

Educational Technology

The Development of a Concept

Alan Januszewski

Foreword by Andrew R. J. Yeaman

2001
Libraries Unlimited, Inc.
Englewood, Colorado

Chapter

2

1963—The Official Inception

The influences of science, engineering, and the AV education movement on educational technology can be seen in the formal definitions. The first in a series of three officially sanctioned definitions of educational technology was developed by DAVI's Commission on Definition and Terminology and supported by the TDP. It was published as a monograph by DAVI in association with the NEA in 1963:

Audiovisual communications' is that branch of educational theory and practice primarily concerned with the design and use of messages which control the learning process. It undertakes: (a) the study of the unique and relative strengths and weaknesses of both pictorial and nonrepresentational messages which may be employed in the learning process for any purpose; and (b) the structuring and systematizing of messages by men [sic] and instruments in an educational environment. These undertakings include the planning, production, selection, management, and utilization of both components and entire instructional systems.

Its practical goal is the efficient utilization of every method and medium of communication which can contribute to the development of the learner's full potential (Ely, 1963, pp. 18-19).

Footnote five was part of this definition. It read: "The audiovisual communications label is used at this time as an expedient. Another designation may evolve, and it does, it should then be substituted" (Ely, 1963, p. 18).

Audiovisual communications was the label used to describe the field in 1963, it was evolving from the AV education movement to educational technology. After, the leadership of the AECT acknowledged the 1963 definition as the first formal definition of educational technology, even though this statement was intended as a definition of audiovisual communications (AECT, 1977).

Theory and the Conceptual Shift

Three major ideas contributed to the formulation of this definition of educational technology as a theory. These three ideas demonstrate "conceptual shifts" or "conceptual reorientation" of prior views of the field. To understand how this definition of educational technology differed from prior views of the audiovisual field, one must understand the rationale supporting it. To understand the rationale, the commission stated that "it is necessary to reorient existing concepts which characterize the audiovisual field" (Ely, 1963).

The three major ideas were identified in the rationale for the definition as: (1) the use of a "process" concept rather than a "product" concept; (2) the use of the terms "messages" and "media-instrumentation" rather than materials and machines; and (3) the introduction of certain elements of learning and communication theory (p. 19). Understanding these three conceptual shifts and how they acted on one another is crucial to understanding the idea of educational technology in 1963.

The commission believed that the traditional view of the field was product based. "The traditional product concept in the audiovisual field," the commission stated, "views the 'things' of the field by identifying machines, use of particular senses, and characteristics of materials by degrees of abstractness and/or concreteness" (p. 19). A technological concept of the AV field called for an emphasis on process.

The commission preferred a process concept of the field that included "the planning, production, selection, management, and utilization of both components and entire instructional systems" (p. 19). This concept also emphasized "the relationship between events as dynamic and continuous" (p. 19). This process view made the product concept of educational technology untenable in a technological age.

To distance educational technology from its former product orientation, the commission chose not to use the terms "materials" and "machines" in its definition. Instead, it opted for the terms "messages" and "instruments." Materials and machines were identified as "things" or products. The commission argued that materials and machines were interdependent elements. "A motion picture and projector are inseparable as are all other materials requiring machines for their use" (p. 19). One was of little practical use without the other.

The commission used the concept of "media-instrumentation" to explain "instruments." "Media-instrumentation," the commission said, "indicates the transmission systems, the materials and devices available to carry selected messages" (p. 20). The concept of media instrumentation also included the people who used the instruments as well as the transmission systems in the educational environment. The thought that both people and instruments comprised media instrumentation was based in the concept of the man-machine system.

Finn (1960b), Bern (1961), and Hoban (1962) had advanced the man-machine-system view of the AV process. All three were associated with the TDP and the monograph produced by the DAVI Commission on Definition and Terminology. Finn had secured the federal grant that funded the project; Bern was a member of the commission that wrote the definition; and Hoban was a consultant to the commission. Sydney Eboch, also a member of the 1963 commission, used the term "media-instrumentation" instead of the term "man-machine system" in a conceptual study of the field (1962).¹ The term "media-instrumentation" and the term "man-machine system" were used interchangeably in the literature of the field during this period. Man-machine system will be used here because, ultimately, it was more popular.

