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ABSTRACT

This paper considers the role philosophy plays in model construction, focusing on the re-visioning of the classroom, an emerging philosophy influencing the perception of instructional development (ID) models. The constructs of paradigm, model, theory, philosophy, and phenomenology are presented as a way of reflecting on the philosophical origins of a model. An overview is provided of the history of ID and the underlying elements of analysis, design, production, evaluation, and revision. A taxonomy for classifying ID models is then suggested. This taxonomy is a matrix relating the three classes of models (classroom, product, and system) to the following selected characteristics: (1) typical output; (2) resources committed to development; (3) team or individual effort; (4) ID skill/experience; (5) emphasis on development or selection; (6) amount of front-end analysis/needs assessment; (7) technological complexity of delivery media; (8) amount of tryout and revision; and (9) amount of distribution/dissemination. The conclusion discusses current visions of ID theory and practice and affirms the relevance of the ID process and existing models. (Contains 19 references.) (MES)

Re-Visioning Models of Instructional Development

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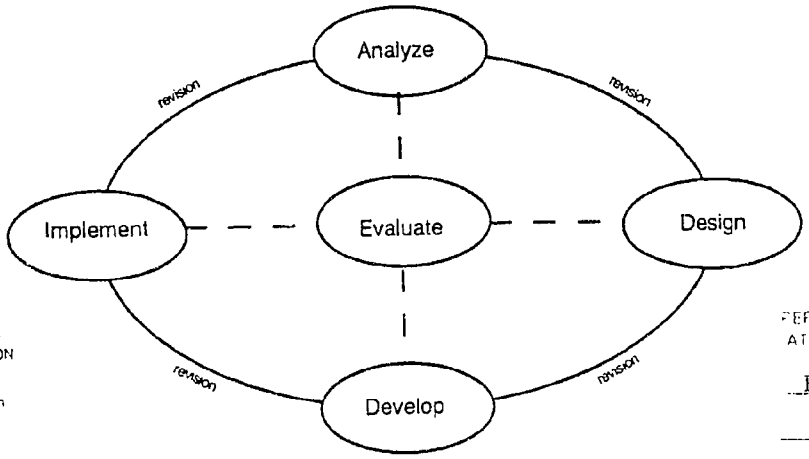

A paper presented at the annual meeting of the *Association for Educational Communications and Technology*, St. Louis, Missouri. This presentation is based on an article with the same title published in volume 45, number 3 of the journal *Educational Technology Research and Development* (Gustafson & Branch, 1997a, pp. 73-89). This presentation also references selected ID models from the ERIC publication *Survey of Instructional Development Models* (Gustafson & Branch, 1997b).

Re-visioning Models of Instructional Development

This presentation reflects on the role philosophy plays in model construction, conceptualizes the "classroom" as a learning space, reviews some of the early history of instructional development (ID) models, suggests a taxonomy for classifying ID models, and concludes with current visions of ID theory and practice. The primary assumption is that there is enough room within the fundamental concept of the instructional development process to incorporate most emerging theories and philosophies of learning.

A Philosophical View

Instructional development paradigms are manifested through conceptual and procedural models. Because paradigms are manifested through modeling (Hlynka & Belland, 1991), it is important to understand the process by which models are derived and the variety of functions process models serve. Process models are constructed upon a philosophical perspective. The more congruent a philosophy is to a learning context in which instruction is developed, the greater the chance that the original instructional purpose will be satisfied. People using ID models should be aware of the philosophical perspective that form models of instructional development.

Human perception about ways in which knowledge is constructed usually forms the basic philosophical orientation for instructional development. Our perceptions are formed by phenomena we observe. Based on human consciousness and self-awareness, we develop arguments to explain our reality, our beliefs, and our values; our philosophy. This remains true for the way we, as individuals [or a community], rationalize propositions such as ideas about how people learn. Based on one's own philosophy, theories emerge. Theories become interpretations about a set of organized principles, such as the principles of learning. Theories can be based on opinion, thought, observation, supposition; or empirical evidence. The process of developing instruction ought to utilize theories to form patterns that prescribe relationships, such as models. While models explain ways of doing, a paradigm describes a way of knowing. Instructional development paradigms, and the models to represent them, provide a means for understanding the fundamental concepts of guided learning, as well as the phenomenological, philosophical, and theoretical origins upon which they are created. A hierarchy phenomenology, philosophy, theory, model and paradigm is presented in Figure 1 as a way of reflecting on the philosophical origins of a model. An emerging philosophy that is influencing our perception of ID models is a re-visioning of the "classroom."

