Piaget's, Ausubel's and Gagne's learning theories and their comparison

INDONESIA UNIVERSITY OF EDUCATION

DEPARTMENT OF CHEMISTRY

ASSINGMENT

FOR THE COURSE

/ KI708/ CHEMISTRY TEACHING

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Oct. 31, 2012

Piaget's learning theory

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). 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. He argued that intellectual development controlled every other aspect of development - emotional, social, and moral.

STAGES OF INTELLECTUAL 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.

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 andreconstructed 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; 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. 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.

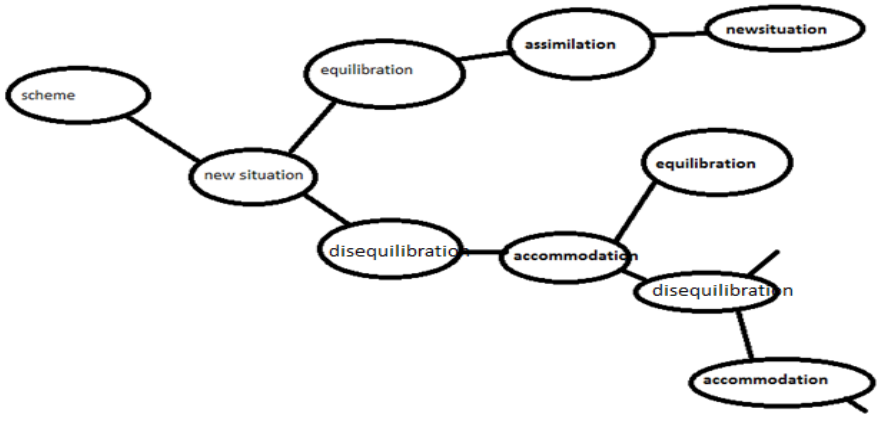
Intellectual growth involves three fundamental processes: **assimilation, accommodation,** and **equilibration**. Assimilation involves the incorporation of new events into preexisting cognitive structures. Accommodation means existing structures change to accommodate to the new information.

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.

IMPLICATIONS FOR EDUCATION

A Piagetian-inspired curriculum emphasizes a learner-centered educational philosophy. The teaching methods which most 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. IPiaget 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". In learning, the teacher must have confidence in the child's ability to learn on his own.

Piaget's learning model



Ausubel's learning theory

David Paul Ausubel was an American psychologist whose most significant contribution to the fields of educational psychology, cognitive science, and science education learning, was on the development and research on **meaningful learning** and **advance organizers**. Influenced by Jean Piaget, Ausubel believed that understanding concepts, principles, and ideas are achieved through deductive reasoning. Similarly, he believed in the idea of meaningful learning as opposed to rote memorization. According to Ausubel the most important single factor influencing learning is **what the learner already knows**. Ascertain this and teach him accordingly. This led Ausubel to develop an interesting theory of meaningful learning and advance organizers.

Learning Theory

Ausubel' believes that learning of new knowledge relies on what is already known. That is, construction of knowledge begins with our observation and recognition of events and objects through concepts we already have. We learn by constructing a network of concepts and adding to them. **Concept map** , developed by Ausubel and Novac, is an instructional device that uses this aspect of the theory to allow instruction of material to learners; it is a way of representing relationships between ideas, images, or words.

Ausubel also stresses the importance of **reception** rather than **discovery learning**, and **meaningful** rather than **rote learning**. He declares that his theory applies only to reception learning in school settings. He didn't say, however, that discovery learning doesn't work; but rather that it was not efficient.

Meaningful learning

Ausebel's theory also focuses on meaningful learning. According to his theory, to learn meaningfully, individuals must relate new knowledge to relevant concepts they already know. New knowledge must interact with the learner's knowledge structure.

Meaningful learning can be contrasted with rote learning. The latter can also incorporate new information into the pre-existing knowledge structure but **without interaction**. Rote memory is used to recall sequences of objects, such as phone numbers. However, it is of no use to the learner in understanding the relationships between the objects.

Because meaningful learning involves recognition of the links **between concepts**, it has the privilege of being transferred to **long-term memory**. The most crucial element in meaningful learning is how the new information is integrated into the old knowledge structure that.

Accordingly, Ausubel believes that knowledge is **hierarchically organized**; that new information is meaningful to the extent that it can be related (attached, anchored) to what is already known.

