

Development of a Matrix of Teaching Models Based on Instructional and Nurturant Effects

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Abstract

The selection of appropriate teaching models with which to bring about meaningful learning is an important and fundamental concern of the professional educator. This paper describes the development of a matrix of models and effects that was a three step process involving the compilation of a list of effects; the development of effect categories by model and domain; and the development of a matrix of models and effects. This project culminated in the creation of a data retrieval chart which allows the user to access information pertaining to teaching models based on instructional and nurturant effects classified by learning domains.

The selection of appropriate teaching models with which to bring about meaningful learning is an important and fundamental concern of the professional educator. While an initial overview of popular teaching models demonstrates significant conceptual differences, it also reveals that similar intellectual and nurturant effects may be yielded from the use of those models. Some models may be dissimilar in both respects, but similarities do exist between families of models that might not be expected to share significant commonalities.

There are times when educators – even those with extensive knowledge about models of teaching – find themselves in need of a concise source of information that renders a comparison of teaching models. Such a reference might be used to balance the instructional and nurturant effects of various teaching models, allowing for an appropriate selection of complimentary models for a particular desired educational outcome. The lack of such information in the existent educational literature is the problem that this article seeks to address.

In developing this manuscript, our intent was to provide a concise source of information about models of teaching concerned primarily with the similarities between models with regard to instructional and nurturant educational effects. To this end, the similarities among fifteen teaching models have been described and subsequently used to develop a graphical representation in the form of a matrix. Three broad steps have been undertaken in this endeavor. The first step involved the compilation of a comprehensive list of effects or characteristics shared by two or more of the models. Second effect categories, were developed by model and domain. Third, the characteristics were compiled into a matrix of fifteen teaching models that reveals similarities among models' instructional and nurturant effects.

One of the limitations of developing such a conceptual tool includes the potential for over-generalization. There is also the possibility that people may infer relationships between variables incorrectly and exhibit faulty assumptions about constructs. Clearly, this topic would benefit from more extensive research than has been devoted to it in the present form. This manuscript is intended to be preliminary in nature; it is the authors' hope that our work may serve as not only a tool for selecting complimentary teaching models, but also as a conceptual scaffold for future research into this neglected educational topic.

Educators are faced with instructional dilemmas with regard to the practical use of teaching methods and instructional models. It is a fundamental educational concern that the model of teaching employed in the pursuit of meaningful learning is well suited to achieve the

desired learning outcomes. Although a single model is frequently too narrowly focused to consistently bring about meaningful learning in the entire population of a given course, the combination of two or more models will often reach a greater number of students while simultaneously reinforcing learning across the student population. In a preliminary review of the most widely used models of teaching, it becomes apparent the complexity of some models and also the degree to which models can sometimes overlap each other. It is with this view that the overall objectives of this study become even more salient.

Models and Effects

The effects of an environment can be direct or implicit. Direct effects are designed to come from the content and skills upon which the learning activities are based. Implicit effects are inferred from the learning environment. To best look at the similarities between effects it will be helpful to have a picture of the components of each model being considered.

Models are representations of aspects of a theory. They aid comprehension and theory building and are useful for organizing and explaining vast amounts of data. Models help theorists understand how their theories are developing and actually raise questions whose answers are important for generating theory (Ornstein and Hunkins, 1988, p. 283).

Models of teaching are actually models of learning. Students not only acquire information, ideas, skills, values, ways of thinking, and expressing themselves but also master the learning process. A model of teaching is a plan or pattern that can be used to design classroom teaching and to shape instructional materials (Joyce, 1992).

Educators must consider both the cognitive and affective domains of learning when designing instruction. Taxonomies or classification systems for categorizing learning domains are helpful to the educator when developing learning objectives. Hierarchical divisions occur under each domain. The instructional and nurturant effects of teaching models can be divided into the domains of learning that include cognitive outcomes and affective outcomes.

There are many different models of teaching that are designed to bring about a particular type of learning and ability to become learners. The manner in which students are taught has an impact upon the student's ability to educate themselves. It is important to recognize the similarities and differences among models of teaching in order to address the learning needs of the individual. One of the fundamental purposes of teaching models is to increase the individuals aptitude to learn.

