Performance Technology: An Introduction

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This brief article has as its major purpose to introduce Performance Technology as a relevant field of application for training professionals. It is divided into four major sections. The first section presents Performance Technology as a term and explains what it means for the professional instructional developer or trainer. The second section takes an epistemological approach in an attempt to answer the question "Where does Performance Technology come from? On what sorts of foundations has it been built?" The third section explores the relevance of Performance Technology for persons in training and human resources development. The final substantive part cites several myths and misconceptions about the field that have gained currency in various training circles that have either never encountered applications of performance technology or which have had dealings with poor representatives of the field. The article concludes with an invitation to those responsible for training to further explore this emerging technology aimed at improving human performance.

Performance Technology: The Term

The word "performance" is one which tends to disquiet trainers who first encounter it in the serious setting of the workplace. It seems to suggest something theatrical, perhaps even of gesture rather than substance. Yet performance is an appropriate term for the business we are in. According to the Larousse dictionary (1970, p. 2343), performance comes from the older French work "parformance." It is a "quantified result," or "a set of obtained results." The Oxford English Dictionary (1970, vol. 7, p. 689) defines performance in terms of "the accomplishment, execution, carrying out . . . of anything ordered or undertaken . . . something performed or done . . . a notable deed, achievement, exploit."

Nickols (1977, p. 14) defines performance as "the outcomes of behavior. Behavior is individual activity whereas the outcomes of behavior are the ways in which the behaving individual's environment is somehow different as a result of his or her behavior." Gilbert (1974) in the same vein, equates performance with "accomplishments" that we value. We may even refer back to Gilbert Ryle's (1949) use of the term "achievements," which he employs to describe the "effects of behavior" as being related to the term performance in Performance Technology. Outcomes, accomplishments valued by the system, or achievements, these are what Performance Technology is concerned with.

The word technology also often rings discordantly in the ears of training professionals for whom the term conjures up mechanistic images. Technology is not machinery. In its origins it essentially referred to the scientific study of practical matters (Oxford English Dictionary, 1971, p. 3248). Recently, it has become increasingly used to refer to the application of what has been discovered scientifically (Hawkridge, 1977; Stolovitch, 1980). When joined with performance and introduced into the workplace it connotes objectivity, systematic procedure, and the application of what has been discovered about human and organizational behavior to economically and effectively enhance accomplishments valued by the environment in which it is applied.

Performance Technology, therefore, is a field of endeavor which seeks to bring about changes to a system in such a way that the system is improved in terms of the achievements it values.

Where Does Performance Technology Come From?

Performance Technology is one of the many offspring of General Systems Theory applied to organizations. It conceives of system as "a complex grouping of human beings and machines for which there is an overall objective" (Checkland, 1972, p. 91). Performance technologists take a systemic approach to performance analysis and change as opposed to making piecemeal interventions. Performance technologists adopt an holistic viewpoint toward performance problems, which means that they examine any given problem within the broader context of the sub-system within which it is located, other interacting subsystems, and ultimately the overall system within which it occurs. This does not suggest that for every problem, performance technologists endlessly examine all systems in an exercise that lasts forever. It does mean, however, that each performance problem is studied in relation to the more global aims of the setting within which it occurs and, if necessary, to settings beyond the immediate place of occurrence if the performance of these other settings are (or eventually will be) significantly affected by the problem and/or its solution.

While performance technology is concerned with systems, it is not generally conceived of as applying to all systems. It is a technology that has application to purposive systems (as opposed, for example, to social systems). This makes performance technology particularly valuable for industry, where organizational purposes and goals are generally clearly defined.

Performance Technology also has its roots in behaviorism and is often seen as an offshoot of the programmed instruction movement. Ainsworth (1979) critically suggests that "what theory does propel performance technology is still closely allied to programmed instruction theory" (p. 3). Performance Technology is concerned with measurable performance and the structuring of elements within the system to improve performance. The performance technologist must identify and analyze stimuli within

the system that may affect performance, responses which are emitted and the consequences of those responses (rewards/punishments) in order to uncover root causes of performance inadequacy. Once this is done, he or she can go on to define observable and measurable performance objectives.

> *A cornerstone of performance technology is outcome signification—discovering valid, useful performance objectives and stating them in terms that are easily understood (Ainsworth, 1979, p. 5).*

Suitable interventions are designed to effect change and these are monitored and modified until the system attains the required level of measurable performance.

