NATIONAL OPEN UNIVERSITY OF NIGERIA

ECE 120

Development of Appropriate Skills in Children

Module 1

ECE 120 (Development of Appropriate Skills in Children) Module 1

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Unit 1 Psychomotor Development

1.0 Introduction

At birth, a child is a fascinating creature in his/her tiny seemingly helpless state; yet he/she is perfectly formed, fully capable of making known his/her pleasure and discomfort to his/her caregivers. Every day, the child brings about remarkable changes in his/her development in all the domains. These developments, particularly the motor skills, cognitive and social competencies and language develop, together and support one another. In this unit, we shall describe the general course of motor development by examining the dynamic systems theory of motor development, gross and fine motor development during infancy and early childhood.

2.0 Objectives

At the end of this unit, you should be able to:

- describe the dynamic systems theory of motor development
- discuss the sequence of motor development
- identify the gross motor and fine motor skills in infancy and early childhood period and handedness.

3.0 Main Content

3.1 The Dynamic Systems Theory of Motor Development

Motor development involves the activities of muscles which lead to changes in posture, movement and coordination of movement with the infant's developing sensory apparatus. Motor follows cephalocaudal development; that is, infants gain control of their heads and upper torsos before they can effectively use their arms.

It also follows proximodistal pattern and differentiation; that is, infants can control their trunks and shoulders before they can use their hands and fingers. The development of hand skills is a clear example of proximodistal development. Motor development proceeds in an orderly sequence but there are considerable variations in the timing at which children first engage in the activities.

Although, the sequence mostly remains the same, some children will skip a step. The dynamic systems theory of motor development views new motor skills as reorganisations of previously mastered skills which leads to more effective ways of exploring and controlling the environment. Each new skill is a joint product of central nervous system development, the body's movement possibilities, the child's goals and environmental supports for the skill.

According to the working of the systems theory, mastery of motor skills involves acquiring increasingly complex systems of action. When motor skills work as a system, separate abilities blend together, each cooperating with others to produce more effective ways. For example, control of the head and upper chest combine into sitting with support, kicking,

rocking on all fours and reaching combine to become crawling. Then crawling, standing and stepping are united into walking (Thelen, 2000).

In addition, the theory supports the fact that motor development cannot be genetically determined. The reason for this is the fact that it is motivated by exploration and the desire to master new tasks. Heredity just maps it out only at a general level.

The following factors: central nervous system development, the body's movement capacities, the goals the child has in mind and the environmental support for the skill determine/affect each new skill.

Therefore, a new skill is a joint product of the factors as listed above. It should be noted that the factors that induce the change vary with age. For example, in the early weeks of life, brain and body growth are especially important as infant achieve control over the head, shoulders and upper torso.

Later, the baby's goals (crossing the room) and environmental supports (parental encouragement) play a greater role. This theory says that when a skill is first acquired, infants must retire it; e.g. a child trying to crawl, often collapse on his/her tummy, move backward and later figure out how to propel self forward by alternatively pulling with arms and pushing with feet, belly-crawling, in various ways, for several weeks.

Motor mastery involves intense practice, for example in learning to work, toddlers gradually make their unsteady steps change to a larger stride, move their feet closer together, toes point to the front and legs become symmetrically coordinated.

Self-Assessment Exercise 1

1. What is motor development?

2. Explain the theory of dynamic systems of motor development.

3. Identify the factors that determine the acquisition of new motor skill.

3.2 Gross and Fine Motor Development in the First Two Years

Gross motor development refers to control over actions that help infants get around in the environment. Getting around or "getting a move on" is called locomotion. Locomotion is movement from one place to another. Children gain capacity to move their bodies through a sequence of activities that includes rolling over, sitting up, crawling, creeping, walking and running.
Fine motor development has to do with smaller movements such as reaching and grasping. The development of hand skills is a clear example of proximodistal development. For example, infants follow slowly moving objects with their eyes shortly after birth but they will not generally reach for them. Though they show a grasp reflex, they do not reliably reach for the objects that appear to interest them.

By the age of 3 months, infants make clumsy swipes at objects. Between the ages of 4 and 6 months, they become more successful at grasping objects. They can hold rattles, large plastic spoons, mobiles and other brightly coloured hanging toys. They can also transfer objects back and forth between hands.

Table 1: Gross Motor Development in the First Two Years

Motor Skills	Average Age Achieved (Weeks)
Turns from stomach to side	12 – 16
Turns from stomach to back	20 – 24
Turns from back to stomach	24 – 28
Sits up	28 – 32
Crawls	32 – 36
Kneels up	36 – 40
Creeps	40 – 44
Stands up	44 – 52
Starts walking	56 – 64
Full walking	64 – 72

Source: Bayley, 2005

Table 2: Fine Motor Development in the First Two Years

Motor skill	Average Age (Weeks)
Swipes at objects	12
Grasps	12 - 24
Builds tower of two cubes	47
Scribbles vigorously	54
Copies horizontal and vertical lines	94 weeks (24 months)

Source: Bayley, 2005.

The above tables show the milestones of motor development of children between birth and two years.

Self-Assessment Exercise 2

1. What is gross motor development?
2. Give examples of gross motor activities and the average ages in which children achieve them.
3. What is fine motor development?
4. Give examples of fine motor activities.