Instructional effects are the direct effects of the model of teaching. These effects are directly achieved by guiding the learner in a planned direction. These effects can be seen as those for which the model was specifically designed to achieve. These effects can be cognitive or affective outcomes.

Nurturant effects are indirect effects. They are those effects that come from experiencing the environment created by the model. These effects can be cognitive or affective outcomes.

Description of Models and Effects

As seen in the following descriptions of instructional models, there is great breadth and depth among and between the models. The variety of instructional effects is matched by the variety of nurturant effects. In choosing a model of teaching, the instructor must balance instructional effects with nurturant effects. There must be a balance instructional “efficiency” with nurturant “predictability”.

Group Investigation Model

Group investigation is designed to lead students to define problems, explore various perspectives on the problems, and study together to master information, ideas, and skills. This model provides a social organization within which many other models can be used when appropriate. The model has been used in all subject areas, with children of all ages.

Instructional Effects

This model is a very direct and efficient way of teaching academic knowledge as well as social process.

Nurturant Effects.

Interpersonal warmth and trust is nurtured along with respect for negotiated rules and policies, independence in learning, and respect for the dignity of others.

Role Playing Model

Role playing leads students to understand social behavior, their role in social interactions, and ways of solving problems more effectively. the model asks students to “act out” conflicts, to learn to take the roles of others, and to observe social behavior. With adaptation this model can be used with students of all ages.

Instructional Effects.

Role playing is specifically designed to foster the analysis of personal values and behavior; the development of strategies for solving interpersonal problems; and the development of empathy toward others.

Nurturant Effects.

These effects include the acquisition of information about social problems and values, and comfort in expressing one's opinions.

Jurisprudential Model

This model is concerned with learning to think about social policy. It is built around the analysis of case studies containing problems that can only be solved by clarifying values and resolving conflicts and competing demands. Although initially the model requires teacher-directed activity and direct instruction, students eventually become competent and discussions become student-directed.

Instructional Effects.

These effects include the mastery of the framework for analyzing issues. Included is the ability to identify policy questions; application of social values to policy stances; application of social values to policy stances; the use of analogies to explore issues; and ability to identify and resolve definitional, factual, and value problems.

Nurturant Effects.

These effects include the capacity for social involvement and a desire for social action; the values of pluralism and a respect for the point of view of others. It advocates the triumph of reason over emotion in matters of social policy.

Inductive Thinking Model

This model attempts to increase the individuals' ability to seek and master information, organize it, build and test hypotheses, and apply what has been learned in independent reading, writing, and the exploration of themselves and the world about them. This model is designed to help develop inductive mental processes, especially the ability to categorize and use categories. Analytic and synthetic abilities are dependent on the development of the distinctions that result in categories.

Instructional Effects.

This model is designed to instruct students in concept formation and at the same time teach concepts.

Nurturant Effects.

This model nurtures attention to logic, language and the meaning of words, and the nature of knowledge.

Biological Science Model

This model helps the individual process information using techniques similar to those of research biologists--using the scientific method. This emphasis of model is content, process, and scientific investigation.

Instructional Effects.

This model is an inquiry model that is designed to teach the processes of research biology and to affect the ways that students process information along with major concepts and information.

Nurturant Effects.

This model nurtures a commitment to scientific inquiry, open-mindedness, a spirit of cooperation, and an ability to work with others.

Concept Attainment Model

This model helps the individual learn categories and study how to learn and apply them. It enables the control of data sets and assists the individual in the development of precise knowledge of concepts. Concept attainment is “the search for and listing of attributes that can be used to distinguish exemplars from nonexemplars of various categories” (Bruner, Goodnow, and Austin, 1967, p. 233).

Instructional Effects.

The instructional effects will depend upon the emphasis of a particular lesson. Lessons are designed for instruction on specific concepts and on the nature of concepts. Provided, also, is practice in inductive reasoning and opportunities for altering and improving the individuals' concept-building strategies.

Nurturant Effects.

