

# Driscoll Chapter 6

## Cognitive and Knowledge Development

### 1. Introduction

- To this point learning theories have not greatly taken into account age and the effects of social interaction (situated cognition notwithstanding). Jean Piaget represents a unique and valuable perspective on learning, tying it with the biological development and distinct stages. Though a lot of his theory has been either rejected or developed, I often wonder if he was more right that we're now giving him credit for. In any case, his perspective can be quite inspirational.

### 2. Terms to Know

- Four Stages of Development
  - Sensorimotor
  - Preoperational
  - Concrete operational
  - Formal operational
- Three Development Processes
  - Assimilation
  - Accommodation
  - Equilibration
- Conservation
- Scheme

### 3. Comments

- First and foremost, Piaget shows us that teaching children is not like teaching adults. Dewey said once that it is wrong to treat children as “defective adults,” and Piaget experimentally makes a case for that priority. In this light, cognitive development is transformation, not just knowledge acquisition.
- The main questions, then are what stages are there for children to pass thought, and how do they do it? Piaget suggested that this process is neither empirical nor innate. Rather, knowledge is constructed in response to the world. He is the first to use the term constructivism, though others have said he preferred constructionism.

- Almost as a precursor to Gardner, Piaget posited three types of knowledge.
  - **Physical Knowledge.** This is an understanding of *things* in the world that has been acquired through direct interaction.
  - **Logical-mathematical knowledge.** This is an abstract knowledge that must be invented within the child.
  - **Social Knowledge.** This contains those things that are transmitted through the culture and environment. As opposed to the first two knowledges, social knowledge must be learned from others.
- **Stages of Development**
  - Conditions for defining stages
    - Each stage is a qualitative leap from the previous
    - Each stage is passed through by every child no matter the culture. There can be no regression from a higher stage to a lower.
    - Each stage contains the abilities of all earlier stages
    - Each stage is logically consistent in its use of schemes and operations.
  - The four stages
    - **Sensorimotor (Birth to 2)**  
Modification of innate reflexes to the beginning of mental representation. If it's visible, it exists. Focuses on things.
    - **Preoperational (2 to 7)**  
Can mentally represent objects. Beginning of language games. Pretending. Egocentrism, where children "talk past" each other (and their parents!). Centration, where they can only focus on a part of a problem
    - **Concrete (7 to 11)**  
Able to demonstrate logically integrated thought. Achieve conservation. Able to conceive of the whole of an issue. No hypothetical ability.
    - **Formal (11 to adult)**  
Able to use abstract reasoning. Can plan systematic approaches to problem solving. Can imagine possibilities beyond the current situation.
  - Processes of Development
    - **Assimilation**  
Perception based upon existing schemes or operations. Add to the structure.
    - **Accommodation**  
Perception requires modification of schemes or operations. Change to the structure.

- **Equilibration**

The process where assimilation and accommodation lead to a realization that there is a major discrepancy between the child's understanding and the environment. This "disequilibrium" causes active development towards a new stage. Brings structure to reflect new realities.

- Criticisms of Piaget

- Sequence of stages is not evidently as rigid as Piaget contended. It has been found that some societies never reach the Formal Operational stage. Some media theorists even feel this is largely true in America due to television. Why would they say that?
- The stages are radically different from one another. Evidence has shown this not to be the case, but instead there lot of intermixing. I love Piaget's notion of the "American Question" - how can we accelerate development. Perhaps evidence of this is present in the alternative ideas later chapter that come from information processing.
- Exhibition of stage characteristic is not consistent, but rather situational to different tasks. A preoperational child is not completely preoperational all the time.
- Changes in characteristics are not due to equilibration, but can be shown to result from specific increased knowledge. Piaget's idea of equilibration is actually more heavily criticized than Driscoll shows. Many see it inadequate to describe why we learn.
- Alternatives to Piaget can be taken as a whole. I find it interesting how many play with the notion of short term memory as an alternative to stages. As a child learns to "chunk" or develops automaticity, the "stages" are developed. I will leave it to you all as to how convincing the information processing alternatives are to Piaget.
- Implications for Instruction
  - Children need to control what they learn and when. It is up to designers of instruction to create possibilities, not programs.
  - A key point here is that the discover learning of the child is not controlled in any way by the teacher. This will be a contrast to controlled environments discussed in the next chapter. The key point is to enable the child to learn in their way; not to do so makes the child unsure of their own perspective on learning.
  - Only social knowledge can have a program or curriculum
  - Children need to interact with peers in their learning. If we accept any version of Piaget's stage theory, then this has to made sense. The formal operational teacher cannot communicate with the concrete operational

student nearly as well as others in the same developmental location. Teacher and student are in two different universes.

- Learning environments should find ways to challenge students' inconsistencies, but should in no way seek to accelerate the developmental process.
- As a final note, it is enticing that at the end of the chapter there is mention of applying some form of developmental stages to adults who are novice learners in an area. I have long felt this would be a productive area of inquiry. Certainly there are ties in this way to the concepts of situated cognition (legitimate peripheral participation) and apprenticeship. I would like try teaching beginning Web authoring using sensorimotor and preoperational concepts in an environment of student-initiated discovery. But that would take a lot of planning and work - maybe someday.