Why is Performance Technology Relevant to Training Professionals?

Performance Technology, as stated previously, adopts a system view rather than operating piecemeal. As such it links the interventions of training departments to the overall performance of the total system. This view permits each intervention made by training and development specialists to show up as a necessary element of the entire organization's productivity rather than as costly acts that eat into profits and remove personnel from their posts (where they are to some degree productive).

As well as systemic, performance technology is systematic in its approach to performance improvement. The orderliness of the technology, the objectivity and care with which analysis, design and evaluation procedures are conducted, and the linking of either training, environmental redesign, feedback systems or incentive systems to measurable performance builds credibility for the professional trainer's/developer's efforts in the eyes of decision-makers.

Performance Technology is theory-based, thus providing a coherent approach to the solution of performance problems as opposed to more ecclectic stances and procedures adopted by most training and human resources development departments. The dual systems and behaviorist foundation permits all interventions undertaken by those subscribing to performance technology to gather a uniformity of purpose without sacrificing flexibility—performance technology looks for optimal solutions regardless of their appearance.

Given a performance problem (defined as a gap between an ideal state of achievement and what is currently being achieved), the performance technologist's usual first step is to conduct a performance analysis in which performance discrepancies are brought to light before any attempt at solution is made. The performance technologist, consequently, is more cause conscious than solution oriented, and in his/her proposed alternative solutions will primarily seek to eliminate causes of performance discrepancy rather than overcome these (elimination generally being a less costly and time consuming activity than constructing interventions).

Performance Technology is bottom-line oriented, which makes it particularly credible to money conscious decision-makers. Performance analysis includes as basic to its modus operandi the assessment of the cost of alternative solutions to performance problems including the cost of not solving a problem. Gilbert (1978), probably the leading thinker in Performance Technology, proposes what he calls the "performance audit" as a procedure for conducting a performance analysis. This audit is conducted in seven stages:

1. Identify accomplishments (i.e., what the system is currently accomplishing).
2. Identify requirements (i.e., what the system requires to be accomplished).
3. Identify exemplary performance (i.e., what the realistic potential is).
4. Measure exemplary performance.
5. Measure typical performance.
6. Compute the potential for improving performance (i.e., the discrepancy between exemplary and typical performance).
7. Translate this potential into stakes (a measure of economic potential; the savings or improvement that might be expected from an improvement from typical to exemplary performance).

What is interesting in Gilbert's approach is that poor performance is cast in a positive light as offering great potential for economic gains. What is also noteworthy is that if the stakes are insufficiently high, the performance discrepancy may be left until it becomes economically viable to reduce it.

Ainsworth (1979) castigates Performance Technology, stating:

> *. . . one word that aptly describes the performance technologist's approach . . . it is "authoritarian" (p. 3).*

This is a surprising accusation, but one frequently heard from those in training who are unaware of the underlying theoretical foundations of Performance Technology. With its systems orientation, performance technology requires that thorough performance analyses be conducted to identify all factors contributing to the current level of performance. It also requires a precise statement of the mission(s) of the system in which improved performance is being sought. If there are incompatibilities at the mission level (e.g., healthy workers and highly productive workers in a poorly ventilated asbestos fiber plant) then the performance technologist will first focus on this problem area. If the mission is accepted by all, alternative solutions are elaborated and objectively analyzed for cost-benefits. The process is rational rather than authoritarian. In fact, as all relevant factors must be taken into account, it is an essentially highly participative (data collected directly and indirectly from all who are involved) and honest approach to improving performance.

Within the training context, performance technology generally seeks to avoid training solutions. While this may at first discomfit the training professional, closer examination is required. Training is generally expensive, not only from the development and delivery perspective, but even more importantly because of *time off the job by those undergoing training*. If performance can be improved by less costly means (e.g., elimination of incompatible tasks; introduction of feedback systems; design of job aids) a higher cost-benefit ratio can be derived. This tends to build greater confidence by decision-makers in the training and development team. It can also result in the acquisition of adequate training funds for those instances in which training is the optimal solution.

