thus, others could and did establish the reference conditions that governed work and working. These standards or requirements were then communicated to the worker, frequently via a medium known as instruction, and subsequently enforced through supervision and various systems of incentives and penalties. In this way, acceptable performance was assured. This proved a viable means of controlling work and working for thousands of years because the linkages between working and work were direct, immediate and, most important, visible. In this scheme of things, the worker was viewed as an instrument, a bundle of muscles, abundant in supply and easily programmed through instruction – and easily and inexpensively replaced if outworn or worn out.

For the most part, other-developed reference conditions assured owners and managers of an adequate supply of trained and therefore skilled workers who could be counted upon to behave in reliably uniform ways in reliably uniform situations. Control over work meant control over work-

ing and the focus of managerial control gradually shifted from the work to the worker. A means became an end.

So, between 1920 and 1980, while managers, academics, and consultants in this country were occupied finding bigger, better, and more complex ways of controlling the worker, working slipped quietly out of sight, taking the control of work with it. The new breed of worker, the knowledge worker, had a new job. Instead of converting instructions and procedures into actions that in turn converted materials from one form to another, the task was to convert knowledge into actions which converted information from one form to another. It fell to the knowledge worker to figure out what did or did not produce results and it still does.

The preceding explains how the knowledge worker came to be the primary source of reference conditions for work and working. The result of these self-developed reference conditions has been a shift in the locus of control, from the manager to the worker. In turn, there has been a shift in the balance of power within organizations; indeed, within society. Plainly put, Simon Legree has lost his whip.

A Shift in the Balance of Power

Algebraic logic dictates that if the variables on one side of the old power equation are different, then the other side must also be different. If a balance exists, it is a new one.

Power, in a social context, is the ability to make things happen, and this ability has three primary sources:

1. politics (i.e., power derived from relationships among people),
2. position (i.e., power derived from formally constituted authority), and
3. profession (i.e., power derived from specialized knowledge).

If these three sources of power are viewed as the legs of a three-legged stool, the effects of the shift from manual to knowledge work are to shorten the positional power leg and to lengthen the professional power leg. The balance of power has shifted from its traditional combination of political and positional power to a new alliance of political and professional power. How we adjust to this new reality remains to be seen.

A Shift in the Focus of Control

What is certain is that we all are faced with a great task, that of making knowledge work productive. Indeed, that task "will be the great management task of this century, just as to make manual work productive was the great management task of the last century" (Drucker; 1968, 1973).
To make work productive, control must be exercised over the work process. "The first thing to know about controlling the work process is that it means control of the work, and not control of the worker" (Drucker, 1973). Because the worker is currently the primary source of reference conditions, knowledge work requires "far better design, precisely because it cannot be designed for the worker . . . only by the worker (Drucker, 1973).

Implicit in the factors discussed above is a new role for the knowledge worker, and a new measure of his or her performance.

A New Role and A New Measure of Performance

In the new scheme of things brought about by the shift from manual work to knowledge work, the role of the worker becomes one of agent, not instrument. This is the role of someone who acts on

behalf of his or her employer, not simply at the behest of a supervisor or manager. Implicit in this new role is a new and fundamentally different measure of performance: contribution instead of compliance.

There is support for a view of workers as contributing agents instead of compliant instruments in the "lessons learned from American's best-run companies" (Peters & Waterman, 1982). Two of the eight properties of excellence are "Autonomy and Entrepreneurship" and "Productivity through People." Both are perfectly matched with the requirements of the new world of knowledge work and knowledge workers. Indeed, it might be the case that the "tremendous grants of autonomy to large numbers of people" which characterizes the excellent companies (Peters, 1982) are not so much grants as they are acknowledgements.

Summary and Conclusions

The differences between the worlds of manual work and knowledge work are summarized in Table 1. This summary does not represent a complete inventory of the differences or their implications, but it does indicate that the scale on which the two worlds of work are different is a wide one; indeed, it might indicate a change in scale, and "a change in scale, as physicists and organizational theorists have long known, requires essentially a change in form" (Bell, 1979).

One required change in form is in the form (and substance) of the fields of performance and instruction. There is an appalling lack of language, let alone tools and techniques for coping with knowledge work and knowledge workers. Instructions tend to focus on observable behaviors and are prescriptive in nature. How does this fit with a world of work and working in which workers must configure their responses instead of simply carry out prefigured routines? How does a technique like "behavior modeling" fare when the behaviors of interest are covert, not overt? More important, how is any model (e.g., the mythical master performer) to be identified when the work itself is not visible? Further, given a requirement for contribution instead of compliance, is the replication of this or that master performer any longer a relevant issue? How does one use the techniques of behavior modification to shape the shadowy repertoire of the knowledge worker?

