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TECHNOLOGICAL DYNAMISM

BY

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ABSTRACT

"The key to success is not information. It's people."

Lee Iacocca

"But the first and most critical step, the step on which success on all other fronts hinges, is to see clearly the enlarged role, importance and potential contributions of the human job holder."

Franklin A. Lindsay,
Jerome S. Rubin and
Richard L. Cohen

This article explores the human resource and its relationship to new developments. For a new technology to be adopted, it must be designed to be user friendly and packaged in a form that illustrates its usefulness. Human dignity must not be subjected to machines or management tools.

TECHNOLOGICAL DYNAMISM

A couple of years ago a friend introduced me to a simple matrix that has proved especially valuable in several courses where I attempt to help my students recognize the various learning styles, attitudes, and

perspectives of learners in a single course or program. The matrix looks like this:

Self-Perception of Competency Matrix

Knowledge of	Know	Don't Know
<u>Competency</u>		
<u>Actual Competency</u>		
Competent	<u>KC</u>	<u>DKC</u>
Incompetent	<u>KInC</u>	<u>DKInC</u>

According to the matrix we can think of any classroom as potentially having four types of students: 1) those who know they are competent, 2) those who don't know they are competent, 3) those who know they are incompetent, and 4) those who don't know they are incompetent. So what? How does this relate to successful applications of new technology? Successful applications of new technology rely on three factors: 1) quality hardware, 2) appropriate software, and 3) people readiness. The four types of students represented by the matrix could be said to operate out of four different readiness cultures. These same "types" of individuals may be found in organizations attempting to introduce new technologies. Depending on whether people know they are competent, don't know they are competent, know they are incompetent, or don't know they are incompetent, may explain anxiety, frustration, enthusiasm, adversity and other dimensions of human behavior that surface at the introduction and during the transition to new operations.

Our case studies suggest that technology can be introduced in ways that evoke and maximize commitment and dedication - or it can be introduced in ways that call upon resistance, hostility, and an adversarial relationship between jobholders and management. (10, p. 6)

Increasingly writers concerned with technological applications are beginning to discuss the relationship of organizational cultures (human factors) to accepted installation of technology. People in leisure and business must leave the ever-improving development of hardware and software to the technicians, programmers and engineers. But these managers along with their friends in psychology, adult education, human resource development, and organization development must assume responsibility for orienting the staff to the new culture and paving the way for technology readiness. If they themselves are not prepared to be the translators between the cultures, they at least must be ready to locate those who speak the multiple languages of technology production and technology use. It may seem far-fetched to propose that some scrutiny of anthropological and sociological literature that delineates some of the challenges inherent in creating cross-cultural understanding be applied to the introduction of technology in organizations, but an examination of current explorations of the translating difficulties may diminish exaggeration.

Schein, for example, in his new book Organizational Culture and Leadership writes:

If the new technology is to succeed, those advocating it must recognize from the outset that the resistance to it is not to the technology per se but to the cultural change implications of its introduction. (9, p. 37)

In other words, the subcultures change with the new technology. Schein explains that with data-processing technology, for example, there may be shifts in power. People formerly in power (did know but now don't know) may not be as skilled as others in using the new tools. In addition to individual differences in self-perceptions of competency related to successfully managing the new technology, complex subcultural differences intervene related to relationships to the technology. That is, a gesellschaft culture envelopes the subculture of users, technicians, and managers.