Finally, the language of the performance technologist is highly compatible with that of many decision-makers. The approach taken by the person utilizing performance technology is not unlike that of the prudent investor (or company director). Systems thinking and concern about measurable benefits are common to many industrial and economic arenas. The training professional who considers investments for solving human performance problems in terms of pay-back periods, cost-benefits, and return on investment will likely find corporate decision-makers more open to the solutions training professionals propose.

Some Myths about Performance Technology

Performance Technology uses an Overspecialized, Incomprehensible, and Deliberately Mysterious Jargon.

It is true that some performance technologists have created specialized terms to refer to specific concepts or procedures they have invented (e.g., Gilbert: PIP, ACORN test, mathetics; Kaufman: system [no "s"] planning; Tosti: formative feedback). Nevertheless, the general vocabulary of performance technology has been drawn largely from other fields such as accounting, behavioral psychology, education, and engineering. With its close relationship to instructional technology, many of the terms and tools utilized by these professionals have also become part of the performance technologist's verbal repertoire. Recently, computer technology and systems analysis have begun to seriously affect the performance technology field and consequently its vocabulary. Growing interest in the tools and techniques of measurement and evaluation, quantitative business analysis, and statistics have also left their imprint.

Performance Technology is not so much jargon generating as it is going through a process of assimilating others' technical vocabularies while it seeks richer resources to help improve human and hence system performance.

Performance Technology is Dehumanizing.

This is one of the cruelest myths and misconceptions attributed to a field which is essentially concerned with human performance. Its concern, however, is rational rather than ideological or emotional. Performance technologists are very aware of the individual nature of human motivation, goal orientation, and value systems. Where these are defined as essential to the mission or missions of a system, they are given priority. Where not, they remain of critical importance in prescribing changes for the system. Improvement of a system that relies on human performance must maintain the strongest respect for the human being if it is to continue effectively. Organizations in which productivity is high and quality is maintained are those where morale, employee self-esteem, and worker satisfaction are also at a high level. It is not axiomatic that what is good for the company is necessarily evil for the employees. Excellent performance often translates into greater job security, improved salaries, and an overall high level of interest and satisfaction in one's employment.

Pride of performance in the workplace is still an important value for most workers. Performance technology, far from dehumanizing, attempts to affect systems in ways that foster both worthy performance and individual self-worth.

Because it has a Well-defined Theory Base, Performance Technology is Intolerant of other Approaches.

Once again half-truth reigns. Because of its insistance on clear definition of a system's mission, measurable indices of actual and desired outcomes, and consideration of the cost of each intervention relative to projected benefits, Performance Technology does manifest intolerance toward those who disregard the purposive nature of the system or make gratuitous decisions which cannot be supported by a clear data base. Similarly, performance technologists become highly uncomfortable when faced with training programs that appear to spring more from the ideologies and interests of trainers than from documentated needs of performers—needs which the workplace has also designated as relevant to the organization's overall mission.

Performance Technology, however, is far from complete. It has constantly remained open to new technologies and theory bases (e.g., Many performance technologists are following with interest developments in cognitive psychology, brain research, organizational development), but has been cautious in accepting those innovations which still lack well-documented empirical evidence of their effectiveness.

Performance Technology Favors Management and Idealizes Corporate Goals.

Performance technologists generally are brought into contact with a problem via management. The performance technologist must, therefore, report back to management. But data on performance and/or lack thereof is collected from and interventions designed for actual performers. Job-aids, feedback systems, training courses, or incentive systems cannot possibly be effective if the characteristics and value systems of performers are not taken fully into account (see as an example of this *Ten Types of On-the-Job Reinforcers: A Taxonomy* by Donald Tosti and Anne O'Brien, 1979, which deals with the importance of distinguishing what individuals value before selecting rewards for performance).

In the workplace, performance valued by the employer must be the prime consideration, but this does not exclude careful analysis of employee goals and motivations. The ideal intervention—which often results in increased freedom and initiative for the performer as well as greater sensitivity to personal style—is one which equally favors both management and the individual employee/performer.

Performance Technology is Inaccessible to Those Who Have Not Received Formal Training In It.

As with any other field, Performance Technology requires careful study, practice, and feedback which are characteristics of most formal training programs. However, the purpose of this article is not to form professional performance technologists, but rather to encourage training professionals to explore the viewpoints and tools of performance technology and thus help improve their own performance through utilization of relevant portions of this growing field.

