Unit 5: Constructivism

What is constructivism?

Constructivism is a learning perspective (as a paradigm or worldview) which suggests that learning is an active, constructive process. According to this view the learner is an information/knowledge constructor. People actively construct their own subjective representations (understandings, pictures or images) of objective reality.

Two views on Constructivism

There are two views within constructivist approach of learning. Two cognitive psychologists, Jean Piaget and Lev Vygotsky, developed the same concept in two different ways. In their approaches, there are also similarities and differences.

(A) Individual Constructivism

It is also known as **personal constructivism** or **Cognitive constructivism. This** perspective is based on the work of Swiss **developmental psychologist** Jean Piaget. Piaget's theory includes two major parts, a "**ages and stages**". This theory predicts what children can and cannot understand at different ages. It describes **how children develop cognitive abilities according to ages** (developmental psychology). Piaget states that learning does not occur passively. It occurs by active construction of meaning according to the developmental stages of cognitive abilities.

He explains that **when we, as learners, encounter an experience (a challenge or situation)** a state of **disequilibrium or imbalance** is created. We must then alter **our thinking to restore equilibrium or balance**. For this purpose, we make sense (make meaning) of the new information by associating it with what we already know, that is, by attempting to **assimilate** it into our existing knowledge. When we are unable to do this, we use **accommodation** by restructuring our present knowledge to a higher level of thinking.

> People want to make sense of their experiences (dflg; ckm\gf cg'ejsf] cy{ vf]Hb5g). Piaget (1952, 1959, 1980) called this need/want for understanding as the **drive for equilibrium**. It is a cognitive state, also called cognitive constructivism. In this process we make sense of new experiences because we're able to explain them using our existing understanding. If we're able to make sense of new experiences, we remain at equilibrium.

Basic Principles and knowledge construction

Piaget's (1936) theory of cognitive development explains how a child constructs a mental model of the world. He regarded cognitive development as a process which occurs due to biological maturation and interaction with the environment. According to Piaget, during knowledge construction process the following processes are involved:

1. **Schemas/ schemes (Schemata)**: Schema is the cognitive structure or mental map (a structured cluster of concept, or a mental framework about something) . It is your understanding or knowledge of X. Schemas are categories of knowledge that help us to interpret and understand the world. They are the concepts of the objects, behaviors or actions. In Piaget's view, a schema includes both a category of knowledge and the process of obtaining that knowledge. In course of receiving experiences, new information is used to modify, add to, or change previously existing schemas. For example, a child may have a schema about a type of animal, such as a dog. If a child has the experience of seeing small dogs, a child might believe that all dogs are small, furry -skfn ePsf), and have four legs. Suppose then that the child encounters a very large dog. The child will take in this new information, modifying the previously existing schema to include this new information. The schema is defined as the basic building block of intelligent behavior – a way of organizing knowledge. Indeed, it is useful to think of schemas as "units" of knowledge.

The schema is adapted or modified by the following three processes (called a**daptation). Adaption** involves the following process and all three are associated with the formation of schema (so they are described separately).

i)**Assimilation** – It is the process of taking new information into our previously existing schema. This process is somewhat subjective because we tend to modify experience or information somewhat to fit in with our preexisting beliefs. On the one hand, assimilation produces a positive effect. When a new object is assimilated into an old schema, the schema gets enriched and renewed. In the example above, seeing a dog and labeling it "dog" is an example of assimilating the animal into the child's dog schema.

ii) **Accommodation** – Another part of adaptation involves changing or altering our existing schemas in light of new information, a process known as accommodation. In other words, accommodation is the process by which the subject adjusts the old schema or builds a new schema on the basis of the old one in order to accept and accommodate the new object when it

fails to conform to the subject's schema. Accommodation involves altering existing schemas, or ideas, as a result of new information or new experiences. New schemas may also be developed during this process.

iii) **Equilibration** – Piaget believed that all children try to strike a balance between assimilation and accommodation. This mechanism of bringing balance between them is called equilibration. As children progress through the stages of cognitive development, it is important to maintain a balance between applying previous knowledge (assimilation) and changing behavior to account for new knowledge (accommodation). Equilibration helps explain how children are able to move from one stage of thought into the next.

