

A Critique of the Research on Learning Styles

Like the blind men in the fable about the elephant, learning styles researchers tend to investigate only a part of the whole and thus have yet to provide a definitive picture of the matter before them.

The primary objective for the study and application of learning styles has been to improve the immediate and long-term results of general teaching-learning episodes (for example, Biggs 1988, Papalia 1978, Smith and Renzulli 1983). Specifically, the field claims to influence four aspects of teaching and learning in schools: (1) curriculum design (Popkewitz et al. 1982, Wang 1980); (2) instructional methods (Corno and Snow 1986); (3) assessment methods; and (4) student guidance (Snow 1986). These claims for affecting the primary processes of schooling are indeed big. How good are they? Is this a new elephant we are blindly examining, or has the old beast just rearranged itself?

General Problems

The operationalization of learning style theory encompasses three pervasive general problems: (1) confusion in definitions, (2) weakness in reliability and validity of measurements, and (3) identification of relevant characteristics in learners and instructional settings.

The first issue is the bewildering array of definitions surrounding learning style conceptualizations. There is wide variation in the scale and the scope of learning, in school achieve-

ment, and in other behavior predicted by the various learning style concepts. Some definitions claim to predict only an individual's free choice between a lecture-style instructional method ver-

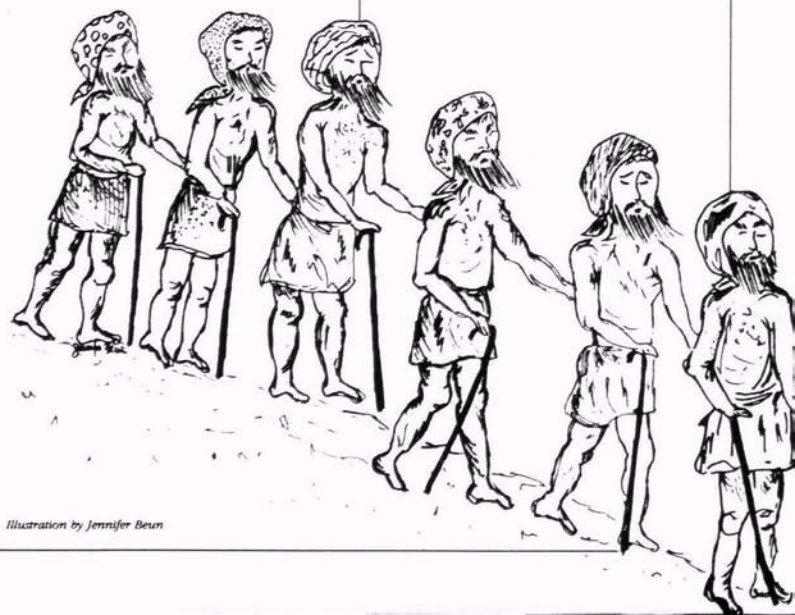


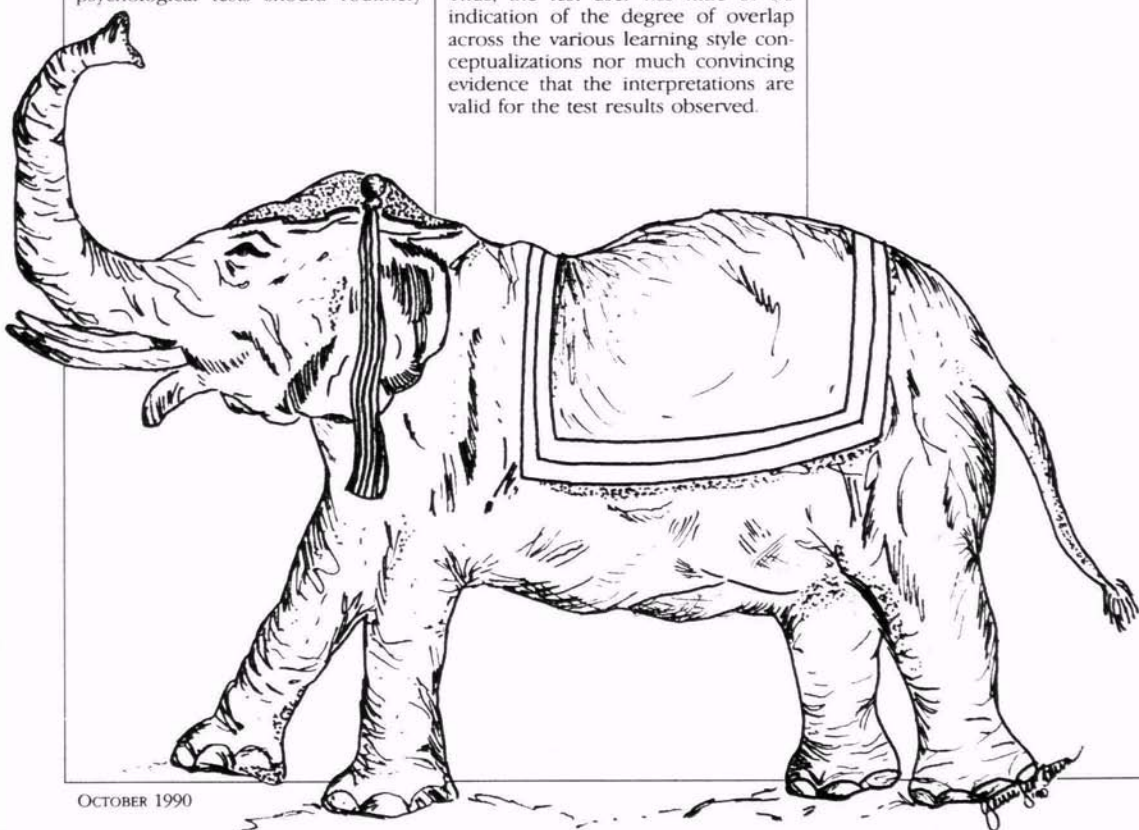
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sus small-group instructional method (Friedman and Stritter 1976); others endeavor to predict habitual response across all learning acts (Yando and Kagan 1970). Definitions of operation also vary widely, with loose distinctions made between *style*, *strategy*, and *tactic*. There may be some convergence emerging in the literature toward using *style* to refer to information processing routines that function in a trait-like manner at the personality level (Entwistle 1981); *strategy* to refer to cross-situational consistency in how students approach school learning (Entwistle 1988, Ramsden 1988); and *tactic* to describe the specific, observable activity of learners in a specific learning situation (Snowman 1989).