3.3 Development of Gross Motor Skills in the Early Childhood

Gross motor skills involve the large muscles used in locomotion (movement). Children make great strides in the development during the preschool years. As early as the age of 3, children can balance on one foot. By age 3 and 4, they can walk upstairs as adults. By age 4 or 5, they can skip and pedal a tricycle. Children at this level of development appear to acquire gross motor skills by teaching themselves and observing the behaviour of other children.

Worthy of note is the fact that girls are better at tasks requiring balance and precision of movement than boys. On the other hand, boys show some advantage in throwing and kicking. Motivation and practice are important in children's acquisition of motor skills.

Table 3 shows the developmental milestones of gross motor skills of 2 - 5 years old children. Individual differences are more impressive in gross motor development during early childhood than sex differences. Moreover, some children are genetically predisposed to developing better coordination or more strength than others. Motivation and practice are also important for children to acquire motor skills.

Self-Assessment Exercise 3

1. Identify one difference between boys and girls in motor development in early childhood.
2. List four developmental milestones of gross motor development between ages 3 - 4 years.
3. List two factors that can enhance gross motor development.

3.4 Development of Fine Motor Skills in Early Childhood

The development of fine motor skills lags behind gross motor skills. Fine motor skills develop gradually. The skills involve the small muscles, which is used in manipulation and coordination. This is another example of the proximodistal trend in development. For example, control over the wrists and fingers enables children to hold writing materials like chalk or pencil properly.

The milestones of the fine motor skills in early childhood are stated in the Table 4.

Table 3: Development of Gross Motor Skills in Early Childhood

Age	Gross Motor Activities
2 years (24 - 35 months)	• Runs well straight ahead • Walks up stairs, two feet to a step • Kicks a large ball • Throws a small ball without falling • Pushes and pulls large toys • Hops on one foot, two or more hops • Tries to stand on one foot • Climbs on furniture to look out of the window
3 years (36 - 47 months)	• Goes around obstacles while running • Walks up stairs, one foot to a step • Kicks a large ball easily • Jumps from the bottom step • Catches a bounced ball, using torso and arms to form a basket • Goes around obstacles while pushing and pulling toys • Hops on one foot, up to three hops • Stands on one foot
4 years (48 - 59 months)	• Turns sharp corners while running • Walks down stairs, one foot to a step • Jump from a height appropriate to their age • Throws a ball overhead • Turns sharp corners while pushing and pulling toys • Hops on one foot, four to six hops • Stands on one foot for 3 - 8 seconds

	• Climbs ladders • Skips on one foot • Rides a tricycle well
5 years (60 - 70 months)	• Runs lightly on toes • Jumps a distance • Catches a small ball using hands only • Hops 2 to 3 yards forward on each foot • Stands on one foot for 8 - 10 seconds • Climbs actively and skilfully • Skips on alternate feet • Rides a bicycle with training wheel

Source Spencer A. Rathus (2006)

Table 4: Development of Fine Motor Skills in Early Childhood

Age	**Fine Motor Activities**
2 years (24 – 35 months)	• Builds tower of 6 cubes • Copies vertical and horizontal lines • Imitates folding of paper • Paints with a brush • Places simple shapes in correct holes
3 years (36 – 47 months)	• Builds tower of 9 cubes • Copies circle and cross • Copies letters • Holds crayons with fingers not fists • Strings four beads using a large needle
4 years (48 – 59 months)	• Builds tower of 10 or more cubes • Copies square

	• Print simple words • Imitates folding paper three times • Uses pencils with correct hand grip • Strings 10 beads
5 years (60 – 71 months)	• Builds 3 steps from 6 blocks using a model • Copies triangle and star • Prints first name and numbers • Imitates folding of piece of square paper into a triangle • Traces around a diamond drawn on paper • Laces shoes

Source Spencer A. Rathus (2006)

From Table 4, it is clear that fine motor skills take a giant leap forward in the pre-school years. As a result of the ability to control the hands and fingers, young children are able to gradually become self-sufficient at dressing and feeding. Children get great satisfaction from managing their own bodies.

Handedness

Handedness is a result of the joint contribution of nature and nurture to brain lateralisation. Children typically display a hand preference by the end of the first year. Handedness reflects the greater capacity of one side of the brain; that is, the individual's dominant cerebral hemisphere to carry out skilled motor action. Other important abilities are generally located on the dominant side as well.

For example, for right-handed people, language is occasionally located in the right hemisphere or more often shared between the hemispheres. The implication of this is that the brains of left-handers tend to be less strongly lateralised than those of right-handers. Many left-handed individuals are also ambidextrous. Although they prefer their left hand, they sometimes use their right hand skilfully as well.

One genetic theory proposes that most children inherit a gene that biases them for right-handedness and a left-dominant cerebral-hemisphere. But that bias is not strong enough to overcome experiences that might sway children towards a left-hand preference. To support this, an example of the English royal family is usually cited that handedness has a genetic component; the Queen's Mother, Queen Elizabeth II, Prince Charles and Prince William are all left-handed.

Handedness develops early. Left-handed children are not necessarily clumsier than right-handed children. Trying to re-orient left-handed children to write or carry out motor activities with the right hand may not help them much.

4.0 Conclusion

We have established in this unit that the theory that supports motor development cannot be genetically determined. Motor mastery involves both motivation and practice. Both gross and fine motor developments are dependent on one another. Handedness is a product of both nature and nurture.

5.0 Summary

Motor development involves the activities of muscles which lead to changes in posture, movement and coordination of movement with infant's developing sensory apparatus. The dynamic systems theory of motor development proposes that children acquire new motor skills by combining existing skills into increasingly complex systems of action.

