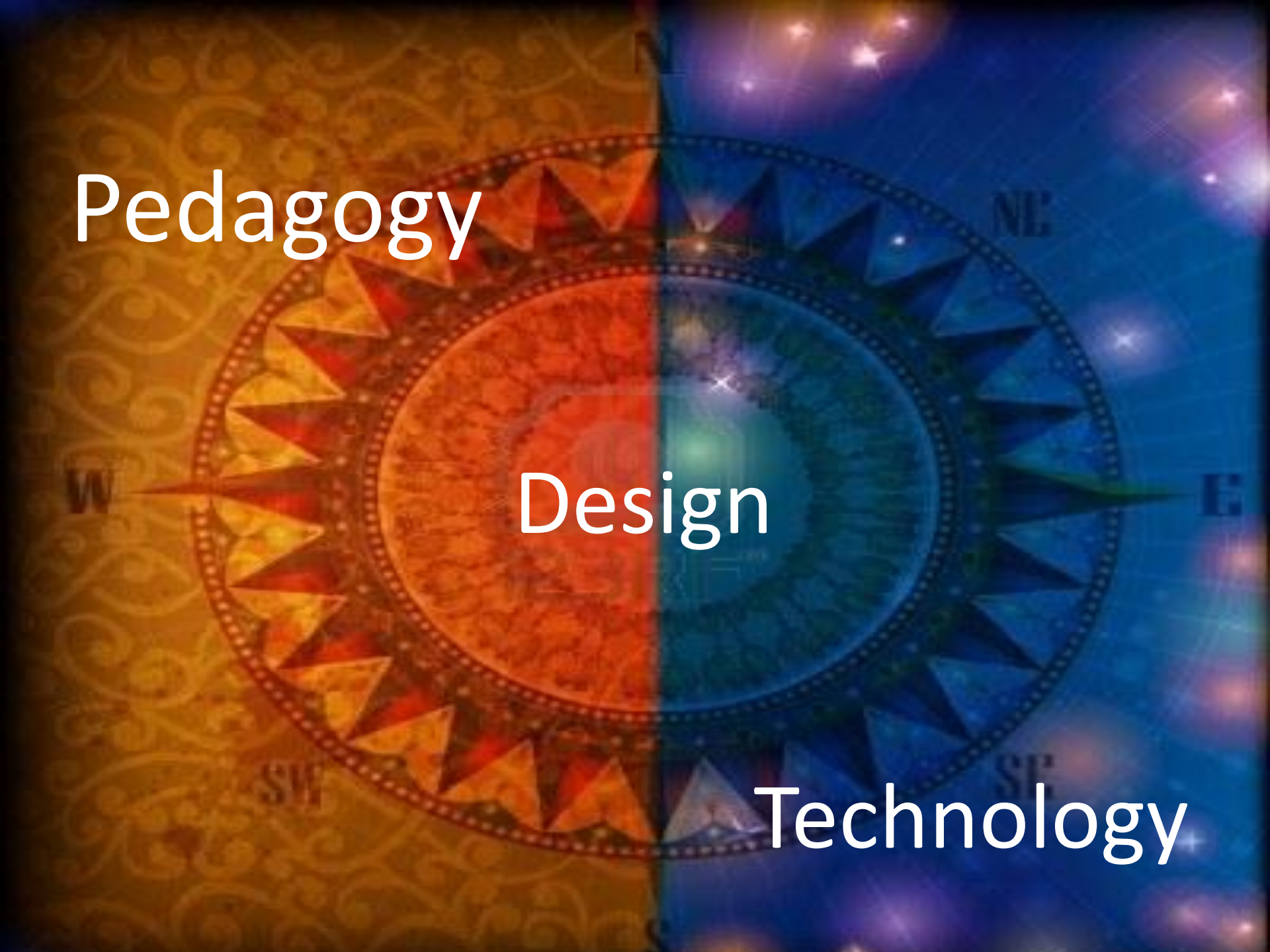# Research Group

- Technology in teacher education, curriculum design, and evaluation
- Distance education
- The impact of emerging technologies on education and society

TOWARDS A THEORY OF INSTRUCTION

Instruction & Teaching

- 1800s to the early 1950s, instruction and teaching were viewed as art forms

- Today they are considered more a series of techniques, methods, and concepts which are potentially unifiable into a theory of instruction

  - (Bugelski, 1971, DeCecco, 1968; Gage, 1964; Haddan, 1970).