Notes

1. The phrase “man-machine system,” despite current discomfort with gender insensitivity, has been retained for the following reasons: (1) it is the phrase that was used by the writers such as Finn and Hoban in the field at the time; (2) reasonable substitutions, like “person-machine” connote a degree of humanity that was not intended or was implied by the use of “man-machine,” a more sterile phrase; and (3) the “man” in the man-machine was intended to refer to the species rather than a specific gender.
2. I chose to use the terms “social” and “behavioral” to classify the communication frameworks rather than “interpersonal communications” and “mass communications,” which is a common classification in this field. My reasoning is that some theories or communication models, like Gerbner’s, could be classified as either an interpersonal or a mass communication model.
3. This, in spite of the fact that B. F. Skinner is generally credited with having coined the phrase “teaching machines.”

Chapter 3

1972—The Struggle for Identity

In 1972, the AECT defined the term “educational technology” rather than the term “audiovisual communications” as follows: “Educational technology is a field involved in the facilitation of human learning through the systematic identification, development, organization and utilization of a full range of learning resources and through the management of these processes” (Ely, 1972, p. 36).

The growth and development of the AV field in the early 1960s prompted the Executive Committee of DAVI to commission a group to investigate the need to change its name (Ely, 1965). Four possible courses were identified: (1) retain the audiovisual label, (2) change the name to educational communications, (3) change the name to learning resources, and (4) change the name to instructional technology or educational technology. In 1965, at the DAVI convention held in Milwaukee, Wisconsin, formal discussions were held about the name change, and in 1970, the organization officially changed its name to the Association for Educational Communications and Technology (AECT). However, the field came to be known by the shortened term “educational technology.” This

identity change occurred despite the fact that the organization's title also included the term "educational communications" (Eraut, 1985). Although the writers of the 1963 definition allowed for a simple change in the label if necessary, other developments in the field also contributed to the need for a new definition.

In producing the first official definition of the field in 1963, the commission's intent was "to define the broader field of instructional technology which incorporates certain aspects of the established audio visual field" (Ely, 1963). Prominent individuals involved with audiovisual education such as Finn (1957; 1960a) and Hoban (1962) had previously used the term "technology" when referring to the activities of the audiovisual field. Considering the 1963 commission's intention "to define the broader field of instructional technology" (p. 3), the acknowledgment in footnote five to the 1963 definition, "that should another label for audiovisual communications evolve that it be substituted" (p. 18), and since prominent individuals in the field had introduced and frequently used the term "technology," it was not surprising that the AV field soon changed its name to include instructional or educational technology.

Donald Ely (1973, 1982) observed that the word "control" in the 1963 definition was problematic for many individuals involved with educational technology. Ely explained that "the strong behavioral emphasis at the time seemed to call for the word 'control'" (Ely, 1982, p. 3). He noted that the word "facilitate" was substituted by many professionals "to make the definition more palatable" (1973, p. 52). Ely described a desire to change the definition of educational technology based on a reaction to certain word choices in the 1963 definition. Ely identified a "metaphysical pathos" on the part of some of the members of the field to the term "control." Perhaps equally important was the desire by members of the field to move away from a behaviorally based psychology, which used language such as control, to a more humanistically based psychology, which used language such as facilitate (Finn, 1967).

Critics of the 1963 Definition

James Knowlton, a faculty member at Indiana University, was a consultant for the 1963 Commission on Definition and Terminology. In an essay that reviewed the 1963 definition, he stated that the definition itself was "couched in semiotic terms" (1964, p. 4) but that the conceptual structure used in the rationale for the 1963 definition "was couched in learning theory terms [and] this disjunction produced some surprising anomalies" (p. 4). Knowlton's argument was based on a need for conceptual and semantic consistency in the definition. Knowlton argued that failing to pair the language of the definition with the language of the conceptual structure in the rationale resulted in a general lack of clarity about this new concept. This lack of clarity in turn caused confusion in the direction of research and practice in the field.

Robert Heinich (1970) saw a need to redefine the field of educational technology for two reasons. First, he was critical of the "communications" based language used in the 1963 definition. Heinich argued that this language was too complicated

for school-based personnel. Second, Heinich argued that the power to make many of the decisions regarding the use of technology in schools should be transferred from the teacher to the curriculum planners. Heinich's argument for changing the definition was based on both linguistic concerns and changes in the functions of practitioners in the field. Heinich promoted a technocratic approach to schooling, an approach where specialists would decide when and where technology would be used. This position was different than that discussed in the rationale for the 1963 definition. In the rationale for that definition, teachers were viewed as partners of educational technologists rather than as their subordinates.