Weakness in the accumulated evidence for the reliability and validity of measurements is the second continuing problem. Users of educational and psychological tests should routinely

expect any conceptualization and measurement scheme to indicate that the test meets minimum standards for use and interpretation. The developers have collected varying degrees and types of evidence to support their various conceptualizations and measurement systems. The tendency among the learning styles researchers, however, has been not to pursue the necessary iterative pattern of hypothesis-investigation-modification but rather to rush prematurely into print and marketing with very early and preliminary indications of factor loadings based on one dataset. This haste weakens any claim of valid interpretation from the test scores. Nor have writers and researchers in learning style theory and measurement consistently pursued methods to carefully distinguish among like concepts in order to collect construct-related evidence. Thus, the test user has little or no indication of the degree of overlap across the various learning style conceptualizations nor much convincing evidence that the interpretations are valid for the test results observed.

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An additional important standard for interpreting educational and psychological tests concerns the reliability of the measurements. Any test score is subject to many unwanted influences or sources of error or variance in the observed score for a particular individual on a particular test. But the user needs to know that the test indicates a true measure without the various sources of error. Thus, test developers have an obligation to provide information about the size and expected sources of variance in their measurement systems. Test developers in learning style have provided some information about the relevant reliabilities, but it's rare to find, for example, standard errors of measurement reported for test scores near the cutoff scores for the various learning style classification decisions. Further, most of the manuals accompanying the learning style tests report a considerable range in the simple reliabilities reported, some notably unreliable and most reported on the basis of only three or four test items.

The third pervasive problem is how to identify accurately which of the possible micro- and macro-adaptations within educational settings will be effective in interaction with which range of learning styles. To make progress here, researchers would have to require creative development of alternative structures in curriculum and instructional methods, careful matching of selected learning style concepts to these variations, and evaluation designs sensitive enough to distinguish real effects. Some learning style theorists have conducted repeated small studies that tend to validate the hypotheses derived from their own conceptualizations. However, in general, these studies have not been designed to disconfirm hypotheses, are open to expectation and participation effects, and do not involve wide enough samples to constitute valid tests in educational settings. Even with these built-in biases, no single learner preference pattern unambiguously indicates a specific instructional design (Doyle and Rutherford 1984, Good and Stipek 1983).

One approach used to evaluate the various contentions surrounding style

and educational treatments is the aptitude-treatment interaction methodology. In their detailed review of this approach, Cronbach and Snow (1977) found no evidence of reliable or useful interactions between student preferences and instructional treatments. Further, they noted extensive covariance of general intelligence with many measures of aptitude; the predictive effect of general intelligence on school achievement is well established.

Researchers have not resolved whether optimal results are achieved when the learning styles of individual learners are systematically matched, or systematically mismatched, to curriculum and/or instructional methods. Witkin (and colleagues 1977) suggested that matching students with teachers or instructional materials according to their cognitive styles might facilitate the students' initial acquisition of skills and provide important continued motivation. But an alternative point of view has been articulated by Shipman and Shipman (1985): "In a complex

changing society with diverse environmental demands, students need the opportunity to become sensitive to and proficient in multiple alternative strategies." Toward such an end, Snow and Lohman (1984) suggest matching student style to instructional format for the initial stages of learning, then moving to systematic mismatches as the student becomes more proficient with the material.