Instructional psychology

- How best to enhance learning
- Solve instructional problems and make decisions about instructional practice
- Instructional theory results when instructional psychologists deductively derive principles of instruction from existing learning theory or inductively develop such principles from empirical studies.

The definition of instructional theory

- **Instructional theory:** Identifying methods that will best provide the conditions under which learning goals will most likely to be attained.
  - Build on or compatible with an existing learning theory.
- **Learning theory:** Specifying the link between what is to be learned and the conditions under which the learning occurs.
- **Instruction:** Deliberate arrangement of learning conditions to promote the attainment of some intended goal.
  - Provide principles by which teachers and instructional designers can assure learning.

"The input for a theory of instruction must include goal establishment, the cultural setting, and all that is known from experience, research, and history. Critical elements include the physical setting, curriculum, teachers, learners, pedagogy, and evaluation" (Hosford, 1972, p. 79).

Historical Development of Instruction and Learning

- Learning, epistemology, and cognition.
- The historical perspective of these schools were highlighted in this course to provide a basis for understanding the evolution and potential growth of instructional theory.
  - Theory construction and psychoeducational design
  - Teacher behavior and classroom dynamics & ARCS motivational design
  - Behavior modification and instructional technology
  - Cognitive construct instructional theories (Bruner, Ausebel, Piaget)
  - Task Analysis Instructional Theories (Bloom, Gagne etc.)

Universal Instructional Theory

- The learner
- The learning task (including desired learning outcomes)
- The learning environment (learning conditions & instructional methods)
- The frame of reference (or the context in which learning occurs)
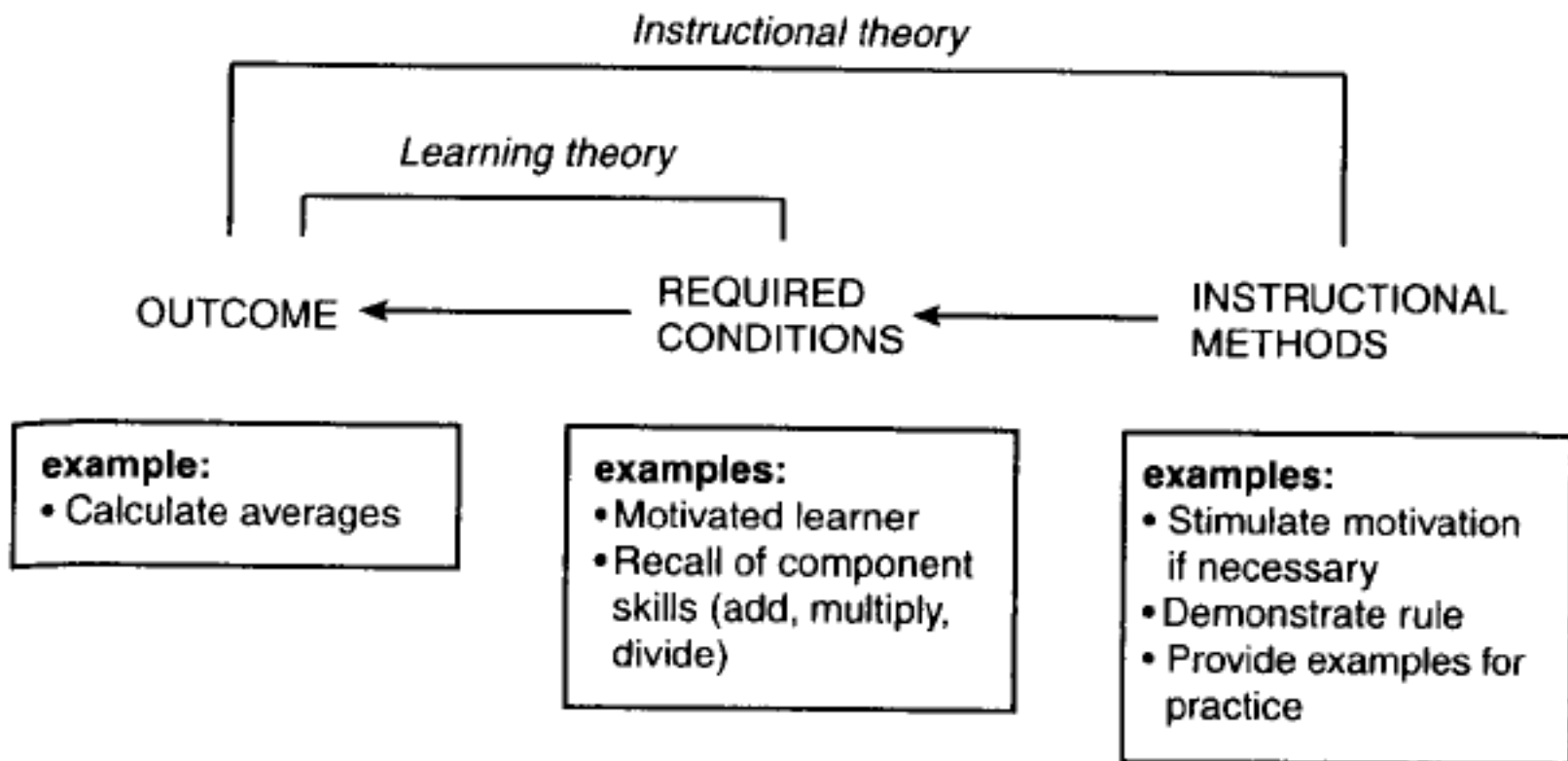 - Schott & Driscoll (1997)