Kenneth Silber (1972a) introduced a "system" that combined ideas from the open classroom movement with some concepts of educational technology. Like Heinich's scheme, Silber's "Learning System" (p. 19) suggested changes in the roles of the teacher and the educational technologist. Unlike Heinich, however, Silber sought to put many decisions about using educational technology into the hands of the learners themselves. Educational technologists would produce a variety of programs and designs that learners would use or adapt to meet their own "long-range learning destination" (p. 21). Silber's position was that the teacher should be more a "facilitator of learning" and less a "teller of information." As a member of the group that wrote several early drafts of the 1972 definition, Silber succeeded in including changes in many of the roles and functions of the practitioners of the field as part of that definition.

The report of the Presidential Commission on Instructional Technology (1970) stated that instructional technology could be defined in two ways:

In its more familiar sense it means the media born of the communications revolution which can be used for instructional purposes alongside the teacher, textbook and blackboard. In general, the Commission's report follows this usage . . . the commission has had to look at the pieces that make up instructional technology: television, films, overhead projectors, computers and the other items of "hardware and software" (p. 19).

The second and less familiar definition . . . (Instructional technology) . . . is a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication and employing a combination of human and non human resources to bring about more effective instruction (p. 19).

Educational technology professionals responded to this report in a special section of *AV Communications Review* (Snider, 1970). The professional reviews of the government report were at best mixed. Donald P. Ely of Syracuse University thought the commission's overall effort was commendable given its lofty charge. Earl Funderbunk, of the NEA, called the recommendations a balanced program. But

David Engler of McGraw-Hill disapproved of the commission's effort to relegate the process-based definition of instructional technology (educational technology) to some "future" role. And Leslie Briggs of Florida State University accused the commission of providing a "two headed image" (Briggs in Snider, 1970, p. 313) of instructional technology (educational technology) by stressing both a hardware and a process orientation of the concept.

The contributors to this special section were generally dissatisfied with the "two headed" orientation of educational technology provided by the commission's report, primarily because this orientation might cause confusion among the potential client groups. They viewed the hardware orientation favored by the Presidential Commission as a setback for the profession. It meant a return to the "audiovisual aids" and "technology as machine" conceptions of educational technology. This orientation also implied the de-emphasizing of research and theory. To account for all of these developments related to the idea of educational technology, professionals in the field believed that a new definition was needed.

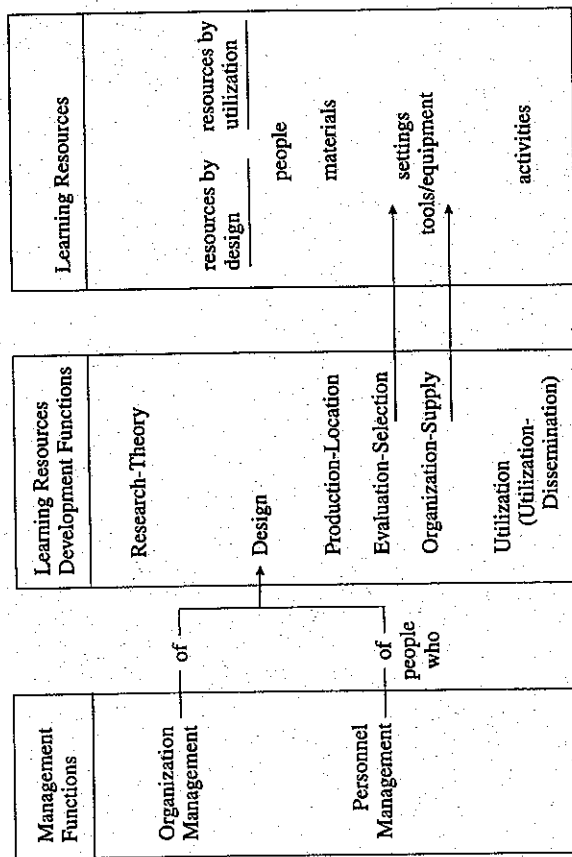
A New Direction

Three concepts are central to the 1972 definition that characterized educational technology as a field: a broad range of learning resources, individualized and personalized learning, and the use of the systems approach (Figure 3.1). "It is these three concepts, when synthesized into a total approach to facilitate learning, that create the uniqueness of, and thus the rationale for, the field of educational technology" (Ely, 1972, p. 37). Examining these three concepts, along with the idea of educational technology as a "field," is crucial to understanding the AECT's 1972 definition.

