Learning Theories

"Educational professionals should strive to integrate ***theory***, ***research***, and ***practice***. Effective teaching requires that we determine the best theoretical perspectives for the types of learning we deal with and their implications for teaching. When reinforced practice is important for learning, then teachers should schedule it. When learning problem-solving strategies is important, then we should study the implications of information processing theory. A continuing challenge for researchers is to specify similarities and differences among types of learning and identify effective instructional approaches for each" (pp. 21 & 25).

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	Conditioning Theories	Cognitive Theories			Teacher	Student		
Empiricism: a doctrine that reflects the idea that *experience* is the only source of knowledge (p. 6) Seminal Theorists: Aristotle & John Locke	**Behaviorism** (Ch.3)			- Behavior theories emphasize the forming of associations between stimuli and responses through selective reinforcement of correct responding (p. 25). - Behavior theories explain learning in terms of observable events (p. 26). - Behavior theories focus on external behaviors and consequences (p. 28). - The hallmark of conditioning theories is that they explain learning in terms of environmental events. These theories contend that mental phenomena are not necessary to	- Teachers should arrange the environment so that students can respond properly to stimuli (p. 22). - Teacher must be in a reinforcable interaction with student (Scheidt, 2009). - Teachers should enhance the similarity between situations and point out common elements (p. 24).	- Learner is programmed/ passive (Scheidt, 2009). - Behavior modification shapes quiet and docile behaviors (p. 100).	- Great for classroom management (Learning for the 21st Century, 2012). - Flashcards, games for independent practice (Scheidt, 2009). - Lecture, drill and practice, rote learning, multiple choice tests, computer games in S-R format with minimal thinking	- Views learning as a change in the rate, frequency of occurrence, or form of behavior or response, which occurs primarily as a function of environmental factors (p. 21) - Explains learning in terms of observable phenomena that need not include internal events (p. 21) **How does learning occur?** - Agree with cognitivists that differences among learners and in the environment can affect learning; however, they stress the role of the environment – specifically how stimuli are arranged and presented and how responses are reinforced (p. 22). **How does memory function?** - Conceive of memory in terms of neurological connections established as a function of behaviors being associated with external stimuli. View forgetting as caused by a lack of responding over time. Behavior theories posit that periodic, spaced reviews maintain the strength of responses in learners' repertoires (p. 23). **What is the role of motivation?** - Motivation is an increased rate or probability of occurrence of behavior, which results from repeating behaviors in response to stimuli or as a consequence of reinforcement (p. 23). [Seminal Theorist: Skinner] - Behavior theories contend that behaviors that are reinforced (rewarded) tend to be repeated in the future (p. 58). **How does transfer occur?** - Transfer depends on identical elements or similar features (stimuli) between situations. Behaviors transfer (or generalize) when the old and new situations share common elements (p. 24).

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				explain learning (p. 73).				**How does self-regulated learning operate?** - Self-regulated learning involves setting up one's own contingencies or reinforcement; that is, the stimuli to which one responds and the consequences of one's responses (p. 24). [few choices] **What are the implications for Instruction?** - Behavior theories seem best suited to explain simpler forms of learning that involve associations, such as multiplication facts, foreign language word meanings, and state capitals (p. 25).
	– Classical Conditioning/ Respondent Conditioning (Huitt, 2012)		John B. Watson Ivan Pavlov Sigmund Freud	- Involuntary behavior, S-R paradigm in which the stimulus elicits the response (Huitt, 2012) - Classical conditioning is a multistep procedure in which a neutral stimulus becomes conditioned to elicit a response through repeated pairing with an unconditioned stimulus (pp. 79 & 490)			- Programmed machines in S-R format primarily intended for testing (pp. 87 & 108).	

