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ABSTRACT

The basic similarities between educational technology and organizational development provide a powerful rationale for collaboration. The two disciplines are essentially in the same business, that of systematically changing human behavior. System theory and the system model appear to supply the language and the technology through which such efforts could be effected. The Command Action Planning System (CAPS) employed by the U. S. Navy at the Human Resource Management Center, San Diego was successful for two reasons. First, the entire approach was systematic in nature (i.e., environmental demands were identified, outputs specified, functions derived, resources identified, and the process then implemented and modified until performance was satisfactory). Second, the collaboration of educational technologists and organizational development specialists allowed a comprehensiveness of effort that would have otherwise been impossible. The collaboration appears to have been made possible by the cross-disciplinary aspects of system theory and the integrative capabilities of the system model. (Author/WCM)

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EDUCATIONAL TECHNOLOGY and ORGANIZATIONAL DEVELOPMENT:
A Collaborative Approach to Organizational Change

by

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and

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The title of this paper implies a condition that to some may seem preposterous. After all, why should anyone propose the joining of two such apparently diverse fields? Each discipline is an independently successful product of today's highly industrialized nations. Each specialty is the child of an accelerating technology; the postpartum evidence of deep-seated pressures for change endemic in modern society. Both fields are young and vigorous, and have for the past two decades been experiencing rapid growth and expansion. So, why collaboration?

This paper has two central points with respect to that question: (1) that collaborative relationships between educational technologists and organizational development specialists are natural and inevitable; and (2) that such collaborative relationships have the potential for significantly increasing the effectiveness of organizational change efforts.

To address the first point, we will examine several similarities in the two disciplines. To demonstrate the potential for increased effectiveness, we intend to first provide a brief outline of what we consider to be the basis for collaboration (i.e., system theory), and then describe a product of a collaborative effort in the United States Navy-

-the Command Action Planning System (CAPS).

Similarities in the Disciplines

The historical roots of both educational technology and organizational development can be partially traced to the military. Shoemaker (1969) indicates that at least one beginning of instructional technology can be traced to the work on task analysis and instructional systems done in the military during the 1950's. French and Bell (1973) point out that the laboratory training stem of organizational development which eventually grew into the National Training Laboratories (NTL), was initially financed by the Office of Naval Research. The numerous studies, projects, and grants funded by and involving the military, indicated at least an interest by the military in both educational technology and organizational development. That interest by the military extends sufficiently far back into time that the military serves as a partial point of origin for each discipline.

An ever increasing focus on behavior is a striking commonality between the two disciplines. The realization among organizational development specialists that organizational behavior is in reality nothing more than complex patterns of individual behavior is evident in Bowers' (1973) statement that:

> "..., it is well to remember that these 'processes' (e.g., organizational decision-making practices) are simply shorthand descriptions for perceived constellations of the behavior of many individuals at various points in organizational space." (p.7)

The work of Mager (1962) and Popham (1966) with respect to focusing instructional outcomes on learner behavior is well known and requires no elaboration here. However, the rationale for focusing on behavior will receive coverage. Gagne (1965) describes four basic reasons for describing instructional outcomes in terms of learner behavior:

> *Revealing the Nature of the Terminal Behavior.* Specifying terminal behavior allows the instructional designer to know what is to be learned. The instruction can then be designed toward this end.
>
> *Specifying Postlearning Behavior for Measurement.* The specification of learning outcomes in measurable terms allows a reliable determination to be made of whether or not those outcomes were in fact achieved.
>
> *Distinguishing the Varieties of Behavior Which Can Be Modified by Instruction.* Behavior can be classified and each classification carries implications for the conditions required for learning.
>
> *Defining the Reinforcement Situation for the Learner.* Making the terminal behaviors known to the learner allows the learner to carry out the matching function required to obtain reinforcement. Further, it seems that the learner is to at least some extent able to then program his own activities.

Gagne's rationale for stating instructional outcomes in terms of the learner's behavior applies equally well to the design of organizational interventions and organization change efforts.

Not only do both disciplines concentrate on behavior, but both specialties seem to view behavior in much the same light (i.e., in terms of individual and environmental variables). McGregor (1967) expressed the performance (P) of an individual in an industrial organization in the following equation:

$$P = f(Ia,\ b, c, d \ldots Em, n, o, p, \ldots)$$

Kolb, Rubin, and McIntyre support this multi-variate view of behavior when they write:

> "One of the most widely accepted and important insights of social psychologists is that behavior is a function of the person and his environment." (p.73)

There has long been a corresponding recognition among educational technologists that individual behavior is a function of individual (I) and environmental (E) variables. The *acquisition* and *maintenance* categories of behavior change posed by Brethower (1967), and expanded upon by Mager and Pipe (1970) demonstrate this recognition. Educational technologists and organizational development specialists seem to view the individual as neither *independent of* nor *dependent on* his environment, but rather, *interdependent with* his environment.

That interdependent view of behavior may be one of the underlying factors in what we perceive to be another similarity --the choice of change strategies. Chin and Benne (1969) suggest three basic strategies for change:

Empirical-Rational. Men are rational and will follow their rational self-interest. Change is attempted by proposing the change and demonstrating that the proposed change is in line with the self-interests of the change targets.