These strategies nurture an awareness of alternative perspectives, a sensitivity to logical reasoning in communication, and a tolerance of ambiguity.

Memory Model

A powerful and effective form of personal power comes from competence based on knowledge; it is essential to success and a sense of well-being. An increase in the ability to memorize increases learning power, saves time, and leads to a better storehouse of information.

Instructional Effects.

This model is specifically designed to increase the capacity to store and retrieve information.

Nurturant Effects.

This model nurtures a sense of intellectual power-- a growing consciousness of the ability to master unfamiliar material, as well as imagery skills and attention to one's environment

Advance Organizer Model

This model strengthens cognitive structure and enhances retention of new information. Advance organizers are introductory material presented ahead of the learning task and at a higher level of abstraction and inclusiveness than the learning task.

Instructional Effects.

The instructional effects are the ideas that are used as well as the information presented to the students. Additionally it nurtures the ability to learn from reading, lectures, and other media used for presentations.

Nurturant Effects.

This model nurtures an interest in inquiry and precise habits of thinking.

Inquiry Training Model

This model promotes strategies of inquiry and the values and attitudes that are essential to an inquiring mind. It encourages the student to engage in causal reasoning and move from facts to theories.

Instructional Effects.

The instructional effects include the promotion of strategies of inquiry which are process skills that include observation, collecting and organizing data; identifying and controlling variables; formulating and testing hypotheses and explanations; and making inferences.

Nurturant Effects.

This model nurtures active and autonomous learning, verbal expression and listening skills, tolerance of ambiguity, persistence, logical thinking, and attitude that all knowledge is tentative.

Synectics Model

This model encourages creative thought by developing information-processing skills. It enhances the ability to go beyond the known and synthesize fresh ideas and solutions.

Instructional Effects.

This model enhances the development of general creative power and creative responses and capacity in a variety of subject-matter domains.

Nurturant Effects.

The nurturant effects of this model include interpersonal understanding and a sense of community; achievement in a subject domain; and group cohesion and productivity.

Nondirective Teaching Model

The Nondirective model places the learner at the center of the teacher-learner process and perceives the process as a partnership.

Instructional Effects.

The activities of this model are determined by the learner as he or she interacts with the teacher and other learners. The instructional effects are dependent on its success in nurturing more effective self-development. The model can be thought of as entirely nurturant in character dependent for effects on experiencing the Nondirective environment rather than carrying content and skills through specifically designed activities.

Nurturant Effects.

The nurturant effects of this model include self-development; personal awareness; and a variety of social and academic goals.

Direct Instruction Model

The direct instruction model approaches academic content systematically. Its design is shaped to generate and sustain motivation through pacing and reinforcement

Instructional Effects.

The instructional effects of this model include mastery of content material and skills; student motivation; and selfpacing ability.

Nurturant Effects.

Through success and positive feedback this model enhances self-esteem.

Contingency-Management Model

This model is designed to develop skills and enable those skills to be used effectively in work and education.

Instructional Effects.

This model is versatile and can be used to guide the instructor's goals in every domain and to develop their instructional materials.

Nurturant Effects.

This model places the teacher in the center of the instructor-learner process and therefore has no nurturant effects except in the area of self-control.

Self-Control Model

This model directly instructs for the target behaviors and also eliminates maladaptive behaviors. Learners use feedback to modify behavior. Students are taught how to modify their patterns of behavior using behavioral systems principles. Control is placed in the hands of the learner and they learn how patterns of behavior develop and change.

Instructional Effects.

The instructional effects of this model include elimination of maladaptive behaviors especially those requiring large amounts of self-control; establishment of self-control; and an increase in target behavior.

Nurturant Effects.

The nurturant effects of this model include awareness of environment; sense of control over oneself and one's environment; self-esteem and self-confidence.

Simulation Model

This model is grounded in cybernetic psychology. Here learning is sensorially experiencing the environmental consequences of one's behavior and engaging in self-corrective behavior. Instruction is designed to create an environment for the learner in which full feedback takes place.

Instructional Effects.

The instructional effects of this model include the acquisition of skills and concepts and knowledge of political and economic systems.