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	– Operant Conditioning*		B.F. Skinner	- Voluntary behavior, R-S paradigm in which the response is followed by a stimulus to either increase or decrease the behavior (Huitt, 2012) - Operant conditioning is a complex procedure in which reinforcement is presented contingent on a response emitted in the presence of a stimulus to increase the rate or likelihood of occurrence of a response (pp. 88 & 496).	- Environment is everything! Change the environment and you can change the individual (Global Beehive, 2010). - Teachers should properly arrange reinforcement contingencies (p. 102). - Teachers give feedback immediately following learners' responses (p. 102).	- Students learn by doing (p. 89) - Students actively respond rather than passively listen (p. 102). - Students move through material at their own pace (p. 102).	- Three-term contingency: (p. 87) $S^D \rightarrow R \rightarrow S^R$ model The *discriminative stimulus* (S^D) sets the occasion for a *response* (R) to be emitted, which is followed by a *reinforcing stimulus* (S^R). A → B → C model The teacher asks a question (S^D or Antecedent), calls on a student volunteer who gives the correct answer (R or Behavior), and says to the student "That's good" (S^R or Consequence). - Break skills down into smaller steps and give reinforcement (Global Beehive, 2010). - Behaviorist stressed associations. The whole is equal to the sum of the parts (p. 165). - *Premack Principle*: Teacher says, "after you do what I want you to do, you can do what you want to do" (pp. 92-93). - *Contingency Contract*: Teacher says, "if you do this, then you will receive that" (p. 111). - Schedules of Reinforcement: (p. 95, Walsh, 2013) • *Fixed-interval* (FI) – time interval is constant from one reinforcement to the next (free time on Friday) • *Variable-interval* (VI) – time interval changes from occasion to occasion around some average value (free time on a variable day of the week) • *Fixed-ratio* (FR) – the amount of responses is constant from one reinforcement to the next (free time after every 5th	- Punishment suppresses a response, but does not eliminate it; when the threat of punishment is removed, the punished response may return (p. 93). - There are alternatives to punishment: (p. 94) 1. *Change the discriminate stimuli* (move the child to the front of the class instead of the back), 2. *Allow unwanted behavior* (allow a student who stands when s/he should be sitting to continue to stand; similar to Guthrie's fatigue method), 3. *Extinguish unwanted behavior* (ignore minor infractions so that it is not reinforced by teacher attention), and 4. *Condition incompatible behavio*r (praise for good behavior, shows the student how to behave appropriately) - Generalization/transfer is a problem for the operant theory, because a response should not be made in a situation in which it never has been reinforced (p. 96). * The theory has been discredited because it cannot adequately explain higher-order and complex forms of learning. Although the principles are commonly applied to enhance student learning and behavior (p. 88).

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							workbook assignment) • *Variable-ratio* (VR) – the amount of responses changes from one reinforcement to the next around some average value (free time periodically around an average of five completed assignments) - Reduce aversive control by using alternative punishments, which will allow student to work on assignments because they want to learn or enjoy the assignments (p. 102). - *Behavioral objectives* are written as clear statements of the intended student outcomes of instruction (p. 103). - Environmental variables (i.e. learning time) affect students' learning, which has led to block scheduling and after-school program such as tutoring (p. 104-105). - Mastery learning guides how teachers break the course into learning units mapped against course objectives with a summative test (p. 106). - Programmed instructional materials in small steps with multiple-choice questions and immediate feedback (p. 107-108).	
	– Contiguous Conditioning Contiguity of Stimulus and Response		Edwin R. Guthrie	- Learning results from a pairing close in time of a response with a stimulus or situation (p. 491)		- Student who sits in a red chair while taking a test makes a good grade and then sits in that same red chair for the	- Flashcards for basic math facts, vocabulary words, and symbols (p. 85)	- Forgetting involves new learning and is due to interference in which an alternative response is made to an old stimulus (p. 84). - Practice links the various *movements* (discrete behaviors) involved in the *acts* (large-scale classes of movement that produce an outcome) and ideally should

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				- The key to changing behavior (a habit) is to find the cues that initiate the action and to practice another response to these cues (p. 85).		next test (Huitt, 2012)		transfer (pp. 84 & 85). - Responses do not need to be rewarded to be learned, but rather learning requires a close pairing in time between stimulus and response – contiguity (p. 85).
	– Connectionism • Trial and Error Learning • Law of Exercise: Law of Use and Disuse • Law of Effect • Law of Readiness		Edward L. Thorndike	- Learning is the forming of associations (connections) between sensory experiences (perceptions of stimuli or events) and neural impulses (responses) that manifest themselves behaviorally (pp. 74 & 491). - Connections are formed through repetition; conscious awareness is not necessary (p. 74).	- Teachers form the habits of their students; do not expect students to created habits themselves (p. 77). - Teachers should teach content in the way it is to be used/applied (p. 77). - Teachers should provide corrective feedback and practice in solving problems correctly (p. 77).		- Application of learned material in different contexts leads to mastery; not drilling students (p. 76). - Practicing a skill in a specific context did not improve one's ability to execute that skill generally (p. 76). - Suggests that knowledge and skills should be taught with different subjects; learning should be integrated across subjects (p. 78).	- Rewards strengthen connections, but punishment does not necessarily weaken connections (p. 77). - Connections are weakened when alternative connections are strengthened (p. 77). - Punishment suppresses responses, but the responses area not forgotten. Punishment is not an effective means of altering behavior because it does not teach student correct behaviors but rather informs them of what not to do (p. 77).