Kirby (1988) and Pask (1988) argue that the best learning style for understanding instruction is the *absence* of any identified style or even any style-like consistency in approach. Both advocate that learners take a very flexible approach to instruction, one that can be easily modified as more cues become available about the learning conditions. Kirby refers to this flexibility as a "synthetic style"; Pask calls it a "versatile style."

Logically, developing the flexibility to deal optimally with all sorts of instructional situations would be a laudable goal for each student. The question remains: do learning style considerations help students develop this flexibility in any way?

Problems with the Evidence

A considerable literature shows at least statistically important effects on short-term achievement when learning style scores were used to group students for intervention. (See, for example, Douglas 1979, Tanenbaum 1982, Steele 1986, DeBello 1985, Hodges 1985, Kroon 1985, and Lynch 1981.) Effects on improved test scores with testing conditions matched to student style have been published by Murrain (1983) and Shea (1983). But there are also studies showing no discernible effect attributable to learning style variation (for example, Cholakakis 1986, DeGregoris 1986, Stiles 1985, and Tappenden 1983). Given the predilection in the scholarly press toward considering positive results more interesting than negative or null results, the availability of negative results regarding learning style intervention likely underestimates the true proportion of negative results found across learning style investigations.

The quality of the published evidence offered by studies in this field is

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also diminished by the following problems. These external threats to validity are ignored in the research designs presently used in learning style research.

1. Many studies in the learning styles literature have been conducted by graduate students preparing their Ph.D. theses under the direction of faculty members with a vested interest in substantiating a particular learning style conceptualization.

2. A recurrent design problem, when comparison groups are selected on the basis of extreme scores, is the potential for statistical regression toward the mean, which subsequently biases interpretation of results.

3. Few of these studies estimate the reactive effects of pretesting for learning style, which may sensitize students to experimental instructional conditions.

4. Students may also be reacting to the experimental arrangement instead of to the experimental variable (Hawthorne effect).

Alternate Explanations

The results observed in present studies of learning style could be, and have been, achieved through more direct mechanisms: general intelligence effects, principles of adaptive education, and instructional alignment. First, to the extent that learning styles correlate with general intelligence (Witkin's field-independence, for example), then school achievement will be highly predictable. Most learning style theorists have not distinguished their constructs sufficiently from measures of intelligence.

Second, the concept of "adaptive education" has enjoyed a long history (Snow 1980, Corno and Snow 1986) and has undoubtedly been practiced by insightful teachers throughout the ages, although tailoring instruction for individual learners has frequently received little support. During the '60s and '70s, for example, "teacher-proof" curriculum packages ignored the individual effects of teacher perceptions and knowledge about their students. Any modification by teachers was considered, at least potentially, substandard education.

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Now we expect that when a student either does not master the necessary content background or supporting knowledge/skill set or has not developed skill in the information processing approach required by a curriculum, the teacher can concentrate on direct training of the missing content knowledge/skill set or information processing (McCombs 1981, 1982a and b, 1984; Palincsar and Brown 1984; Dansereau 1988). Alternatively, the teacher can choose to proceed in a manner that avoids the missing content knowledge and the inexperienced information processing, in order to preserve student motivation and self-esteem while missing links are learned. Either choice requires information about the student and about the new learning task; and both require teachers comfortable with modifying curriculum guidelines to suit individual students. These teacher-initiated adaptations are very much like the various instructional variations suggested by the learning styles literature.

Third, "instructional alignment" might also account for learning style-like results. This concept grew from earlier ideas of curricular alignment

(Levine 1982) to focus on the idea of specifying desired outcomes sufficiently well to allow both teachers and students to efficiently arrange learning conditions to achieve those outcomes. In 1989 Cohen and colleagues reviewed results from the leading published learning style theorists as compared to studies deemed to have the critical instructional elements (task clarity, feedback, opportunity for practice) sufficiently aligned. This critique found essentially no effects due to learning style alone, but substantial effects when instruction and testing met the following criteria for alignment: (1) the stimulus condition critical features were precisely defined; (2) instruction was designed to present those critical features and reinforce behaviors that attend to those features; (3) the same critical features occur both in the instruction and in the assessment. The argument is that those learning style studies showing effects achieve the effects by aligning instruction, not by matching instruction and style.

Old Elephants or New?

The conceptualizers, instrument developers, and researchers in the learning styles field promise to deliver the power for students, teachers, and parents to take control of learning environments and interactions. But, in general, the learning style conceptualizations, and the claims made on their behalf, remain to be systematically and comparatively evaluated in practice. Until the fundamental concepts of validity and reliability are established and until each competing concept is carefully investigated, researchers and users alike will continue groping like the five blind men in the fable about the elephant, each with a part of the whole but none with full understanding. □

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Author's note: My synthesis of research, *Learning Styles in Secondary Schools: A Review of Instruments and Implications for Their Use*, is available from the National Center on Effective Secondary Schools at the University of Wisconsin—Madison. To order a copy, send a check or purchase order for \$9, payable to Center Document Service, to Center Document Service, Rm. 242, 1025 W. Johnson St., Madison, WI 53706.

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