Normative-Re-educative. Rationality and intelligence are not denied; however, behavior is viewed as supported by sociocultural norms and commitment to these norms. Change is attempted by getting individuals to change their normative-orientations and develop commitment to new ones. Change requires modifications in attitudes, values, skills, and significant relationships, not just new knowledge or information.

Power-Coercive. Change is accomplished through the application fo power in some form. The change process is one of compliance by those with lesser power with the wishes of those holding greater power. The power to be applied is usually legitimate power or authority.

There appears to be a connection between the three strategies and three basic views of the individual. The Empirical-Rational strategy would seem to assume that the individual is independent of his environment. The Normative-Re-educative strategy appears to recognize interdependency with one's environment, and th. Power-Coercive strategy patently asserts that one is dependent upon his environment. Although it may or may not be based on an interdependent view of the individual, we do see a tendency among educational technologists and organizational development specialists to rely on the Normative-Re-educative strategy for change.

Whether the change in question is one of modifying the behavior of an individual, or of altering the behavior patterns of an entire organization, the issue is still the same--how does one obtain movement from the current or projected state of affairs to the desired state of affairs? Change is the "core process" of both educational technology and organizational development. With respect to behavior change, one might conceive of the educational technologist operating primarily at the individual or micro-level, and the organizational development specialist operating at the organizational or macro-level. Overlapping of the disciplines occurs at the level of the group.

Whether it be at the micro-level of the educational technologist or the macro-level of the organizational development specialist, both disciplines are concerned with changing behavior. Both disciplines seem to prefer an interdependent view of the individual with his environment, and choose their change strategies accordingly. It is possible to look at behavior change as one basis for collaboration in graphic form (Figure 1).

BEHAVIOR CHANGE AS A BASIS FOR COLLABORATION

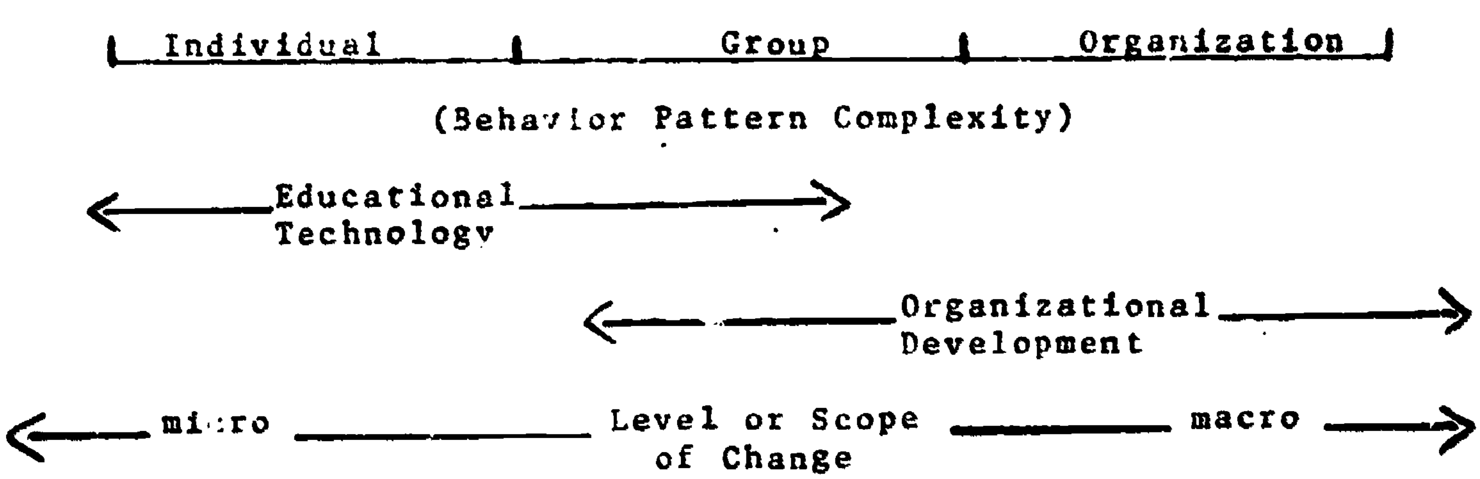

FIGURE I

The continuum represents the complexity of behavior patterns to be considered in a change effort, with individual behavior being the least complex and organizational behavior the most complex. Adding the normal domain of activities for each discipline helps to clarify their relationship and to illustrate the overlap at the group level. The level or scope of change effort illustrates their micro-macro relationship. The fact that both educational technologists and organizational development specialists are essentially in the same business provides a strong rational basis for collaboration.

If the business of change is to be a responsible one, then at some point the issue of accountability must be raised. An insistence on professional accountability is becoming more predominant in both disciplines. Deterline (1971) describes accountability in education as follows:

> "Accountability imposes three directives: specified performance capability will be produced; the instructional components must produce those results; and an empirical development and management process must be employed." (p.23)

Bowers (1973) suggests a similar requirement in organizational development when he writes:

> "..., responsible change practice requires that one must be able to say that a particular treatment produces the condition which it is intended to produce." (p. 20)

One needs to be able to identify the intended outcomes of an organizational intervention with no less validity and reliability than can be done for an instructional sequence. It is in the area of accountability that taxonomies of behavior such as those presented by Gagne (1970), and Tennyson and Merrill (1971) can perhaps be coupled with taxonomies of diagnosis and intervention as prescribed by Harrison (1971), French and Bell (1973), and Bowers (1973). This matching could well serve to have the "treatment" match the "condition", and thus improve the accountability of change efforts in both disciplines. Irrespective of the methodologies used, the truly responsible practitioners in both disciplines seem to welcome and to advocate accountability.