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Rationalism: a doctrine that reflects the idea that the *mind/reason* without recourse to the senses is the only source of knowledge (p. 5) Seminal Theorists: Plato & Descartes		**Cognitivism**		- Cognitive theories explain learning with such factors as knowledge construction, information processing, memory networks, and student perceptions and interpretations of classroom factors – teachers, peers, materials, and organization (p. 25). - Cognitive theories consider the cognitions, beliefs, values, and affects of learners (p. 26). - Cognitive theories posit that learning occurs internally (p. 28).	- Teachers should make learning meaningful and take into account learners' perceptions of themselves, others, and learning environments (p. 22). - Teachers should address students' perceptions of the value of learning by telling students how knowledge can be used in different settings, teaching rules and procedures to apply in situations to determine what knowledge will be needed, and by providing students with feedback on how skills and strategies can benefit them in different ways (p. 24).			- Stresses the construction of knowledge and skills, the development of mental structures and memory networks, and the cognitive processing of information and beliefs (p. 22) **How does learning occur?** - Agree with behaviorists that differences among learners and in the environment can affect learning; however, they stress the role of the learners' thoughts, beliefs, attitudes, and values (p.22). **How does memory function?** - Information processing theories equate learning with encoding, or storing knowledge in memory in organized, meaningful fashion. Forgetting is the inability to retrieve knowledge from memory caused by interference, memory loss, or inadequate cues to access information. Cognitive theories place greater emphasis on presenting material to be learned in such a way that the learner can organize it , relate it to what they know, and remember it in a meaningful fashion (p. 23). **What is the role of motivation?** - Motivation and learning are related, but not identical. Motivation can help to direct attention and influence how knowledge is constructed. Although reinforcement can motivate students, its effects on behavior are not automatic but instead depend on how students interpret it (p. 23). [Seminal Theorist: Bandura] - Cognitive and Constructivist theories of motivation postulate that it is the expectation of reward, rather than the reward itself, that motives behavior (p. 58). **How does transfer occur?** - Transfer occurs when learners understand how to apply knowledge in different settings. Situations need not share common elements (p. 24). **How does self-regulated learning operate?** - Self-regulated learning occurs when learners have some choice in their motives or methods for learning, time spent learning, criterion level of learning, the

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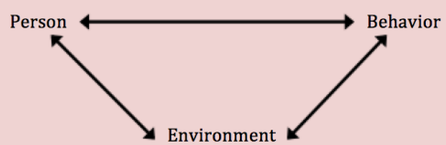
								setting where learning occurs, and the social conditions (p. 24-25). [lots of choices] **What are the implications for Instruction?** - Cognitive theories are more appropriate for explaining complex forms of learning, such as solving mathematical word problems, drawing inferences from text, and writing essays (p. 25).
		– **Social Cognitive Theory** (Ch.4)	A. Bandura	- People acquire knowledge, rules, skills, strategies, beliefs, and attitudes by observing others (*models*). Learning occurs in a social environment (p. 117). - SCT emphasizes the roles of expectations (e.g., self-efficacy, outcome) and goals; these beliefs and cognitions do not arise from nowhere but, rather, are constructed by learners (p. 302). - People act in accordance with beliefs about their capabilities (*self-efficacy*)	- Teacher may reteach some points rather than continue the lesson (p. 119). - Teachers know their students well and incorporate various educational practices (i.e., small groups and large groups so that all needs are met) to positively affect motivation and learning (p. 372).	- Student behaviors often alter the instructional environment (p. 119).	- *Models and Self-Efficacy*: Teachers build self-efficacy by introducing the lesson with a statement about all students being able to learn by working diligently. The teacher then explains and demonstrates. Possibly even uses other models such as student or experts (p. 153). - *Worked Examples*: Teachers present step-by-step problem solutions, often with accompanying diagrams or sound (narration). They incorporate cognitive models and demonstrations plus explanation (pp. 154 & 285). - *Tutoring and Mentoring*: Tutoring emphasizes content instruction within a short period of time while mentoring typically involves modeled counsel and guidance over a longer time (p. 155).	- SCT makes assumptions about learning and the performance of behavior: (p. 118) 1. There are reciprocal interactions among persons, behavior, and environments as represented by the Triadic Reciprocality Model of Causality a. Personal factors include cognition, affective, and biological events (Astroluna, 2010, 2:21). b. Behavior of the learner c. Environment includes factors such as teacher expectations, feedback, type of instruction, etc.  2. Enactive (through actual doing) and vicarious learning (by observing models – either live, symbolic, or electronic) a. SCT contends that behavioral consequences serve as sources of information and motivation, people's cognition affect learning; not consequences 3. There is a distinction between learning and performance. a. We can sometimes know things, but just not act on it. Conversely, we can have behaviors without knowledge (i.e. a 2 year old who can count yet does not have the

