

Jean Piaget (Intellectual Development)

Author: Wanda Y. Ginn

The focus of this paper is Jean Piaget's theory of intellectual development. Piaget has been labeled an interactionist as well as a constructivist. His interest in cognitive development came from his training in the natural sciences and his interest in epistemology. Piaget was very interested in knowledge and how children come to know their world. He developed his cognitive theory by actually observing children (some of whom were his own children). Using a standard question or set of questions as a starting point, he followed the child's train of thought and allowed the questioning to be flexible. Piaget believed that children's spontaneous comments provided valuable clues to understanding their thinking. He was not interested in a right or wrong answer, but rather what forms of logic and reasoning the child used (Singer, 1978). After many years of observation, Piaget concluded that intellectual development is the result of the interaction of hereditary and environmental factors. As the child develops and constantly interacts with the world around him, knowledge is invented and reinvented. His theory of intellectual development is strongly grounded in the biological sciences. He saw cognitive growth as an extension of biological growth and as being governed by the same laws and principles (London, 1988). He argued that intellectual development controlled every other aspect of development - emotional, social, and moral.

STAGES OF INTELLECTUAL DEVELOPMENT

Piaget may be best known for his stages of cognitive development. Piaget discovered that children think and reason differently at different periods in their lives. He believed that everyone passed through an invariant sequence of four qualitatively distinct stages. Invariant means that a person cannot skip stages or reorder them. Although every normal child passes through the stages in exactly the same order, there is some variability in the ages at which children attain each stage. The four stages are: sensorimotor - birth to 2 years; preoperational - 2 years to 7 years; concrete operational - 7 years to 11 years; and formal operational (abstract thinking) - 11 years and up. Each stage has major cognitive tasks which must be accomplished. In the sensorimotor stage, the mental structures are mainly concerned with the mastery of concrete objects. The mastery of symbols takes place in the preoperational stage. In the concrete stage, children learn mastery of classes, relations, and numbers and how to reason. The last stage deals with the mastery of thought (Evans, 1973).

HOW CHILDREN LEARN

A central component of Piaget's developmental theory of learning and thinking is that both involve the participation of the learner. Knowledge is not merely transmitted verbally but must be constructed and reconstructed by the learner. Piaget asserted that for a child to know and construct knowledge of the world, the child must act on objects and it is this action which provides knowledge of those objects (Sigel, 1977); the mind organizes reality and acts upon it. The learner must be active; he is not a vessel to be filled with facts. Piaget's approach to learning is a readiness approach. Readiness approaches in developmental psychology emphasize that children cannot learn something until maturation gives them certain prerequisites (Brainerd, 1978). The ability to learn any cognitive content is always related to their stage of intellectual development. Children who are at a certain stage cannot be taught the concepts of a higher stage.

Intellectual growth involves three fundamental processes: assimilation, accommodation, and equilibration. Assimilation involves the incorporation of new events into preexisting cognitive structures. Accommodation means existing structures change to accommodate to the new information. This dual process, assimilation-accommodation, enables the child to form schema. Equilibration involves the person striking a balance between himself and the environment, between assimilation and accommodation. When a child experiences a new event, disequilibrium sets in until he is able to assimilate and accommodate the new information and thus attain equilibrium. There are many types of equilibrium between assimilation and accommodation that vary with the levels of development and the problems to be solved. For Piaget, equilibration is the major factor in explaining why some children advance more quickly in the development of logical intelligence than do others (Lavatelli, 40).

IMPLICATIONS FOR EDUCATION

A Piagetian-inspired curricula emphasizes a child-centered educational philosophy. The teaching methods which most American school children are familiar with - teacher lectures, demonstrations, audio-visual presentations, teaching machines, and programmed instruction - do not fit in with Piaget's ideas on the acquisition of knowledge. Piaget espoused active discovery learning environments in our schools. Intelligence grows through the twin processes of assimilation and accommodation; therefore, experiences should be planned to allow opportunities for assimilation and accommodation. Children need to explore, to manipulate, to experiment, to question, and to

search out answers for themselves - activity is essential. However, this does not mean that children should be allowed to do whatever they want. So what is the role of the teacher? Teachers should be able to assess the child's present cognitive level; their strengths and weaknesses. Instruction should be individualized as much as possible and children should have opportunities to communicate with one another, to argue and debate issues. He saw teachers as facilitators of knowledge - they are there to guide and stimulate the students. Allow children to make mistakes and learn from them. Learning is much more meaningful if the child is allowed to experiment on his own rather than listening to the teacher lecture. The teacher should present students with materials and situations and occasions that allow them to discover new learning. In his book *To Understand Is To Invent* Piaget said the basic principle of active methods can be expressed as follows: "to understand is to discover, or reconstruct by rediscovery, and such conditions must be complied with if in the future individuals are to be formed who are capable of production and creativity and not simply repetition" (p.20). In active learning, the teacher must have confidence in the child's ability to learn on his own.

IMPLICATIONS FOR INSTRUCTIONAL TECHNOLOGY

The technologies that encourage interactivity such as multimedia , hypermedia and virtual reality fit in with Piagetian thought. Computer software that is strictly drill and practice does not fit in with an active discovery environment. Drill and practice does not encourage creativity or discovery.

Students not only use multimedia to learn, but they also use it to communicate their understanding of the subject to those around them. They can create what they learn by using an authoring tool such as Hypercard. Peer teaching is used as the students work together in the making of their projects. Students become active participants instead of passive sponges and the teacher truly takes on the role of facilitator as she gives them guidance in their creations. Hypermedia also allows the students to manipulate their environment as they follow the path(s) of their choice. Virtual reality has the potential to move education from its reliance on books to experiential learning in naturalistic settings. For example, rather than reading about an event, the children can participate in the event with simulated persons and/or objects. These technologies supply the students with a learning environment that encourages children to initiate and complete their own activities.