Gross motor development refers to control actions that help children to get around while fine motor development focuses on the use of the muscles around the fingers and hands for manipulation and coordination. Important factors that enhance motor development include motivation and practice. Hand preference which reflects an individual's dominant cerebral hemisphere, strengthens during early childhood.

Research on handedness supports the joint contribution of nature and nurture to brain lateralisation. A great majority of left-handed children have no developmental problems rather they are more likely to display outstanding verbal and mathematical talents.

6.0 Self-Assessment Exercise

1. Discuss in details the theory of dynamic systems of motor development.
2. Describe the developmental milestone of gross motor skills of children between ages 2 and 4.
3. Explain the achievements of 4 - 5 years old children in fine motor skills. What are the implications of these achievements for the pre-school teachers?
4. Identify at least two factors that affect motor development.
5. Discuss the reasons why you will or will not support a parent of a left-handed child to force the child to use the right hand.

7.0 References/Further Reading

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Unit 2 Piaget's Theory of Cognitive Development

1.0 Introduction

According to Jean Piaget (1965), cognitive development is the process of learning about the world and all of its many components. In this unit, we shall be discussing what cognition is, the background to Piaget's cognitive theory, what the theory is all about and the cognitive theory of Jean Piaget.

2.0 Objectives

At the end of this unit, you should be able to:

- define cognition
- explain Piaget's theory of cognitive development.

3.0 Main Content

3.1 Definition of Cognition

The word "cognition" has its roots in the Latin word "cognoscere" which means "to know". The mind is the springboard of knowing. So the development of the mind falls within the cognitive domain. Cognitive domain has many overlapping components such as reasoning, concepts, memory and language. Each of these aspects has specific characteristics and patterns. Cognitive development therefore is the gradual and orderly changes by which mental processes become more complex and sophisticated. In other words, cognitive development can be viewed as the changes in intellectual abilities which include attention, memory, academic and everyday knowledge, problem-solving, imagination, creativity and language.

Self-Assessment Exercise 1

1. What is cognition?
2. Give examples of the domain of cognition.
3. Define cognitive development.

3.2 Piaget's Theory of Cognitive Development

Jean Piaget (1896 - 1980) was a Swiss psychologist who was interested in how knowledge develops in human beings. He created one of the best known stage theories by describing 4 qualitatively different stages of cognitive development. He devised a model describing how humans go about making sense out of their world by gathering and organising information. He was greatly influenced by his background knowledge of training in biology.

Piaget's theory of cognitive development states that children actively construct knowledge as they manipulate and explore their world. According to him, people form mental concepts about their world regardless of age. He called these concepts about the world, 'Schemas'. These schemas are general ways of thinking about or interacting with things in the environment. Piaget noted that our thinking processes change radically, though slowly from birth to maturity because we constantly strive to make sense out of the world.

He identified 4 factors affecting this radical change. They are: **biological maturation, activity, social experiments** and **equilibration**. These factors interact to influence changes in thinking. He explained maturation to be the unfolding of the biological changes that are genetically programmed. There is little or no external or environmental impact on this aspect of cognitive development. To him, cognitive development follows a predictable pattern of maturation as determined by biological (hereditary) factors.

In activity, physical maturation helps the increasing ability to act on the environment and learn from it. The activities generated such as exploration, observation and organising of information by maturation enables us to alter our thinking processes at the same time. According to Piaget, cognitive development is influenced by learning from others - that is, social transmission. We reinstate the knowledge already gathered from the cultural environment. The fourth factor - equilibration, will be discussed in the next unit as it is closely related to imitation and accommodation.

Jean Piaget believed that experiences within the environment are key factors influencing the developing mind. He provided a biological explanation for the connection between the developing mind and the developing brain. He also believed that environment plays a vital role throughout the course of cognitive development.

Self-Assessment Exercise 2

1. Who was Jean Piaget? Describe him in two or three sentences.
2. What shaped his cognitive theory?
3. Describe Piaget's cognitive development theory.

4.0 Conclusion

Jean Piaget devised a model describing how humans go about making sense of their world by gathering and organising information. Piaget's ideas provide an explanation of the development of thinking from infancy to adulthood.

5.0 Summary

Piaget's theory of cognitive development states that children actively construct knowledge as they manipulate and explore their world. Factors affecting the radical change in the thinking processes include:

- biological maturation activity
- social experiences and equilibration.

6.0 Self-Assessment Exercise

1. What is cognition?

2. Explain the relevance of Jean Piaget's background to his theory of cognitive development.

3. Briefly describe Jean Piaget's cognitive development.

7.0 References/Further Reading

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Unit 3 Cognitive Processes: Assimilation and Accommodation

1.0 Introduction

In the last unit, we discussed Piaget's theory of cognitive development and the psychological structures or organised ways of making sense of experience to involve some processes which change with age. In this unit, we shall be discussing the concepts of assimilation and accommodation as they relate with the cognitive process structures.

2.0 Objectives

At the end of this unit, you should be able to:

- define the concepts of assimilation and accommodation
- define equilibrium
- explain the role of these concepts in the process of cognitive development.

3.0 Main Content

3.1 Piaget's Theory

Jean Piaget believed that all species inherit two basic tendencies or what he called "invariant functions". Organisation is the combining, arranging, recombining and re-arranging of beliefs and thoughts into coherent systems while adapting or adjusting to the environment.