It is particularly important to recognize that different interpretations of these three concepts would result in differing conceptions of the field of educational technology. Differing interpretations would also have the more visible effect of resulting in substantially different products and processes developed in that field. The different interpretations of these concepts were due in large part to differences in educational philosophy and goals. The writers of the 1972 definition seemed to be aware that the major concepts could be interpreted differently, and they seemed to be interested in including individuals with different philosophical backgrounds in the field.

The writers of the 1963 definition and its supporting rationale were less concerned with accommodating divergent educational philosophies than were the authors of the 1972 definition. Perhaps this was because the 1963 definition was the first formal attempt to define educational technology. Such an undertaking was formidable enough. Perhaps it was because the writers of the 1972 definition paid more attention to the discussions of educational philosophy in the literature from the rest of the field of education than was the case in 1963. Perhaps it was because the 1963 definition viewed educational technology as a theory and, potentially, as an educational philosophy itself. There is no doubt, however, that by 1972 the authors chose to consider educational technology a field of study rather than as a specific theory.

Figure 3.1. Functions of Educational Technology



From: Association for Educational Communications and Technology (1972). *The field of educational technology: A statement of definition. Audiovisual Instruction*, 17, 36-43.

The Field

The decision to refer to educational technology as a field of study rather than a theory or a branch of theory did at least four things: (1) it acknowledged that there was more than one theory of educational technology, more than one way to think about the role of educational technology; (2) it promoted philosophical discussions by members of the profession; (3) using the word "field" encompassed both the "hardware" and "process" orientations of instructional technology reported by the Presidential Commission (1970); and (4) it allowed a definition based on the "tangible elements" (Ely, 1972) that people could observe. This meant defining educational technology by what educational technologists actually did or how they functioned in their profession rather than as an abstract concept, as in the case of the 1963 definition, where educational technology was viewed as a theory.

The concept of "field" has been difficult for educational technologists. Like many areas of study within education, it is very difficult to discuss educational technology without using the word "field" as a descriptor. Certainly AV professionals used the term to describe the "audiovisual field" before either instructional technology or educational technology were ever used. The 1963 definition frequently used "field" (Ely, 1963) to move the discussion along, even though it was argued that

8. This is not unlike the semantic problems that the educational technology field faces regularly.
9. The literature of educational technology contains much discussion about the open classroom movement and its proponents. Also prevalent are commentaries defending educational technology from charges that it is a dehumanizing way to instruct. The latter argument revolves around statements like “humanism is the use of technique to attain human goals” (Rosove, 1972).
10. During this time, the systems approach was frequently equated with a systematic approach in the literature of the educational technology field. However, there were also articles that distinguished between the systems approach and a systematic approach. Almost all of these studies point out that the systems approach is systematic, but that it has other attributes as well.
11. Lida Cochran was also the spouse of Lee Cochran, a professor of education at the University of Iowa, the organizer of the Lake Okoboji leadership conferences, and an acknowledged leader of the early educational technology movement. I realize that including this particular footnote runs the risk of diminishing or devaluing the contribution that Lida Cochran has made to the field of educational technology. I sincerely hope that such an inference is not made. I have included this note as a way to offer yet another set of intellectual connections in the field. Lida Cochran was also the mother of Dennis Myers, who became a professor of Instructional Technology at the University of Toledo.

Chapter 4

1977—The Systemization of Educational Technology

In 1977, the AECT changed its definition of educational technology from:

Educational technology is a field involved in the facilitation of human learning through the systematic identification, development, organization and utilization of a full range of learning resources and through the management of these processes (Ely, 1972, p. 36), to its third definition of educational technology:

Educational technology is a complex, integrated process, involving people, procedures, ideas, devices and organization, for analyzing problems and devising, implementing, evaluating and managing solutions to those problems, involved in all aspects of human learning. In educational technology, the solution to problems takes the form of all the *Learning Resources* that are designed, selected, used, or all three, to bring about learning; these resources are identified as Messages, People, Materials, Devices, Techniques, and Settings. The processes for analyzing problems, and devising, implementing, and evaluating solutions are identified by the *Educational Development Functions of Research Theory, Design, Production, Evaluation Selection, Logistics, Utilization, and Utilization Dissemination*. The processes of directing or coordinating one or more of these functions are identified by the *Educational Management Functions of Organizational Management and Personnel Management* (AECT, 1977, p. 1).