One might speculate that accountability brought about the application of systems-engineering techniques to organizational development and educational technology, or one might take a stance quite the reverse. At any rate, both educational technology and organizational development have been increasingly utilizing (in one form or another) what has come to be called the "systems-approach." The works of Banathy (1968), Corrigan (1969), and Kaufman(1964, 1968, 1970, 1972) are examples of such applications in education. The treatment of organizations and their development in system terms is illustrated by writers such as Katz and Kahn (1966), Lawrence and Lorsch (1967, 1969), and Bowers (1973) to name but a few. Whereas mathematics has long been the common tongue of the physical sciences, system theory seems well on its way to becoming the currency of the behavioral sciences. As Robert Chin (1969) notes:

> "..., the system model is regarded by some system theorists as universally applicable to physical and social events, and to human relationships in small or large units." (p.299)

System theory seems to provide both a language and a rapidly growing technology ideally suited to bridging whatever gaps may exist between the micro-level of the educational technologist and the macro-level of the organizational development specialist.

When one looks at the similarities mentioned thusfar with respect to the two disciplines, it becomes readily apparent that both fields are moving ever closer to a common purpose--that of *systematically changing human behavior.* It is this "common purpose" coupled with their similarities that forms our final point concerning the naturalness and inevitability of collaboration between educational technologists and organizational development specialists.

Lawrence and Lorsch (1967) have made an intense study of the impact of differentiation (division of labor) and integration (coordination) on the behavior of individual organizational members. They define integration as:

> "-- *the quality of the state of collaboration that exists among departments that are required to achieve unity by the demands of the environment.*" (p.11)

If one substitutes *discipline* or *practitioner* for *departments* in the foregoing definition, one can then see that the requirement for collaboration among educational technologists and organizational development specialists is a function of environmental demands for the unity of their efforts. Given our earlier position that both educational technologists and organizational development specialists are concerned with the systematic changing of human behavior, it is our contention that collaborative relationships should be effected *before* environmental demands bring to pass such an integration. As Kaufman (1970) points out:

> "The concept of change surrounds us these days, and much in education has been written about it. Change is inevitable; the question educators must face is whether we will help to shape it as participants, or whether we will be swept along as spectators." (p.123)

Assuming that similarities between the two disciplines would indeed facilitate collaboration, there are as yet many unanswered questions. What would be the theoretical basis around which collaboration might occur? What integrative devices could be used? What has been attempted thusfar, and with what results? Simply put, we think system theory provides the theoretical basis, and the system model an integrative device. The Navy's Command Action Planning System (CAPS) will serve as one example to illustrate the increased effectiveness achieved through collaboration in organization change efforts.

Open-System Theory

System theory presents a theoretical basis for collaboration between educational technologists and organizational development specialists with which members of both disciplines seem somewhat familar. However, we caution against confusing the application of systems-engineering techniques with the application of system theory. Kaufman (1970) expresses a similar concern when he differentiates between system (singular) and the systems-approach. Our intent in addressing system theory is not to give it definition, but to present our understanding of certain of its aspects. Our rationale for addressing system theory has been more than aptly put by Bowers (1973) who states:

> "That the systems viewpoint has had considerable currency is demonstrated by the increasing frequency with which writers and practitioners in the field (OD) have referred to it in what they write and say. Unfortunately, not all who recognize its general value also accept its substance. The thoughtful implementer, no less than the casual observer, is faced with the problem of differentiating those who identify the truly systemic from those formulations which merely attempts to identify <u>with</u> it." (p.5)

What then is a system? Current system definitions seem to be an attempt to describe the tangible form or structure of a system. This is evidenced by the inclusion of words such as parts, elements, things, and components in current definitions. Beckett (1971) comments at length on the weaknesses of such definitions. This focus on "thing" structure may be a carry over from the "closed-system" theory of the physical sciences where system boundaries are clearly defined. Katz and Kahn (1966), citing the work of Allport (1962), point out that in a social structure where physical boundaries in the usual sense are non-existent, that it is *events* rather than *things* which are structured. Thus, social entities (organizations, and groups) may be profitably viewed as comprised of cycles of events as well as a collection of interdependent elements. It is from this energic flow point of view that we have developed the following definition of systems:

> *Systems are patterned cycles of events, consisting of inputs, transformations, outputs, and transactions for new inputs to continue the cycle.*

The cycle of events that comprises a system is in fact carried out by various entities. In social or socio-technical systems these entities are usually men, or machines, or some combination of the two. However, one must not confuse the entities with the system. The system is a cycle of events that may involve many and various entities in its execution and closure. These entities may be replaced by other entities, yet essentially the same cycle of events will persist. The cyclic nature of a system can be graphically illustrated (*Figure 2*).