Advance Organizers

Ausubel advocates the use of advance organizers as a mechanism to help to link new learning material with existing related ideas. Ausubel's theory of advance organizers fall into two categories: **comparative** and **expository**.

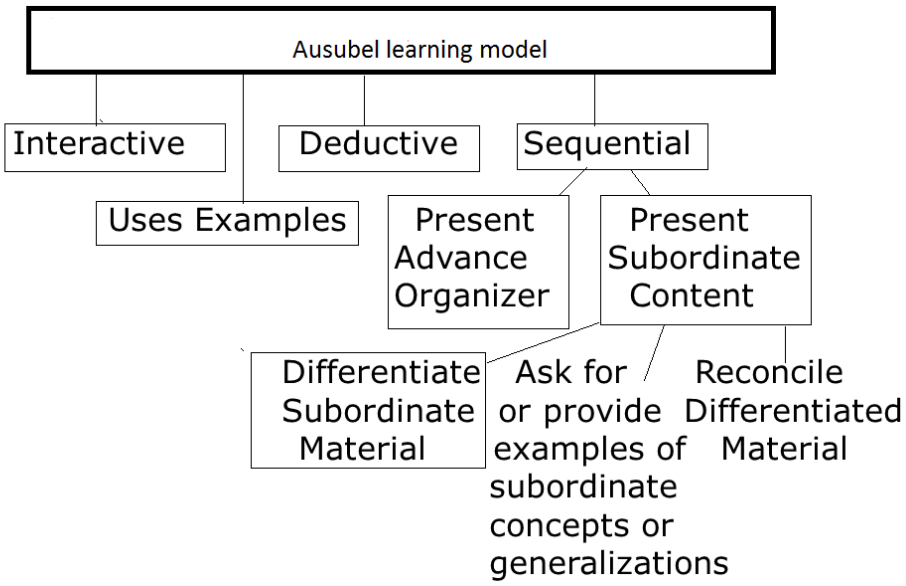
Comparative Organizers

Comparative organizers activate existing schemas and are used as a reminder to bring into the working memory of what you may not realize is relevant. A comparative organizer is also used both to **integrate** as well as to **discriminate**. Itintegrate[s] new ideas with basically similar concepts in cognitive structure, as well as increase[s] discriminability between new and existing ideas which are essentially different but confusably similar.

Expository Organizers

Expository organizers are often used when the new learning material is unfamiliar to the learner. They often relate what the learner already knows with the new and unfamiliar material—this in turn is aimed to make the unfamiliar material more plausible to the learner.

Ausubel's learning Model



Gagne's learning theory

- From the observations of the students' learning, he thought that the cause of their failure in learning was the gaps in their knowledge of the sub-components of the tasks, i.e. the prerequisite skills. Thus, he assumes a cumulative organization of learning events based on prerequisite relationships among learned behaviors. **In other worlds, instruction should provide a set of component tasks and sequence those tasks to ensure the learners' mastery of each component task and the optimal transfer of the final task**
- Grange's principal assumption is that there are different kinds of learned outcomes, and that different **internal** and **external** conditions are necessary to promote each type.

What is learning to Gagné?

1. Learning is cumulative. Human intellectual development is the building of increasing complex structures of human capabilities.
2. Learning is the mechanism by which an individual becomes a competently functioning member of society
3. Learning results in different kinds of human behaviors, i.e. different human capabilities, which are required both from the stimulation from the environment and the cognitive processing undertaken by the learners.

Gagne's ideas about learning and instruction:

1. Because learning is complex and diverse, different learning outcomes (capabilities) requires different **instructions**, **prerequisites** and **processing** by the learners. In other worlds, the specific operations that constitute instructional events are different for each different type of learning outcome.
2. Events of learning operate on the learner in ways that constitute the conditions of learning. **The internal states** required in the learner to acquire the new skills are internal conditions of learning, and **the environmental stimuli** required to support the internal learning process are external conditions of learning. Learning hierarchies define what intellectual skills are to be learned and a sequence of instruction.

Taxonomy of Human learning capabilities

Gagné identifies five major categories of learning:

.verbal information,
.intellectual skills,
.cognitive strategies,
.motor skills and
.attitudes.

Different internal and external conditions are necessary for each type of learning.