Conceptual Changes for the 1977 Definition

The *Definition of Educational Technology* (AECT, 1977) was a 169-page book that was intended to do two things: (1) systematically analyze the complex ideas and concepts used in the educational technology field; and (2) show how these concepts and ideas related to one another (Wallington, 1977). This publication included the definition of educational technology (which is 16 pages of the text), a history of the field, a rationale for the definition, a theoretical framework for the definition, a discussion of the practical application of the intellectual technique of the field, the code of ethics of the professional organization, and a glossary of terms related to the definition.

A substantial portion of the analysis in this book was predicated on a conceptual difference between the terms "educational technology" and "instructional technology." Understanding how the authors of the 1977 definition viewed the relationship between instructional technology and educational technology is essential to understanding the 1977 definition and its theoretical framework. The basic premise of this distinction was that instructional technology was to educational technology as instruction was to education. The reasoning was that, because instruction was considered a subset of education, then instructional technology was a subset of educational technology (AECT, 1977). For example, the concept of "educational technology" was involved in the solution to problems in "all aspects of human learning" (p. 1). The concept of "instructional technology" was involved in the solution to problems where "learning is purposive and controlled" (p. 3).

In addition to the distinction between educational technology and instructional technology, at least two other complex conceptual developments were also undertaken by the authors of the 1977 definition. These developments were interrelated. The developments were: (1) the 1977 definition of educational technology was called a "process" (p. 1). The authors intended the term "process" to suggest that educational technology could be viewed as a theory, or a field, or a profession. And (2) the systems concept was infused throughout the entire definition statement and in all the major supporting concepts for the definition in both its descriptive and prescriptive senses. The authors tied these two conceptual developments together by saying that the use of the systems concept was a process (AECT, 1977).

The systems approach was one of the three major supporting concepts for the 1972 definition. In 1977, the systems approach was no longer a major supporting concept for the definition. It had become the basis for the definition itself. In their effort to reinforce the process conception of educational technology, the leadership of the field now assumed that all major supporting concepts of the definition were tied to, or to be viewed in light of, the systems approach.

The three major supporting concepts of the 1977 definition were learning resources, management, and development. Learning resources were any resources utilized in educational systems. The 1977 writers called the descriptive use of the systems concept "resources by utilization." The authors called resources specifically designed for instructional purposes, a prescriptive use of the systems approach, "resources by design" or "instructional system components."

The concept of "management" was often used as a metaphor for the systems approach (Heimich, 1970). Like the concept of learning resources, management could be used in a descriptive fashion to describe administrative systems, or in a prescriptive way to prescribe action. The term "instructional development" was frequently used to mean the "systems approach to instructional development" or "instructional systems development" (Twelker, et al., 1972). The fact that the management view of the systems approach to instruction often included an instructional development process, and the fact that instructional development models frequently included management as a task to be completed in the systems approach, further intertwined the systems concept with the process view of educational technology.

The Process of Educational Technology: Theory, Field, and Profession

The notion that educational technology was a process was not new when the 1977 definition was written. "Process" was one of the three major supporting concepts incorporated into the rationale of the 1963 definition (Ely, 1963). The belief that educational technology was a process was also one of the major reasons why the leadership of the profession tended to reject the report of the Presidential Commission on Instructional Technology (1970), which focused on the hardware of the field in its first definition of instructional technology.

Chapter 5

1994—The Full Circle

By 1994, the definition of educational technology had nearly come full circle. The definition produced in 1994 read: "Instructional technology is the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning" (Seels and Richey, 1994, p. 1).

There are no new concepts included in the 1994 definition. What was new was the identification of many theoretical and conceptual issues in the explanation. The 1994 definition was intended to be much less complicated than the 1977 one. The extent to which the writers were successful can be judged in part by reviewing the criticisms of the 1977 definition.

Criticisms of the 1977 Definition

The attempt by the writers of the 1977 definition to show the congruence of educational and instructional technology revealed a conceptual problem for the field. The definition of educational technology, which was concerned with "all aspects of human learning" (p. 1), had become so broad that some individuals in the field pointed out that there was no difference between educational technology and the curriculum, school administration, or teaching methods (Ely, 1982). Saettler (1990) wryly pointed out that the definition had become everything to everybody, and he dubbed it the "omnibus definition."