Equilibration refers to the process by which a person utilizes his self-adjustment mechanism to move his cognitive equilibrium to a higher level. When equilibration is reached, the subject assimilates the object into the current schema. This equilibration will not be broken until his present schema can no longer assimilate the new stimuli. Therefore, when a person loses the equilibration (disequilibration) established through assimilation and accommodation between his body and the environment, he needs to change his behavior so as to reestablish the equilibration. The process from equilibration to non-equilibration and back to equilibration reflects the reason for human cognitive development.

Note: The term equilibration refers to the overall movement from assimilation to accommodation and then back to assimilation.

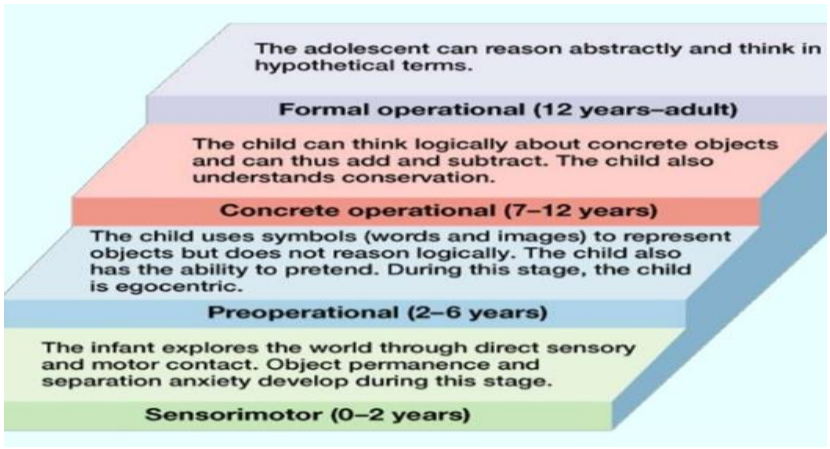
***The* four development stages (proposed by Piaget)**

According to Piaget, individuals go through four stages of cognitive development as a result of the above mentioned cognitive processes. The four stages are

1. Sensorimotor stage (0-2 years)
2. Preoperational stage (2-7 years)
3. Concrete operational stage (7-11 years)
4. Formal Operational Stage (beyond 11 years)

- **Sensorimotor stage:** Children experience the world through movement and senses (use five senses to explore the world). During the sensorimotor stage children are extremely egocentric, meaning they cannot perceive the world from others' viewpoints.

- **Preoperational Stage:** (magical thinking predominates. Acquisition of motor skills). Egocentrism begins strongly and then weakens. Children cannot conserve or use logical thinking.
- **Concrete operational Stage:** (from ages 7 to 11/12) (children begin to think logically but are very concrete in their thinking). Children can now conceive and think logically but only with practical aids. They are no longer egocentric.
- **Formal operational Stage:** (from age 12 onwards) (development of abstract reasoning). Children develop abstract thought and can easily conserve and think logically in their mind.



Educational Implications

Piaget's cognitive theory has got three major educational implications for children in their early years as elaborated below:

i. **Discovery learning** – Piaget believed that every child acquires knowledge by directly acting on the environment. So the settings of the home or school environment should be in such a way that it provided wide opportunities for them to discover things for themselves by natural contact with the surroundings.

ii. **Children can learn only when they are ready to learn**: Do not impose new skills unless the child has the readiness to learn – Piaget stresses on the level of thinking of a child at various ages, and he also argues the unless a child is ready to learn a particular skill, he/she should not be imposed on it, because that becomes just a superficial memorization rather than a deeper understanding.

iii. **Individual differences exist** - Though all children go through the similar series of development, the rate of varies from child to child. Hence children in their early years are to be provided with ample opportunities for development without enforcing them to learn.

iv. **Acceptance of individual differences in developmental progress:** Piaget's theory assumes that all children go through the same developmental sequence but that they do so at different rates. Therefore, teachers must make a special effort to arrange classroom activities for individuals and small groups of children rather than for the total class group. In addition, because individual differences are expected, assessment of children's educational progress should be made in terms of each child's own previous course of development, not in terms of normative standards provided by the performances of same-age peers.