Nurturant Effects.

This model nurtures the development of concepts and skills; critical thinking and decision making; empathy; knowledge of political, social, and economic systems; awareness of the role of chance; facing consequences; and a sense of effectiveness.

Building a Matrix of Models

A review of teaching models, with heavy utilization of Models of teaching (B.Joyce, 1992), will be undertaken in order to develop an overall list of key characteristics. The list will then be reviewed and data will be grouped according to broad teaching/learning effects. The resulting data will be assembled into a graphical matrix.

This project was accomplished in a series of steps that ultimately end in a matrix of teaching models. The following are a list and description of steps undertaken to accomplish the goals of this study.

Step One: Compilation of List of Effects

Instructional Effects.

- Constructionist View of Knowledge
- Disciplined Inquiry
- Effective Group Process and Governance
- Analyses of personal values and behavior
- Strategies for solving interpersonal problems
- Empathy
- Framework for analyzing social issues
- Ability to assume role of the “other”
- Competence in social dialogue
- Concept formation processes
- Specific concepts
- Process of research in biology

- Inductive reasoning
- Nature of concepts
- Improved concept-building strategies
- Mastery of facts and Ideas
- A system for memorizing
- Attending faculties
- Conceptual structures
- Meaningful assimilation of information and ideas
- Scientific process
- Strategies for creative inquiry
- General creative capacity
- Creative capacity in subject domain
- Mastery of academic content and skills
- Student motivation
- Selfpacing ability
- Academic skills and knowledge
- Social skills/behavior
- Self-management skills
- Emotional responses
- Personal skills/behavior
- Increase target behavior
- Decrease maladaptive behavior
- Method of establishing self-control

- Behavioral point of view
- Awareness of environment
- Concepts and skills
- Knowledge of political and economic systems

Nurturant Effects.

- Respect for dignity of all and commitment to pluralism
- Independent as a learner
- Commitment to social inquiry
- Facts about social values
- Comfort in expressing opinions
- Empathy/Pluralism
- Facts about Social Problems
- Capacity for social involvement and desire for social action
- Attention to logic
- Sensitivity to language
- Awareness of the nature of knowledge
- Scientific knowledge
- Commitment to scientific inquiry
- Open-mindedness
- Ability to Balance alternatives
- Cooperative spirit and skill
- Awareness of alternative perspectives

- Tolerance of ambiguity
- Appreciation of logic
- Sensitivity to logical reasoning in communication
- A sense of intellectual power
- Creative attitudes and capacities
- Habits of precise thinking
- Interest in Inquiry
- Spirit of creativity
- Independence of autonomy in Learning
- Tolerance of ambiguity
- Tentative nature of knowledge
- Achievement in subject domain
- Group cohesion and productivity
- Personal awareness
- Self-development
- A variety of social and academic goals
- Self-esteem
- Method of establishing self-control
- Behavioral point of view
- Awareness of environment
- Sense of control over oneself and one's environment
- Self-esteem and confidence
- Concepts and skills

- Knowledge of political and economic systems
- Critical thinking and decision making
- Empathy
- Awareness of the role of chance
- Facing consequences
- Sense of effectiveness

Step Two: Development of Effect Categories by Model and Domain

Cognitive Domain.

This domain includes outcomes that “deal with the recall or recognition of knowledge and the development of intellectual abilities and skills” (Bloom, 1956, p.7). Cognitive learning, which involve the mental processes, range from memorization to the ability to think and solve problems. The categories included in this study are:

- *Knowledge and Comprehension*: facts, terminology, conventions, trends, sequences, classifications and categories; criteria and methodology; and universals and abstractions such as principles, generalizations, theories, and structures. Comprehension, translation; interpretation; and extrapolation of information; master information, ideas, and skills; academic knowledge; acquisition of information about social problems and values; specific concepts and concept formation strategies; understand language, meaning of words, and nature of knowledge; increase the capacity to store and retrieve information; ability to learn from reading; capacity in a variety of subject-matter domains; social and academic goal attainment; development of skills to be used in work and education; and critical thinking skills.
- *Analysis*: breaking the whole into parts and distinguishing elements; relationships; and organizational principles; explore various perspectives of problems; and mastery of the framework for analyzing issues.
- *Synthesis*: putting parts together in a new form such as a unique communication; a plan for operation; or a set of abstract relations; ability to define problems; ways of solving problems more efficiently; development of strategies for solving interpersonal problems;

ability to identify and resolve definitional, factual, and value problems; ability to categorize; and make decisions.