One excellent illustration of the multiple subcultures that may coexist during a single technological transition is presented by Carroll. (1) In charting a systems development team he includes: 1) a steering committee or top management, 2) a project manager, 3) the users* (this category includes users, potential users, and other managerial personnel), 4) the specialists (the category includes systems analysts, systems designers, programmers, and other specialists). Carroll makes his case for a potential clash of cultures by citing others (e.g. Kintisch and Weisbord, 1977 and Lawrence and Lorsh, 1967) who note the different orientation to goals, time, interpersonal relationships, and formality of organizational structures of these various groups who are each expected to adjust to the transition. To further illustrate this point, Schein states:

The data-processing professional is often convergent in his thinking process, intolerant of ambiguity, impersonal, concrete and output oriented, compulsive and precise, and, therefore, likely to misunderstand and clash with the general manager, who perceives his world as ambiguous, imperfect, and imprecise. (9, pp. 37-38)

Yankelovich and Immerwahr present a concept they tag "discretionary effort" to explain that the new technology permits workers much greater flexibility in the extent of involvement in work tasks. Their precise definition deserves citation:

Discretionary effort is the difference between the maximum amount of effort an individual could bring to his or her job and the minimum effort required to avoid being fired or penalized." (10, p. 4)

Sadly, their studies found only 25 percent of all workers reporting felt they were giving as much effort as they could to their jobs and almost half reporting that they put only slightly more in their jobs than the minimum required.

Our language often provides excellent clues related to major social changes. Certainly words that have linked themselves to 'technology' demonstrate the magnitude of contemporary concerns about such innovations: technology revolutions, technology transfer, appropriate technology, and high-tech/high/touch are the buzz words of thousands of articles and speeches here and abroad. The worlds of leisure and business are particularly concerned with such issues as they relate to information processing, biotechnology, robotics, and communication technologies. Technology has traveled a considerable distance from the Greek technologica (a systematic treatment of knowledge) and early industrial era technology (applied science) to present micro-mega meanings.

Among the best studies to determine individuals' perceptions of information technology is that by Hiemstra.(6) He places this work under the label of "strategic ethnography," examining the cultural interpretations within four organizations as far as meanings held about "information technology." The reader may refer to Hiemstra's article for the more detailed examination of his methodology, discussion of organizational culture, and culture from a communications perspective. An attempt here will be only to summarize his major findings. First, he found that within the four organizations surveyed, 76 kinds of information technology were identified. After these 76 terms were presented, three clusters of terms were analyzed:

The clusters are what information technology was supposed to lead to, what it is actually leading to, and what it will lead to in the future. (p. 808)

"Speed, efficiency, productivity, and easier work" were most frequently cited as the goals of information technology. When asked about the actual results of the technology, respondents again cited speed and efficiency, but added were comments about depersonalization, increased motivation, communication changes and revolution. Productivity and easier work were mentioned more often when describing the future of technology.

Hiemstra (6) concludes that eight semantic dimensions were used by interviewees in his study to define information technology:

- fast/slow
- dynamic/static
- potent/impotent
- young/old
- future/past
- creative/routine
- exciting-fun/dull

exciting-fun/dull

mysterious/obvious

Information technology is moving work fast, is active, is powerful, is young, is futuristic, is creative, is fun, and is mysterious according to accounts along these eight dimensions.

Finally, Hiemstra reports what he terms the "dominant metaphors" expressed to describe information technology. The most dominant was that it is magic, next it is a toy, then it is fun, and last it is a moving object. There is a delightful Cassady cartoon in the Summer 1984 Phi Kappa Phi National Forum in which a crystal ball gazing Madam Thelma is performing alongside a large computer. Two men are standing before this great technology, with the one confidentially advising his colleagues, "Don't breathe a word of this to anyone - but after we assess the demographic projections, consider the political variables, analyze the sociological conditions, and factor in the economic indicators - we always check with Madame Thelma over there." The magic perception is somewhat created when so much information is not continually present to the human senses. Harman (5) implies that certain individuals are uncomfortable with new technology because of its "invisible nature." That is, they have been used to working with tangible information, not pieces that are microscopically stored inside machines on tiny little diamond chips.