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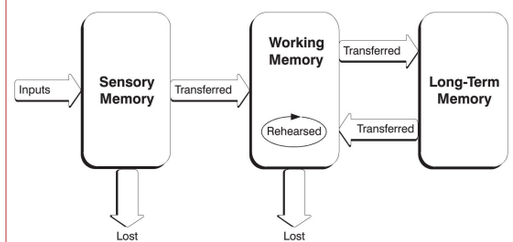
				and the expected outcomes (p. 117). - Self-efficacy refers to personal beliefs about one's capabilities to learn or perform actions at designated levels (p. 142).				understanding of a one-to-one correspondence) (Drjhilp, 2012, 7:36). 4. Role of self-regulation requires that people have choices and contends that people desire to control the events that affect their lives and to perceive themselves as agents. Perceived self-efficacy is a central process affecting one's sense of agency (others include outcome expectations, values, goal setting, self-evaluation of goal progress, and cognitive modeling and self-instruction)
		– **Information Processing Theory** (Ch. 5-6) Classical vs. Contemporary		- *Information processing* is actually not a single theory; it is a generic name applied to theoretical perspectives dealing with the sequence and execution of cognitive events (p. 160). - Information that is encoded for storage in LTM is easier to access. - Encoding and retrieval are facilitated through: (pp. 182-184, 204, & 235). • *Organization*: taken from Gestalt theory, hierarchal organization	- Teacher is the attention getter, organizer, connector and repeater; teacher logically organizes the information (Scheidt, 2010). - Teachers help focus students' attention for learning by using signals, movement, variety, interest, and questions (p. 173 & 176). • *Movement*: teachers engage students by moving around encouraging/ talking to students rather than sitting at a	- Students create new and evolving schema with charts and diagrams (Scheidt, 2010). - Contemporary theories stress knowledge *construction* (as opposed to earlier/classic views which emphasized knowledge acquisition similar to static computer input stages) by learners, or co-construction if others (e.g., teachers, peers) participate in the process (p. 173).	- *Guided practice* (a key component of direct instruction) consists "of the teacher working a few problems at the board and discussing the steps out loud… asking students to come to the board, work problems, and discuss their procedures… checking the answers of the entire class in order to see whether some students need additional instruction… [and] asking students to work together, in pairs or in groups, to quiz and explain the material to each other" (Rosenshine, 1995, p. 264-265). - Working memory has a limited capacity of seven plus or minus two (7±2) items and a limited duration (pp. 181 & 204). - *Advance organizers*: are broad statement presented at the outset of lessons that help to connect new material with prior learning (p. 196). • *Expository organizers* – provide students with new knowledge such as concept definitions (e.g., define warm-blooded animal, relate it to the animal classification and give	- Information in memory begins as environmental sensory input. Sensory memory holds information for miliseconds. The information is either lost or pocesssed in the brain as perceptions that include meanings. The information continues to be processed in WM (e.g., rehearsed/thought about) and integrated/compared with information in LTM or lost (p. 172).  - Classic Information Processing Theories downplays the importance of interactions between people and their environments once environmental inputs are received. This is a limited view. Most contemporary theories of learning and development (Bandura, Piaget, Bruner, & Vygotsky) hold that cognitive processes (including thinking and learning) are situated (located) in physical and social contexts (i.e., a reciprocal relationship between people and their environment) (p. 300). - Changes to the model: short-term memory (STM) was replaced by working memory (WM) to better reflect the dynamic (all processes workk simultaneoulsy) nature of

