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ABSTRACT

The task of synthesizing descriptive data from the "root social sciences" to form a usable model for applied research is quite different from the task of employing, verbatim, the theoretical and methodological constructs of those same sciences. This study conceptualizes the instructional encoding conditions that potentially effect and/or affect the encounters of predisposed learners/decoders involved in perceiving, differentiating, recalling, manipulating, and/or using knowledge. A path model of encoding conditions that prefigure learning from instruction includes the following: learner processes, task requirements, resource attributes, teacher considerations, and intellectual, physical, emotional, and sociocultural modalities. The encoding conditions consist of an instructional environment that is composed of four variables: the teacher, the learner, the task and the resources. It is maintained that if learning (achievement, process) is the ultimate product of the instructional environment, then an effective (natural science) and affective (social science) instructional environment is the product of the interactions of the four variables. (AEF)

Title:

Learning from Learning from Instruction: Reconceptualizing the Research Environment

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OBJECTIVE

The task of synthesizing descriptive data from the "root social sciences" (Clark, 1989) to form a usable model for applied research is quite different than the task of employing, verbatim, the theoretical and methodological constructs of those same sciences. Certainly learner competence is a goal or end product that applied fields concerned with instructional theory hold in common with the root social sciences concerned with learning/cognitive theory, but the means of arriving at the end product is, or should be, different. Therefore, the objective was to conceptualize (in the phonemic tradition) the instructional encoding conditions that potentially effect and/or affect the encounters of predisposed learners/decoders involved in perceiving, differentiating, recalling, manipulating, and/or using knowledge.

THEORETICAL FRAMEWORK

Perhaps the most pervasive problem with research on learning from instruction has been the lack of inclusiveness: our inattention to the totality of the instructional environment. Separately, we have covered several variables, usually more than one at a time, including learner, teacher, and treatment characteristics, environmental or situational conditions, intrinsic and extrinsic motivation, media characteristics, response characteristics, and factors related to the instructional message or task.

In the past, our commitment to the constructs imposed by a particular discipline has failed to produce the consistency, generality, and commonality needed for the development of a comprehensive model for applied research on learning from instruction. In the future, the relations between learning/cognitive theory research and learning from instruction research must be reciprocal: each should serve, in part, to strengthen the other.

Without some acknowledgment of the effective and affective processes involved in learning from instruction, applied research efforts will continue to produce extremely limited observations. Learning from instruction should be based, in part, upon the constructs of learning/cognitive theory, but instructional theory should not be confused with learning/cognitive theory.