v. Pupils bring schemas of their own into a classroom and while some will be shared, others will be kept personal and this idea needs to be kept in mind by teachers in their planning of classroom tasks.

vi. This theory that suggests that even failure can lead to learning. Pupils often expect the world to work in a particular way, and something happens to suggest otherwise, they make mistakes. However, by **accommodating this new experience** into their schemas pupils learn from the experience of failure, or others' failure.

vii. New information must be assimilated and accommodated.

viii. Information should match with the cognitive structure.

ix. **Development cannot be speedy up**: Piagetian-based educational programs accept his strong belief that premature teaching could be worse than no teaching at all, because it leads to superficial acceptance of adult formulas rather than true cognitive .

B: Social Constructivism (Socio-constructivist perspective)

Russian philosopher and psychologist Vygotsky states that the process of knowing (cognitive development) is affected by other people and is mediated by community and culture. An important part of Vygotsky's work (1986) is critical upon Piaget's contribution to constructivism. While Piaget believes that development precedes learning (based on development or maturation learning occurs), Vygotsky believes the opposite. Vygotsky stated that the **child's mind is inherently social in nature** and so **speech moves from social to inner egocentric**. Therefore, according to Piaget, the **development of thought is followed by the development of speech** (thought first and then social speech). But, Vygotsky claims that **thought develops from society** to **the individual** and not the other way. Thus, Vygotsky's main concern is that social interaction and social context (a world full of other people, who interact with the child from birth onwards) are essential in the cognitive development (social interaction first and then cognitive development). He states that "Every function in the child's cultural development appears twice: **first, on the social level, and later, on the individual level; first, between people (inter-psychological) and then inside the child (intra-psychological).**

Vygotsky (1978 died at the age of 38 in 1934) believes that Piaget focuses too much on internal processes of individuals (i.e. cognitive development). But, Vygotsky focuses on the construction of knowledge through social interaction (Social interaction first). So, he is known as social constructionist. In other words, Vygotsky considers **cognitive development** as a function of **external factors such as cultural, historical, and social interaction** rather than of individual construction. Vygotsky believes that people master their behavior through psychological tools. He considers language as the most important psychological tool.

Vygotsky was a supporter of Paiget's work, but disagreed with Piaget on one key point. Vygotsky did not believe that maturation (cognitive development) itself was enough of a means to allow children to access higher order thinking skills. He advocated that it was the interaction of children with one another, through language, that influenced the level of conceptual understanding they could reach above all else.

Basic Principles (Concepts) of Social Constructivism/Key concepts

i. Inter-psychological and Intra-psychological levels

The major theme of Vygotsky's theoretical framework is that social interaction plays a fundamental role in the development of cognition. Vygotsky believed that **everything is learned on two levels**. First, through interaction with others, and then integrated into the individual's mental structure.

> Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (inter-psychological) and then inside the child (intra-psychological).

This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals. In other words, knowledge is first constructed in a social context (interpsychological) and is then appropriated by individuals (intra psychological).

ii. Zone of Proximal Development (ZPD)

Another important concept of Vygotsky's theory is the idea that the **potential for cognitive development is limited to a "zone of proximal development" (ZPD)**. This "zone" is the area of exploration *for which the student is cognitively prepared, but requires help and social*

interaction to fully develop .The ZPD is the *distance* between a student's ability to perform a task under adult guidance and/or with peer collaboration and the student's ability solving the problem independently. According to Vygotsky, learning occurs in this zone. A teacher or more experienced peer is able to provide the learner with "scaffolding" to support the student's evolving understanding of knowledge domains or development of complex skills. Collaborative learning, discourse, modelling, and scaffolding are strategies for supporting the intellectual knowledge and skills of learners and facilitating intentional learning.