A SYSTEM AS A CYCLE OF EVENTS

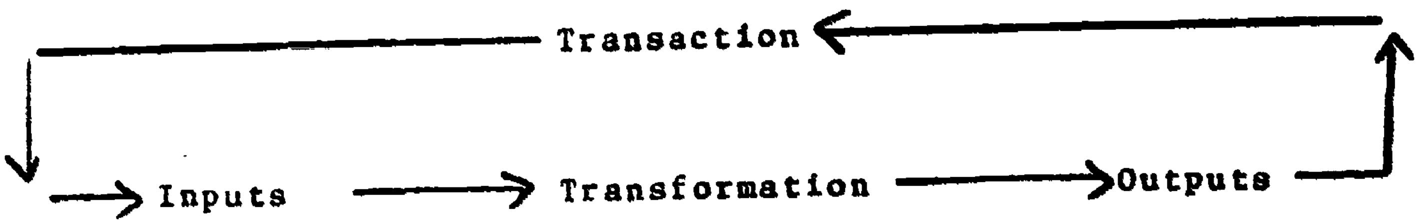

FIGURE 2

A system may be considered as having two phases--the *transformation phase*, and the *transaction phase*. In a system at its simplest, one entity may execute the transformation phase while a second entity executes the transaction phase. A baker who barters bread with a miller for flour is a very simple, yet illustrative example. It is the making of flour, the making of bread, and the exchange of the two that constitutes the system, <u>not</u> the baker, the miller, the flour, or the bread. The cycle of events constitutes the system, not the entities involved. Thus, the "wholeness" or *gestalt* of a society, organization, or group lies not in some mystical attribute that separates the whole from the sum of the parts, but in the closure and reinitiation of a cycle of events.

When one applies a system viewpoint to social entities (e.g., organizations, or groups), he immediately encounters many far-reaching implications. Chief among these implications is the requirement to consider the interaction of the entity with its environment. The environment actually consists of other entities; the term *environment* is simply a convenient way of collectively referring to all these other entities. As a given entity cannot exchange its outputs with itself for new inputs (and it is the transaction phase that closes the cycle), it is obvious that it takes a minimum of two entities to have even the simplest of systems. Together, in interaction, those entities can carry out a cycle of events that is characterized by closure and reinitiation.

A number of relationships are readily apparent when one examines entities in interaction (*Figure 3*)

ENTITIES IN INTERACTION

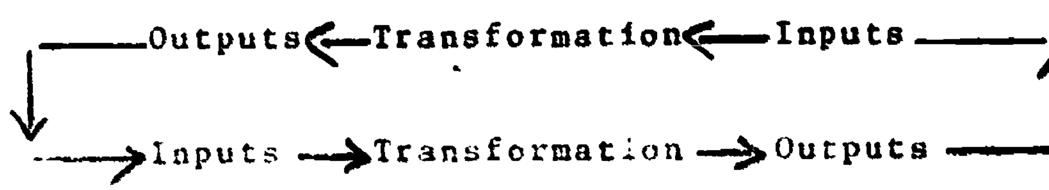

FIGURE 3

The first point is rather glaring in that the transaction phase and the transformation phase are seen as identical (i.e., each entity receives inputs, transforms them, and thus yields outputs). Transformation and transaction are terms used to distinguish between phases in a system.

The operation of the entities involved in each phase is the same. Other relationships that can be derived from an examination of entities in interaction are:

- The outputs of a given entity serve as inputs to other entities.
- The outputs of a given entity are a function of its inputs, the transformation process, and the *input requirements of other entities.*
- The inputs to a given entity are actually the outputs of other entities.
- The inputs to a given entity are a function of its output requirements, its transformation process, and the *output capabilities of other entities.*
- The survival of any entity is a function of its ability to *continue* to meet its input requirements.

It is from this "an output is an input is an output" relationship that the meaning of *interdependency* begins to take on clarity. Lawrence and Lorsch (1969) termed this exchange of outputs for inputs as a "contributions-inducements" relationship. Basically, that relationship implies that one cannot examine a given entity's outputs and inputs only with respect to that entity. One must also consider which outputs are exchanged with which entities for which inputs.

Katz and Kahn (1966) demonstrate two categories of inputs--*maintenance* and *production*. They write:

> "*Maintenance inputs* are the energic imports which sustain the system; *production inputs* are the energic imports which are processed to yield a productive outcome." (p.32)

A second point then, is that in examining a given entity (organization, group, or individual), one must also analyze the input-output transactions in terms of which *kinds* of outputs are exchanged with which *kinds* of entities for which *kinds* of inputs.

The very existence of maintenance input requirements suggests that the ability to survive is a major parameter of any social entity, and the performance assessment of any organization, group, or individual must take into account interactions with other entities. Seashore and Yuchtman (1968) conducted an intensive examination of seventy-five organizations in an attempt to isolate and identify variables that could be used as measures of organizational performance. They concluded by saying:

> "We define the effectiveness of an organization as its *ability to exploit its environments in the acquisition of scarce and valued resources to sustain its own functioning*." (p.186)

One criterion for social entities is their ability to obtain the inputs they require to continue to function. We hasten to add that there may or may not be a contingency relationship between outputs and inputs. But this criterion seems to address one aspect of the entity--its interaction with the environment (other entities), but there is another aspect to be considered--the transformation process itself.