TECHNIQUE

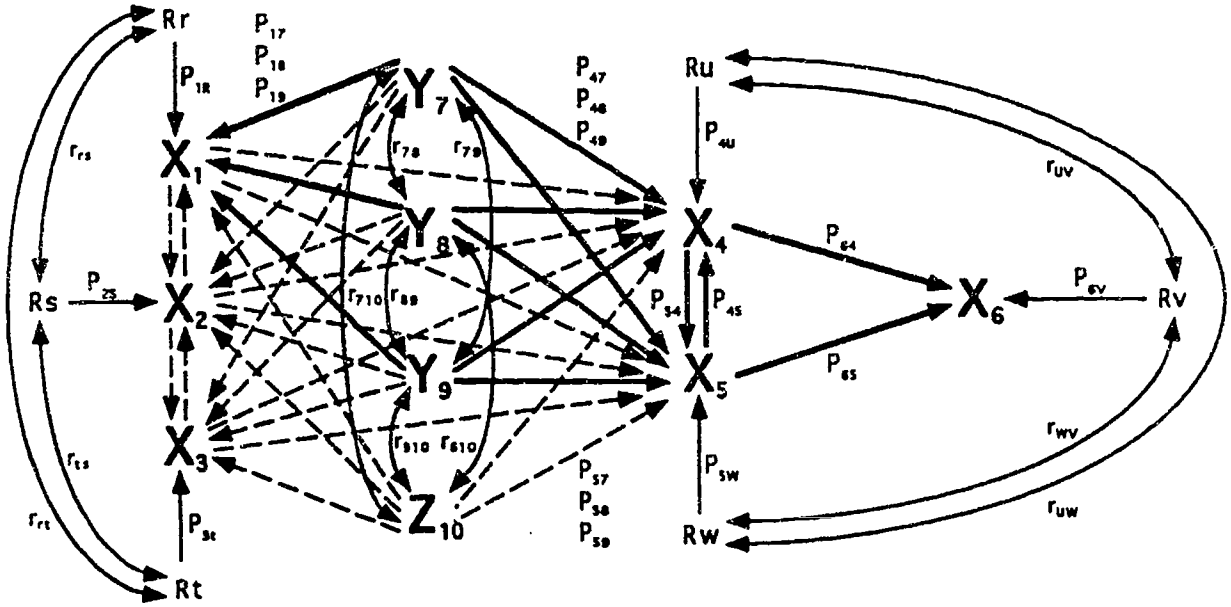
The path model (Figure 1) depicting the ontological dependence and functional relations (see Fenstermacher, 1986 and Travers, 1981 for a discussion of, and rationale for, these terms) of the variables of instruction was patterned after the LISREL 7 model by Jöreskog & Sörbc ~ (1989). Inferencing strategies were employed to identify qualitative and theoretical surface features that may or may not be considered during the encoding phase of instruction, but that are certainly potential indicators of interactions during the decoding phase of instruction. The model is nonrecursive, with both temporal and conceptual sequences employed to estimate pathways of influence. The model is based upon the presumption that there is both theoretical and intuitive commonality among researchers and practitioners interested in learning from instruction. For such a model to be of value to all researchers within an applied field of study, it must be eclectic. It must be broad enough to include our quantitative and qualitative research interests, and dynamic (nonlinear) enough to allow for the inclusion of various theories pertaining to what, where, when, how, which, and why learners learn. The model was used as a heuristic technique (not as an analytical device) to conceptualize, albeit naive, *a priori* encoding conditions.

NOTATION AND DEFINITIONS

Several types of variables are illustrated in Figure 1. The X_i's represent endogenous variables which are effected/affected by other variables from within the model. The Y_i's (innate qualities) and the Z_i (experiential qualities) are termed exogenous variables since they are not effected/affected by other variables from within the model during the time pre-instructional encoding conditions are being considered. Exogenous variables are, in fact, the inherent substance of the endogenous variables: the differentiated developmental modes innately existing within, acquired by/from experience (socioculturally constructed), or designed into the variables of instruction. The double-headed curved arrows represent unanalyzed correlations between exogenous variables. The R_i's represent residual variables (error variances) that impinge upon the other variables within the model, but for which no observations are gathered. Two kinds of intermediary relations are depicted in the model. Functional relations between the variables are

represented by solid arrows; however, no causal relations, in the Newtonian sense, were intended. Similarly, ontologically dependent relations are represented by dashed arrows. The P_{ij}'s are referred to as path coefficients that represent the estimated impact of one variable upon another. (Note that only solid arrows have such designations and that for clarity some have been labeled outside the model, above and below the respective solid arrows.)

Figure 1. A Path Model of Encoding Conditions that Prefigure Learning from Instruction.



Learner Processes	X_1	Predisposed modalities of inference (intellectual, physical, emotional, sociocultural) that facilitate or suppress learning (achievement, process) from instruction.
Task Requirements	X_2	Prior and/or new implicit and/or explicit characteristics of knowledge structures and/or processing demands.
Resource Attributes	X_3	Qualitative and/or theoretical surface features employed to present and/or represent and convey temporal, spatial, or spatiotemporal characteristics.
Teacher Considerations	X_4	Predisposed conceptions of prior and/or new implicit and/or explicit structural and/or processing demands of the task and of the predisposed learner.
Teacher Considerations	X_5	Predisposed perceptions of qualitative and/or theoretical surface features essential for economical representation of the task for the predisposed learner.
Teacher Considerations	X_6	Predisposed formulations of concomitant encoding conditions predicated to be indispensable for engaging the predisposed learner with the task.