Construct	Definition	Attributes
Paradigm	A way of knowing; a pattern or example that verbally or diagrammatically describes recurring features of phenomena.	• Basis or referent for action. • Illustrates fundamental interrelationships. • Allows for variation in the way in which they are modeled. • Facilitates replication of the fundamental concept.
Model	A way of doing; an explicit representation of a reality. An example or pattern that prescribes relationships in a normative sense.	• Explains or predicts abstract and observable phenomena. • Varying levels of generality. The greater the fidelity between application and supporting theory. the higher the relative level of generality. The more conditions required for application, the lower the relative level of generality. • Conceptualizes a set of propositions.
Theory	An interpretation about a set of organized principles based on opinion, thought, observation, supposition; or empirical evidence.	• Ability to generate hypotheses; and make predictions. • Provides conceptual explanations founded by philosophical argument. • Explains a phenomenon. • Yet to be disproved. • Provides the motivation for modeling.
Philosophy	Arguments posited in the search for truth through logical reasoning. Ways in which an individual [or community] rationalizes propositions.	• Contains numerous interconnecting theories. • Uses precise terminology, analytical statements and narrative examples to illustrate conditions of an argument. • Characterized as *Ethical*: System of values governing conduct and expressions of moral approval. *Epistemological*: Belief system conjured from multi-sensory interactions with the universe. *Metaphysical*: System of relating to the reality beyond what is perceptible to the senses.
Phenomenology	Study of the development of human consciousness and self-awareness.	• Based on human perceptions about the universe. • Units of life experiences. • Motivation for human action. • Based on an observable fact or event.

Figure 1. Constructs of conceptual paradigm.

Re-visioning the "Classroom"

The reality of what constitutes today's classroom for teachers, trainers, product developers, and system developers has been widely expanded due in large part to the almost daily advances in educational technology. The emerging concept of "anything, anywhere, anytime" is beginning to cause instructional developers to move away from developing teacher-centered, dyadic instruction to developing instruction for environments that facilitate student-centered, guided learning. This shift of thinking requires a re-visioning of the "classroom."

A macroscopic view of instruction reveals that multiple interactions occur during episodes of guided learning; each situated within a context for a specified period of time (Figure 2). Developing instruction for a classroom where a student is constructing knowledge and skills while at the same time interacting with peers, media, content and teachers requires ID models that allow individuals or teams to see beyond narrowly defined outcomes.

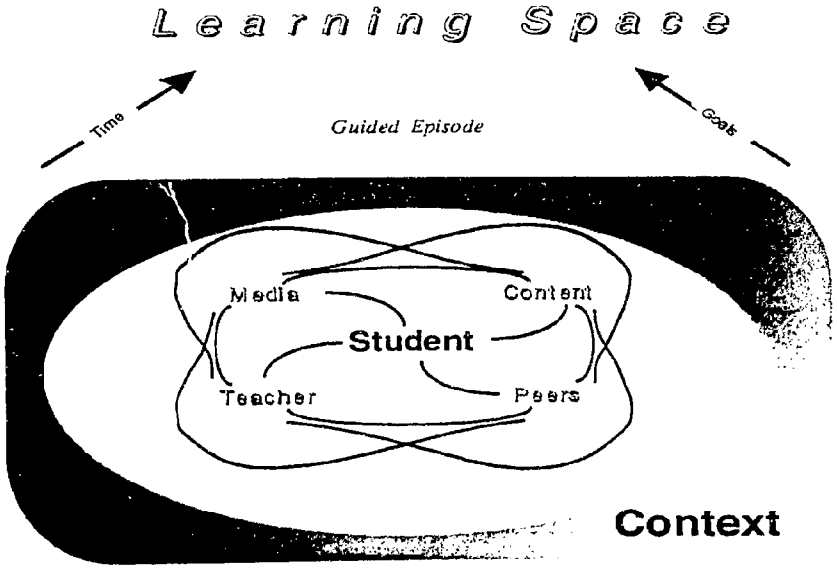

Figure 2. Learner-centered paradigm illustrating multiple; and concurrent interactions, that occur during episodes of guided learning.

Learner-centered classrooms, wherever they are located, represent an epistemological shift from regarding students as the occupants of learning spaces to regarding the *actions* of students during guided learning as the prime motivation for the development of instruction. Models of instructional development need to be re-visioned in order to consider learning space as framed by the new concept of "classroom."