FIGURE 10.1 The Relationship between Instructional Theory and Learning Theory

PSYCHOLOGICAL RESEARCH + THEORY	**LEARNING THEORY** PAVLOV THORNDIKE SKINNER GUTHRIE HULL TOLMAN ESTES	**COGNITIVE PSYCHOLOGY + EPISTEMOLOGY** WERTHEIMER PIAGET KOHLER ELKIND KOFFKA FLAVELL DUNCKER	**HUMANISTS** COMBS MASLOW ROGERS KELLY

APPLICATION + SIMPLIFICATION	**SIMPLIFICATION + APPLICATION TO EDUCATION** SKINNER BRUNER HADDAN HOLLAND GAGE DE CECCO KELLER GLASER SNELBECKER GAGNE BUGELSKI TRAVERS

EDUCATIONAL PSYCHOLOGY	**CLASSROOM INTERACTION** FLANDERS BELLACK DUNKIN + BIDDLE BROPHY + GOOD JOYCE + WEIL	**QUASI-INSTRUCTIONAL THEORY** GAGNE HOSFORD BRUNER	**APTITUDE TREATMENT INTERACTION** CRONBACH + SNOW

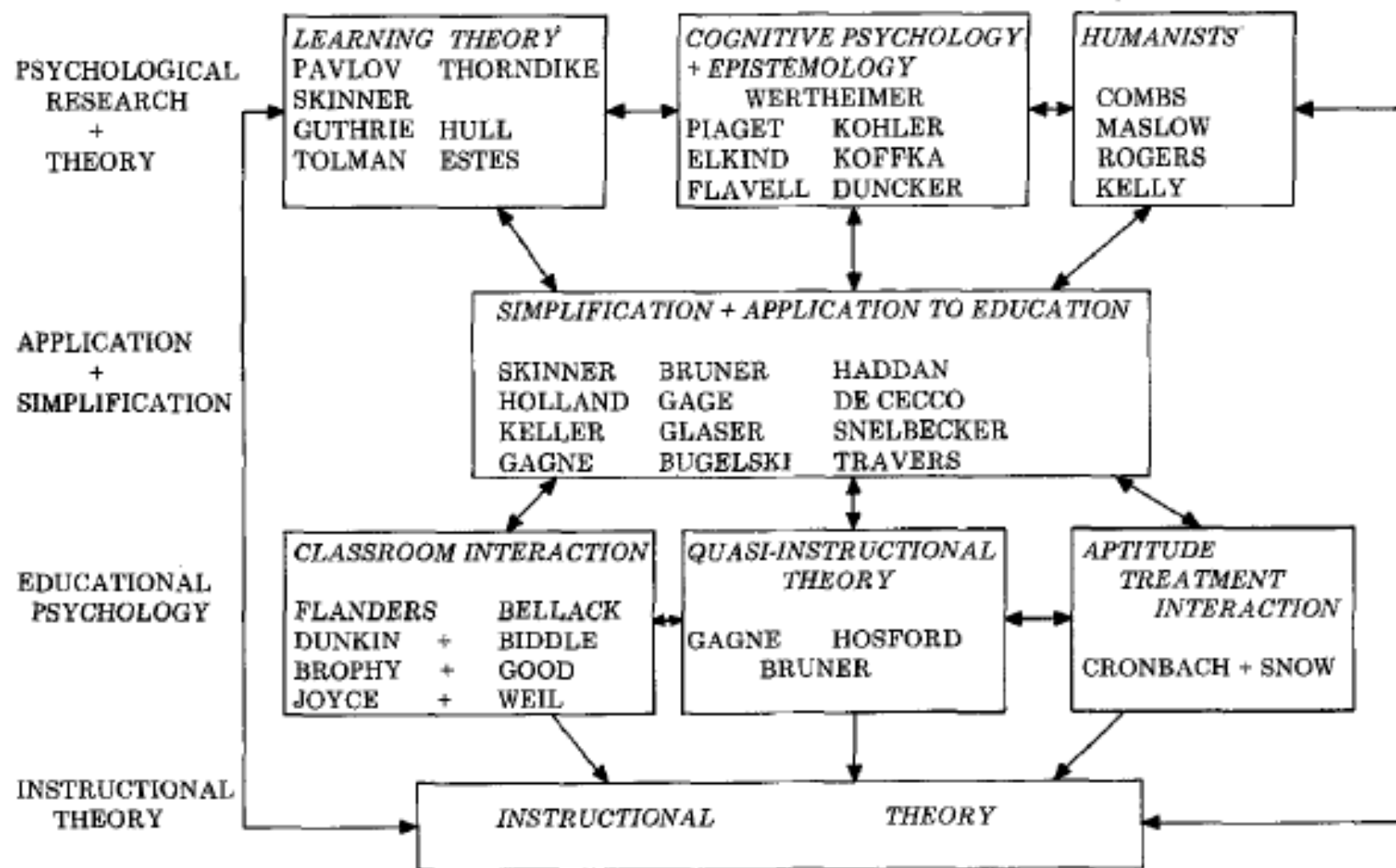| INSTRUCTIONAL THEORY	**INSTRUCTIONAL THEORY**

Fig. 1. Historical development of instruction and learning.

Instructional Theories

- Radical behaviorism→Performance analysis and improvement
- Ausubel meaningful reception learning→ Reigeluth's Elaboration Theory
- Situated cognition->Authentic instruction & apprenticeship models
- Bruner's instructional theory→Inquiry models
- Bandura's self efficacy & social learning→ Keller's motivational design

Cognitive and epistemological approaches

- Theorists adhering to cognitive approaches to learning included the
  - Gestaltists (Duncker, 1945; Hering, 1878; Koffka, 1924, 1935; Kohler, 1925, 1940; Muller, 1896; Wertheimer, 1912, 1945)
  - Structuralists, functionalists (Piaget, 1926, 1936, 1947; Baldwin, 1893, 1897, 1906)
  - Developmentalists and psychologists (Bruner, 1960; Elkind, 1967; Flavell, 1970; Werner, 1948).
- Phenomena of particular concern to these theorists were perception, concept formation, problem solving, creativity, and thinking; all nonobservable mental events that were shunned by the behaviorists.