There were also serious flaws in the reasoning and the conceptual interpretations used in the theoretical framework and rationale for the 1977 definition. Establishing the difference between education and instruction, the authors argued that "education, then, includes two classes of processes not included in instruction: those processes related to the administration of instruction . . . and those processes related to situations in which learning occurs when it is not deliberately managed" (p. 56). One of the examples of learning not being deliberately managed, which was provided in the discussion, was "incidental learning" (p. 56). It was reasonable for the authors to argue that learning that was not deliberately managed, or "incidental learning," was part of the concept of education (Januszewski, 1997).

However, the definitions of "technology" by Galbraith, Hoban, and Finn, which are used by the authors of the 1977 definition to discuss the term "technology" as it related to the concept of educational technology, all included the ideas of organization, management, and control (AECT, 1977). Organization, management, and control were considered to be critical characteristics of technology by the writers in 1977. But the ideas of management, organization, and control were contrary to the idea of "incidental learning" and "learning that was not deliberately managed." Education, at least as it was distinguished from instruction included in the rationale of the 1977 definition, did not seem compatible with technology. It is difficult to conceive of a technology of the incidental, unmanaged, and unintended. The gains made in organizing the framework of the concept of educational technology by distinguishing between education and instruction were lost when education was paired with technology (Januszewski, Butler, and Yeaman, 1996).

Another problem with the discussion of educational technology presented in the 1977 definition and rationale was the relationship of educational technology to "theory." There are three ways in which the concept of theory is related to educational technology in the 1977 definition statement: (1) there is the thought that educational technology was a "theoretical construct" (p. 18, 20, 24); (2) there is the notion that educational technology itself was "a theory" (p. 2, 135, 138); and (3) there is the thought that the "definition of educational technology was a theory" (p. 4, 20, 134). To some degree, all three of these discussions of theory and educational technology are accurate, but they cannot be used interchangeably as they are in this definition. A theoretical construct is not the same as a theory. Nor is it the case that, because a definition of a concept is a theory, the concept itself is a theory.

The word "theory" has been used in at least four ways in the literature: (1) the law-like theory of the hard sciences; (2) theories that are supported by statistical evidence; (3) theories that identify variables influencing the field of study; and (4) the theory as a systematic analysis of a set of related concepts (Kliebard, 1977).

It is the fourth sense of theory that is of interest to this analysis. Systematic analyses of any abstract concept can be said to be theories of that concept. Referring to educational technology as a theoretical construct, or a theory, or calling the definition of educational technology a theory may be accurate if it includes a systematic analysis of the concept of educational technology.

The writers of the 1977 definition provided criteria for theory that was not the theory as a systematic analysis of related concepts. They provided criteria for a view of theory that was attempting to establish general principles and predict outcomes (AECT, 1977). This approach was substantially different from the usage of the word theory in the 1977 definition statement. Further confusion arises because of the authors' claim that educational technology did indeed meet the criteria for being a predictive theory (Januszewski, 1995).

Theory is a word that many people recognize as having several meanings. The writers of the 1977 definition intended a specific meaning of the term "theory" by providing a set of criteria for that meaning. They wanted to make theory a technical term. However, even if the authors demonstrated their case for meeting the criteria that they imposed (and they did not), the criteria they had established did not match the understanding of the usage of the term "theory" that was implied by the authors in the entire definition statement (theory as a systematic analysis of related concepts).

Certainly "educational technology" is a theoretical construct. "Educational technology" may also be considered a theory, depending on what exactly is intended by the word theory. The 1977 definition is a theory, a theory about the abstract concept of "educational technology." But because the definition of the concept of educational technology may be a theory of educational technology, it does not make the concept of educational technology itself a theory. This is similar to saying that a definition of the concept of democracy may be a theory of democracy but that the concept of democracy itself is not a theory.

Perhaps the biggest problem with this systematic treatment of the concepts provided in the 1977 definition was that few involved in the field adopted it. Many in the field adopted only portions of the definition (e.g., Gustafson, 1981). Scholars cited certain parts of the definition and its supporting statements to make erudite points about the field of educational technology (e.g., Gentry, 1987), but reading the literature reveals that the whole conceptual framework provided in the 1977 definition, specifically the part intended to distinguish educational technology from instructional technology, was not widely adopted by the membership of the field (Seels and Richey, 1994).