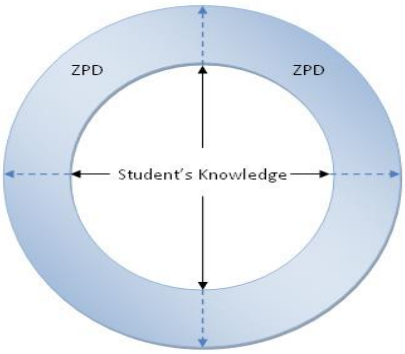
The ZDP is the level at which learning takes place. It comprises cognitive structures that are still in the process of maturing, but which can only mature under the guidance of or in collaboration with others.

Vygotsky believed that pupils learn optimally from their peers, whether they are of the same age or of a higher age and developmental stage. Vygotsky made reference to the zone of proximal development (ZPD) and suggested that there is a difference between what a person is able to do on his or her own and what they can achieve with the help of somebody who has greater knowledge than them. He claimed that if a teacher can provide scaffolds during this time then the child's knowledge could be brought to a higher level as they learn from each other. Once the learning process is complete, these scaffolds are no longer needed and can be by-passed. Alongside this, it was pointed out that not all pupils learn to the same extent. Some children as able to learn more in the ZPD than others as well as some pupils not needing as many scaffolds as others.

For Vygotsky, it is peer work and cooperation that lies at the heart of learning. It is the responsibility of parents or teachers to transmit knowledge to those who are less knowledgeable through formal and informal means. The way that people become more knowledgeable is through increased actions and interactions with the environment, as Piaget suggested, but it is essential that pupils interact with their peers to gain a true experience of what they are learning.

The Zone of Proximal Developmen

White circle: what the student can learn unaided



Blue circle: what student can learn with help

ZDP: area of 'potential' where learning takes place

To ensure development in the ZDP, the assistance/guidance received must have certain features such as : a) **Intersubjectivity** – the process whereby two participants who begin a task with different understandings arrive at a shared understanding. This creates a common ground for communication as each partner adjusts to the perspective of the other. b) **Scaffolding -** adjusting the support offered during a teaching session to fit the child's current level of performance. c) **Guided participation** – a broader concept than scaffolding that refers to shared endeavours between expert and less expert participants.

iii. **The more knowledgeable other (MKO)**

It is the concept associated with ZPD. The MKO refers to anyone who has a better understanding or a higher ability level than the learner with respect to a particular task, process, or concept. The MKO is normally thought of as being a teacher, coach, or older adult, but the MKO could also be peers, a younger person, or even computers.

v. **Scaffolding:**

Scaffolding is an assisted learning process that supports the ZPD, or getting to the next level of

understanding with the assistance of teachers, peers or other adults. In other words, Scaffolding is a social and instructional support for students learning new concepts. It can be compared with the structures erected alongside newly constructed buildings. The scaffolding supports the construction and is taken away after completion (or when the lesson is understood.). In a social interaction, a knowledgeable participant can support by means of speech and by other supportive conditions so that new students can participate in and extend current skills and knowledge to a high level of competence. Thus, scaffolding is the "role of teachers and others in supporting the learner's development and providing support structures to get to the next stage or level". With support or scaffolding, the student can learn the concept or skill and practice with their supportive mentor or more knowledgeable other until they are comfortable to do it on their own.

Scaffolding is an instructional structure whereby the teacher models the desired learning strategy or task then gradually shifts responsibility to the students. According to McKenzie, (1999), scaffolding provides the following advantages:

a) It provides clear directions for students
b) It clarifies purpose of the task
c) It keeps students on task
d) It offers assessment to clarify expectations
e) It points students to worthy sources
f) It reduces uncertainty, surprise and disappointment
g) It delivers efficiency
h) It creates momentum

Educational Implications

Vygotsky's theory is widely accepted and successfully implemented in many learning and teaching areas such as languages, mathematics, and information communications and technology (ICT). Here we discuss some characteristics of learning and teaching of those subjects mentioned above.

i. **Cooperative learning**: According to Vygotsky, cooperative learning is an integral part of creating deeper understanding. Students should not only work with teachers one-on-one, but they should also work with other students, who have a lot to offer one another. Vygotsky is a firm believer that social interaction and cultural influences have a huge effect on a student and how learning occurs. Learning does not occur in a vacuum.

