Progress Toward a General Theory of Instruction?

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A t ASCD's Annual Conference in 1963, Jerome Bruner proposed four criteria for a theory of instruction:

1. It should specify the experiences which most effectively implant in the individual a predisposition toward learning.

2. It must specify the ways in which a body of knowledge should be structured so that it can be most readily grasped by the learner.

3. It should specify the most effective sequences in which to present the materials to be learned.

4. It should specify the nature and pacing of rewards and punishments in the process of learning and teaching (Bruner, 1966, pp. 40-41).

It is difficult to know what influence Bruner's statements had upon educators, but judging by subsequent heightened activity, the effects were considerable. In 1964, the ninth Curriculum Research Institute focused on instructional theories and the proceedings were published in *Theories of Instruction* (Macdonald and Leep-

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er, 1965). A further attempt was made in 1968 to produce a position paper on criteria for developing theories of instruction. The ten criteria, published in Ira Gordon's *Criteria for Theories of Instruction*, were:

1. A statement of an instructional theory should include a set of postulates and definitions of terms involved in these postulates.

2. The statement of an instructional theory or sub-theory should make explicit the boundaries of its concern and the limitations under which it is proposed.

3. A theoretical construction must have internal consistency—a logical set of internal consistency, a logical set of interrelationships.

4. An instructional theory should be congruent with empirical data.

5. An instructional theory must be capable of generating hypotheses.

6. An instructional theory must contain generalizations which go beyond the data.

7. An instructional theory must be verifiable.

8. An instructional theory must be stated in such a way that it is possible to collect data to disprove it.

9. An instructional theory must not only explain past events but also must be capable of predicting future events.

10. At the present time, instructional theories may be expected to represent qualitative synthesis (Gordon, 1968, pp. 16-23).

Cawelti, writing in *Educational Leadership* in 1974, exhorted readers that theories of instruction proposed in the 1960s needed to be taken up by teachers and university scholars. Instead of listing further criteria for theory building he proposed eight component areas as the take-off points for educators to develop hypotheses in their endeavors to produce a general instructional theory. His eight component areas were:

Human Growth and Development
Motivation
Organization
Concept Choice and Sequence
Material Selection
Learning Strategies
Learning Theory
Environment (Cawelti, 1974, p. 429).

Figure 1. Integrated Criteria for a General Theory of Instruction*

I. Theoretical Characteristics

A. Characteristics and organization of the components. A theory of instruction should consist of a set of:
  (1) logically, and
  (2) theoretically related (Bugelski)
  (3) internally consistent (Gordon) statements (axioms, corollaries, postulates) (Gordon), arranged in a
  (4) hierarchical or systematic order, so that
  (5) the higher level constructs integrate the constructs below (Gordon).
  (6) These statements should be as few as possible (Bugelski) to cover all of the theories and findings relevant to the area specified (Cawelti, Bruner) and should be
  (7) clearly defined (Gordon).
  (8) If possible, these statements should be quantitatively related, as well as
  (9) qualitatively related (Travers, Gordon).

B. Boundaries
  The boundaries or limitations of concern of the theory should be stated, including such limitations as theories of learning and development subscribed to, philosophies adhered to, characteristics of the students and organizations deemed suitable (Gordon). The most general theory will have as few such limitations as possible (Hosford, Travers).

II. Empirical Characteristics

The statements included (except for axiomatic statements and those noted in IIB(3) should relate to existing empirical evidence in the following manner:

A. Testability
  The statements should be:
  (1) capable of being easily and clearly restated in the form of hypotheses (Gordon) about which
  (2) evidence can be collected to either verify (Gordon) or refute them (Gordon).

B. Support
  The statements should have
  (1) demonstrable empirical support (Gordon, Travers) and
  (2) predictive value in similar situations (Gordon).
  (3) However, at the present time it may be necessary to include as yet untested hypotheses to meet the completeness criteria noted in section IA above.

III. Prescriptive Characteristics

To be of practical use, a theory of instruction should contain or clearly imply a series of prescriptive statements, specifying how best to obtain given ends, if they are desired. Areas to be covered include strategies, sequencing, materials, reinforcements, motivation (Bruner, Bugelski).

* The respective contributions of criteria or statements by Gordon, Bruner, Cawelti, Travers, Hosford, and Bugelski are indicated in parentheses, where appropriate.

During the same period of time, Philip Hosford began building upon the criteria developed by Bruner and Gordon. He produced explicit definitions about instruction and teaching, a basic rationale, and a number of axioms, laws, rules, and postulates which purportedly represented a general theory of instruction (1973, 1975). While this was no mean undertaking, some basic deficiencies remained. For example, Hosford did not indicate hierarchical relationships between his rules and postulates. Furthermore, he suggested that his postulates were value-free, yet took a definite child-centered, nondirective teaching stance in describing many of them.