- *Application:* using abstractions in particular situation; application of social values to policy stances; use of analogies to explore issues; use of categories; affect the ways that students process information; imagery skills; interest in inquiry and precise habits of thinking; promotion of strategies of inquiry; active and autonomous learning; verbal expression and listening skills; and development of creative power and responses.
- *Evaluation:* making judgments in terms of internal evidence or logical consistency and external evidence or consistency with facts developed elsewhere; and attention to logic.

Affective Domain.

This domain includes outcomes that “emphasize a feeling tone, an emotion, or a degree of acceptance or rejection” (Krathwohl, Bloom, & Masia, 1964, p.7). Affective learning encompass the emotions, feelings, beliefs, attitudes, and values. The categories included in this study are:

- *Receiving:* sensitivity to the existence of stimuli; awareness; willingness to receive; and selected attention; understand social behavior; open-mindedness; awareness of alternative perspectives; sensitivity to logical reasoning in communication; and an awareness of and attention to one’s environment.
- *Responding:* active attention to stimuli such as acquiescence; willing responses; and feelings of satisfaction; study together to master information; social process; role in social interactions; comfort in expressing one’s opinions; capacity for social involvement and desire for social action; spirit of cooperation; ability to work with others; ability to master unfamiliar material; logical thinking; development of creative power and responses; group cohesion and productivity; and empathetic involvement.
- *Valuing:* learners beliefs and attitudes of worth; acceptance; preference; and commitment; analysis of personal values and behavior; development of empathy toward others; respect for point of view of others; commitment to scientific inquiry; tolerance of ambiguity; persistence; attitude that all knowledge is tentative; interpersonal understanding and sense of community; motivation; enhancement of self-esteem; self-confidence; and sense of effectiveness.

- *Organization:* internalization of values and beliefs involving conceptualization of values and organization of value system; respect for negotiated rules and policies; self development; and personal awareness.
- *Characterization:* behavior that reflects a generalized set of values and a characterization or philosophy of life; interpersonal warmth and trust; independence in learning; respect for the dignity of others; triumph of reason over emotion in matters of social policy; self-pacing ability; self control; and control of one's environment.

Step Three: Development of Matrix of Models and Effects

This step involved the compilation of models and effects according to domain. The effects of each model were analyzed for placement in a domain and subsequent sub-category. The resultant compilation was placed in a table to provide easy retrieval and reference (see Figure 1).

The development of the matrix of models and effects was a three step process that involved the compilation of a list of effects; the development of effect categories by model and domain; and the development of a matrix of models and effects. The project produced a data retrieval chart that allows the user to access information pertaining to teaching models based on instructional and nurturant effects classified by learning domains.

Figure 1: Instructional and Nurturant Effects of Selected Teaching Models: Cognitive and Affective Domains

Teaching Model	Cognitive Effects					Affective Effects				
	Knowledge Comprehension	Analysis	Synthesis	Application	Evaluation	Receiving	Responding	Valuing	Organization	Characterization
Group Investigation	I	I	I				I		N	N
Role Playing	N	I	I			I	I N	I		
Jurisprudential		I	I	I			N	N		N
Inductive Thinking	I N		I	I	N					
Biological Science	I	I		I N		N	N	N		
Concept Attainment	I			I		N		N		
Memory	I			N		N	N			
Advance Organizer	I			N						
Inquiry Training	I	I	I	I N		N	N	N		
Synectics	I N		I	I			I N	N		
Nondirective Teaching	N		I						N	
Direct Instruction	I							I N		
Contingency-Management	I			I						N
Self-Control						N		N		I N
Simulation	I N		N				N	N		

I: Instructional Effect

N: Nurturant Effect

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