ii. **Peer-Teaching**: By letting students of similar but differing abilities work in groups, they can help each other: often a lot more effectively than a teacher would be able to. Practically, this suggests multi-aged classrooms, and a high level of vertical integration of the subject matter.

iii. As teachers, we can create classroom experiences for students to **collaborate** with each other to construct knowledge. We should also **recognize the diversity** of the class and embrace student differences.

iv. We can promote **dialogue** of the material so that students can critically think about and discuss what they are learning. To embrace diversity, students must interact socially. Because participants bring their own backgrounds, views, and experiences to the learning context, their social interaction allows for multiple perspectives on the content and multiple representations of reality. In addition, **collaboration** with diverse others can be a vehicle for developing an appreciation of personal and cultural differences.

v. In the traditional teaching mode, teachers explain, analyze, and introduce too much. Students receive knowledge passively. They have few time and space for thinking. The traditional mode neglects students' practicing process and just input fixed things into students. In contrast, the constructivism agrees that **learning is active process and it is student initiative**. Without **students' initiative participation**, the learning is meaningless.

vi. The idea of learning as socially constructed formed the main aspect of Constructivist theory and this influenced classroom practice enormously by bringing about the **development of collaborative learning programmes.**

vii. Present problems in the zone of proximal development

viii. Emphasize the active role of learners in building understandings and making sense of the information.

ix. **Learner active:** The student is the person who creates new understanding for him/herself. The teacher coaches, moderates, suggests, but allows the students room to experiment, ask questions, try things that don't work. Learning activities require the students' full participation (like hands-on experiments). An important part of the learning process is that students reflect on, and talk about, their activities. Students also help set their own goals and means of assessment.

a) **Reflective learning:** Students control their own learning process by reflecting on their experiences. This process makes them experts of their own learning. The teacher helps create situations where the students feel safe questioning and reflecting on their own processes, either privately or in group discussions.

b) **Collaborative learning:** The constructivist classroom relies heavily on collaboration among students. There are many reasons why collaboration contributes to learning. The main reason it is used so much in constructivism is that students learn about learning not only from themselves, but also from their peers. When students review and reflect on their learning processes together, they can pick up strategies and methods from one another.

c) **Learning through inquiry (inquiry-**based learning): The main activity in a constructivist classroom is solving problems. Students use inquiry methods to ask questions, investigate a topic, and use a variety of resources to find solutions and answers

In the classroom, the constructivist view of learning can point towards a number of different teaching practices. In the most general sense, it usually means **encouraging students to use active techniques (experiments, real-world problem solving) to create more knowledge and then to reflect on and talk about what they are doing and how their understanding is**

Encourage group work and the use of peers as resources (collaborative learning) (Helping students learn HOW TO LEARN) **Learner construct knowledge (Learning is constructed):** In a constructivist classroom, learning is Constructed. Students are not blank slates upon which knowledge is imprinted. They come to learning situations with already formulated knowledge, ideas, and understandings. This previous knowledge is the raw material for the new knowledge they will create.

1. Children learn more, and enjoy learning more when they are actively involved, rather than passive listeners

2. Education works best when it concentrates on thinking and understanding, rather than on rote memorization. Constructivism concentrates on learning how to think and understand.

3. Constructivist learning is transferable. In constructivist classrooms, students create organizing principles that they can take with them to other learning settings.

4. Constructivism gives students ownership of what they learn, since learning is based on students' questions and explorations, and often the students have a hand in designing the assessments as well. Constructivist assessment engages the students' initiatives and personal investments in their journals, research reports, physical models, and artistic representations. Engaging the creative instincts develops students' abilities to express knowledge through a variety of ways. The students are also more likely to retain and transfer the new knowledge to real life.

5. Constructivism promotes social and communication skills by creating a classroom environment that emphasizes collaboration and exchange of ideas. Students must learn how to articulate their ideas clearly as well as to collaborate on tasks effectively by sharing in group projects. Students must therefore exchange ideas and so must learn to "negotiate" with others and to evaluate their contributions in a socially acceptable manner. This is essential to success in the real world, since they will always be exposed to a variety of experiences in which they will have to cooperate and navigate among the ideas of others.