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				such as the animal classification system is one example. Others include mnemonic strategies and mental imagery. • *Elaboration*: is the process of expanding upon new information by adding to it or linking it to what one knows (i.e., mnemonic devices such as King Phillip Cried Out For Good Soup). • *Schema*: is a structure that organizes large amounts of information into a meaningful system (i.e., knowing what to expect when going to a restaurant). - Retrieval of knowledge occurs when the appropriate cues	desk (Burns, 2012, 14:45) - Encoding specificity refers to the manner of encoding. Retrieval occurs best when cues (content) and conditions (context) match those present during encoding/learning (pp. 207 & 235). - *Teaching for transfer*: transfer (applying knowledge in new ways, in new situations, or in familiar situations with different content) must be directly addressed. Practicing skills in varied contexts and ensuring that they understand different uses for knowledge (e.g., *homework*) builds links in LTM. There are many types of transfer: (pp. 226 &234-235). • Positive – driving skills		its characteristics) and generalizations (e.g., less vegetation grows at higher elevations) needed to comprehend the lesson. • *Comparative organizers* – introduce new material by drawing analogies with familiar material. - *Conditions of learning*: the circumstances (see bullets) that prevail when learning occurs (pp. 197 & 491). • *Learning outcomes* – intellectual skills, verbal information, cognitive strategies, motor skills, and attitudes (p. 198) • *Learning events* – include internal conditions such as prerequisite skills and cognitive processing requirements of the learner & external such as environmental stimuli (p. 198) • *Learning hierarchies* – are organized sets of intellectual skills with the highest element in the hierarchy being the target skill (p. 199, DLM, and Haring & Eaton, 1978). • *Phases of learning* – include preparation, acquisition, and transfer (pp. 200-201) - *Cognitive load*: refers to the demands placed on the information processing system and in particular to WM. Ways to reduce cognitive load include scaffolding, simple to complex sequencing, use of authentic tasks, and collaborative learning (pp. 201-202).	information processing and stages are replaced with phases of informtion processing such as perceiving and integrating new knowledge into long-term memory (LTM) (p. 172). - Regardless of how LTM comparisons are made (e.g., template matching, prototype theory, or filing cabinet[l]), research evidence supports the idea that perception depends on bottom up and top-down processing (pp. 178-179 & [l]Treisman, 1992). • *Bottom-up processing*: analyzes features and builds a meaningful representation to identify stimuli (i.e., beginning readers), also used when unfamiliar stimuli is encountered (i.e., handwriting) • *Top-down processing*: incorporates prior knowledge, experiences, context, beliefs on perception, and motivational states to identify familiar stimuli (i.e., skilled readers) - Forgetting refers to the loss of information from memory or to the inability to retrieve information because the information has been distorted, the retrieval cues are inadequate, or other information is interfering with its recall (p. 215).

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				enter WM and activates LTM networks through spreading activation (p. 235). - Focus is on how knowledge is acquired, rather than constructed (p. 296). - Thinking resides in the mind rather than in interaction with people and situations (p. 297). - Processes of thinking and learning are *relatively uniform across people* and develop in *formal instructional settings* (p. 297).	facilitate acclimating to a new car • Negative – driving a standard transmission could interfere in driving an automatic • Zero – driving skills have no influence on computer skills			
		• Gestalt Theory*	Wertheimer Koffka Köhler	- The essence of Gestalt psychology is that objects or events are viewed as organized wholes. The basic organization involves a figure (what one focuses on) against a ground (the background). What is	- Teacher should try to make concepts meaningful (make abstract concepts more concrete). For example, in the problem $4x+7=15$, 'x' can represent cookies such that the sentence is "4 times how many cookies plus 7 equals 15 cookies?" (p.	- Students have to know how to use the abstract symbols (p. 159).	- The whole is greater than the sum of its parts (p. 165). - Gestalt psychologists felt that the whole loses meaning when it is reduced to individual components. For example, when teaching algebra, the variable 'x' loses meaning unless it can be related to broader categories like cookies, which can take on different values (pp. 159 & 165). - Some of the most important *Gestalt principles* are figure-ground relation, proximity, similarity, common direction, simplicity, and closure (pp. 165-166).	- Learning is a cognitive phenomenon involving reorganizing experiences into different perceptions (pattern recognitions) of things, people, or events. Insight occurs when people suddenly "see" how to solve the problem (pp. 165 & 177). * Gestalt theory is no longer viable, although it offers important principles that are found in current conceptions of perception and learning. Information processing principles are clearer and explain perception better (pp. 164 & 167).