Articles abound, particularly in such journals as *Performance & Instruction*, the official publication of the National Society for Performance and Instruction (NSPI). Articles and books by Tom Gilbert, Donald Tosti, Donald Bullock, Geary Rummler, Karen Brethower, William Deterline, Robert Mager, Peter Pipe, David Cram, and Joe Harless will certainly aid the training professional gain greater knowledge of and insights into the field.

Workshops by some of the persons mentioned above are usually well structured and dense, and provide ready-to-use skills to participants. Conferences on Performance Technology such as those held by NSPI are also useful events for learning about the field and, more importantly, for sharing experiences in informal after-session conversations.

Via reading, formal workshops, conferences, and information and experience sharing, Performance Technology can become readily accessible to the interested trainer.

To Conclude

There is little doubt that Performance Technology adopts a hard-nosed and highly objective approach to training and human performance. Performance Technology takes into consideration the cost of any intervention to improve human performance. It views these costs as investments which must yield returns valued by the investing system. Perfor-

We Have Lost A Great Friend

Dick Lewis, who initiated the audiovisual and instructional television services in 1949 at San Jose State College (now San Jose State University), passed away on October 26th. He was a professor of education, retiring in 1969, but continuing as a leader in audiovisual education and new teaching methods both in California and throughout the country.

Dick was born in Porterville, California, on December 7, 1908. He received his B.A. in Education and Drama in 1930 from San Jose State College and holds both the M.A. and Ed. D. degrees from Stanford University.

He taught in California public schools and from 1935-42 directed radio and drama productions and taught speech at Glendale (California) Junior College. From 1942-46 he served in the U.S. Navy as Assistant Director of the Training Film Branch.

Among his most noteworthy accomplishments has been organizing the audiovisual directors in the 19 California State University institutions and solving many system-wide problems during the years of rapid growth.

Nationally Dick is most widely known as a co-author (along with James W. Brown and Fred F. Harcleroad) of the leading basic college textbook in the educational media field (McGraw-Hill, publishers). He was a visiting professor at many universities and participated in numerous presentations and workshops.

Dick's many friends will remember him as one of the strong but unassuming leaders in his field. He rarely wanted recognition or acclaim for his efforts or his accomplishments. He was most thoughtful of other persons. While many of his contributions can be easily measured, an equal number are immeasurable in material ways.

A scholarship fund is being set up in his name through A.E.C.T. Dick Lewis will truly be missed.

If you would like to be a part of this effort, please fill out the form below and send it, with your check (payable to the ECT Foundation), to the address shown.

Jerrold E. Kemp
Fred F. Harcleroad
James W. Brown
Contributions are tax-deductible.

Mr. Richard Nibeck
ECT Foundation
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I wish to contribute the enclosed amount to the RICHARD B. LEWIS Memorial Fund being established in the ECT Foundation.

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mance technologists do not define what these returns should be; the system does this. Once, however, the purpose of the system is defined and returns specified in an overt manner, Performance Technology demands systematic and objective study of the performance problems. Its point of reference is worthy performance—worthy as determined by the system.

W. Frank Blount, the most senior person in charge of training and education within AT & T, in a keynote speech (Blount, 1980) recommended that all of us in training take a hard look at ourselves. We are often fascinated by our own training approaches, our tools, our ideologies . . . .

> *. . . far too often I see that we allow training to become an end in itself. In fact, I have observed in visiting with groups of training people, that we really do not talk about results, we do not talk about human performance in people, we talk about packages of training materials we have produced, or processes that we have refined or standards that we have changed. I . . . worry about training becoming an end in itself (p. 17).*

So do performance technologists. If those of us in training and human resources development cannot demonstrate effectiveness in terms that the system in which we operate values, we must not be surprised when it is our departments that experience heavy budget cuts, when we are maligned and when we become dumping grounds for persons whose contributions to the system are no longer judged useful.

As professionals in training we have the potential to offer our organizations more than they ever bargained for.

> *I believe that the untapped and unapplied proven potential for improvement in our business, in our people, in our products, in our service, in our customer relations, through human performance technology is absolutely awesome (Blount, 1980, p. 16).*

Improved human performance can result in dramatic increases in productivity and worker satisfaction. And that is what both Performance Technology and our business is all about.

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