Piaget established that people are born with a tendency to organise the thinking processes into psychological structures. These psychological structures according to Woolfolk (2010) are our systems for understanding and interacting with the world. Piaget explained cognitive theory in form of cognitive structure. To him, simple structures are continually combined and coordinated to become more sophisticated and then more effective.

As children learn about the world, they are adding to their schema (conceptual understandings). The schemes (schemas) are what he called "building blocks of thinking". They could be regarded as the organised systems of actions or thoughts that allow us to mentally represent or "think about" the objects and events in our world. Schemas can be very small and specific, e.g. sucking through a straw scheme. They can be larger and more general like the drinking scheme. Schemas can therefore be defined as mental systems or categories of perception and experience.

As it has been noted earlier, people inherit the tendency to adapt to their environment. Adaptation involves two basic processes called *assimilation* and *accommodation*. Piaget established that schemas are strengthened through these two basic processes of assimilation and accommodation.

Self-Assessment Exercise 1

1. What does Woolfolk mean by "psychological structure"?

2. Piaget defined schemas as_____.

3.2 Assimilation

According to him, assimilation takes place when people use their existing schema to make sense out of objects or events in their world. Assimilation involves trying to understand something new by fitting it into what we already know. In other words, if new information or experience can be incorporated within an existing schema, then the process of assimilation occurs.

The concept of assimilation has its roots in biology. In biology, assimilation is the process by which food is digested and converted into the tissues that compose an animal. Cognitive assimilation therefore refers to the process by which someone responds to new objects or events according to existing schema or ways of organising knowledge.

3.3 Accommodation

Sometimes, a new experience or information cannot easily fit into an existing schema. In that case, the existing schema may be changed or a new schema may be created to incorporate the new event, information or experience. This process is called accommodation.

In other words, accommodation is the modification of existing schema to permit the incorporation of new events or knowledge. Accommodation is also a biological term. It means a change in structure that permits an organism to adjust or adapt to a novel object or event to a novel source of stimulation. Piaget believed that assimilation and accommodation are adaptive mental processes that occur spontaneously and continuously to help individuals make sense of the world. They are lifelong processes but not deliberate mental processes (Estes, 2004).

Piaget opined that the cognitive processes of organising, assimilating and accommodating can be viewed as a kind of complex mental balancing act. Therefore, when children can assimilate new information and experience into the existing schema or accommodate it into a new schema, a state of mental balance or equilibrium is established. According to Estes (2004), the restoration of equilibrium indicates that the knowledge base has been reconstructed and that the new experience is now part of the person's known knowledge base.

From Piaget's theory, we learnt that the actual changes in thinking take place through the process of equilibrium (that is the act of searching for a balance). This is the source of intellectual motivation and it lies at the heart of the natural curiosity of the child.