Banathy (1968), in writing on instructional systems, indicates that within system (entity) boundaries can be found both *content* and *process*. Content refers to tangible resources, while process refers to the functions in which content engages. It is this resource-function relationship that characterizes the transformation phase of a system's cycle of events (*Figure 4*).

EXPANDED VIEW OF THE TRANSFORMATION PHASE

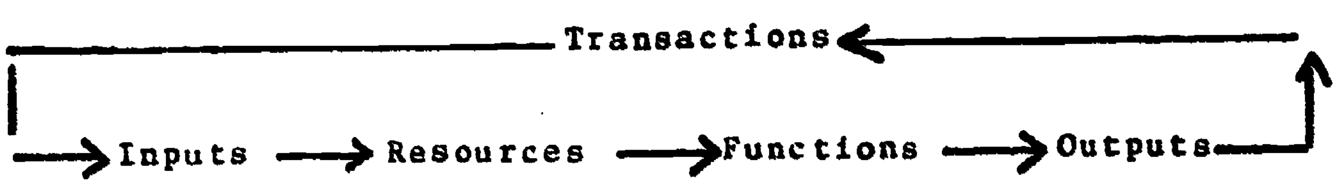

FIGURE 4

As was the case with the transaction phase earlier, a number of relationships can be derived from an examination of the transformation phase.

- There is a given range of inputs for which a specified output can be exchanged (it is unlikely that you could trade a bale of cotton for a new automobile).
- There is a given range of functions that will result in a specified output (the end result of drilling, bolting, and welding, is not a bale of cotton).

- There is a given range of resources that can accomplish a specified function (pressing, wrapping, and strapping will not be accomplished by a mechanic with a 3/8" socket set and torque wrench).
- There is a given range of inputs that can be utilized by a given transformation process (if you're in the business of producing cotton bales, you probably don't want to trade them for an automobile anyway).

To the extent that the preceding relationships prevail, the entity will be efficient (i.e., it will not waste energy in producing its output). To the extent that the transformation process is wasteful the entity will make inordinate demands on its environment for inputs. This can result in such unsatisfactory transactions with other entities in the system that survival itself can be endangered. A second parameter for the effectiveness of any social entity is then related to its output/input ratio. Bowers (1973), in developing a taxonomy of interventions for organizational development efforts, addresses this aspect of organizational effectiveness when he writes:

> "Although persons may, for reasons of background, information, and the like, hold in fact as ideal any of an almost infinite variety of functional configurations, the one which they <u>should</u> hold, if their concern is for the well-being of the organization, is one which maximizes the output/input ratio." (p.8) .

One obvious way to maximize the output/input ratio is to hold outputs constant and increase inputs. With respect to that particular point we should like to modify Bowers' maximum output/input ratio to include a concept of optimum inputs as a limitation. Seashore and Yuchtman (1968) demonstrate the requirement for such a qualification when they state:

> "The second qualification is that the *ability* to exploit the organization's environment cannot be equated with *maximum use* of this ability in the short run, for an organization might then destroy its environment and reduce its longer-run potential for favorable transactions. We must invoke an *optimization* concept." (p.186)

Considering systems as cycles of events, and entities as the means whereby that cycle is executed, allows us to place our two parameters in perspective. The complete cycle of events that comprises a system consists of two phases. The first phase is the transformation phase. The ability of the entity to maximize its output/input ratio within optimal input limitations applies to this phase. The second phase is the transaction phase. The ability of the entity to obtain the inputs necessary to sustain its own functioning apply to this phase. One must remember that even in the simplest of systems (a cycle of events executed by only two entities) both criteria apply to both entities. It is this fact that makes open negotiation between transacting entities an absolute must if both are to be assured of continued functioning.

Admittedly, the introduction of a medium of exchange such as money considerably complicates matters. Also, rarely would a cycle of events of any magnitude ever be executed by only two entities. Notwithstanding these points, the basic relationships that can be derived from system theory can still be profitably applied to organizations, groups, and individuals.

Assuming that system theory does provide an abstract basis for collaboration between educational technologists and organizational development specialists, one must still arrive at some concrete integrative device. One means for translating abstractions into concrete form is through the use of models. We think the system model provides the integrative device for collaboration between educational technologists and organizational development specialists.

The real utility of a model is probably a function of the extent to which people tend to use it as a guide for their activities. This suggests some general criteria for models such as simplicity, range of applicability, and adaptivity to the idiosyncrasies of the user. We feel the model that follows meets those criteria.

The model is partly based on one originally developed during the design of the Navy's Programmed Instruction Writer's Course at San Diego, which in turn was derived in part from the work of Kaufman (1964, 1968), and Banathy

(1968). The model has been used as an operational basis for instructional system development (Nickols, 1971); as a theoretical basis for determining organizational development strategies in the United States Navy (Cameron, Rush, and Nickols, 1972); and the creation of an action-planning intervention for OD efforts with naval units (Trygsland, Forbes, Guido, and Nickols, 1973). The problem-solving/planning process developed from the basic model is also being used in the development of affirmative action plans in the Navy's race relations and equal opportunity programs.