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				important is the configuration, not the individual parts (p. 165). - Gestalt Theory holds that perception (attaching meaning to environmental inputs received through the senses) is meaningful (pp. 165 & 177).	159). - Learning is enhanced by classifying and grouping bits of information into organized chunks (p. 183).		• *Figure-ground*: postulates that any perceptual field may be subdivided into a figure against a background. Such salient features as size, shap, color, and pitch distinguish a figure from its background (pp. 166). • *Closure*: means that people fill in incomplete patterns or experiences (p. 167).	
		– **Constructivism** (Ch. 8)	Theorists: Piaget Bruner Vygotsky Philosopher: John Dewey	- Psychological & philosophical perspective contending that individuals form or construct much of what they learn and understand (p. 296). - Constructivism is not a theory but rather an *epistemology*, or philosophical explanation about the nature of learning (p. 298). - Highlights the interaction of people and situations in the acquisition and	- Teachers provide minimal instructional guidance (p. 302). - Teachers actively engage learners by customizing relevant connections to students' prior knowledge and using open-ended questions; serve as models, guides, and facilitators (Scheidt, 2009). - Teachers provide experiences that challenge their thinking and force them to	- Learners create new knowledge based on experience; judges his/her own progress (Scheidt, 2009). - People are active learners and develop knowledge for themselves through the manipulation of materials and social interaction (pp. 298 & 299). - Students are part of a learning community that values ideas and opinions (senoritasophs13, 2013, 1:41).	- Emphasis is on the integrated curriculum in which students study a topic from multiple perspectives/ subject areas (pp. 299 & 303). - *Discovery learning* refers to obtaining knowledge for oneself. Teaching for discovery requires presenting questions, problems, or puzzling situations to resolve and encouraging learners to make intuitive guesses. Discovery can impede learning when students have no prior experience. It is best suited when the learning process is important (pp. 333-334). - *Inquiry teaching* is a form of discovery learning, although it can be structured to have greater teacher direction (p. 335). - *Discussion and debates* are useful when the objective is to acquire greater conceptual understanding or multiple sides of a topic (p. 336).	- Focus is on how knowledge is constructed, rather than acquired (i.e., Classic Info Processing Theory) (p. 296). - Thinking derives from knowledge and skills developed/ constructed by individuals as a function of their *experience*, not necessarily formal instruction (p. 297). - Knowledge is not imposed from outside people bur rather formed inside. A person's constructions are true to that person but not necessarily to anyone else. This is a major drawback of many forms of constructivism. Educators cannot accept this premise in good conscience because education demands that we impart certain values (e.g., honesty, fairness, responsibility) in our students regardless of whether some societal constituencies do not deem them important (pp. 298 & 302). - Constructivists' emphasis on minimal instructional guidance may downplay the importance of human cognitive structures (p. 302). - Constructivism is not a single viewpoint but rather has different perspectives: (pp. 299-300)