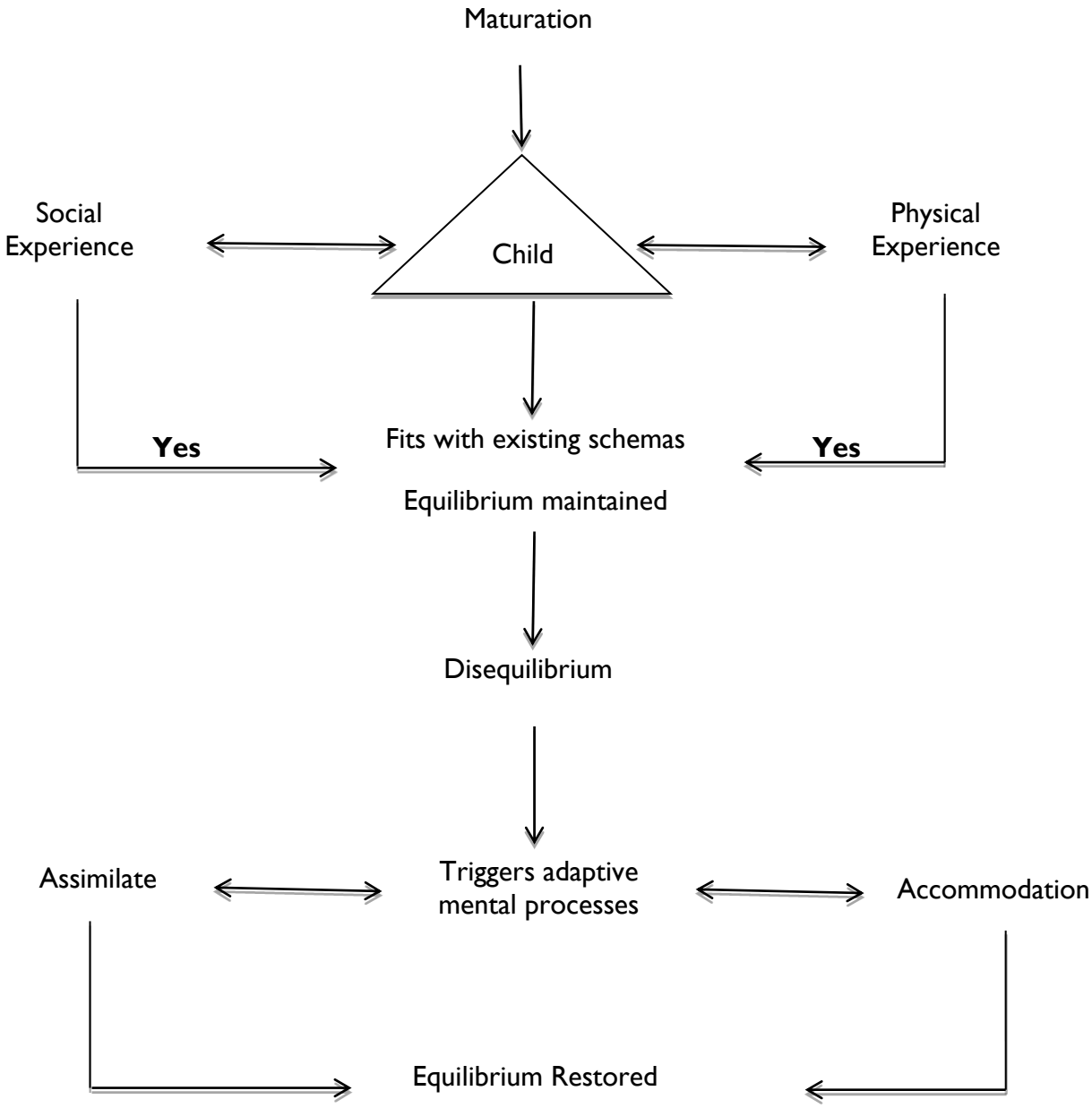

Fig. 1: Constructing and Reconstructing Knowledge: Piaget's Cognitive Adaptive Process (Adapted from Estes, Linda S., 2004).

Self-Assessment Exercise 2

1. Briefly describe the processes of assimilations and accommodations.
2. What is equilibrium?
3. Why is the process of equilibrium important in cognitive development?

4.0 Conclusion

According to Piaget (1964), the essence of education is to form minds which can be critical, can verify and not accept anything they are offered without examination. The implication of this is that we need to promote critical thinking in children in order to equip them with the necessary skills to help them make informed decisions.

5.0 Summary

People inherit the tendency to adapt to their environment. Adaptation involves the basic processes of assimilation and accommodation. Assimilation is trying to understand something new by fitting it into what we already know while accommodation is the modification of existing schemas to permit the incorporation of new events or knowledge.

The process of restoring a mental balance is termed equilibrium, that is, the search for mental balance between cognitive schemas and information from the environment.

6.0 Self-Assessment Exercise

1. Explain what cognitive assimilation is in the process of cognitive development.
2. Describe the process of accommodation and its role in cognitive development.
3. Explain the role of both assimilation and accommodation in individual's attempt to make sense of the world.
4. What is equilibrium? Explain the process of equilibrium on cognitive development.

7.0 References/Further Reading

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Unit 4 Piaget's Stages of Cognitive Development

1.0 Introduction

In the last unit, we learnt about Jean Piaget as one individual who has tremendously influenced the contemporary field of child development more than any other person. His work focuses on children's mental processes. He investigated the ways in which children perceive and mentally represent the world, how they develop thought and logic, how they develop the ability to solve problems.

Mainly, Piaget was pre-occupied with how children form concepts or natural representations of the world and how they manipulate their concepts to plan changes in the external world. He linked his views on children's mental processes to observable behaviour because he recognised that thoughts cannot be measured. In this unit, we shall learn more about the stages of cognitive development.

2.0 Objectives

At the end of this unit, you should be able to:

- identify Piaget's stages of cognitive development
- describe the characteristics of each stage of Piaget's cognitive development.

3.0 Main Content

3.1 Piaget's Four Stages of Cognitive Development

Piaget identified four major stages of cognitive development. Children move through the four stages between infancy and adolescence. The cognitive processes develop in an orderly sequence, or series of stages.

However, some children may be more advanced than the others at particular ages but the developmental sequence remains the same. The stages are generally associated with specific ages. He however, pointed out that these are only general guidelines and not labels for all children of a certain age.

Self-Assessment Exercise 1

1. List Piaget's stags of cognitive development.
2. What is the approximate age of pre-operational stage?
3. List two characteristics of the formal operational stage.

3.2 Piaget's Contributions to Education

Piaget's theories of intellectual development have given rise to what is often called constructivist learning. He suggested that individuals actively construct knowledge on an on-

going basis. He theorized that we are all constantly receiving new information and engaging in experiences that lead us to revise our understanding of the world. Piaget believed that children create knowledge of the world for themselves as they interact with the people and things in their environment. This approach has a significant impact on education in general and on early childhood education specifically.

Although Piaget spent little time in defining the educational implications of his theory, the educational implications have been given as follows:

1. His theory implies active learning during the early childhood years. Hands-on manipulation of materials and objects in the world provides the child with much information to assimilate and accommodate.

2. Understanding how children gain knowledge about their world is essential to planning for future learning.

3. The learning environment must allow for manipulation of objects and interactions with other children and adults.

4. On the constructivist learning environment, research supports the fact that learning is a social and collaborative endeavour rather than a solitary activity. That is:

- activities are learner-centred rather than teacher-centred.

- topics are driven by children's interests rather than strict adherence to a fixed curriculum.

- emphasis is on understanding and application rather than memorization or copying.

Table 1: Piaget's Stages of Cognitive Development

Stage	**Period of Development**	**Characteristics**
Sensorimotor	Birth – 2 years	1. At first, the child lacks language and does not use symbols or mental representations of objects. 2. Uses senses and motor skills to explore environment. 3. Begins to make use of initial memory and thought. 4. Develop object permanence recognition; that objects do not cease to exist when they are hidden. 5. Moves from reflex actions to goal –directed activity. 6. Acquires the basics of language.