Rooted in system theory, the model has provided a framework around which navy educational technologists, organizational development specialists, and race relations experts have been able to collaborate in planned organizational change efforts. The model is based on a logical analysis of the functioning of an open-system. Briefly, the analysis states that system *action* is typified by the following stages:

(1) inputs are received, which combine with existing content to form

(2) resources; which are utilized to execute

(3) functions; which when completed, yield

(4) outputs; which, if acceptable, can be exchanged for

(5) inputs; (which close and reinitiate the cycle).

However, the *planning* of a system must proceed in reverse order (i.e., from the output stage and work backwards through functions, resources, and inputs). When one connects the planning and action phases, the result is a model (*Figure* 5).

SYSTEM MODEL

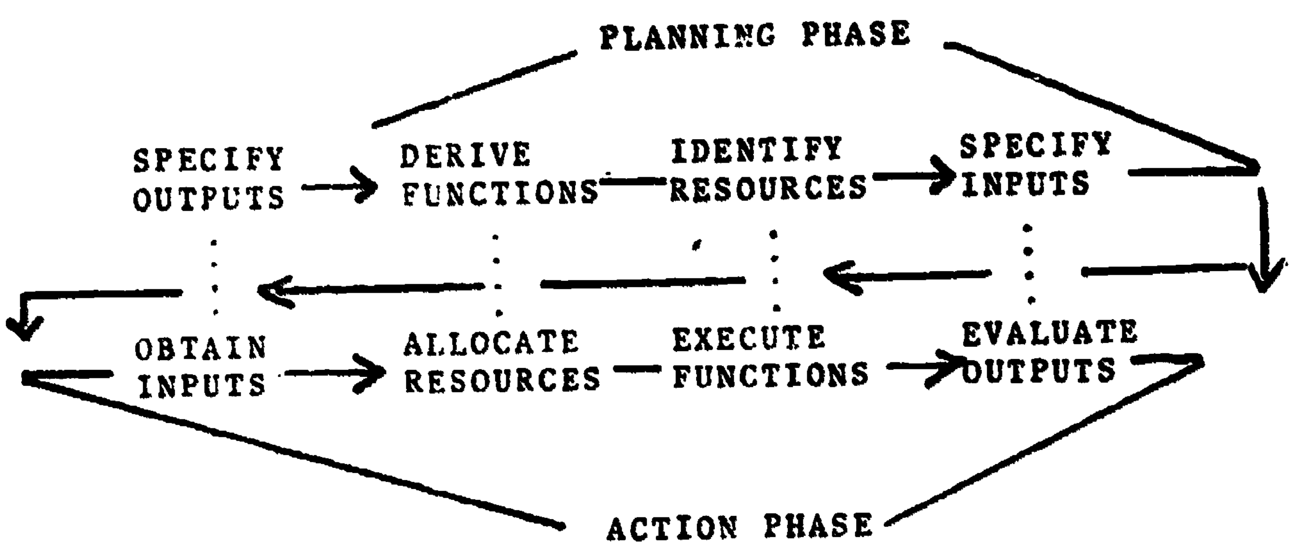

FIGURE 5

Although we will not describe the model in any grea detail, there are a few points to consider, particularly with respect to the planning phase.

Specify Outputs. Keeping in mind that an output is also an input, the specification of outputs must consider two factors: (1) the output capabilities of the producing entity; and (2) the input requirements of the receiving entities. Measurability is a critical issue, as agreement on intended outputs will be reached on the basis of the measures or criteria by which it will be possible to distinguish between acceptable and unacceptable outputs--NOT the words used to describe them.

- Derive Functions. Production functions must be derived from an analysis of intended outputs. Maintenance functions can be derived from an analysis of the nature of the entity. If the intended output is a frame for a programmed instruction text, and one of the criteria for frames is that all information presented must be relevant to the response to be made, then certain functions become apparent: (1) criteria for determining subject matter relevance must be established; (2) the information contained in frames must be checked against those criteria; (3) frames must be accepted or rejected, and if rejected; (4) either the frame, the criteria, or both must be modified until a match exists.

- Identify Resources. Again, a form of logical derivative analysis is used. If the function to be performed is one of typing, then obviously such resources as typewriters, typists, paper, etc., will be required.

- Specify Inputs. This is basically the difference between what the producing entity already has in the way of resources, and what it requires in order to produce the intended output(s). At this point, some idea of the reality of the system can be formulated. There oftentimes appears to be a discrepancy between what people say they want, and what they will in fact expend energy and resources to obtain. The issue of output validity comes into the open as one begins to negotiate for inputs on the basis of projected outputs.

We do not intend to imply that the system model provides a step by step process for guaranteed success. We know of no "cookbook" approaches that are effective. It is our intention to say that the system model can and has provided a "common frame of reference" for people with varied backgrounds, skills, and values. We consider the system model more as a guide and channeling device for the energies and talents of diverse specialists than as a set procedure for doing something. At least such is the manner in which the utilization of system theory and the system model was perceived by the authors in their application. That application is the subject of the final portion of this paper.