Intellectual Modalities	Y_7	Differentiated developmental modes innately existing within, acquired by/from experience (socioculturally constructed), or designed into the variables of instruction.
Physical Modalities	Y_8	Differentiated developmental modes innately existing wit ..., acquired by/from experience (socioculturally constructed), or designed into the variables of instruction.
Emotional Modalities	Y_9	Differentiated developmental modes innately existing within, acquired by/from experience (socioculturally constructed), or designed into the variables of instruction.
Sociocultural Modalities	Z_{10}	Differentiated developmental modes acquired by/from experience (socioculturally constructed) or designed into the variables of instruction.

POINT OF VIEW

The encoding conditions that prefigure learning from instruction consist of an instructional environment that is composed of four variables: the teacher, the learner, the task, and the resources. It follows, then, that if learning (achievement, process) is the ultimate product of the instructional environment, then an effective (natural science) and affective (social science) instructional environment is the product of the interactions from within, between, and among the teacher, the learner, the task, and the resources (Clark, 1990). Intellectual, physical, emotional, and sociocultural modalities have been identified to further describe the distinctiveness of the differentiated developmental modes innately existing within, acquired by/from experience (socioculturally constructed), or designed into the variables of instruction. The model not only depicts the intermediary relations between the independent variables and the dependent variable of interest (the predisposed teacher's formulation of encoding conditions predicated to be indispensable for engaging the predisposed learner with the task), but also makes explicit the kinds of intermediary relations (functional, ontological) that exist between the variables.

It is noteworthy to observe that the functional relations (solid arrows) specified in the model represent potential interactions of inartificial innate qualities originating in, or derived from, the constitutions of the teacher and of the learner. All other intermediary relations appearing in the model represent ontologically dependent interactions (dashed arrows) of socioculturally constructed experiences. Each intermediary relation implicitly represents an hypothesis.

The functional relations, those solid arrows with path coefficients assigned, could be tested by estimating the magnitude of the relation. Since certain assumptions may not be met and/or quantitative data may not be available, equation systems for estimating the magnitude of the ontologically dependent interactions, those dashed arrows without path coefficients assigned, are unidentified at this time. Nevertheless, while quantitative estimates of the impact of one variable upon another may not be possible in every situation, this heuristic technique makes the implicit explicit by facilitating clearer thinking, which may result in the generation of additional insights regarding research on learning from instruction. The relations between and among the variables of instruction are never indifferent in their effect and/or affect upon learning from instruction. Therefore, they are of great import to our efforts in diagnosing and prescribing the between and among relations of the variables of instruction.

The implication of such within, between, and among dependence of the variables of instruction is that functional and ontological relations within the instructional environment result from the abilities of the teacher and learner to integrate the other variables in a schema that will result in a theoretically predictable performance. The yet-to-be-researched interactions that exist within the path model of encoding conditions may impinge upon current assumptions held by confirmationists regarding uncontrolled pre-existing differences within, between, and among the variables of instruction.

SCIENTIFIC IMPORTANCE

Research proceeding from this conceptual level requires not only the interpretation of the variables of instruction (teacher, learner, task, resources) and the modalities of inference (intellectual, physical, emotional, sociocultural), but of the intermediary relations (functional, ontological) as well. Together, the variables of instruction, modalities of inference, and intermediary relations can serve as common denominators for a variety of research interests in applied fields of study. Moreover, theoretical integrity would be established and/or advanced if these components were either implicit or explicit features of most, if not all, research models. To view the study of learning simply as a natural science, to be measured by statistics, is simplistic, misleading, and false; learning is a state of mind, a matter of horizons.

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