Table 1: Characteristics of Manual and Knowledge Work

Manual Work	Characteristics	Knowledge Work
Materials-based	*Work Base*	Information-based
Overt Behaviors	*Working*	Covert Behaviors
High	*Visibility*	Low
Direct & Immediate	*Linkages to Results*	Indirect & Delayed
Concentrated	*Knowledge*	Distributed
Position & Politics	*Balance of Power*	Politics & Profession
Linear-Sequential	*Nature of Work*	Non-Linear-Parallel
Prefigured	*Responses*	Configured
Others	*Source of Standards*	Worker
Worker	*Focus of Control*	Work
Management	*Locus of Control*	Worker
Compliance	*Measure of Performance*	Contribution
Instrument	*Role of the Worker*	Agent

One conclusion, then, is that professionals in the fields of performance and instruction must do what managers in organizations must do; namely, "develop new approaches, new principles, and new methods – and fast" (Drucker, 1973). At the very least, they will have to adapt and modify the old ones to suit a new set of reference conditions.

What does a requirement for a change in form signify for organizations? Despite varying words, some current views are remarkably consistent. Organizations will be "atomized" (Deal & Kennedy, 1982); or they will consist of "networks" (Naisbitt, 1982); or if hierarchies remain at all, they will be "flatter and more transient" (Toffler, 1980). In short, decentralization is the rage and the pyramid will be variously exploded, smashed, or flattened. Strong words, these.

Mindful of the potential for "future schlock" (Bell, 1976) and of the ever-present risk of presenting ideas deserving of that "most useful of barnyard epithets, more appropriate to the spoken than the written word" (Andrews, 1982), this article does not speculate about the future form of organizations beyond observing that "Simple Form, Lean Staff," another of the eight properties of excellence seems to be catching on – and reminding the reader that "authority has to be exercised by someone, authority is an essential dimension of work, and it is inherent in the fact of organization" (Drucker, 1973).

A second conclusion, then, is that it is probably unwise to hold one's breath while waiting for the pyramid to disappear. There is profit, however, in recognizing that the work of professionals in the fields of performance and instruction is a form of knowledge work. Like journalism, "It is a business of finding themes and patterns, many of them arbitrary, that seem to make sense of events" (Yoder, 1983). Our work, like journalism, is a form of intelligence work, a task of piecing things together, a matter of synthesis as well as analysis. It is like trying to assemble a jigsaw puzzle without looking at the picture on the box; the boundaries, patterns, parts, and relationships are all there – if you can spot them.

Finally, although it seems certain that we cannot continue unchanged the practices of the past, there is very little clarity regarding what will take their place. Whatever their final form, future practices in the fields of performance and instruction will no doubt more closely approximate a "craft" than a full-blown technology. For now, it seems safe to conclude that:

> "We are all in the business of buying and selling knowledge from [and to] one another because we are each so profoundly ignorant of what it takes to complete the [larger] process of which we are a part" (Sowell, 1980).

References

1. Andrews, K. R., "Letter from the editor," *Harvard Business Review*. Cambridge: Harvard University. May-June 1982.
2. Bekkedahl, C.I., "Discipline and the profession of naval arms." *United States Naval Institute Proceedings*. Vol. 103, No. 891. May, 1977.
3. Bell, D.J. *The coming of post-industrialist society: A venture in social forecasting*. New York: Basic Books, 1973 (Foreword 1976).
4. Bell, D. "Communications technology – for better or for worse." *Harvard Business Review*. Cambridge: Harvard University. May-June 1979.
5. Deal, T.E., & Kennedy, A.A. *Corporate cultures: The rites and rituals of corporate life*. Reading: Addison-Wesley. 1982
6. Drucker, P.F. *The age of discontinuity*. New York: Harper & Row. 1968
7. Drucker P. *Management*. New York: Harper & Row. 1973
8. Drucker, P. *Managing in turbulent times*. London: Heinemann. 1980
9. Galbraith, J.K. *The age of uncertainty*. Boston: Houghton-Mifflin. 1977
10. Gregerman, J.B. *Knowledge worker productivity*. New York: American Management Association (monograph). 1977
11. Naisbitt, J. *Megatrends*. New York: Warner Books. 1982
12. Peters, T.J. *The excellent companies*. Basking Ridge: AT&T (videotape). 1982
13. Peters T. & Waterman, R.H., Jr. *In search of excellence: Lessons from America's best-run companies*. New York: Harper & Row. 1982
14. Powers, W.T. Behavior: *The control of perception*. Chicago: Aldine. 1973
15. Sowell, T. *Knowledge and decisions*. New York: Basic Books, 1980.
16. Toffler, A. *The third wave*. New York: William Morrow & Company, 1980.
17. *U.S. Senate, Hearings*. Washington, D.C. Senate Subcommittee on Employment and Productivity (March 19 & 26, April 2 & 16) 1982
18. Yoder, E.M. Jr. "Two storytellers." *The Washington Post* [Op-Ed]. March 24, 1983
19. Zand, D.E. *Information, organization, and power*. New York: McGraw-Hill, 1981.
20. Zuboff, S. (quoted by Daniel Goleman in) "The electronic rorschach." *Psychology Today*. February, 1983.

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