Pre-Operational	2 – 7 years	1. Gradually develops the use of language. 2. Develops ability to think in symbolic form. 3. Thought is egocentric. 4. Employs static reasoning – able to think operations through logically in one direction. 5. Demonstrates lack of irreversibility and conservation.
Concrete Operational	7 – 11 years	1. Able to solve concrete problems in logical fashion. 2. Reasoning becomes logical. 3. Can organise objects into hierarchies of classes and subclasses (Able to classify and seriate). 4. Understands reversibility. 5. Shows understanding of laws conservation. 6. Demonstrates less egocentrism.
Formal operational	11 years and older	1. Able to solve abstract problems in logical fashion. 2. Thinking is characterised by deductive logic. Becomes more scientific in thinking. 3. Understands conservation.

The above table summarises the four stages and the characteristics of children at each stage of cognitive development.

4.0 Conclusion

Jean Piaget is one of the most influential investigators that have influenced the field of child development more than the others. He did not believe that children's learning depends on reinforcement from adults. According to his cognitive development theory, children construct knowledge as they manipulate and explore their environment.

5.0 Summary

Jean Piaget identified four major discrete stages of cognitive development. These include: the sensorimotor, pre-operational, concrete operational and formal operational stages. The cognitive processes develop in an orderly sequence or series of stages. However, some

children may be more advanced than others at particular ages but the development sequence remains the same for all children.

6.0 Self-Assessment Exercise

1. Describe the four stages of Jean Piaget's cognitive development.
2. What are the implications for classroom practice?
3. Examine the criticism of this theory.

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Unit 5 Sensory-Perceptual Ability and Response

1.0 Introduction

The development of most sensory abilities commences in the prenatal environment prior to birth. As the new born infants emerge from the temperature-controlled environment of the womb to the world, they have a remarkable set of capacities that are crucial for survival and for evoking adult attention and care in their new environment. The capacities are embedded in their sensory capabilities which they use to explore their new world. They receive a variety of stimuli through the five senses of vision, hearing, taste, smell and touch from their environment.

These five senses are functional to certain level at birth. For example, from the day of birth, a baby can open his/her eyes. The baby is aware of light and dark and can fix his/her eyes on near objects for brief periods.

Normal babies can hear almost immediately after birth. They are startled by very loud noises and react by crying. They can feel pain and their senses of smell and taste are well developed at birth. In this unit we shall examine sensory abilities with which children explore their world.

2.0 Objectives

At the end of this unit, you should be able to:

- identify the sensory abilities
- explain their role in the development of the perceptual abilities.

3.0 Main Content

3.1 Vision

New born babies can see but they do not possess great sharpness of vision or visual acuity. The reason for this is the fact that parts of the brain that process visual information are not yet fully developed at the time of birth. Findings revealed that vision is the least developed of the senses at birth. As a result of this, new babies cannot focus their eyes well and their visual acuity is limited. Visual acuity is the fineness of visual discrimination.

According to Estes (2004), objects outside of the optimal field of vision are somewhat blurry for the first six weeks of life. However, by the time the infants are six months old their visual acuity is similar to that of adults.

Although new born infants cannot see well, they actively explore their environment by scanning it for interesting sights and tracking moving objects. However, their eye movements are slow and inaccurate. Nevertheless, once new-borns focus on an object, they tend to look only at a single feature. Even though they prefer to look at colour rather than gray stimuli, they are not yet good at discriminating colours.

Research supports the fact that young infants can recognise and distinguish patterns (Klaus and Klaus, 1998). Infants are able to remember some of what they see. They also have definite visual preferences. They appear to prefer moving objects to stationary objects. It has also been established that infants show little or no visual accommodation.

Visual accommodation refers to the self-adjustment made by the lens of the eye to bring objects into focus. Objects placed within a close range are clearest focus for most infants. This range can be expanded when lighting conditions are bright. It has been speculated that this sensory capacity of gazing into others eyes promotes attachment between infants and caregivers. Another important skill at this stage of development is the visual memory. The images processed by the brain become part of the visual memory of the infant.

Self-Assessment Exercise 1

1. Identify the sensory abilities.

2. Which is the least developed of all the senses at birth?

3.2 Hearing

The sense of hearing is well developed before the baby is born. Although myelination of the auditory pathways is not complete before birth but the middle and inner ears normally reach their mature shapes and sizes before babies are born. It has been established that some sounds travel through the womb. New born infants can hear remarkably well at birth unless their middle ears are clogged with amniotic fluid. Infants can hear a wide variety of sounds and this sensitivity improves greatly over the first few months of life.

According to Saffren, Werker and Werner (2006), infants at birth prefer complex sounds such as noises and voices to pure tones. Babies are more likely to respond to high-pitched sounds than to low-pitched sounds. Babies who are only a few months old can tell the difference between varieties of sound pattern. It has also been established that young children listen longer to human speech than to structurally similar non-speech sounds. Infants can detect the sounds of any human language.

These capacities reveal that the baby is marvellously prepared for the awesome task of acquiring language. It is also important to note that the sense of hearing plays a significant role in the formation of affectionate bonds between infants and their mothers. Research indicates that infant prefer the mothers voices to those of other women but do not show similar preferences for the voices of their father. Responsiveness to sound also supports the new born baby's exploration of the environment.