A Collaborative Effort in the United States Navy

It was through the development of the Command Action Planning System (CAPS) workshop at the Human Resource

Management Center, San Diego, that we first became aware of the potential inherent in collaborative relationships between educational technologists and organizational development specialists. That awareness came as the result of the apparent widespread applicability of a number of concepts and techniques from educational technology to an organizational change intervention such as CAPS.

In this section we will attempt to answer that following questions: What is CAPS? How was CAPS more effective as a result of collaboration that might otherwise have been the case? Finally, what results have been obtained with CAPS?

What is CAPS?

CAPS is basically a systemic problem-solving/planning process. In essence, CAPS takes a group of key leaders from a given organization and has them generate data relevant to current organizational issues; then processes that data through a problem-solving/planning procedure. CAPS has three major outputs: (1) a Command Action Plan; (2) participants with newly acquired skills; and (3) information about how the organization and its members function.

The Command Action Plan is typified by the following characteristics:

- diagnostic - the plan is based on data about current blocks and barriers to more effective organizational functioning.
- measurable - the plan contains objectives and standards for assessing the attainment of those objectives, including time-tied milestones.
- accountability - the plan must specify who is responsible for actually accomplishing any action steps and also specify management responsibilities.
- realistic - the plan is limited to those actions that can be implemented within current organizational resource constraints, and to those areas over which the organization exercises control.
- high probability of success - the plan is conceived of by key organizational leaders, and modified through advance troubleshooting.

Skill acquisition by the participants occurs in primarily four areas. The participants acquire the ability to (1) conduct rudimentary diagnoses of organizational and group functioning, (2) conduct effective meetings, (3) manipulate the CAPS process to identify and resolve organizational issues, and (4) utilize evaluation as a means of obtaining feedback for revision purposes as opposed to the administration of punitive measures.

Information generated during CAPS generally relates to how the organization is functioning (e.g., the content supplied by participants) and how the members function (e.g., the process by which they develop that content).

These then, are the three primary outputs of CAPS-a Command Action Plan, relevant organizational skills, and data pertinent to organizational and member functioning.

The sequence of events or functions whereby those outputs are attained can be broken into three major areas: (1) pre-workshop; (2) workshop; and (3) post-workshop.

- Pre-workshop functions consist of the following:

  - Senior Participant Pre-Brief. The senior participant is prepared for his role in CAPS, which is crucial to its success.

  - Staff Team Building. The personnel who will facilitate the workshop clarify expectations, make role assignments, and conduct facilitator training as required.

Actual functions executed during the formal workshop are:

- Workshop Opening. Introductions, senior participant's opening remarks, participant questions, administrative details, workshop ground rules, glossary of terms, and workshop overview.

- Problem Identification. Develop "I Want Lists," Present Lecturette on Effective Meetings, Develop "We Want Lists," Develop Problem Statements, Develop Objectives, and Specify Standards for Objectives.

- Problem-Solving/Planning. Identify Possible Courses of Action, Select Proposed Courses of Action, Troubleshoot Proposed Courses of Action, Write Action Plan Elements, and Integrate Action Plan Elements.

- Workshop Closing. Human Resource Management Center Input, Senior Participant's Closing Remarks, and Final Critique.

Post-workshop functions are:

- Summative Evaluation. Product outcomes are checked against pre-established criteria, senior participant prepares evaluation letter, staff critiques workshop, follow-up contact is scheduled and executed, and evaluation data is compiled.

- Modification and Revision. Evaluation data is analyzed, discrepancies identified, and modification proposals generated. Modifications are tested, then incorporated.

The CAPS process, as can be seen from the foregoing, is really nothing more than a systematic problem-solving process. The participants provide relevant content, and the staff guides the manipulation of the process. Together, they produce realistic solutions to organizational problems.

A number of resources are required to put on a CAPS, however, we do not intend to provide a complete inventory. Instead, we will comment on only two--the time frame for CAPS, and the participant structure.

Navy units are under a great number of constraints with respect to time. Operational commitments are heavy and reduced manning does not allow much time for any activity that does not obviously relate directly to mission accomplishment. CAPS was designed to fit what appeared to be the maximum time frame most units would allow for an unknown quantity such as CAPS (i.e., three days).

The participant structure (i.e., who attends) is one of the more significant aspects of CAPS. The workshop is designed to have four small groups from a given organization. The four groups represent each layer of the organization-top management, middle management, line management and the work force. Within each group can be found a lateral slice of the organizational level represented. Each group is also composed of both the formal and the informal leaders of the organization. Thus, the participant input addresses vertical and lateral, formal and informal aspects of the organization's structure.

It is difficult, if not impossible, to describe CAPS meaningfully through the use of abstractions. Hopefully, as we proceed through the remainder of this section, the image of CAPS in our readers' minds will more closely approximate the image we hold.

<u>How was CAPS more effective as a result of collaboration?</u>

Whether CAPS is more effective as a result of collaboration than would otherwise have been the case is a question that cannot be objectively answered in this paper. It is our subjective judgment that such is in fact the case. That judgment is based on the large number of concepts and techniques from educational technology which were successfully applied in the development of CAPS. It is our intention, at this point, to simply indicate what some of those concepts and techniques were, and to what end they were applied.