Other educators have proposed criteria, components, and postulates for theories of instruction, such as Travers (1966), Bugelski (1971), Stiles (1974), and Snelbecker (1974), but none of these writers went into the detailed analysis provided by Hosford.

Perhaps we need to reflect upon the progress which has been made toward useable theories of instruction. Why is it that Hosford's book (1973) on a general theory of instruction is the only detailed volume to date? Is Hosford's theory in a useable format for practitioners to implement? Are there other deficiencies in his theory apart from the lack of hierarchical and value-free statements?

Statements Integrated

Figure 1 integrates the statements and criteria suggested by the writers mentioned previously and, at the same time, removes at least some of the deficiencies noted about their theories. The first set of criteria outlined in Figure 1 are concerned with the organization of any theory of instruction that is proposed. The elements of the theory should relate logically, theoretically, and be internally consistent. Thus elements under a sequencing heading, for example, should all be concerned with sequencing, with the most inclusive elements at the top. While differing theoretical orientations may be included in the theory, such as humanistic concerns about the classroom climate and learning theory concerns about reward and punishment, care must be taken to integrate these concerns, perhaps through higher-level elements, rather than simply juxtaposing seemingly contradictory groups of elements.

Following from the above, the elements need to be organized in some meaningful manner. One possibility would be to develop a pyramid-shaped structure, with the elements becoming more abstract and inclusive as one moves from the bottom up. Another option would be to use the "feed-back loop" approach so popular among the "systematic instructional design" group (Rowntree, 1974). Whatever system is used, it should be a natural outgrowth of the development of the theory, rather than a forced-fit.

The call for both parsimony and completeness may seem somewhat contradictory. However, any successful theory must resolve the tensions between the vast amount of educational theory and research available and the need to condense this material into a useable form.

The need for clear definitions and boundaries may be too obvious to need further justification. However, both of the existing general theories of instruction (Hosford, 1973; Bugelski, 1971) contain vague and undefined terms. Hosford, at least, is quite clear about the boundaries of his theory: "They hold for teaching toward any goal except one—the production of irrational behavior" (1973, p. 57).

The second set of criteria concern the empirical characteristics necessary in an acceptable theory of instruction. Generally speaking, all of the elements should be capable of being tested, and available empirical evidence should support each element. Hosford in particular has a tendency to include elements that would be very difficult either to prove or disprove, such as: "The silent curriculum gains momentary definition during teacher-learner interactions" (1973, p. 99).

While providing empirical support for each element could well prove a considerable task, Bugelski attempted to do so for each of his 59 elements. One function of a proposed theory of instruction should be to spur further development and refinement in theory building. Such impetus is unlikely to be forthcoming from a theory which cannot be tested or which does not attempt to provide support for its postulates. Likewise, an untestable

or unsupported theory is unlikely to win enough backing from educational opinion leaders to be widely adopted.

On the other hand, it may be necessary to include *some* difficult to test or minimally supported elements, particularly at higher-order levels, to clarify the assumptions being made or to integrate otherwise isolated elements. Similarly, although Travers (1966) and Gordon (1968) express the hope that eventually theories of instruction will be able to make quantitative statements, such as: "five standard reinforcement units result in one standard unit of learning," both admit that such exactitude is presently beyond our abilities. However, qualitative statements, such as "rewarded behavior is more likely to reoccur," can and should be included.

The final criteria are in accordance with Bruner's (1966) call for a theory *for* teaching. While using a "teachers should" approach would not do justice to the wide variety of teacher aims and objectives, statements can be formulated indicating that a given result can be obtained by following a particular procedure.

Again, if this criterion is not met, it is unlikely that the theory will have much impact on actual teaching practice.

Attempts to produce a general theory of instruction should not and need not be left to stagnate. Despite efforts in the mid 1960s and 1970s to produce criteria and/or axioms and postulates for a general theory, little has recently appeared in the literature.

It is one thing to pinpoint inadequacies in general theories of instruction which have been published, but quite another to produce an alternative which is not also deficient in some ways. Our alternative model, based on theoretical, empirical, and normative criteria, is currently being applied to several curriculum areas in an attempt to refine it. ∎

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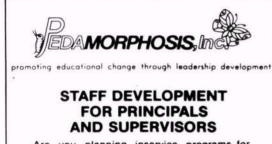
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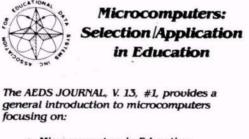
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