Self-Assessment Exercise 2

1. Identify the sensory abilities of children.

2. Describe the role of hearing in the formation of bonding.

3.3 Taste and Smell

Facial expressions of new-borns reveal that they can distinguish several basic tastes. They relax their facial muscles in response to sweetness. They purse their lips when the taste is

sour. They show a distinct arch-like mouth when it is bitter. This shows that new-born infants are sensitive to different tastes. The different reactions of new-born infants to tastes are important for survival. The food that best support the infants' early growth is the sweet-tasting milk of the mother's breast. New-born infants can readily learn to like a taste that at first evoked either a neutral or a negative response.

The sense of taste is strongly connected to the sense of smell. New born infants can definitely discriminate distinct odours such as that of onions. Babies show more rapid breathing patterns and increased bodily movement in response to powerful odours. They also turn away from unpleasant odours. As with taste, certain odour preferences are present at birth.

For example, the smell of bananas causes a relaxed, pleasant facial expression, whereas the odour of rotten eggs makes the infant frown. The dual attraction, the human odours of the mother and that of her breast help babies locate an appropriate food source.

Self-Assessment Exercise 3

1. How can we know that new born babies can distinguish basic tastes?

2. How do babies locate sources of food?

3.4 Touch

The sense of touch is an extremely important avenue of learning and communication for infants. This skill is well developed at birth. Research reveals that newborn infants are very responsive to touch especially around the mouth, on the palms and on the soles of the feet. These areas are the first to develop along with the genitals during the prenatal periods. Touch is activated by stimulation to the skin which in turn provides information about the external world.

The sensations of skin against skin also provide feelings of comfort and security that may be major factors in the formation of bonds of attachment between infants and their caregivers. Experiences that involve the sense of touch are called tactile. Estes (2004) identifies other components of the sense of touch to include responses to texture, temperature and pain.

At birth, new-borns are quite sensitive to pain. Research indicates that physical touch releases endorphins – painkilling chemicals in the brain. Allowing a new-born to endure severe pain overwhelms the nervous system with stress hormones which can disrupt the child's developing capacity to handle common everyday stressors.

Self-Assessment Exercise 4

1. Identify the five senses that support the new-born infant's survival.

2. What is visual acuity?

3.5 Perceptual and Intellectual Development

Perception is the process of detecting a stimulus and assigning meaning to it. According to Woolfolk (2010), this meaning is constructed based on both physical representations from the world and our existing knowledge.

Rathus (2006) on the other hand, sees perception as the ability that infants develop to be able to integrate disjointed sensations into meaningful patterns of events. Research identifies several stages of the path from sensory input to recognised objects. The first phase involves extracting or analysing to give a rough sketch. This feature analysis has been called *bottom-up processing*. The stimulus must be analysed into features or components and assembled into a meaningful pattern from "the bottom-up".

Gestalt Phase

This involves perceiving organised meaningful wholes. This pattern was brought about by psychologists that studied the processes in Germany. They were called Gestalt Theorists. Gestalt means "pattern" or "configuration". It refers to people's tendency to organise sensory information into patterns on relationships. Instead of perceiving bits and pieces of unrelated information, we usually perceive organised, meaningful whole.

At the last stage of perception, the features and patterns detected are combined in light of the context of the situation. There is also the prototype that is a best example of classic case of input. So, to recognise patterns rapidly in addition to noting features, we use context and what we already know about the situation or our prior knowledge about words or pictures or the way the world generally operates. In other words, what you know affects what you are able to perceive.

Self-Assessment Exercise 5

1. What is perception?

2. List the phases involved in perception.

4.0 Conclusion

The perceptual capacities of children are embedded in their sensory capabilities. The senses are functional to certain level at birth. As the infants grow, their capabilities also keep on developing with the stimulations from the environment.

5.0 Summary

New-born infants have a remarkable set of capacities that are crucial for survival and for evoking adults' attention and care in the new environment as they come to the world. These capacities are embedded in their sensory capabilities, that is, their five senses of vision, hearing, taste, smell and touch. Perception is the process of detecting a stimulus and assigning meaning into it.

6.0 Self-Assessment Exercise

1. Identify the sensory abilities.

2. Describe each of the sensory capacities and their role in perceptual development.

3. Describe the relationship between sensory perception and intellectual development.

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Unit 6 Perceptual and Intellectual Development

1.0 Introduction

Perceptual development is another dimension of the child's development, just as you have in cognitive, social-emotional development. Perception is receiving input through our senses.

We have learned in Unit 3 that the senses of hearing, touch, taste and smell but not vision are remarkably well developed at birth. That is, the new born comes to the world with a good number of perceptual skills. These inborn sensory capacities play a crucial role in perceptual development. There are also research evidences to support the fact that experience also plays a crucial role in perceptual development. This means that both nature and nurture interact to shape perceptual development. In this unit we shall examine perceptual processes and the influence on intellectual development.

2.0 Objectives

At the end of this unit, you should be able to:

- explain "perceptual development"
- discuss the processes of perceptual development
- discuss the relationship between perception and intellectual development.

3.0 Main Content

3.1 Perceptual Processes

The ability to perceive accurately requires that two separate events occur. First, the sense organs must pick up the sight or sound and second the brain must evaluate and interpret it. This means that perception is the process of detecting a stimulus and assigning meaning to it. The meaning assigned is constructed based on both physical representations from the world and our existing knowledge.

The path from sensory input to recognised objects goes through several stages. According to Anderson (2005), the first phase involves the process of extracting or analysing features to give a rough sketch. This, he called "bottom-up processing" - analysing features or components and assembling into a meaningful pattern from the bottom up. As perception continues, the features are organised into patterns.