The derivation and specification of workshop outcomes and performance parameters benefited greatly from some of the concepts and techniques of educational technology. A modified version of the process proposed by Kaufman (1970, 1972) was used to derive the three-faceted needs assessment which formed the design basis for the workshop. The concept of behavioral objectives served to make the workshop outcomes measurable. Criterion-referenced testing was the key concept used in the design of evaluation measures and devices.

The development of workshop functions was accomplished through a variation of task analysis. The concept of fading, borrowed from programmed instruction, manifests itself in the built-in transfer of group leadership from staff to participants. Another programming technique, that of retrogressive chaining, was utilized as a sequencing aid in developing staging directions for staff performance. The concept of active and relevant responding serves as a screening device to ensure that no non-essential functions are ever inserted in the CAPS process.

The desired participant input for CAPS was identified using a reversed target population analysis. Target population analysis was also utilized to ensure that CAPS' materials are at the level of the participants. The concept of relevant subject matter was used to ensure that only the required information is contained in the facilitator's guide and participant handouts. Behavioral analysis found application in determining what that subject matter should be.

Evaluation and feedback makes use of both formative and summative evaluation. The requirement for field-testing and validation was lifted from the instructional system's developmental process and imposed *in toto* on the CAPS management process.

Many other examples could be listed, but those given will suffice to illustrate the broad applicability of concepts and techniques from educational technology to organization change efforts. It is important to note that it was system theory and the system model that allowed those applications to take place. System theory provided a language with which specialists from the two disciplines were able to communicate, and the system model provided the integrative device for their efforts.

Although we attribute the effectiveness of CAPS to the collaborative effort that took place, that collaboration is not the measure of effectiveness. The effectiveness of CAPS is to be found in the results produced by CAPS. Those results were both predictable, and surprising.

<u>What results have been achieved by CAPS?</u>

The predictable results have to do with the intended workshop outcomes. These intended outcomes and their actual results are as follows:

- Action Plan. At last count, some thirty-five CAPS workshops have been conducted for navy units, and in all thirty-five, the plan has been produced in accordance with specifications. In all but two or three of these instances, that action plan has also been successfully implemented by the command. These action plans have dealt with problems ranging from unsatisfactory living conditions aboard ship, through environmental pressures such as upcoming overseas deployment, to disruptive morale and disciplinary problems.

- Skill Acquisition. Skill acquisition is assessed in part by the participants ability to execute the CAPS process unaided. The last half day of a CAPS workshop usually provides this opportunity and participants inevitably demonstrate that ability. Follow-up contact with receiving units indicates that the skills required to execute CAPS are incorporated in the repertoires of participants in that they can be observed to be applying those skills to their daily work situations.

- The information generated about organizational and member functioning generally serves to identify hitherto unknown talents and resources in current organization staffing, and to provide the top manager (and others) with a microcosmic view of the entire organization in operation. The top manager has the opportunity to see his key subordinates in "live action," and most senior participants report that the experience alone makes the three days worthwhile.

- The staff has been particularly pleased with the results obtained in the attitudinal area or affective domain. An intended outcome of CAPS in this respect is stated as "an increased sense of potency" on the part of the participants. A considerable body of evidence, both objective and subjective, exists to indicate that the achievement of this outcome is reliably and effectively achieved.

In addition to the achievement of intended outcomes, CAPS has yielded some results that were not at all anticipated. A few of the more significant are as follows:

- The center at San Diego, which developed CAPS, was suddenly inundated with requests from fleet units for CAPS workshops.
- The Navy's race relations program picked up the CAPS process, shortened it and applied it to the development of affirmative action plans for equal opportunity. As a result, they report what they consider to be genuine progress in that area.
- CAPS became one of the cornerstones of the Navy's Human Goals Program. CAPS' success with fleet units resulted in its being made an integral part of the Human Resource Management Cycle which is now required of all fleet units on a periodic basis.
- Spin-off products of CAPS, as reported by receiving units in follow-up contacts, include improved vertical and lateral communication within the organization (which we attribute to the "shared experience" of CAPS), better interpersonal relationships in and between organizational layers, and improvements in overall morale and organizational performance.

The CAPS phenomenon appears to us to have been highly successful for basically two reasons. The first reason is that the entire approach was systemic in nature (i.e., environmental demands were identified, outputs specified, functions derived, resources identified, and the process then implemented and modified until performance was satisfactory). The second reason is that the collaboration that occurred between the educational technologists and the organizational development specialists allowed a comprehensiveness of effort that would have otherwise been impossible. The collaboration appears to have been made possible by the cross-disciplinary aspects of system theory and the integrative capabilities of the system model.

The basic similarities between educational technology and organizational development provide a powerful rationale for collaboration. That we see the two disciplines essentially in the same business, that of systematically changing human behavior, seems to us to portend an environmental requirement to do so. System theory and the system model appear to supply the language and the technology through which such efforts could be effected. Our own experience indicates that such attempts are well worth the expenditure of resources that is required.

Our basic expectation in writing this paper has been that it would spark the interest and imagination of others, who might then attempt similar ventures. We feel the potential benefits to be derived far outweigh any associated costs. If even one such venture is undertaken as a result of this paper, we will consider its writing to have been a success.

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