Bruner's work in Instructional Theory

- Drawn upon research in concept attainment, human development, and the acquisition of knowledge
- Towards a Theory of Instruction
- An instructional theory must recognize the:
  1. Experiences which most effectively implant in the individual a predisposition toward learning,
  2. ways in which a body of knowledge should be structured so that it could be most readily grasped by the learner,
  3. most effective sequences in which to present the materials to be learned, [and]
  4. nature and pacing of rewards and punishments in the process of learning and teaching

(Bruner, 1966, pp. 40 41).

The field of classroom interaction

- Concurrent to the work of Gagne and Bruner other researchers were developing new perspectives and tools for analyzing learning aptitudes and classroom interaction
  - (Bellack, 1963; Brophy and Good, 1974; Cronbach and Snow, 1977; Dunkin and Biddle, 1974; Flanders, 1970; Joyce and Weil, 1972).

Humanistic Psychologists

- Concerns about the nature of human interaction and affect in the classroom (Association for Supervision and Curriculum Development, 1962; Combs, 1959; Kelley, 1947; Maslow, 1968; Rogers, 1969).

- Focused upon the role of the individual's personality upon learning.

"Without adequate attention to the personality of the learner, instruction could not be perceived as meaningful, nor incorporated into the learner's reality.

The foundation for instructional theory

- Diverse
- Roots deeply embedded in learning theory, cognitive psychology, and epistemology.
- Concerns for classroom interaction and the role of affect and aptitude on achievement.
  - Advantages?
  - Disadvantages?

Disadvantages

- Difficulty of extracting, reconciling, and incorporating principles drawn from antagonistic philosophies into an instructional theory.

- Instructional theories must deal with a wealth of situational variables and must be applicable in a variety of instructional situations.

- An instructional theory should lead to more productive research efforts and the treatment of learners in a nonfragmented fashion.

Commission on Instructional Theory

- Any instructional theory should contain clearly defined:
  - terms, and
  - boundary conditions

An instructional theory should be:
  - internally consistent,
  - congruent with empirical data,
  - capable of generating hypotheses,
  - be generalizable beyond the data at hand,
  - verifiable, and
  - capable of predicting future events.

Concurrent with discussions on the scope and purpose of "Instructional Theory," considerable related research has been conducted in allied fields.

- Behavior modification (Homme, 1970; Skinner, 1968),
- Cognitive psychology (Ausubel, 1966; Ojemann and Torrance, 1966)
- Humanistic psychology (Maslow, 1968; Rogers, 1969),
- Information processing, task analysis (Briggs, 1968; Gagne, 1965, 1974; Glaser, 1963)
- The study of teacher behavior (Cronbach and Snow, 1977)

Gagne's Eight Different Modes of Learning

- Gagne (1965), in a work drawing upon principles from both the behavioral and cognitive literature, posited eight different modes of learning.
- Each successive mode of learning presupposed the occurrence of the previous mode in the hierarchy.
  - Signal Learning (Type 1),
  - Stimulus-Response Learning (Type 2),
  - Chaining (Type 3),
  - Verbal Association (Type4),
  - Multiple Discrimination Learning (Type 5),
  - Concept Learning (Type 6),
  - Principle Learning (Type 7) and
  - Problem Solving (Type 8).

Gagne's conditions of learning

- Behaviorist roots
- Brings cognitive information processing perspective
- Serve basis to instructional design models

Gagné's Theory of Instruction —was developed by→ **Robert M. Gagné**

is made up of three components

A Texonomy of Learning Outcomes

Conditions of Learning

Nine Events of Instruction

Cognitive Domain

Affective Domain

Psychomotor Domain

are

**Cognitive Strategies
Intellectual Skills
Verbal Information**

Attitudes

Motor Skills

1. Gaining attention
2. Informing learners of objectives
3. Stimulating recall of prior learning
4. Presenting the stimulus
5. Providing learning guidance
6. Eliciting performance
7. Providing feedback
8. Assessing performance
9. Enhancing retention and transfer