This process was studied in Germany by psychologists called Gestalt theorists. Gestalt means "pattern" or configuration. Gestalt in German refers to people's tendency to organise sensory information into patterns or relationships. However, if all perception relied only on feature analysis and Gestalt principle, learning would be very slow.

In the last stage of perception according to Anderson, the features and patterns detected are combined in the light of the context of the situation. We have a prototype (a best example or classic case) of input.

In other words, to recognize pattern rapidly, in addition to noting the features, we use context and what we already know about the situation i.e. our prior knowledge about words or pictures or the way the world generally operates. Therefore, what we know also affects what we are able to perceive.

Self-Assessment Exercise 1

1. What is perception?

2. List the stages of memory input.

3.2 Perception and Reading Ability

The ability to read is based on a wide range of developmental skills acquired during the pre-school years. One critical component is perception. The average age for reading readiness is 6.5 years. However, many children learn to read either earlier or later than this average. Many children are deficient in reading abilities because of poor perceptual judgements. These abilities are to be acquired between ages three and eight years.

From our knowledge, we know that sensory changes appear to be linked to maturation of the nervous system. Children will naturally exhibit some poor perceptual judgements because the perceptual skills have not fully matured. The maturity of these skills is essential to the ability of the child to read.

Three areas of interest that pertain directly to the development of reading ability are discussed below:

Discrimination: Discrimination is the ability to recognise differences in forms. Two of the forms that children frequently confuse are "b" and "d". If a child has problems or difficulty with laterality (distinguishing right from left) consequently such a child will be unable to make the discrimination required to tell the difference between the two letters.

Attention: Life would be impossible if every variation in colour, movement, sound, smell, temperature and other features ended up in working memory. Therefore, adults are selective of what they pay attention to. By paying attention to selected stimuli and ignoring others, adults limit the possibilities of what they will perceive and process.

In other words, adults can focus on one thing of importance in the environment and block out all interfering events and attend directly to the task at hand. What adults pay attention to is guided to a certain extent by what they already know and what they need to know. Attention is affected by what else is happening at the time, by the complexity of the task and by the ability to control or focus attention. Children with attention deficit disorder have great difficulty focusing attention or ignoring competing stimuli. Young children may have problems paying attention because of distractions from competing events.

One reason for their perceptual difficulties is that attention takes effort and is a limited resource. They learn to attend to things more efficiently as they mature and may be able, like adults, to focus on the one thing of importance in the environment and block out all interfering events. The first step in learning is paying attention. Children cannot process information that they do not recognise or perceive.

There are three important factors in children's attention.

These include:

1. Obligatory attention

This involves paying attention to only one cognitively demanding task at a time;

2. Search strategy

This is an ability to visually scan an object in an efficient way. With children, this ability increases with age.

3. Context use

This involves the context in which the perceptions must be interpreted.

Self-Assessment Exercise 2

1. Perception is one of the developmental skills required for reading. Yes or No?

2. What is discrimination?

3. Why do children have problems paying attention?

3.3 Gaining and Maintaining Attention

The following strategies can be used to gain and maintain children's attention.

Use of signals

Signals can be developed that would tell children to stop what they are doing and focus on the task at hand. In these signals, visual and auditory signs can be mixed. Teachers should avoid distracting behaviours such as tapping a pencil while talking. Clear and short directions can be given before and not during transitions. Being playful with young children such as using a dramatic voice or clapping game can enhance gaining and maintaining attention.

Reaching out rather than calling out

It is important to use children's names, speaking in a firm but non-threatening voice and walking to the children and looking into their eyes rather than calling them out will help in gaining attention.

Incorporating variety, curiosity and surprises into activities

This could be done by creating shock through staging an unexpected event such as a loud argument. Provide shift in sensory channels by giving instructions that require children to touch, smell or taste. Use movements, gestures and voice inflection (speaking softly, and then more emphatically).

Asking questions and providing frames for answering

For example, ask children why a particular material is important and how they intend to use and the strategies they will use. Have children work in pairs to improve each other's work.

Recognition of Distinctive Features

The ability to recognize the distinctive features of objects is a major area of perceptual development of children. There are a few key features that are associated with each object. For example, long ears are associated with rabbits. It takes children longer to recognise this "clue". According to Anselmo and Franz (1987), a variation of this skill is the child's ability to identify invariants in the objects they use. An invariant is defined by them as anything that always stays the same in an object in spite of superficial changes in appearance. It is important to note also that some researchers believe that children also impose meaning on what they perceive, constructing categories of objects and events in surrounding environment. The major reason for the difficulty in recognising distinctive features is that children rely heavily on the context for making accurate identifications.

Self-Assessment Exercise 3

1. Mention two strategies that can be used to improve attention.

2. What is an invariant factor?

4.0 Conclusion

Having reviewed the development of children's perceptual capacities, we can safely use Gibson's (2000) differentiation theory to conclude that children search for invariant features in the environment (those that remain stable) in a constantly changing perceptual world. They explore internal features, notice stable relationships among those features, detect patterns and develop intermodal perception.

5.0 Summary

Perception is the process of detecting a stimulus and assigning meaning to it. There are three stages of perception. These are *discrimination*, *attention* and *recognition of distinctive* features. We can gain, attain and maintain attention using these guidelines - use of signals, reach out rather than call out, incorporate curiosity, variety and surprises to activities among others.

6.0 Self-Assessment Exercise

1. Explain the concept of perception.

2. Identify and discuss the processes of perceptual development.

3. Discuss the relationship between perception and reading.

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