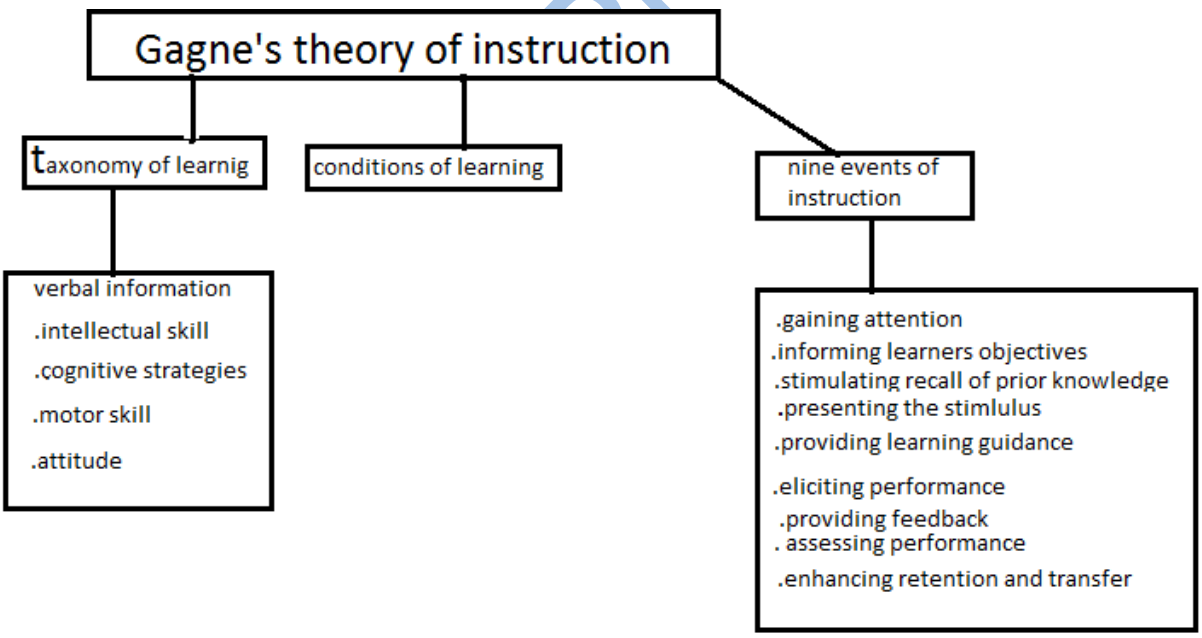
Gagné indicated nine events of instruction

The instructional events do not produce learning, but support the learner's internal process. Three phases of the nine events are described

1. **Preparing for learning**: gain attention, inform objectives, and stimulate recall of prior knowledge
2. **Acquisition and performance:** present stimulus material, provide learner guidance, elicit performance an provide feedback
3. **Transfer of learning**: assess performance and enhance retention and transfer process

The nine events are:

- Gain Attention: it is related to the processing of perception
- Inform objectives: it builds up expectancy
- Stimulate recall of prior knowledge: it initiates the retrieval from working memory
- Present stimulus material: it focuses on selectively perceiving stimulus
- Provide learner guidance: it related to the encoding process
- Elicit performance: the focus is response
- Provide feedback: the focus is reinforcing response
- Assess performance: it establishes cueing retrieval
- Enhance retention and transfer: it requires generalization process



Comparison of Gagne's, Ausubel's and Piaget's learning theories

They are similar in that all three attempt to explain and describe how learning occurs. All their learning theories can be considered attempts to improve teaching, learning, and the educational and instructional process as a whole.

questions	Gagne	Ausubel	Piaget's
theory	Behaviorist/cognitivist	cognitivist	Cognitivist/constructivist
How does learning occur?	Environmental stimulation and learner cognitive processing.	Deductive reasoning,	Constructed by the learner
What factors influencing learning?	Internal and external conditions, sequence the learning of skills	What the learner already knows, previous experience.	maturation
What is the role of memory?	Encoding, storage, retrieval	Encoding, storage, retrieval	Prior knowledge remixed to current context.
How does transfer occur?	Applying to other contexts	Applying prior and new knowledge to other contexts	socialization
What types of learning are best explained by this theory?	Task based	Reception(meaningful)	Discovery learning