SOLUTIONS MANUAL

Educational
Psychology

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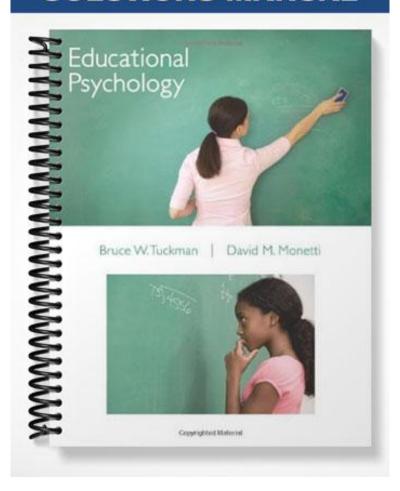# *Chapter 2: Cognitive and Language Development*

This chapter deals with principles of cognitive development, brain physiology and brain-based learning and teaching. The important contributions of the theories Jean Piaget and Lev Vygotsky, and their application to classroom practice are presented. The relationship between language, language development, and thinking is also included. Since the capacity for thinking grows as children mature, developmentally appropriate experiences that will facilitate this growth in the classroom environment are also provided.

Outline
Stories to Learn From: Infinity
I.   Cognitive Development and the Brain
    A. General Principles of Cognitive Development
        1. Children develop at different rates
        2. Development if continuous and orderly
        3. Learning, experience, and social interaction contribute to development
        4. Heredity and environment affect development
    B. Physiology of the Brain
        1. Neurons: cell body, dendrites, axons
        2. Cerebral Cortex: left hemisphere, right hemisphere, lateralization
    C. Brain-Based Learning
        1. Twelve mind-brain learning principles: the brain: a) is a complex adaptive system,b)is social, c) searches for meaning, d)uses patterning, e)perceives and creates parts and wholes simultaneously, f) uses focused and peripheral attention, g)uses conscious and unconscious processes, h)organizes memory, i) learns developmentally, j) is challenged and inhibited by threat, k) is uniquely organized.
        2. Three conditions for complex learning
            a. Relaxed alertness
            b. Orchestrated immersion
            c. Active processing
II. Developmental Psychology of Piaget
    A. Schema: basic unit of cognitive organization
    B. Adaptation: interaction with environment
    C. Assimilation: incorporates new information
    D. Accommodation: modifies existing schema
    E. Equilibration: motivates intellectual development
    F. Intelligence: combination of all schemata
    G. Operations: systems for dealing with events
III. Piaget's Four Stages of Cognitive Development
    A. Sensorimotor (Infancy - toddlerhood)
        1. Concepts of objects
        2. Cause and effect relationships
        3. Object permanence
Box 2.1 Did You Know?

    B. Pre-operational (Early childhood)
       1. Symbols can represent ideas
       2. Egocentrism: focus on self
       3. Centration: focus on only one aspect of stimulus
       4. Irreversibilty: inability to think backward/ reverse event
       5. Conservation: quantity stays the same

Box 2.2 An Example to Aid Understanding

    C. Concrete Operational (Elementary – Middle)
       Capacity for logical thinking develops
       1. Inversion: application of reversibility
       2. Compensation: one dimension compensates equally for another
          a. Seriation
          b. Classification
    D. Formal Operations (High School – College)
       Reasons logically using abstract schemata to solve problems
       1. Deductive reasoning
       2. Inductive reasoning
       3. Reason about a number of variables at the same time
IV. Applying Piaget to Educational Practice
    Practical applications of schooling process
    A. Learning by exploration
    B. Learner-Centered Orientation
    C. Use of Themes

Box 2.3 Take it to the Classroom

    D. Focus on development of schemata
V. Critique and Updating Piaget's Theory
    A. Concepts such as object permanence and conservation may occur earlier
    B. Clear demarcation between stages is not supported by new studies
    C. Children can learn more that assumed depending on task and instruction
VI. Developmental Psychology of Lev Vygotsky
    Emphasis on society and culture in promoting cognitive growth
    Social Interaction: language mediates between situation and meaning conveyed
    A. Internalization: social activities evolve into mental abilities
    B. Behavior is affected by the context in which it occurs
    C. Zone of Proximal Development: range of tasks children perform with help and those they can perform with assistance
    D. Applying Vygotsky to Teaching
       1. Provide learners with challenging tasks
       2. Have learners work cooperatively
       3. Provide cognitive models
       4. Provide tasks with real-world connections
       5. Relate to learner's cultural context
VII.   Language Development
    There are four main aspects of language
    A. Phonology: the distribution and patterning of speech sounds and pronounciations
    B. Meaning: the relation between words and what they describe

    C. Grammar: rules for ordering words to form sentences.
    D. Communication: using the three aspects above to convey information including social conventions (pragmatics)
VIII.   Language and Thinking
    Prevalent theory is that language and thought influence each other
IX. Is Language Special?
    Evidence that language is special:
    A. Chomsky claimed that a language organ facilitates language acquisition
    B. Acquisition of language is universal
    C. Language is independent of other aspects of cognitive development
    D. Language acquisition is self-motivated
X. Facilitating Language Development in the Classroom
    Recommended techniques:
    A. Modeling: restate and add words
    B. Expansion: add information
    C. Self-talk: model talking to describe task while doing it
    D. Parallel talk: describe activity as child is doing it

Learning Objectives

1. Explain general principles of development and the relationship between the brain and cognitive development.
2. Describe intellectual development according to Piaget as the process of adaptation, featuring the schema, the processes of assimilation, accommodation and equilibration, and the four factors that influence cognitive development.
3. Explain and illustrate the four stages: (a) sensorimoter (b) preoperational (c) concrete operational (d) formal operational, of Piaget's model of cognitive development.
4. Apply Piaget's conception of cognitive development to the process of education.
5. Recognize criticisms and limitations of Piaget's theory.
6. Explain Vygotsky's theory of cognitive development in terms of its main concepts and characteristics: sociocultural perspective, social construction of meaning, internalization, zone of proximal development, and scaffolding, and apply it to teaching.
7. Describe language development, including the concepts of phonology, grammar, and communication, and illustrate how language development can be facilitated in the classroom and English language learners accommodated.

Lecture Topics

Focus only on major parts of Piaget's theory which have application for classroom context. Some of the information will be of interest primarily to early childhood practitioners. Provide opportunities for students to experiment / perform tasks related to concepts such as conservation and seriation.

Assignments

1. Students create a compare and contrast chart for theories developed by Piaget and Vygotsky and select the one that they think made the most significant contribution and explain why.
2. Students should try some of Piaget's experiments with children and report back to class on their observations. If possible, videotape and share and analyze with class.

Service

- Volunteer to assist in pre-school or kindergarten classroom.
- Help at local library in children's or young adult sections.

Articles for Further Study

*Bergen, D. & Fromberg, D. (2009). Play and social interaction in middle childhood. *Phi Delta Kappan*, 90 (6), 426-430.
1. How is play defined? 2. How can educators and parents facilitate aspects of play that support emotional, social, cognitive, and creative growth?