Others see new technology more the result of a synergistic process than hocus-pocus. "Technological dynamism" is the expression Harlan Cleveland uses in his recent book The Knowledge Executive to describe periods in societies' development when scientific creativity may result in both quantitative and qualitative advancements. He contends that although it is not easy to account for societal differences when examining this dynamism, a common process does exist. This process involves the successful mix of four types of information:

science - "know what"

technology - "know how"

values - "know why"

social authority - "know who"

According to Cleveland "Each has a role, but it's know-how that provides the dynamic thrust; technology is the instrument for continual change." (2, p. 130) Likewise, Lindsay, Rubin, and Cohen (8) identify the predominant importance of technologically equipped workers. "The education skills and commitment of people also become the key to continued innovation." (8, pp. 10-11)

One aspect of technological dynamism that clearly deserves more attention is that surrounding the fear of unemployment resulting from improved technology. Hiemstra picked up some expressions of "more work with fewer people" and "letting people go" in his study. Draper in an extremely detailed report on robotics argues that we cannot assume "that

new technologies by nature create more jobs than they eliminate." (8, p. 47) Again the magical or mystical aspects of technologies appear:

In fact, robotics had on balance created no jobs at all, and never will, although this seemingly obvious point (discussed below) was and still is concealed by mystification. During the 1960s the number of jobs rose steadily for reasons that had nothing to do with computers and robots, which in any case were very rare by current standards. (8, p. 47)

Draper continues by citing rather dramatic figures estimated by both researchers in the United Kingdom and the United States of job losses resulting from robotics. Standard researchers on assignments with the Bureau of Labor Statistics confirm this position "of the 20 occupations expected to generate the most jobs in the economy during this period, not one is related to high technology." (Levin and Rumberger cited in People and the New Technologies An Issue for Managers - August, 1983).

A report from the Public Agenda Foundation (1983) contains similar fears related to new technologies, not specifically naming robotics. However, this report contains some principles based on case histories for employees dealing with transitions, somewhat similar to Carroll's study noted earlier:

- 1) Avoid surprises.
- 2) Share the knowledge of the economics and competitive realities of the company with employees.
- 3) Involve employees directly in the introduction of the new technologies.
- 4) Invest adequately in employee training and retraining.
- 5) Provide employees the incentive of sharing in the productivity benefits resulting from the new technologies.
- 6) Explore new forms of employee job security. (1, pp. 1-2)

Yankelovich and Immerwahr found Americans less willing to work with new technology than Japanese counterparts because they do not recognize a bond between incentives and performance. However, these same researchers report that new technology enhances jobs according to the workers in four out of five cases. That is, four out of five report that innovations have made jobs more challenging. (10) Thus, they reconfirm the failure to properly introduce new technology in many U.S. work settings.

Contemporary literature on issues of new technology and American workers is at best fuzzy and at worst contradictory. To illustrate, some researchers say these innovations will expand the work force, while others feel the same technology will displace workers. Despite the haze, technological innovations will certainly push their way into both leisure

and business sectors and writers such as Hiemstra, Carroll, Yankelovich and Immerwahr** offer some direct and indirect guidance for successful and dynamic applications of new ways to manage our pleasures and our profits.

*The term "user" is an unfortunate choice of technology jargon. It is most frequently handled as Carroll has indicated to distinguish the "users" of the technology output from the "producers" of the technology software and hardware. As Hiemstra studied the communications within four organizations he concluded: "The term 'user' can cause some confusion for the uninitiated, since an information technology user in all likelihood never touches most technologies. Instead, the users and the clients are the managers and executives who use the services of information technologies but do not operate it themselves. Users are likely to call the technology 'that fancy gadget,' to be viewed as afraid or intimidated by the technology, and to view the use of a keyboard as 'not something I went to school for.' Most 'have no concept whatsoever of how it works.' They either will not type or cannot type. If they try to operate the equipment, they 'are always screwing it up' because they 'don't know how' and 'don't want to know about it.'" (6, p. 810)

**See also Careers Tomorrow: The Outlook for Work in a Changing World (Selections from The Futurist, edited by Edward Cornish, World Future Society, 4916 St. Elmo Avenue, Bethesda, MD 20814).

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