Historical Overview

Although the exact origins of the instructional development (ID) process can be debated, it is commonly accepted that the writings of Silvern (1965) represent an early attempt to apply General Systems Theory (GST) to the design of instruction. Silvern was particularly interested in how GST could be used to create effective and efficient training for aerospace and military training and published what might be considered the first ID model, although he used the term "instructional systems." Silvern's model, and practically all other early ID models, were based in behaviorism; broadly defined as the measurement and study of human behavior. Although many now associate behaviorism with Skinner and Stimulus-Response theory, most of the early writers had far more encompassing theoretical and philosophic perspectives. Essentially, these behaviorists believed, as many ID practitioners believe today, that behavior can be observed, measured, planned for, and evaluated in reasonably valid and reliable ways.

Historically, instructional development has been grounded in a set of beliefs that, when implemented, include analysis, design, production, evaluation and revision. *Analysis* might include conducting a needs assessment in a school (Rossett, 1987), identifying a performance problem in a business setting (Gilbert, 1978; Harless, 1975), or stating a goal (Mager, 1984a). *Design* would typically include writing objectives in measurable terms (Mager, 1984b; Dick & Carey, 1996), classifying learning as to type (Briggs & Wager 1982), specifying learning activities (Briggs, Gustafson & Tillman, 1991), and specifying media (Reiser & Gagné, 1983). *Production* would include preparation of all student and teacher materials (both print and non-print) as specified during design (Kemp, Morrison & Ross, 1994). *Evaluation* would include both formative and summative efforts (Dick & Carey, 1996). Formative evaluation would be devoted to identifying needed revisions to the instruction with the summative effort being directed to assessing the degree to which the objectives had been achieved. *Revision* would involve making any changes determined to be needed based on the formative evaluation data. Some authors add another element, implementation, to the ID process; particularly if the environment in which they work involves wide dissemination of the products of the ID process.

Instructional development is used in this presentation to represent the comprehensive process beginning with analysis and ending with revision although many authors use different terms for the various elements and as already noted, some add an implementation step following evaluation. Although we talk of a beginning and end, the ID process is not necessarily linear and may be quite dynamic, recursive and never-ending.

A Taxonomy of ID Models

The instructional development process can be practiced in a variety of settings and various models have been created that reflect this variation. Although the number of models published

exceeds the number of unique environments, there are enough differences among ID models that there is some value in creating a taxonomy for classifying them so as to organize the extensive literature on this topic. A taxonomy of ID models can help focus the way in which we vision the roles of models in instructional development. A matrix relating the three classes of models (classroom, product, and system) to nine selected characteristics is presented in Figure 3. The values in the individual cells of the matrix indicate how each characteristic is viewed by those who have one of the three different perspectives.

Selected Characteristics	Classroom Orientation	Product Orientation	System Orientation
Typical Output	One or a Few Hours of Instruction	Self Instructional or Instructor-Delivered Package	Course or Entire Curriculum
Resources Committed to Development	Very Low	High	High
Team or Individual Effort	Individual	Usually a Team	Team
ID Skill/Experience	Low	High	High/Very High
Emphasis on Development or Selection	Select	Develop	Develop
Amount of Front-End Analysis/Needs Assessment	Low	Low to Medium	Very High
Technological Complexity of Delivery Media	Low	Medium to High	Medium to High
Amount of Tryout and Revision	Low to Medium	Very High	Medium to High
Amount of Distribution/ Dissemination	None	High	Medium to High

Figure 3. A taxonomy of instructional development models based on selected characteristics.

Only ID models that contain all five of the elements are reviewed here to focus a re-visioning the role of models in instructional development. While a review of all the published instructional development models is beyond the scope of this article, several models were chosen that represent general categories of the ID process and that have been most influential due to their wide and continuing distribution and citation in the literature. Stamas (1973), Andrews and Goodson, (1980),

Gustafson (1981, 1991), and Edmonds, Branch and Mukherjee (1994) provide more extensive reviews of ID models. Some of the early models included in this review are no longer in circulation, but were selected based on their original influence.

The views posited in this article have been formed by several assumptions after considering an historical perspective; and as a result of looking across the broad base of literature about the utilization of instructional development. We believe there is enough room within the fundamental concept of the instructional development process to incorporate most emerging theories and philosophies of learning, however, our basic assumption is that people engage in instructional development when all of the following conditions exist: the desired outcome can be defined, the learning gap is caused by a lack of knowledge and skill, and instruction is a valid approach to address the learning situation.

Conclusion

Rapidly advancing telecommunications technology is motivating teachers and trainers to visualize a type of classroom that is *virtually* capable of instruction about *anything, anywhere, anytime*. The increased sophistication of distance learning infrastructures and the growing effectiveness of Web-based learning tools have directed the attention of instructional developers to domains hitherto unexplored. Many contemporary instructional strategies will not be useful for developing learning in virtual communities that take advantage of existing and near-future telecommunications technology. Electronic performance support systems, rapid prototyping applications and automated instructional development tools also are influencing the models of instructional development and the ways in which they are applied.