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				refinement of skills and knowledge (p. 298).	rearrange their beliefs (p. 302).		- Role-playing, debates, cooperative learning groups, and real world activities like internships (Learning for the 21st Century, 2012, 1:55).	• *Exogenous* – posits a strong influence of the external world (i.e., experiences, teaching, and exposure to models) on knowledge; views are appropriate when the interest is determining how accurately learners perceive the structure of knowledge within a domain (compatible with contemporary Information Processing Theories) • *Dialectical* – posits knowledge derives from interactions between people and their environments, views are appropriate for designing interventions to challenge children's thinking (compatible with Bandura's Social Cognitive Theory and the developmental theories of Bruner and Vygotsky) • *Endogenous* – posits that knowledge develops through the cognitive activity of abstraction and follows a generally predictable sequence; views are appropriate for exploring how learners develop from novices through greater levels of competence (compatible with Piaget's Cognitive Development Theory)
		• Cognitive Development Theory	Jean Piaget	- Cognitive development depends on four factors: biological maturation, experience with the physical environment, experience with the social environment, and equilibrium (p. 303). - Equilibrium is a biological drive that makes internal mental structures and external	- Teachers should evaluate the developmental levels of their students prior to planning lessons (p. 307). - Teachers need to build enrichment activities into their lessons (p. 307).	- Children make sense of their environments and construct reality based on their capabilities at the present time (p. 306).	- Teachers should: (p. 307) • *Understand cognitive development* – student should not be expected to operate at the same level • *Keep students active* – rich environments that allow for active exploration and hand-on activities) • *Create incongruity* – optimal learning is that which is not too difficult nor too easy; can also be created by allowing students to solve problems and arrive at wrong answers • *Provide social interaction* – development can proceed without social interaction, but it is a key source for cognitive development	- Piaget concluded from his research that children's cognitive development passed through a fixed sequence of stages: (p. 304) • Sensorimotor – birth to 2 • Preoperational – 2 to 7 • Concrete operational – 7 to 11 • Formal operational – 11 to adult - Developmental change is internal. Environmental factors are extrinsic; they can influence development but not direct it. Piaget contended that cognitive development could not be taught, but could be accelerated. This suggests that teaching may have little impact on development (p. 306). - Learning occurs when children experience cognitive conflict and engage in equilibrium to construct or alter internal structures. *Optimal learning* occurs when the conflict is small and when children are in transition between stages (p. 306).

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				environmental reality consistent with each other; resolves conflicts with one's thinking (pp. 303 & 306).				- Current research indicates that changes in children's thinking seem to be linked to more gradual changes in attention and cognitive processing than cognitive structures as Piaget suggested (pp. 306 & 308).
		• Cognitive Growth Theory	Jerome Bruner	- Learners assign meaning to stimuli and events based on their cognitive capabilities and experiences with the social and physical environments (p. 310). - Recommends that concepts be taught in a simple fashion so children can understand them and represented in a more complex fashion with development (p. 310).	- Teachers revisit learning through a spiral curriculum.		- Teaching is a means of prompting cognitive development (p. 309). - When teaching math, teachers should: (p. 310) 1. Review prior knowledge (basics related to concept) 2. Allow students to work with manipulatives (enactive representation) 3. Use a visual (iconic) representation 4. Present problems in symbolic mode	- Highlights the various ways that children represent knowledge, which emerge in a developmental sequence: (p. 308) • *Enactive* – motor responses; ways to manipulate objects and aspects of the environment (i.e., blocks) • *Iconic* – action-free mental images; visual properties of objects and events that can be altered (i.e., pictures) • *Symbolic* – symbol systems; (e.g., language and mathematical notation); remote and arbitrary (i.e., the *x* variable in $3x-5=10$) - Debunked Thorndike's Law of Readiness (p. 75) by suggesting that instruction needs to be *differentiated* to match children's cognitive abilities so that they can learn. Any content can be taught in a meaningful fashion to learners of any age (p. 309). This does not mean that learners of any age can be taught anything (p. 310). - The goal of *differentiated instruction* is to facilitate student's meaningful access to the curriculum. All school personnel need expertise in "developing and using modifications, instructional strategies, and data collection procedures so all students can participate in and demonstrate progress on the general education content standards, thus addressing context, content, high expectations, and accountability measures" as addressed by IDEA (Ryndak, et al., 2008, p. 208).
		• Sociocultural Theory	L.S. Vygotsky	- Establishes a psychological theory that unifies behavior and mind (p. 313).	- An expert/ competent teacher provides learning opportunities for students (only part of the ZPD)	- Knowledge is co-constructed between two or more people; learners are part of a community (p. 313).	- The *zone of proximal development* (ZPD)… • Is the difference between what children can do on their own and what they can do with assistance from others. Interactions with adults and peers in the ZPD	- Stresses the interaction of interpersonal (social), cultural-historical, and individual factors as the key to human development (p. 312). • The social environment is critical for learning and thought that social interactions transformed learning experiences (p. 312). • The cultural-historical aspects illuminate the

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	Conditioning Theories	Cognitive Theories			Teacher	Student		
				- Vygotsky's position is a form of dialectical (cognitive) constructivism because it emphasizes the interaction between people and their environment (p. 313). - Emphasizes the importance of social interactions in acquisition of skills and knowledge (p. 297). - Learning involves transforming and internalizing the social environment. Vygotsky believed that self-verbalization "self-talk" helps develop thought by organizing behavior (p. 319 & 321). ➢ "If you can say it, you can do it."	(pp. 315 & 318). - Teachers use a student's prior knowledge to enhance learning (p. 315). - Instructional styles are not equally beneficial for all cultures; value of *differentiated instruction* (p. 318). - Learning Environments: (p. 326) • Teachers should pose problems of emerging relevance to students • Structure learning around primary concepts • Seek and value student's points of view • Adapt curriculum to address students' suppositions/ beliefs to	- Learners bring their own understandings to social interactions and construct meanings by integrating those understandings with their experiences in the context (p. 314).	promote cognitive development (p. 313). • Represents the amount of learning possible by a student given the proper instructional conditions (p. 314). • Requires a good deal of guided participation (p. 314). • Has often been wrongly viewed in a rather limited way that emphasized the interpersonal at the expense of the individual and cultural-historical levels and treats the concept in a unidirectional fashion (p. 314). • Broadly refers to now forms of awareness that occur as people interact with their societies' social institutions (p. 315). • Must be viewed by placing it in a larger theoretical context that is centered around cultural influence (p. 318). - *Reciprocal teaching* involves an interactive dialogue between a teacher and a small group of students. Although it is not a Vygotskian concept, the term captures this sense of dynamic, multidirectional interaction found in ZPD (pp. 316 & 318). - *Self-regulated learning* requires metacognitive processes such as planning, checking, and evaluating (p. 315). - *Instructional scaffolding* refers to the process of controlling task elements that are beyond the learners' capabilities so that they can focus on and master those features of the task	point that learning and development cannot be dissociated from their context. Thus, "school" is not simply a word or a physical structure but also an institution that seeks to promote learning and citizenship. Vygotsky believed that school was important because it allowed learners to develop greater awareness of themselves, their language, and their role in the world (pp. 312 & 315). • Human development occurs through the cultural transmission of tools (i.e., language, symbols). All learning is *socially mediated* by tools such as language, symbols and signs. Tools are used as mediators of more advanced learning (pp. 313 & 322). - Most controversial contention was that all higher mental functions originated in the social environment; however, the claim appears to be too strong (p. 313). • Young children mentally figure out much knowledge about the way the world operates long before they have an opportunity to learn from the culture in which they live. • Children also seem biologically predisposed to acquire certain concepts (e.g., understanding that adding increases quantity), which do not depend on the environment. - Learning is often sudden, in the Gestalt sense of insight, rather than reflecting a gradual accretion of knowledge (p. 314). - The construction process also includes children's inventing of procedures that incorporate implicit rules (p. 317). - Assessment is less concerned about right and wrong answers than about next steps after students answer (p. 328). - Teaching style is reflective and takes into account knowledge of students, the context, psychological processes, learning and motivation, and knowledge

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					• avoid lessons that lack meaning, alignment need not be perfect (recall ZPD) • Assess student learning in the context of teaching (continuous, authentic, and of both the teacher and student)		that they can grasp quickly. Not a formal part of Vygotsky's theory (actually past of Bandura's participant model technique), but fits nicely within the ZPD (p. 316). - *Peer collaboration* reflects the notion of collective activity (i.e., comparing solutions/answers with partners). Cooperative groups are most effective when each student has assigned responsibilities and all must attain competence before and are allowed to progress (pp. 316-317, 318; Scheidt, 2009). - Through *apprenticeships* and collaborations, learners transform their experiences based on their knowledge and characteristics and reorganize their mental structures (p. 312). - Peer-assisted learning includes peer tutoring and cooperative learning such as the jigsaw methods and STAD (student-teams-achievement division). Cooperative learning is best suited for material with well-defined objectives or problems with clear answers (p. 324-325).	about oneself (p. 328). - Constructivist assumptions of self-regulated learning: (p. 424) • There is an intrinsic motivation to seek information. • Understanding goes beyond the information given. • Mental representations change with development. • There are progressive refinements in levels of understanding. • There are developmental constraints on learning. • Reflection and reconstruction stimulate learning.