Although in recent years there have been many advances in learning theory, the technology of development and delivery systems, and in the training, skills and sophistication of instructional designers, the unifying variables contained in most of the original ID models remain valid. Namely, that the process involves analysis, design, production, formative and summative evaluation, and perhaps dissemination. What we have witnessed, particularly in the last ten years, is a markedly increased interest of a wide array of constituencies in how the ID process may be applied to meet there learning and performance requirements. Also witnessed have been claims (sometimes emotional) that the ID process is philosophically inconsistent with recent thinking about human learning and that interesting, interactive and exploratory environments require a different way of conceptualizing the development process. While we have no quarrel with those who are exploring alternative ways of developing learning environments, we believe many of the claims for uniqueness are overstated. Provided that the developers can agree upon what is to be learned and that it can and should be measured in a reasonably valid and reliable fashion, we believe that the ID process and existing models remain relevant.

This presentation issues a challenge to our colleagues in programs that prepare instructional developers to assure that our graduates are well versed in a variety of learning theories and skilled in performing the kinds of analysis and design that lead to teaching higher order types of learning. The profession can only be the beneficiary of such a vigorous, but honest debate about re-visioning models of instructional development.

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Re Visioning Models of Instructional Development

Overview of Presentation

A Philosophical View

A Philosophical View

A Philosophical View

A Philosophical View

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- [illegible]
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A Philosophical View

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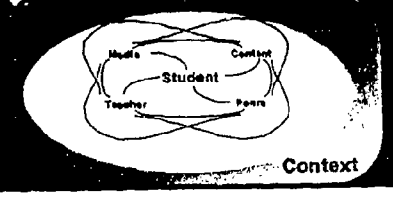
Re-visioning the Classroom



ID defined
ADDIE: A generic ID model

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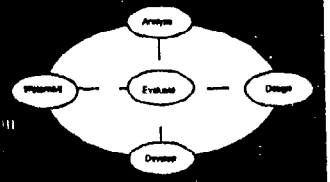
D [illegible]
I Implementation
E [illegible]



Why ID models?

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- Teach process
- Conduct research about process

Early ID models

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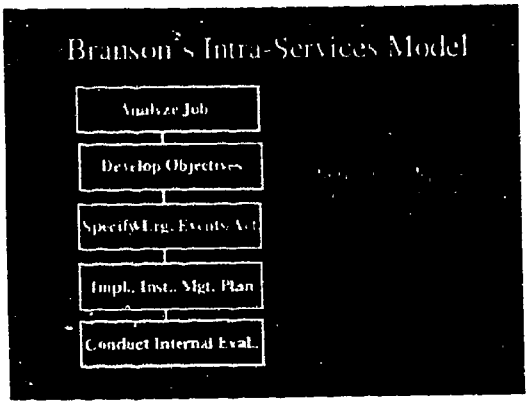
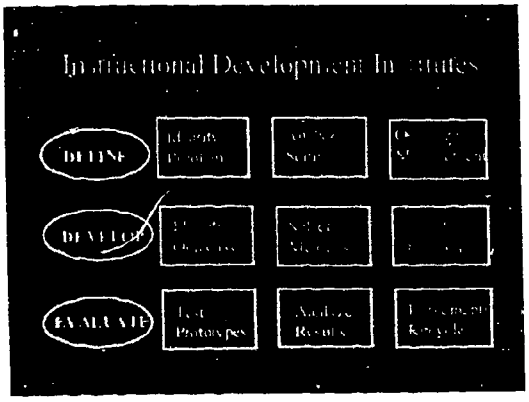
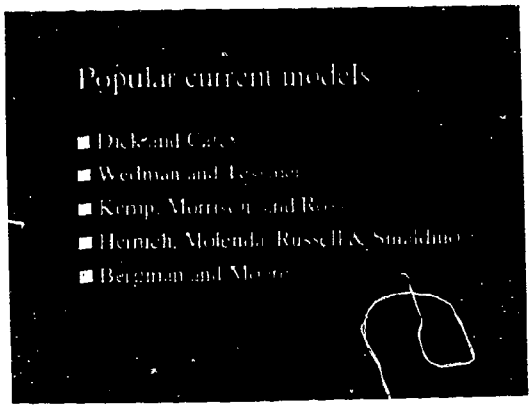
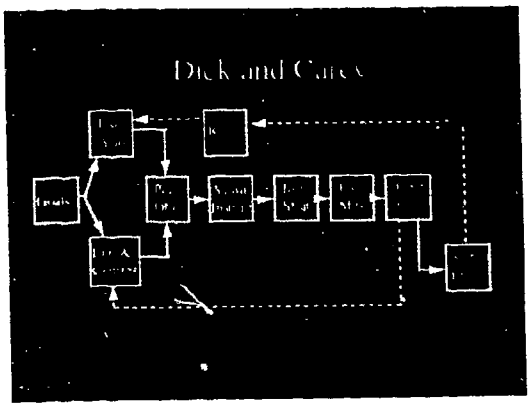
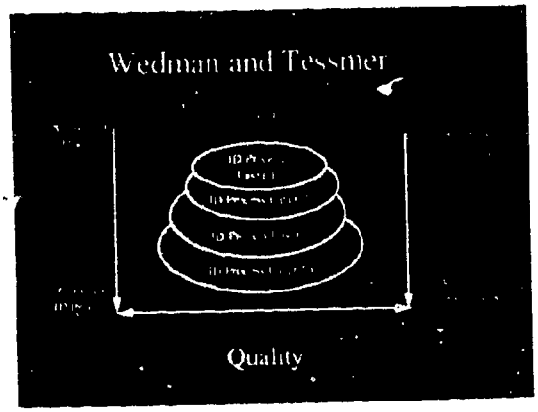
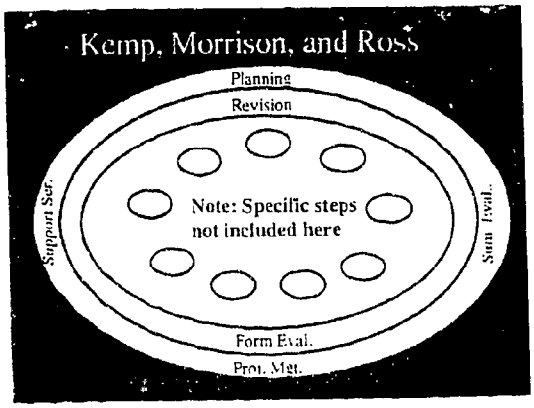






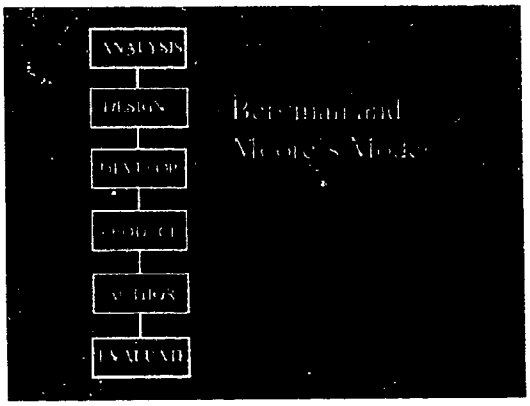






Heinich,'Molenda', and Russell & Smaldino

- Analyze Learner Char.
- State Objectives
- Select, Modify Mtls.
- Utilize Mtls.
- Req. Learner Response
- Evaluate



Reiser and Moore's Models

Making sense of the models

- Unstated assumptions
- User-friendliness of
- Developer environment

Classification matrix

- Dimensions
- Nine Defining Characteristics of ID models

TAXONOMY OF ID MODELS

Output	Low Bias	High	Concrete
Resource	Very low	High	High
Instr. Learn.	Instr.	Learn.	Learn.
ID Knl.	Low	High	High
Dev. Skl.	Novice	Develop.	Develop.
Need Assess.	No	Yes	High
Instructional	Low	Med-High	Med-High
Mod. Revision	Low	Very High	Med-High
Inst. Distribution	Low	High	Med-High

Selected factors now impacting ID

- Constructivism
- Learner-centered design
- Authentic assessment
- Multimedia
- Development Time
- Delivery technology
- Accountability and ROI

Alternative development paradigms

Rapid Prototyping

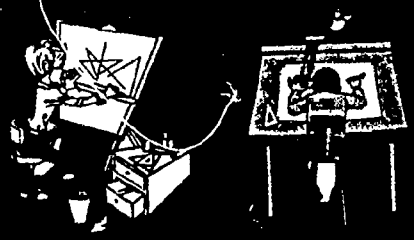
Rapid Prototyping

Ready

Fire

Aim

Concurrent Engineering



Performance Support Systems

Conclusions •

- ID Process becoming more complex
- ID Process Becoming more structured
- Many factors dictate change
- And [illegible]